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UNITED STATES COMMISSION OF FISH AND FISHERIES

SPENCER F. BAIRD, COMMISSIONER

THE FISHERIES

AND

FISHERY INDUSTRIES

OF THE

UNITED STATES

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BY

GEORGE BROWN GOODE

ASSISTANT SECRETARY OF THE SMITHSONIAN INSTITUTION

AND A STAFF OF ASSOCIATES

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SECTION II

A GEOGRAPHICAL REVIEW OF THE FISHERIES INDUSTRIES AND FISHING COMMUNITIES FOR THE YEAR 1880

WASHINGTON
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1887

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National Oceanic and Atmospheric Administration

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LETTER OF TRANSMITTAL.

WASHINGTON, D. C., *March* 1, 1883.

Prof. SPENCER F. BAIRD,
U. S. Commissioner of Fish and Fisheries:

SIR: I have the honor to submit herewith a geographical review of the fisheries of the United States, including the fishery districts of the Atlantic, the Gulf, and the Pacific coasts, and of the great lakes. This report has been prepared by the following-named census agents and assistants of the United States Fish Commission: Dr. Tarleton H. Bean, Mr. A. Howard Clark, Capt. Joseph W. Collins, Mr. R. Edward Earll, Mr. Richard H. Edmonds, Mr. Ernest Ingersoll, Prof. David S. Jordan, Mr. Ludwig Kumlien, Col. Marshall McDonald, Mr. Frederick Mather, Mr. Silas Stearns, Mr. Frederick W. True, and Mr. W. A. Wilcox. The manuscript of this volume was prepared for the press by Mr. R. E. Earll, and has been printed under the editorial supervision of Mr. A. Howard Clark.

This report constitutes Section II of the Special Report on the Food Fishes and Fishery Industries of the United States, prepared through the co-operation of the Commission of Fish and Fisheries and the Superintendent of the Tenth Census. Section I, the Natural History of Useful Aquatic Animals, has already been published.

The accompanying statistical statement gives a summary of the fisheries of the country in 1880. We find that the total number of persons actually employed in the fishery industries, either as fishermen or in preparing the products for market, was 131,426, of whom 101,684 were fishermen, and the remainder shoresmen. The fishing fleet consisted of 6,605 vessels (aggregating 208,297.82 tons) and 44,804 boats, and the total amount of capital invested was $37,955,349, distributed as follows: Vessels, $9,357,282; boats, $2,465,393; minor apparatus and outfits, $8,145,261; other capital, including shore property, $17,987,413.

The value of the fisheries of the sea, of the great rivers, and of the great lakes was $43,046,053, and that of those in minor inland waters was $1,500,000; in all, $44,546,053. These values were estimated upon the basis of the prices of the products received by the producers, and, if average wholesale prices had been considered, the value would have been much greater.

STATISTICS OF THE FISHERIES OF THE UNITED STATES IN 1880.(a)

	States and territories.	GRAND TOTAL.			PERSONS EMPLOYED.		APPARATUS AND CAPITAL.		
		Persons employed.	Capital invested.	Value of products.	Fishermen.	Shoresmen.	Vessels.		
							Number.	Tonnage.	Value.
		Number.			*Number.*	*Number.*			
	The United States	131,426	$37,955,349	$43,046,053	101,684	29,742	6,605	208,297.82	$9,357,282
	New England states	37,043	19,937,607	14,270,393	29,838	7,205	2,066	113,602.53	4,562,131
	Middle states, exclusive of great lake fisheries	14,981	4,426,078	8,676,579	12,584	2,397	1,210	23,566.93	1,382,000
	Southern Atlantic states	52,418	8,951,722	9,602,737	38,774	13,644	3,014	60,880.15	2,375,450
	Gulf states	5,131	545,584	1,227,544	4,382	749	197	3,009.86	308,051
	Pacific states and territories	16,803	2,748,383	7,484,750	11,613	5,190	56	5,463.42	546,450
	Great lakes	5,050	1,345,975	1,784,050	4,493	557	62	1,768.87	183,200
1	Alabama	635	38,200	119,275	545	90	24	317.20	14,585
2	Alaska	6,130	447,000	2,661,640	6,000	130	.....	.....	.....
3	California	3,094	1,139,675	1,860,714	2,089	1,005	49	5,246.80	535,350
4	Connecticut	3,131	1,421,020	1,456,866	2,585	546	291	9,215.95	514,050
5	Delaware	1,979	268,231	997,695	1,662	317	69	1,226.00	51,600
6	Florida	2,460	406,117	643,227	2,284	196	124	2,152.97	372,645
7	Georgia	899	78,770	119,993	809	90	1	12.00	450
8	Illinois	300	83,400	60,100	265	35	3	209.73	8,500
9	Indiana	52	20,360	32,740	45	7	1	21.90	2,500
10	Louisiana	1,597	93,621	392,610	1,300	297	49	539.69	20,821
11	Maine	11,071	3,375,994	3,614,178	8,110	2,961	606	17,632.65	633,542
12	Maryland	26,008	6,342,443	5,221,715	15,873	10,135	1,450	43,500.00	1,750,000
13	Massachusetts	20,117	14,334,450	8,141,750	17,165	2,952	1,054	83,232.17	3,171,189
14	Michigan	1,781	442,665	716,170	1,600	181	36	914.42	98,500
15	Minnesota	35	10,160	5,200	30	5	1	33.59	5,000
16	Mississippi	186	8,800	22,540	110	76	.....	.....	.....
17	New Hampshire	414	209,465	176,684	376	38	23	1,019.05	51,500
18	New Jersey	6,220	1,492,202	3,176,589	5,659	561	590	10,445.90	545,900
19	New York	7,266	2,629,585	4,380,565	5,650	1,616	541	11,582.51	777,600
20	North Carolina	5,274	506,561	845,695	4,729	545	95	1,457.90	39,000
21	Ohio	1,046	473,800	518,420	925	121	9	359.51	38,400
22	Oregon	6,835	1,131,350	2,781,024	2,795	4,040	.....	.....	.....
23	Pennsylvania	552	119,810	320,050	511	41	11	321.99	10,500
24	Rhode Island	2,310	596,678	880,915	1,602	708	92	2,502.77	191,850
25	South Carolina	1,005	66,275	212,482	964	41	22	337.32	15,000
26	Texas	601	42,400	128,300	491	110	.....	.....	.....
27	Virginia	18,864	1,914,119	3,124,444	16,051	2,813	1,446	15,578.93	571,000
28	Washington	744	30,358	181,372	729	15	7	216.62	11,100
29	Wisconsin	800	222,840	253,100	730	70	11	220.25	26,700

a The value of fishery products taken by unprofessional fishermen in the minor inland waters of the United States is roughly estimated at $1,500,000. It was impossible during the fishery investigation to obtain details of this industry.

STATISTICS OF THE FISHERIES OF THE UNITED STATES IN 1880.

APPARATUS AND CAPITAL—continued.				VALUE OF PRODUCTS BY FISHERIES.							
Boats.		Value of minor apparatus and outfits.	Other capital, including shore property.	General fisheries. (b)	Whale fishery.	Seal fishery.	Menhaden fishery.	Oyster fishery.	Sponge fishery.	Marine-salt industry.	
Number.	Value.										
44,864	$2,465,393	$8,145,261	$17,987,413	$22,405,018	$2,323,943	$2,289,813	$2,116,787	$13,403,852	$200,750	$305,890	
14,787	739,970	5,038,171	9,597,335	10,014,645	2,121,385	111,851	539,722	1,478,000	.....	3,890	
8,293	546,647	674,951	1,822,480	2,882,294	.....	.....	1,261,385	4,532,900	.....	.....	
13,331	640,508	1,145,878	4,789,886	2,217,797	408	.....	315,680	7,068,852	.....	.....	
1,252	56,173	52,823	134,537	713,594	.....	.....	.....	313,200	200,750	.....	
5,547	404,695	467,238	1,330,000	4,792,638	202,150	2,177,962	.....	10,000	.....	302,000	
1,594	83,400	766,200	313,175	1,784,050	.....	.....	.....	.....	.....	.....	
110	10,215	7,000	6,400	74,325	.....	.....	.....	44,950	.....	.....	1
3,000	60,000	7,000	380,000	564,640	500	2,096,500	.....	.....	.....	.....	2
853	91,485	205,840	307,000	1,341,314	201,650	15,750	.....	.....	.....	302,000	3
1,173	73,585	375,535	457,850	383,887	32,048	111,851	256,205	672,875	.....	.....	4
830	33,227	70,324	113,080	300,029	.....	.....	941	687,725	.....	.....	5
1,058	28,508	39,927	65,037	426,527	.....	.....	.....	15,950	200,750	.....	6
358	15,425	18,445	44,450	84,993	.....	.....	.....	35,000	.....	.....	7
101	2,000	11,900	61,000	60,100	.....	.....	.....	.....	.....	.....	8
15	1,650	20,210	5,000	32,740	.....	.....	.....	.....	.....	.....	9
165	4,800	18,000	50,000	192,610	.....	.....	.....	200,000	.....	.....	10
5,920	245,624	934,593	1,562,235	3,576,678	.....	.....	.....	37,500	.....	.....	11
2,825	186,448	297,145	4,108,850	479,388	.....	.....	11,851	4,730,476	.....	.....	12
6,749	351,736	3,528,925	7,282,600	5,581,204	2,089,337	.....	61,769	405,550	.....	3,890	13
454	10,345	272,920	60,900	716,170	.....	.....	.....	.....	.....	.....	14
10	900	3,760	500	5,200	.....	.....	.....	.....	.....	.....	15
58	4,600	1,600	2,600	12,540	.....	.....	.....	10,000	.....	.....	16
211	7,780	60,385	89,800	170,634	.....	.....	.....	6,050	.....	.....	17
4,065	223,963	232,339	400,000	940,678	.....	.....	146,286	2,080,625	.....	.....	18
8,441	289,885	390,200	1,171,900	1,689,357	.....	.....	1,114,158	1,577,050	.....	.....	19
2,714	123,175	225,436	118,950	785,287	408	.....	.....	60,000	.....	.....	20
487	29,830	253,795	151,775	518,420	.....	.....	.....	.....	.....	.....	21
1,300	216,660	245,750	639,000	2,776,724	.....	4,300	.....	.....	.....	.....	22
156	13,272	40,538	55,500	132,550	.....	.....	.....	187,500	.....	.....	23
734	61,245	138,733	204,850	302,242	.....	.....	221,748	356,925	.....	.....	24
501	9,790	25,985	15,500	192,482	.....	.....	.....	20,000	.....	.....	25
107	15,000	4,400	23,000	81,000	.....	.....	.....	47,300	.....	.....	26
6,618	292,720	560,763	489,636	602,239	.....	.....	303,829	2,218,376	.....	.....	27
334	6,610	8,048	4,000	109,960	.....	61,412	.....	10,000	.....	.....	28
319	24,975	145,165	26,000	253,100	.....	.....	.....	.....	.....	.....	29

b Includes fisheries for all food species except oysters.

Since 1865 the fisheries have greatly increased in extent and value, chiefly due to improved methods of preservation of products and means of transportation.

The fisheries of the New England States are the most important. They engage 37,043 men, 2,066 vessels, and 14,787 boats, and yield products to the value of $14,270,393. In this district the principal fishing ports, in order of importance, are: Gloucester, Portland, Boston, Provincetown, and New Bedford, the latter being the center of the whale fishery. New England was settled in 1620 by colonists chiefly from the western counties of England, who selected that portion of the coast on account of its peculiar fitness for the prosecution of the fisheries, and by the middle of the seventeenth century there was a considerable fleet of ketches and snows engaged in the cod fishery on the off-shore banks, where—especially on the banks of Newfoundland—France, Spain, Portugal, and England already had a fleet of several hundred large vessels. Just before the war of the Revolution New England had 665 vessels and 4,405 men employed in its fisheries.

Next to New England in importance are the South Atlantic States, employing 52,418 men, 3,014 vessels (the majority of which are small and engaged in the shore and bay fisheries), and 13,331 boats, and returning products to the value of $9,602,737.

Next are the Middle States, employing in the coast fisheries 14,981 men, 1,210 vessels, and 8,293 boats, with products to the amount of $8,676,579.

Next are the Pacific States and Territories, with 16,803 men, 56 vessels, and 5,547 boats, with products to the amount of $7,484,750. The fisheries of the great lakes employ 5,050 men, 62 vessels, and 1,594 boats, with products to the amount of $1,784,050. The Gulf States employ 5,131 men, 197 vessels, and 1,252 boats, yielding products to the value of $1,227,544.

Forty-three distinct fisheries are recognized by American writers, each being carried on in a special locality and with methods peculiar to itself. Among the most important of these are the oyster fishery, the off-shore cod fishery, the whale fishery, the fur-seal fishery, the mackerel fishery, the menhaden fishery, the halibut fishery, the antarctic seal and sea-elephant fishery, the west-coast salmon fishery, the lobster fishery, the shad and alewife fisheries, the swordfish fishery, and the clam fishery.

The off-shore fisheries are carried on by citizens of the New England and Middle States, and are prosecuted on the great oceanic banks extending from Nantucket to Labrador, and upon the ledges and shoals between these and the coast.

The great purse-seine fisheries for mackerel and menhaden are carried on north of Cape Hatteras, at distances from the shore varying from 1 mile to 150 miles. The fishing-grounds in the Gulf of Saint Lawrence, formerly frequented by many hundreds of American vessels, have been almost entirely abandoned since the introduction of the purse-seine, and in 1882 only one vessel visited those waters, returning with about 200 barrels of mackerel. The oyster fishery is located for the most part between Cape Hatteras and Cape Cod, chiefly in the great inland bays. In all the great rivers of the Atlantic coast are fisheries for the anadromous shad and the two species of alewife. About the keys of Southern Florida is an extensive sponge fishery, and on the shoals of the Gulf of Mexico the red-snapper and grouper fisheries are yearly increasing in value. The fur-seal fishery is chiefly located upon the Pribylov islands of Alaska. A small fleet of vessels yearly penetrates to the ice-bound islands of the Antarctic for seal-skins and sea-elephant oil. The whaling fleets, with headquarters at New Bedford and San Francisco, frequent all oceans, the larger vessels cruising chiefly in the North Pacific, while the smaller ones pursue their prey throughout the Atlantic and South Pacific. The salmon fishery is seated upon the Columbia River and its tributaries, though other rivers in Oregon and California produce large quantities of salmon, which is extensively canned and exported. The most valuable product of the great-lake fisheries is the whitefish. The swordfish fishery of Southern New England, though employing but 40 vessels and perhaps 160 men, produces 1,500,000 pounds weight annually.

The export of American fishery products is comparatively small, owing to the fact that the demand for such products for home consumption is really greater than the supply, and is constantly on the increase. In 1880 the total value of exported fish products amounted to $5,744,580, of which, according to custom-house records, England received $2,601,017. Of the quantity sent to England, $1,596,007 was in canned preparations, and $363,790 in fresh oysters, the remainder

being chiefly products of the whale fishery. In former years there was an extensive export trade in dried cod with Spain and Portugal. Large quantities of canned salmon are sent to China, Japan, and Australia.

At present no subsidies are allowed to fishermen, except that the duties on imported salt used in the preparation of fish are remitted. This practice was begun in 1866, at which time the old bounty law was repealed.

The United States, with the intention of aiding its fishermen, has paid to Great Britain the sum of $5,500,000 for the privilege of fishing in the British provincial waters from 1873 to 1885.

Since 1871 the United States has appropriated over one million dollars to be used by the United States Fish Commission in behalf of the fishermen and fish consumers, and under the direction of the Commissioner, Prof. Spencer F. Baird, very important results have been accomplished. All the State Governments, with the exception of six, have established State fish commissions, and most of these have been liberally supported by grants of money.

The undeveloped fishery resources are very great. Many of the fishes and invertebrates which in Europe are highly valued by the poorer classes are never used here. Only about 150 of the 1,500 species of fishes known to inhabit the waters of the United States are ordinarily found in the markets.

Yours, very respectfully,

G. BROWN GOODE,

Special Agent Tenth Census, in charge of Fishery Investigation.

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TABLE OF CONTENTS.

PART I.—THE COAST OF MAINE AND ITS FISHERIES..By R. EDWARD EARLL.
PART II.—THE FISHERIES OF NEW HAMPSHIRE.....By W. A. WILCOX.
PART III.—THE FISHERIES OF MASSACHUSETTS .....By A. HOWARD CLARK.
PART IV.—THE FISHERIES OF RHODE ISLAND .....By A. HOWARD CLARK.
PART V.—CONNECTICUT AND ITS FISHERIES .....By A. HOWARD CLARK.
PART VI.—NEW YORK AND ITS FISHERIES .....By FRED. MATHER.
PART VII.—NEW JERSEY AND ITS FISHERIES.....By R. EDWARD EARLL.
PART VIII.—PENNSYLVANIA AND ITS FISHERIES.....By R. EDWARD EARLL.
PART IX.—DELAWARE AND ITS FISHERIES.....By J. W. COLLINS.
PART X.—MARYLAND AND ITS FISHERIES ....By R. EDWARD EARLL.
PART XI.—VIRGINIA AND ITS FISHERIES ....By MARSHALL MCDONALD.
PART XII.—NORTH CAROLINA AND ITS FISHERIES .....By R. EDWARD EARLL.
PART XIII.—THE FISHERIES OF SOUTH CAROLINA AND GEORGIA .....By R. EDWARD EARLL.
PART XIV.—EASTERN FLORIDA AND ITS FISHERIES .....By R. EDWARD EARLL.
PART XV.—THE FISHERIES OF THE GULF OF MEXICO..By SILAS STEARNS.
PART XVI.—THE FISHERIES OF THE PACIFIC COAST.....By DAVID S. JORDAN.
PART XVII.—THE FISHERIES OF THE GREAT LAKES.....By FREDERICK W. TRUE.
APPENDIX.—HISTORICAL REFERENCES TO FISHERIES.....By A. HOWARD CLARK.

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PART I.

THE COAST OF MAINE AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of Maine and its Fisheries:
1. Descriptive and statistical recapitulation of the fisheries of the State.

B.—The Passamaquoddy District:
2. General review of the fisheries of the district.
3. The fisheries of Calais, Robbinston, and Perry.
4. Eastport and its fisheries.
5. The fishing towns between Eastport and Lubec.
6. Lubec and its fisheries.
7. The fisheries of Trescott and Whiting.

C.—The Machias District:
8. General review of the fisheries of the district.
9. Cutler to Jonesboro', inclusive.
10. Jonesport and its fisheries.
11. Millbridge, Steuben, and other towns in the vicinity.

D.—The Frenchman's Bay District:
12. General review of the fisheries of the district.
13. Gouldsboro' and its fisheries.
14. Sullivan, Hancock, and Lamoine.
15. Mount Desert Island and its fisheries.
16. Trenton, Ellsworth, and Surry.

E.—The Castine District:
17. General review of the fisheries of the district.
18. Blue Hill, Brooklin, and Swan's Island.
19. Deer Island and its fisheries.
20. Isle au Haut, Sedgwick, and Brooksville.
21. Castine and its fisheries.
22. Penobscot, Orland, and Bucksport.

F.—The Belfast District:
23. General review of the fisheries of the district.
24. Belfast and adjacent towns.
25. Camden and its fisheries.
26. The Fox Islands.

G.—The Waldoboro' District:
27. General review of the fisheries of the district.
28. Rockland, Thomaston, and Saint George.
29. Matinicus Island and its fisheries.
30. Cushing, Friendship, Waldoboro', and Bremen.
31. Bristol and its fishery interests.
32. Monhegan Island and its fisheries.
33. Damariscotta and adjoining towns.

H.—The Wiscasset District:
34. General review of the fisheries of the district.
35. New Castle and Edgecomb.
36. Booth Bay and its fisheries.
37. Southport and its fisheries.
38. Wiscasset and Westport.

I.—The Bath District:
39. General review of the fisheries of the district.
40. Georgetown and its fisheries.
41. Bath and other less important towns.

J.—The District of Portland and Falmouth:
42. General review of the fisheries of the district.
43. Harpswell and its fisheries.
44. The fishing towns of Casco Bay.
45. Portland and its fishery interests.

K.—The Saco, Kennebunk, and York Districts:
46. General review of the fisheries of the districts.
47. Mr. Wilcox's account of Scarboro' Beach, Pine Point, and Saco Bay.
48. Mr. Wilcox's account of Biddeford Pool and its fisheries.
49. Mr. Wilcox's account of the fisheries of Kennebunk and Kennebunkport.
50. Mr. Wilcox's description of the fisheries between Wells and Kittery.

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PART I.

THE COAST OF MAINE AND ITS FISHERIES.

A.—GENERAL REVIEW OF MAINE AND ITS FISHERIES.

1. DESCRIPTIVE AND STATISTICAL RECAPITULATION OF THE FISHERIES OF THE STATE.

LOCATION AND EARLY SETTLEMENT.—The State of Maine includes an area of 32,000 square miles in the extreme northeastern corner of the United States. It is claimed that the region was visited by the Northmen in the latter part of the tenth century. An attempt was made to settle a colony on Neutral Island, on the Saint Croix River, under a grant from the King of France, in 1604. In 1613, French Jesuits established a mission at Mount Desert Island, but they were driven away by the English the following year. About this time Capt. John Smith with a company of fishermen took possession of Monhegan Island, from which point he made visits to different portions of the coast for the purpose of making maps of the region. In 1620 the territory was granted to the Plymouth Company, and three years later the first permanent settlement within the present limits of the State was established near the mouth of the Piscataqua River. From that time onward the province grew in importance and many colonists were soon comfortably settled within its borders. The eastern portion was for many years under the control of the French, who made little effort to develop its resources, but the western part was from the first in the possession of the English, and by 1650 a number of important settlements, some of them founded fifteen to twenty years earlier, were scattered along its shores.

The Massachusetts colony obtained control of the region west of the Kennebec River in 1677: nine years later its jurisdiction was extended to the Penobscot, and in 1691 all of the territory west of the Saint Croix, as well as Nova Scotia, was transferred to it by the Provincial charter. The treaty of 1783 ceded to Massachusetts all of Maine's present territory, and she continued her superintendence over it until 1820, when Maine became a separate State, at which time it had a population of over 298,000. In 1860 the State had 628,279 inhabitants, the number increasing to 648,936 in 1880.

PHYSICAL CHARACTERISTICS OF THE COAST.—Geologically considered, the region is one of peculiar interest. With unimportant exceptions, as at Perry on the Passamaquoddy and Rockland on the Penobscot, the coast is one huge bed of metamorphic rocks, including granites, syenites, and mica schists. These are everywhere scraped and grooved by huge glaciers which descended from the northward and extended many miles into the sea, and which were of sufficient thickness entirely to cover Mount Desert and of such weight as to plow out enormous valleys and ravines in the hard granite floor. The principal furrows and ridges extend nearly north and south, the shoreline being made up of a series of long rocky peninsulas separated by deep and narrow fjords, which

give to Maine a peculiarly ragged and uneven coast with hundreds of excellent harbors, in many of which the largest vessels of the world can find safe anchorage. Beyond the headlands are scattered innumerable rocky islands and sunken ledges having the same general trend as the peninsulas of the mainland. In addition to these we find large rocks and bowlders scattered over the surface of the land and the ocean bottom, where they have been left by the receding glaciers. Enormous quantities of these fragments are frequently piled together, many of the well-known fishing banks, and even the famous George's Shoals being, according to Prof. N. S. Shaler, made up of glacial deposits.

These sunken ledges and rocks are covered with marine animals, which constitute the favorite food of many of our most important food-fishes, and the locality is a favorite resort of the cod, haddock, hake, and other species known as "bottom feeders."

The distance along the ocean shore of the State from Quoddy Head to the mouth of the Piscataqua River is only 250 miles in a straight line, but, owing to the peculiar features already mentioned, Maine has 2,500 miles of sea-coast exclusive of the outlying islands. The rocky character of the country forbids extensive agricultural interests, and the majority of those living along the coast are necessarily dependent upon the various industries connected with the sea, such as shipbuilding, the vessel-carrying trade, and the fisheries.

ORIGIN AND GROWTH OF THE FISHERIES.—With so extensive a coast-line and such excellent harbors for vessels and boats in the near vicinity of the more important fishing grounds, Maine enjoys many advantages, not possessed by other States, for the prosecution of the fisheries. In fact these advantages led to the settlement of the country, and for two and a half centuries continuously the fisheries have been prosecuted by a large percentage of the people. For many years foreign ships made annual visits to the coast to secure cargoes of cod, many of them bringing small colonies which were left at some convenient harbor to continue the fishing during the absence of the vessel. These began to build for themselves comfortable dwellings and to clear a limited amount of land on which to raise products for their own tables. In this way were founded a number of important settlements, which, in a few years, became quite independent of the Europeans. Their resources being limited they found that the construction of large vessels was impracticable, and they therefore contented themselves with building small craft, ranging between 15 and 40 tons, in which they visited the nearer fishing grounds, some of them venturing as far as Cashes' and Jeffries' banks, and the Seal Island ground.

This condition of affairs practically continued until the beginning of the present century, when in some localities larger craft were built for engaging in the offshore fisheries, and by 1825 the Maine fishermen, in common with those of Massachusetts, frequented Grand and Western banks, the Magdalen islands, and Labrador. Between 1830 and 1870 the fisheries were peculiarly important, nearly every coast town having its fleet of vessels in addition to a considerable number of small boats. Occasional seasons during these years resulted disastrously, but the period was on the whole a prosperous one, and in many localities the small vessels were replaced by larger and better ones. From 1870 to 1879 the fisheries were less remunerative, and, owing to the unsatisfactory results, many of the vessels were fitted for the coasting trade, and others were allowed to remain idle, so that the fishing fleet was reduced to less than three-fourths of its former size. The crews soon turned their attention to other pursuits, or provided themselves with boats for prosecution of the shore fisheries. This decrease in the vessel fisheries was most noticeable in the smaller towns. Another season of prosperity has just begun, but, though signs of renewed activity are everywhere manifest, no considerable increase in the size of the fleet has yet occurred.

THE PRESENT CONDITION OF THE SEA FISHERIES.—During the season of 1880, 11,071 per-

sons were actively engaged in the capture or preparation of fishery products. Of these, 3,630 belonged to the vessel fleet, 4,480 fished from small boats, and the remaining 2,961 were employed as shoresmen in preparing the products for the markets. In addition to these, 1,591 persons were, according to Mr. C. G. Atkins, engaged in the river fisheries, making a total of 12,662 persons directly dependent upon the fishery industries. Not less than 2,500 others were engaged in transferring the fish to the larger markets, in the manufacture of fishery apparatus, or in other dependent industries, which brings the total for those directly and indirectly engaged in the fishery industries up to 15,000. A majority of these have families dependent upon them for support, and, allowing for these, we find that fully 48,000 persons, equal to 7½ per cent. of the total population of the State, are, to a greater or less extent, dependent upon the fisheries for a livelihood.

The total capital invested in the various industries connected with the sea fisheries for the same period was $3,375,994, of which $633,542 was in vessels and $245,624 in boats, the remaining $2,496,828 representing the value of gear and outfit, shore-property, and floating capital.

During the year, the Maine fishermen landed 202,048,449 pounds of sea products, valued at $1,790,849 as they came from the water. These products received an enhancement in value of $1,823,329 in process of preparation, making them worth $3,614,178 when placed upon the market. Of the entire catch of sea products, 42,548,008 pounds were sold fresh, 93,195,430 pounds were used for drying, 39,690,615 pounds were pickled, 9,038,242 pounds were smoked, and 17,576,154 pounds were canned.

The principal species taken were cod, herring, mackerel, hake, haddock, and lobsters; these constituting seven-eighths of the entire catch. The following quantities of each of the above-named species were secured: Cod, 56,004,325 pounds, valued at $656,753; herring, 34,695,192 pounds, valued at (including sardines) $1,043,722; mackerel, 31,694,455 pounds, valued at $659,304; hake, 24,447,730 pounds, valued at $278,336; haddock, 17,728,735 pounds, valued at $225,393; lobsters, 14,234,182 pounds, valued at $412,076.

The vessel fleet numbered 606 sail, aggregating 17,632.65 tons, valued at $1,413,361, including apparatus and outfit. It was divided into two classes, the larger vessels being engaged in the offshore, while the smaller were employed in the inshore fisheries. Of the offshore fleet, 94 engaged in the offshore cod fisheries for a greater or less period. Some of them fished for cod during the entire season, while others, after making one or two trips to the banks, joined the fleet engaged in the mackerel fishery, bringing the total for this fishery up to 81 vessels, manned by 1,042 fishermen. Four vessels were employed in the halibut fishery, and twenty-six fished for haddock during the winter months. The smaller craft were in the shore fisheries, taking cod, herring, mackerel, or lobsters, as might at the time seem most desirable. The catch of the vessel fleet reached 212,747 quintals of dry fish, worth $618,025, and 96,350 barrels of pickled fish, worth $510,052. In addition to these, oil and sounds to the value of $109,119 were saved, making the total value of the catch of the vessel fleet $1,359,376.

THE LOBSTER FISHERIES.—One thousand eight hundred and nine men, with capital to the amount of $189,219, were engaged in the lobster fishery. The catch for the season amounted to 14,234,182 pounds, netting the fishermen $268,739. Of the entire catch, 9,494,284 pounds were sold to the twenty-three canneries of the State. These furnished employment to 782 persons, including smackmen, tinsmiths, and factory hands. The product of the canneries amounted to 1,542,696 one-pound cans, 148,704 two-pound cans, and 139,801 cans of other kinds. The enhancement in canning was $143,337, the total value of the canned products as placed upon the market amounting to $238,280. A description of the lobster fishing and canning interests will be found in another part of this report.

THE SARDINE INDUSTRY.—The sardine industry, which is now one of the most important fishery industries of the State, began in a small way in 1875, since which time it has grown enormously. In 1880 it furnished employment to 1,896 fishermen and factory hands, including 372 belonging to New Brunswick. Eighteen canneries, valued at $89,500, were in operation, and 46,000 barrels of herring and 775 barrels of mackerel were put up. The product of the canneries amounted to 7,550,868 cans of the various brands, in addition to 8,365 barrels of Russian sardines and anchovies. The total value of the canned products amounted to $817,654, $776,704 of this amount representing the enhancement in process of preparation.

A full description of each of the more important fisheries in which the Maine fishermen are interested will be found in another part of this report.

RECAPITULATION FOR 1880.—The following statements show in detail the extent of the marine fishery interests of the State for 1880. The fresh-water fisheries will be considered in a separate chapter by Mr. C. G. Atkins:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	3,630	Capital in vessels and boats	$1,552,959
Number of boat-fishermen	4,480	Capital in nets and traps	260,800
Number of curers, packers, fitters, &c	894	Other fixed and circulating capital	a 1,562,235
Number of factory hands	2,067	Total	3,375,994
Total	11,071		

a Other fixed and circulating capital.—Cash capital, $052,473; wharves, shorehouses, and fixtures, $417,925; factory buildings and apparatus $491,837; total, $1,562,235.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	529	15,367.64	$550,867	$110,568	$496,595	$1,158,030	In vessel fisheries	1,935	$30,826
Idle	32	1,102.99	34,650			34,650	In boat fisheries	3,520	42,280
In menhaden fishery	5	320.08	20,000			20,000	Purse-seines:		
In lobster fishery	39	771.08	25,025	600	6,380	32,005	In vessel fisheries	127	69,750
In oyster fishery	1	69.96	3,000		150	3,150	In boat fisheries	1	300
Total	606	17,632.65	633,542	111,168	503,125	1,247,835	Haul-seines:		
Boats.							In boat fisheries	184	5,440
In vessel fisheries	2,102		64,950			64,950	Total	5,717	148,596
In shore fisheries	3,818		180,674	43,100	16,400	240,174	*Traps.*		
Total	5,920		245,624	43,100	16,400	305,124	Weirs	132	27,502
							Fykes	1,095	6,360
							Lobster-pots	104,456	78,342
							Total	105,683	112,204

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	202,048,449			$3,614,178
Fresh fish.				
For food	16,597,360			207,965
For bait	17,330,000		86,650 barrels	64,988
For fertilizer	2,790,000		13,950 barrels	6,575
Total	36,717,300			279,528

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Dry fish.				
Cod	52, 494, 325	18, 090, 352		$565, 325
Hake	23, 597, 730	9, 788, 688		131, 098
Haddock	9, 917, 775	3, 526, 320		70, 841
Pollock	5, 220, 000	2, 010, 000		36, 000
Cusk	1, 965, 600	846, 720		20, 790
Total	93, 195, 430	34, 268, 080		824, 054
Pickled fish.				
Mackerel	27, 342, 000	18, 228, 000	91, 140 barrels	524, 055
Herring:				
Ordinary	6, 116, 250	4, 893, 000	24, 465 barrels	73, 395
Russian sardines and anchovies	2, 703, 625	1, 673, 000	8, 365 barrels	29, 078
Miscellaneous	1, 747, 100	1, 035, 400	5, 177 barrels	25, 885
Total	37, 908, 975	25, 829, 400	129, 147 barrels	652, 413
Smoked fish.				
Herring:				
Ordinary	3, 751, 942	2, 710, 778	318, 915 boxes	63, 783
Bloaters	2, 387, 000	1, 723, 333	51, 700 boxes	36, 190
Haddock (Finnan haddies)	2, 899, 300	1, 414, 500		78, 175
Total	9, 038, 242	5, 848, 611		178, 148
Canned fish.				
Mackerel	1, 252, 455		814, 068 cans	96, 749
Herring (sardines)	6, 496, 875		7, 500, 084 cans	772, 176
Miscellaneous	21, 660		12, 996 cans	1, 928
Total	7, 770, 490		8, 327, 748 cans	870, 853
Lobsters.				
Fresh	4, 739, 898			173, 796
Canned	9, 494, 284		1, 831, 201 cans	238, 280
Total	14, 234, 182			412, 076
Clams.				
For food	1, 090, 810		109, 081 bushels	38, 178
For bait	1, 781, 640		178, 164 bushels=12,726 barrels	63, 630
Canned	311, 880		31, 138 bushels=456 028 cans	47, 318
Total	3, 183, 330		318, 383 bushels	149, 126
Miscellaneous.				
Fish-oil			168, 782 gallons	67, 492
Sounds		131, 098		117, 988
Marine products used for fertilizers				25, 000
Enhancement in value of southern oysters in transporting and transplanting				37, 500
Total				247, 980

B.—PASSAMAQUODDY DISTRICT.

2. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

ORIGIN AND DEVELOPMENT OF THE FISHERIES.—The Passamaquoddy customs district, extending from Calais to Cutler, is in many respects the most important fishing region in the State. Though its general fisheries are limited and its vessel fleet is quite small, the shore fisheries are of peculiar importance, and there are certain special industries which are either peculiar to the district or in which its interests are more extensive than those of any other locality. The coast is peculiarly

bold and rugged, and the waters, which are very deep, are greatly affected by tides and currents. The district contains few villages of importance, the principal ones being Calais, Eastport, and Lubec. Smaller settlements are found at various points where coves or harbors afford shelter and anchorage for boats and small vessels.

The fisheries began with the settlement of the region, about 1780, and during the latter part of the last century and the first half of the present one they were of considerable importance, a large fleet of vessels visiting the more distant fishing grounds for the capture of cod, mackerel, and other species. Later, owing to various causes, the offshore fisheries were largely discontinued, and the residents turned their attention to the shore fisheries, selling their large vessels and providing themselves with smaller craft for engaging in the work. Even at the present time the offshore banks are little frequented by these people, nine-tenths of all the fishermen being provided with boats and small vessels for fishing along the shore.

IMPORTANCE OF THE HERRING FISHERIES.—The herring is the principal fish of the region, and immense numbers are taken annually. Special industries depending on this fishery, as the smoking of herring, the frozen herring trade, and the preparation of sardines, constitute the principal business, and thousands of persons find employment either in catching the fish or in preparing the various products. The shores are everywhere lined with brush weirs in which small herring are extensively taken during the summer months, and in winter, when the weirs cannot be fished, the most of the men are provided with nets, in which immense quantities of large fish are secured.

In the smoking of herring this district leads all others, and probably three-fourths of the herring smoked within the limits of the United States are prepared by the fishermen of Lubec and Eastport. The business began early in the present century, and continued to increase till in 1865 between 400,000 and 500,000 boxes were smoked annually at Lubec, and large numbers were put up at other places. Since that time the quantity has gradually fallen off, and fewer herring are smoked now than for many years, though the dilapidated and weather-beaten smoke-houses everywhere present give unmistakable evidence of the importance of the work in former times.

The frozen-herring trade originated at Newfoundland, and for some years it was confined exclusively to that island. About fifteen years ago the first cargo was shipped from Eastport, and the business has since that time grown to enormous proportions, the quantity shipped in the winter of 1879–'80 reaching 28,000,000 fish, valued at $90,000. Though a majority of the fish are caught by the New Brunswick fishermen, our own citizens are also engaged in the work and secure large quantities during the season. The Passamaquoddy district is at present the only one within the limits of the United States where herring are extensively frozen for shipment.

The sardine industry is of very recent origin, having been started in 1875. Up to 1880 it was confined exclusively to the village of Eastport, and though a few canneries are now operated elsewhere this district still practically controls the industry for the entire country.

THE POLLOCK FISHERY.—In addition to its herring interests the Passamaquoddy district is noted for its pollock fisheries. The most important pollock grounds in New England are within its borders, and large numbers of these fish are secured annually by the hand-line fishermen, who devote considerable attention to their capture during the summer months.

STATISTICAL RECAPITULATION FOR 1880.—The following statements show in detail the extent of the various fishery interests of the Passamaquoddy district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	179	Capital in vessels and boats	$117,180
Number of boat-fishermen	596	Capital in nets and traps	27,806
Number of curers, packers, fitters, &c	273	Other fixed and circulating capital	a464,250
Number of factory hands	1,390	Total	609,236
Total	2,438		

a Other fixed and circulating capital.—Cash capital, $324,125; wharves, shorehouses, and fixtures, $46,625; factory buildings and apparatus, $93,500; total, $464,250.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	25	650.37	$30,275	$5,570	$18,455	$54,300	In vessel fisheries	250	$3,750
Idle	3	70.78	1,900			1,900	In boat fisheries	200	2,400
In lobster fishery	1	22.88	500	10	160	670	Purse-seines:		
Total	29	744.03	32,675	5,580	18,615	56,870	In vessel fisheries	1	700
Boats.							Haul-seines:		
In vessel fisheries	90		1,835			1,835	In boat fisheries	60	3,000
In shore fisheries	378		50,515	5,960	2,000	58,475	Total	511	9,850
Total	468		52,350	5,960	2,000	60,310	*Traps.*		
							Weirs	67	15,875
							Lobster-pots	2,775	2,081
							Total	2,842	17,956

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	31,515,588			$1,081,715
Fresh fish.				
For food	4,188,000			42,507
For bait	480,000		2,400 barrels	1,800
For fertilizer	1,900,000		9,500 barrels	4,350
Total	6,568,000			48,657
Dry fish.				
Cod	2,627,625	905,520		28,298
Hake	2,021,700	838,656		11,232
Haddock	906,255	322,224		6,473
Pollock	1,460,440	564,032		10,072
Cusk	52,000	22,400		550
Total	7,068,080	2,652,832		56,625
Pickled fish.				
Herring:				
Ordinary	1,725,000	1,380,000	6,900 barrels	20,700
Russian sardines and anchovies	2,703,625	1,673,000	8,365 barrels	29,078
Miscellaneous	401,100	267,400	1,337 barrels	6,685
Total	4,829,725	3,320,400	16,602 barrels	56,463

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Smoked fish.				
Herring:				
Ordinary	2,716,000	1,962,310	230,860 boxes	$46,172
Bloaters	1,987,000	1,490,000	44,700 boxes	31,290
Haddock (Finnan haddies)	492,500	211,500		12,000
Total	5,195,500	3,663,810	275,560 boxes	89,462
Canned fish.				
Mackerel	37,650		12,336 cans	3,985
Herring (sardines)	6,496,375		7,500,084 cans	772,176
Total	6,534,025		7,512,420 cans	776,161
Lobsters.				
Fresh	351,348			12,883
Canned	953,910		152,568 cans	18,793
Total	1,305,258			31,676
Clams.				
For food	15,000		1,500 bushels	525
Miscellaneous.				
Fish-oil			27,593 gallons	11,037
Sounds		11,232		10,100
Marine products used for fertilizers				1,000
Total				22,146

3. THE FISHERIES OF CALAIS, ROBBINSTON, AND PERRY.

CALAIS.—Calais is a town of 6,000 inhabitants on the west bank of the Saint Croix River about 30 miles above Eastport. It includes the city of Calais, the village of Milltown, and a scattered settlement known as Red Bank. The residents of Calais and Milltown are engaged in the manufacture and shipment of lumber, having extensive saw-mills and a large vessel fleet. Red Bank is in the midst of an agricultural region, in the lower part of the town, with granite quarries and plaster mills.

Having so extensive a water-line, the town has naturally a certain interest in the fisheries; but, with the exception of a few lobsters and clams taken along the shore, the fishing is confined largely to the capture of salmon (*Salmo salar*) and alewives (*Pomolobus vernalis*) in small weirs. A few salt-water species are taken, chief among which is the herring (*Clupea harengus*), which is used as a dressing for the land. The section is too far removed from the fishing-grounds of the coast to have any boat-fisheries of note, though a few of the inhabitants go occasionally to the outer headlands to catch a supply of pollock (*Pollachius carbonarius*), hake (*Phycis chuss* and *P. tenuis*), and cod (*Gadus morrhua*) for family use.

Prior to 1878 it is said that no fishing-vessels were owned in the town. At that time parties bought small schooners and engaged in the Bay of Fundy cod and hake fisheries. At the present time (1880) there are four vessels, of 25 to 50 tons each, fishing from the town. These employ forty-three men during the fishing season, which lasts from April to December. One of the vessels is sailing under British papers, and for this reason is omitted from the list of American fishing vessels.

In 1879 there were cured at the city of Calais, where the vessels are owned, about 2,125 quintals of cod, 2,175 quintals of hake, 700 quintals of pollock, and 600 quintals of haddock

(*Melanogrammus æglefinus*). In 1880 the catch will probably be about 5,825 quintals, of which 50 per cent. will be hake, 25 per cent. cod, and the remainder, pollock and haddock, in about equal quantities. About half of the fish are sent to Boston for exportation, and the rest are sold to the country trade.

ROBBINSTON.—Robbinston is a town of 900 inhabitants on the west side of the Saint Croix River, just opposite the village of Saint Andrews. It has two post-offices, one called Robbinston and the other South Robbinston, but neither is a village of any size. At present little business is done, though ship-building was formerly carried on in a small way.

The people are mostly farmers, but a few living along the river bank are engaged in weir-fishing and lobstering, while men go occasionally in small open boats to the lower fishing-grounds for pollock, cod, and herring. The catch is largely for home consumption, and is so small as to be of little importance. No fishing-vessels are owned in the town.

There are ten weirs for the capture of herring, which are sold to the sardine cannery of Hart & Balcome, built in the spring of 1880, and now employing about forty hands. The catch of these weirs is considerably less than that of those a few miles further down the river, and beyond this point the capture of herring as a business ceases to be profitable. Salmon are occasionally taken with the herring.

PERRY.—The town of Perry, lying to the west of Saint Andrews Bay, and to the north of Cobscook Bay, has about 1,450 inhabitants, mostly engaged in farming. Formerly a number of the people were interested in the weir-fisheries, and many had large smoke-houses for curing their catch of herring. Now, however, but two weirs are fished in the town, and less than 2,000 boxes of herring are smoked annually. No fishing-vessels are owned, and but few of the people interest themselves in the fisheries. Occasionally, during the height of the season, a few men go for pollock, selling their catch to Eastport dealers. These cannot be called professional fishermen, as they spend a greater part of their time in farming, and do not average over twenty-five quintals of pollock to the man during the season. There are two post-offices, called Perry and North Perry respectively, but neither are villages of any note.

4. EASTPORT AND ITS FISHERIES.

ORIGIN AND DEVELOPMENT OF THE FISHERIES.—Eastport, the most easterly settlement in the United States, is situated on a small, rocky island, lying between Cobscook Bay and the Passamaquoddy River. The island, formerly known as Moose Island, was first settled by traders about 1780, and was incorporated as a town under the present name in 1798. It soon became prominent as a trading-post, and both foreign and American vessels resorted to the region in considerable numbers. The place continued to grow in importance for many years, and in 1850 had a population of 4,125. From that date, owing to various causes, its commercial interests gradually declined, and, in 1875, the town had less than 3,500 inhabitants. About that time, the first successful experiments were made in the preparation of herring as sardines, and as soon as it became certain that the small fish could be utilized in this way, and that a market could be found for the products, large canneries were erected, and parties engaged extensively in the work. The industry has since grown to enormous proportions, and to-day it constitutes the principal business of the place, making it one of the liveliest settlements on the coast of Maine.

From its earliest settlement the people of Eastport have been largely dependent upon the fisheries. The location of the village at the western entrance to the Bay of Fundy, in the center of a large fishing district, gave it a decided advantage as a market; and the abundance of rocks,

which forbade any extensive agricultural interests, compelled its people, in common with those of the adjoining British islands, to depend almost wholly upon the sea for their support. Its spacious harbor warranted the inhabitants in investing largely in vessel property, and they soon built or purchased quite a fleet of fishing schooners. These, in addition to the fleet owned at other points in the district, depended chiefly upon Eastport for their supplies, and also found it a desirable market for their catch.

THE MACKEREL FISHERY.—As early as 1820, the merchants of the place were extensively interested in the mackerel fisheries. In 1830 the business was at its height, when, according to Mr. D. I. Odell, there were fully forty sail of "mackerelmen," averaging 60 to 70 tons each, fitting and selling at Eastport. These vessels carried a total of nearly 600 men. Mackerel of large size were very abundant in the vicinity at this time, and, according to Mr. S. B. Hume, it was not uncommon to catch individuals weighing upward of 2 pounds within a few rods of the wharves; while 100 dressed fish would often fill a barrel. From 700 to 1,000 barrels is said to have been an average catch for a vessel during the season.

In connection with the mackerel fishery, which did not begin till midsummer, most of the vessels went to the outer banks or fished in the Bay of Fundy for cod, usually landing 700 to 800 quintals each before the mackerel season opened.

THE LABRADOR COD FISHERY.—As early as 1820, a number of the vessels, after making a short trip to some of the nearer grounds for cod, "fitted" for Labrador to engage in the cod fisheries of that region. They usually started in June and returned in September. By 1830 there were from six to ten vessels engaged regularly in the Labrador fisheries. A few years later, this branch of the fishery began to decline, and by 1855 it was wholly neglected.

THE TRADE WITH BOAT-FISHERMEN.—Seeing that both the mackerel and Labrador fisheries were being abandoned, the merchants were obliged to turn their attention to the shore fisheries. They soon began to cater to the trade with the local boat-fishermen, and to that of the vessels employed in the Bay of Fundy cod fisheries. A number of large curing stands were built, and a considerable business was done in drying fish, the greater part of which were purchased from the boat and vessel fishermen of the surrounding islands.

Then, as now, the bulk of the catch of the fishermen of New Brunswick and Nova Scotia was consumed in the United States, and the duty levied on their importation not only seriously affected the extent of these fisheries but also greatly reduced the value of the fish taken. As a result, Eastport controlled to a considerable extent the catch of the Bay of Fundy, and most of the men living within a convenient distance sold their fish either from "kench" or "from the knife;" while others often landed dried fish on the island to be carried to Eastport in small quantities from time to time, in order to avoid the payment of duties. With such intimate relations existing between the Eastport fishermen and their foreign neighbors, it was very difficult to distinguish between foreign and domestic products, and thousands of quintals of cod and other species were annually smuggled across the line.

THE MAGDALEN ISLANDS HERRING FISHERY.—Before the decline of the mackerel fishery, a number of vessels were sent to the Magdalen Islands in the early spring for herring, which they salted and brought to Eastport and Lubec for smoking or pickling. This business began as early as 1830, and continued to be important till 1868, since which time only an occasional vessel has been sent. In addition to the "Magdalen trade," the shore herring fisheries were very extensive, and next to Lubec, Eastport prepared the largest quantity of smoked herring of any town in the United States.

THE FISHERIES IN 1850.—Mr. M. H. Perley, in his Report of the Fisheries of New Brunswick for 1850, gives seven firms, with a total capital of $33,500, engaged in the fish trade at Eastport. These, according to the same authority, employed 238 men; used 18,900 bushels of salt; cured 18,000 quintals of fish and 3,500 boxes of smoked herring; put up 12,000 barrels of pickled herring, 300 barrels of mackerel, and 3,503 barrels of other fish (probably cod, haddock, and hake), in addition to 450 barrels of oil and a quantity of canned goods, the whole having a value of $85,800.

ORIGIN OF THE CANNING INDUSTRY.—Eastport claims the honor of putting up the first can of hermetically sealed goods within the limits of the United States. The process originated with the French, and was first employed on the American continent at Halifax, Nova Scotia, by Mr. Charles Mitchell, of Aberdeen, Scotland, in 1840. About this time Mr. U. S. Treat began experimenting in the same line at Eastport, and in 1843 Mr. Mitchell removed to Eastport and joined him in the work. It was here that lobsters were first canned. From this beginning the business has developed to its present enormous proportions. There are now three lobster canneries at Eastport, and two others a few miles distant, on British soil. The products of the three canneries in 1880 amounted to nearly 136,000 one-pound and 5,000 two-pound cans. In addition to those canned several hundred barrels of lobsters were shipped fresh to Portland and Boston.

THE EFFECT OF FREE TRADE WITH CANADA.—Eastport was seriously affected by the treaty that admitted foreign fish free of duty, and from that time its fishing interests, owing to a tendency of the New Brunswick fishermen to send their catch to the larger markets, gradually declined. Many of the dealers soon gave up the business, while others removed elsewhere. The larger fishing-vessels owned in the town were one after another sold from the district, and most of the fishermen turned their attention to the boat-fisheries, taking a considerable quantity of pollock, haddock, hake, herring, and other species along the shore. Pollock and herring have long been more abundant in this region than on any other portion of the entire coast.

THE FROZEN HERRING TRADE.—In the winter of 1854–'55 a Gloucester vessel secured a quantity of frozen herring in Newfoundland, and carried them to Gloucester, to be used as bait in the George's Bank cod fisheries. This was the beginning of a trade in frozen herring which has since assumed important proportions. In the winter of 1866–'67 a vessel engaged in the business made a trip to Eastport and obtained a full cargo of herring. The following year a number of vessels visited the region for a similar purpose. From that time the business has rapidly increased, until Eastport has come to control the frozen-herring trade of the United States. The fishing begins as soon as the fish can be frozen, usually about the middle of November, and lasts until the weather becomes "soft" in spring. From the first the fishing has been quite important, and has gradually increased, until in the winter of 1879–'80 there were ninety-five cargoes, averaging 250,000 fish each, in addition to 9,500 barrels of 450 fish each, shipped from the region, making a total of 28,000,000 herring, valued at $90,000. These were mostly taken by the fishermen of New Brunswick and sold to American fishing-vessels, that carried them to Boston, New York, Gloucester, Portland, and other places.

HADDOCK SMOKING.—About 1868 Eastport parties began smoking haddock, and a number have continued the work to the present time. The height of this business was in 1875, since which time it has been less extensive. In the winter of 1879–'80 there were 210,000 pounds of "Finnan haddies," valued at $12,000, smoked in the town. All of them were sent to Portland for distribution.

ORIGIN AND GROWTH OF THE SARDINE INDUSTRY.—In the fall of 1874 New York parties

conceived the idea of using small herring for "Russian sardines." They at once ordered a supply of these fish from Eastport for their experiments. The herring were found to answer the purpose admirably, and the following summer parties went to Eastport to engage in this business. It was soon found that the herring could also be utilized in the preparation of oil sardines, and, after various experiments, methods were hit upon by which a fine quality of sardines were prepared. From the first the demand for American sardines has rapidly increased and other establishments soon located at Eastport, and several canneries have recently been built elsewhere along the shore for utilizing the small herring that are found in considerable quantities. In the fall of 1880 there were in the town of Eastport alone thirteen canneries, employing nearly 1,500 persons, for the capture and preparation of sardines. These put up during the season about 7,000,000 cans, valued at upwards of $725,000.

EXTENT OF THE VESSEL AND BOAT FISHERIES IN 1880.—An examination into the present condition of the fishing fleet shows that in 1880 Eastport had fourteen vessels, with a total of 358.56 tons, valued at $13,000. These carried ninety-two men, and landed about 8,750 quintals of fish. In addition to these there were five or six small vessels, owned by Eastport parties, sailing under the British flag. There were seventeen herring weirs, valued at $4,000, at Eastport and adjacent small islands. These caught about 1,200 hogheads of fish, worth over $5,000. Between thirty and forty additional boat-fishermen were engaged in the capture of pollock, hake, and haddock in summer, the greater part of these, with a few others, turning their attention to the herring fisheries in winter.

EASTPORT TRADE IN FISHING PRODUCTS.—There were eleven firms dealing extensively in fishery products which they bought from the American and Provincial fishermen. They furnished constant employment to twenty-seven men, and required fifteen additional hands during the busy season. These firms occupied property worth $27,000, and required a cash capital of $52,000 for carrying on their business. They handled in 1879, according to estimates by Mr. S. B. Hume, Paine Brothers, Mr. B. F. Milliken, and others, 50,000 quintals of dry fish, 13,700 barrels of pickled fish, 375,000 boxes of smoked herring, 45,000 boxes of bloater herring, 210,000 pounds of smoked haddock, 53,000 pounds of dry fish-sounds, 3,600 barrels of liver and herring oil, and 5,000 barrels of pomace, the whole having a value of $330,000. The frozen-herring, sardine, and lobster interests mentioned elsewhere foot up about $840,000 more, making the total trade in fishery products at Eastport $1,170,000.

5. THE FISHING TOWNS BETWEEN EASTPORT AND LUBEC.

PEMBROKE.—Pembroke is a town of about 2,500 inhabitants, lying to the north of Cobscook Bay. It is traversed throughout its entire length by Pénmaquan River, which in its lower half is of considerable width and is known as Penmaquan Bay. The lower part of its western boundary is formed by the north branch of the Cobscook River, an arm of Cobscook Bay, into which the Dennys River empties. The water in the vicinity of the town is quite salt, and is much affected by the tides, which are unusually strong.

The town has two post-offices. The principal one is at Pembroke, a village of over a thousand inhabitants, with extensive lumbering interests, and a large iron mill; the other, called West Pembroke, is at the head of navigation of the river, a mile or more above Pembroke village. The latter was formerly engaged in ship-building and had a small lumber trade, but it is now an agricultural section, with no business of note.

The fishing for salt-water species is of little importance. The fishing fleet consists of two ves-

sels, the Josie L. Day and Beauty, of 15.88 and 26.25 tons, respectively. In 1879 these vessels furnished employment to sixteen men, and landed about 2,200 quintals of fish, two-thirds of the catch being hake. They also engaged in herring netting on the coast of New Brunswick during the winter season, selling their catch to the vessels employed in the frozen-herring trade.

In addition to the vessel-fishing, a number of farmers and mechanics living in the lower part of the town go in small boats to the pollock grounds of 'Quoddy River at intervals during the summer and catch fish for family use, often selling a few quintals to their neighbors. Aside from the parties mentioned, few persons are interested in the fisheries, as the fishing grounds are too far distant.

DENNYSVILLE.—Dennysville is a town of about 500 inhabitants, near the head of the northern branch of Cobscook River. It has a village of the same name, with about 300 inhabitants, at the head of navigation on the Dennys River. The residents are engaged chiefly in farming and lumbering, and there is no salt-water fishing of note, though a few parties go down the bay in small boats for a few days during the height of the pollock season, catching a supply for their own tables. A small business is done in river fishing and several weirs have been built for catching salmon and alewives.

EDMUNDS.—The town of Edmunds has a scattered population of 450 inhabitants, engaged chiefly in agricultural pursuits. It forms the west bank of one of the arms of Cobscook Bay, but has no fishing interests, if we neglect the few farmers that occasionally resort to the pollock grounds of 'Quoddy River for local supply.

6. LUBEC AND ITS FISHERIES.

GENERAL STATEMENTS.—The town of Lubec is made up of a series of irregular peninsulas, separated from each other by the various branches of Cobscook Bay. It has a shore-line greater in proportion to its area than almost any other town on the coast. It was settled about 1780, and was a part of Eastport up to 1811, when it was incorporated as a town and named in honor of Lubec, Germany. In 1850 its population numbered nearly 3,000, but of late it has been gradually losing in numbers from year to year, and at present has only 2,136 inhabitants. There are three post-offices in the town, called Lubec, North Lubec, and West Lubec, respectively. The first-named is the only village of importance. It is situated at "The Narrows," on the main ship channel of 'Quoddy River, and is, next to Eastport, the leading commercial center of the region. In other portions of the town the people live along the shores, and divide their time about equally between farming, fishing, and herring smoking.

ORIGIN AND GROWTH OF THE SMOKED-HERRING INDUSTRY.—By the beginning of the present century Lubec had become extensively engaged in the fisheries, and its people soon became largely interested in catching and smoking herring, which have for many years been remarkably abundant in that locality. They soon took the lead in the smoked-herring trade, and have retained it to the present day. In 1821, according to Mr. Jacob McGregor, there were twenty smoke-houses in the town, putting up a yearly average of 2,500 to 3,000 boxes of herring each. Prior to 1828 the herring were mostly taken by "torching." At that date brush weirs were introduced for their capture by fishermen from Nova Scotia, and they soon came into general favor.

As early as 1830 Lubec began sending vessels to the Magdalen Islands for an additional supply of herring for smoking and pickling. In 1860 she had eleven vessels engaged in this fishery, bringing cargoes of 700 to 800 barrels each, about one-half of the entire quantity being smoked. Since 1860 she has sent only a small fleet, but one or two vessels going yearly for several years.

The business reached its height between 1845 and 1865, when there were about forty-five weirs owned in the town. During these years, according to Mr. P. Gillis and others, from 400,000 to 500,000 boxes of herring were smoked annually. Since that date, owing to various circumstances, the business has fallen off greatly. The principal cause of this is said to be the result of the war, which virtually destroyed the herring trade with the South, where a large part of the fish was consumed. This market destroyed, years of overproduction followed, which so reduced the price that all parties lost heavily.

The business continued to decline until in 1879 the Magdalen supply was entirely cut off, and there were but thirty-one weirs fished by Lubec parties. There were at that time seventy-four smoke-houses in the town, but some of them remained idle and others were little used. The total product of these smoke-houses in 1879 reached only 153,000 boxes, of which the greater part were sent to New York, the remainder going to Boston and Portland. In 1880 the quantity of fish smoked at Lubec will be even less than in 1879, though herring are more abundant. In addition to the "hard herring," a few bloaters have been put up each season for several years, the total for 1879 amounting to 3,000 boxes of 100 fish each.

THE SARDINE INDUSTRY.—For two or three years a part of the catch of small herring from the various weirs has been sold to the "sardine" canneries at Eastport, and considerable money has been realized by the fishermen from this source. In the fall of 1880 a sardine cannery was built at Lubec to utilize the catch of small herring, and others will doubtless be established during the coming season.

GENERAL FISHERIES IN 1880.—Aside from its herring interests, the town has never been extensively engaged in the fisheries. In 1854 a vessels was sent to Labrador for codfish, and one or two were sent yearly up to 1858, when the business was discontinued.

In 1879 eight small vessels were engaged in the various shore fisheries, but in 1880 the fleet had been reduced to six vessels, with a total of 81.42 tons. There were a few line-fishermen who fished from small boats during the summer months.

7. THE FISHERIES OF TRESCOTT AND WHITING.

TRESCOTT.—Trescott is a town of 600 inhabitants, lying to the west of Lubec. Its northern part is a peninsula bounded by the various branches of Cobscook Bay, while its southern portion borders on the ocean, and has three little coves or harbors, affording fair anchorage for small vessels and boats. The first harbor, called Bailey's Mistake, is in the extreme eastern portion of the town. The next is a little cove known as Haycock's Harbor, with half a dozen houses near its shores. Formerly several herring weirs were owned and fished at this cove, and the catch was smoked and sold in Lubec, but for several years there has been no fishing of any kind. The third harbor is Moose River, where in 1868 two weirs were fished regularly for herring, and houses were built for smoking the catch. At that time herring were abundant, and a profitable business was carried on for a number of years, after which it was entirely abandoned. At the present time two men are engaged in boat-fishing from the harbor, selling their catch in Lubec. According to Mr. F. Warren, there was formerly some ship-building at the place, but this interest has died out, and the people of the neighborhood are now engaged chiefly in farming.

From the northern portion of the town a few men go occasionally in small boats to the lower fishing grounds, but no extensive business is carried on, and no fish are caught for market.

WHITING.—Whiting is a town of 400 inhabitants, lying to the north of Cutler. In its extreme

eastern part is a small village of the same name, situated at the head of navigation of the south branch of Cobscook River. The residents are engaged chiefly in lumbering and farming, and there is no professional fishing from the town, though boats go down the bay occasionally for pleasure fishing.

C.—THE MACHIAS DISTRICT.

8. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

GENERAL ACCOUNT OF THE FISHERIES.—The people of the Machias customs district, which includes the coast-line between Cutler and Gouldsboro', are engaged chiefly in farming and lumbering. Large saw-mills are located on the principal water privileges, and a large quantity of lumber is prepared and shipped to other localities. The inhabitants have never been extensively engaged in the fisheries, and at the present time only fifteen fishing vessels are owned in the district. Of these vessels only one is engaged in the offshore fisheries, the remainder being small craft fishing on the inner grounds. The boat-fisheries also are of little importance, the men giving their attention chiefly to the capture of lobsters in the summer and to clamming in winter.

Formerly a good many brush weirs were fished for herring, the catch being smoked or pressed for oil. Recently, however, the weirs have been neglected, and the business is now quite unimportant, though, owing to the establishment of several sardine canneries in 1880, a new impetus has been given to this particular fishery, and many new weirs are being built, as herring are reported very abundant.

The clamming interests of Mason's Bay are quite important, and a number of small vessels from various portions of the State, and even from Massachusetts, spend several months in the region each winter, their crews being provided with small boats, in which they visit the flats at low water to secure a supply of bait for their own use during the following season, or for sale to the fishing fleets of the larger cities. The vessel serves both as a home and work-shop during their stay in the region, and at the close enables them to transport the products to any desired locality without additional expense. Many of the local fishermen, having little to occupy their attention in winter, naturally resort to the clam-flats, deriving a considerable revenue from this source.

The lobster fisheries began in 1855, since which time they have gradually increased in importance, until they now take the leading place among the fisheries of the region.

STATISTICAL RECAPITULATION FOR 1880.—Detailed statistical statements of the fisheries may be found in the following table:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	62	Capital in vessels and boats	$30,465
Number of boat-fishermen	360	Capital in nets and traps	12,075
Number of curers, packers, fitters, &c	10	Other fixed and circulating capital	*a* 40,643
Number of factory-hands	129	Total	$83,183
Total	561		

a Other fixed and circulating capital.—Cash capital, $26,748; wharves, shorehouses, and fixtures, $2,245; factory buildings and apparatus, $11,650; total, $40,643.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.
Vessels.						
In food-fish fishery:						
Active	11	246.17	$6,217	$1,885	$4,780	$12,882
Idle	3	27.97	850	.....	.....	850
In lobster fishery	1	32.97	1,500	10	160	1,670
Total	15	307.11	8,567	1,895	4,940	15,402
Boats.						
In vessel-fisheries	26	.....	495	.....	.....	495
In shore-fisheries	281	.....	9,468	3,600	1,500	14,568
Total	307	.....	9,963	3,600	1,500	15,063

Nets and traps.	No.	Value.
Nets		
Gill-nets:		
In vessel-fisheries	45	$612
In boat-fisheries	250	3,000
Haul-seines:		
In boat-fisheries	23	615
Total	318	4,227
Traps.		
Weirs	15	1,610
Fykes	10	50
Lobster-pots	8,251	6,188
Total	8,276	7,848

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	7,496,124	.....	.....	$116,972
Fresh fish.				
For food	477,200	.....	.....	6,363
For bait	2,202,000	.....	11,010 barrels	8,258
For fertilizer	60,000	.....	300 barrels	150
Total	2,739,200	.....	.....	14,771
Dry fish.				
Cod	1,040,325	358,512	.....	11,204
Hake	316,170	131,152	.....	1,756
Haddock	264,915	94,192	.....	1,892
Pollock	107,880	41,664	.....	744
Cusk	29,640	12,768	.....	314
Total	1,758,930	638,288	.....	15,910
Pickled fish.				
Mackerel	27,900	18,600	93 barrels	535
Herring:				
Ordinary	42,500	34,000	170 barrels	510
Miscellaneous	29,000	16,000	80 barrels	400
Total	99,400	68,600	343 barrels	1,445
Smoked fish.				
Herring:				
Ordinary	74,094	53,533	6,298 boxes	1,260
Canned fish.				
Mackerel	41,250	.....	33,000 cans	3,437
Lobsters.				
Fresh	107,950	.....	.....	3,958
Canned	2,474,300	.....	402,768 cans	57,729
Total	2,582,250	.....	.....	61,687
Clams.				
For food	111,060	.....	11,106 bushels	3,887
For bait	9,940	.....	994 bushels = 71 barrels	355
Canned	80,000	.....	8,000 bushels = 100,000 cans	10,000
Total	201,000	.....	.....	14,242
Miscellaneous.				
Fish-oil	.....	.....	2,850 gallons	1,140
Sounds	.....	1,756	.....	1,580
Marine products used for fertilizers	.....	.....	.....	1,500
Total	.....	.....	.....	4,220

REVIEW OF THE FISHERIES BY TOWNS.—If we except Jonesport, there are no important fishing settlements in the district, though the residents of several villages are more or less interested in the capture of the different species. Below may be found a brief description of the fishing interests of the different towns.

9. CUTLER TO JONESBORO', INCLUSIVE.

CUTLER.—The town of Cutler lies to the eastward of Machias Bay, with the open ocean on the south. Its population, numbering less than 1,000, is scattered along the shore, the interior being nearly uninhabited. The people are now engaged almost wholly in farming, though formerly considerable fishing was done. Fifteen years ago more than a dozen brush weirs were fished in Little Machias Bay and Little River by the residents of the town; but at present the fishing interests in this line are confined to one weir. Two vessels of 18.42 and 42.07 tons, respectively, furnishing employment to fifteen men, are fished from the harbor; but one of these is chartered from Jones port. About thirty men engage in lobstering and line-fishing from boats during a part of the summer. There are eight smoke-houses, but only two of them are in repair, and the total quantity of herring smoked yearly does not exceed 2,000 boxes. The vessel-catch amounted to 850 quintals in 1879, and to 600 quintals in 1880. The catch of herring in the weirs has been constantly decreasing until during the present season it will not exceed 15 hogsheads. According to Mr. S. B. French, Cutler was for a short time interested in the Magdalen herring fisheries, sending her first vessel in 1860, and two or three each season until 1864.

MACHIASPORT.—Machiasport is a town of 1,500 inhabitants, lying to the south of Machias. It is divided by the Machias River, and has a village of 300 inhabitants at the head of steamboat navigation. The region is one largely interested in the lumber trade, and it has a fleet of vessels engaged in coasting. The southern portion of the town is a peninsula, with Machias Bay on the east and Little Kennebec River on the west. The shores are indented by numerous harbors and coves, and from these twenty-three men, with 17 boats, are engaged in lobstering from April to August, selling their catch to the cannery on Little Kennebec River. There are no professional boat-fishermen, though a number catch a few cod, hake, and haddock each season for home use and for sale in the neighborhood. The smoked herring business amounts to less than 300 boxes yearly.

Two fishing-vessels with a total of 54.37 tons are owned in the town. These are engaged in the Bay of Fundy and La Have fisheries, with trawl and net, during the summer months, and in the herring fisheries in winter. They carry a total of fourteen men, and in 1879 landed 600 quintals of dry fish. The present season, 1880, the catch will be about 825 quintals.

EAST MACHIAS.—East Machias, with its extensive lumber mills and ship-yards, is a town of nearly 2,000 inhabitants, lying to the north of Machiasport. No fishing vessels and but three or four fishing-boats are owned in the town. The largest of these makes Grand Manan her headquarters during the summer season while fishing for cod and pollock, and in the fall she is employed in the herring fishery in the same locality. Her total catch for 1879 was about 75 quintals of dried fish, and 50,000 herring. The other boats go only occasionally to the fishing grounds near Cross Island in summer, catching a few quintals of cod and hake for home use. The town is supplied with fresh fish by peddlers from Jonesboro and other places.

MACHIAS.—Machias is a small town of about 2,200 inhabitants, lying to the northwest of Machiasport on the Machias River. It has a village of 1,500 inhabitants at the head of navigation. Many of the residents are engaged in the coasting trade, but the majority are interested in or find employment at the extensive saw-mills of the village. It is the county seat of Washington

County, and contains the custom-house for the Machias district, which embraces the section of coast lying between Cutler on the east and Gouldsboro' on the west.

The people of the place have never engaged extensively in the fisheries, as they are fully 15 miles from the fishing grounds. There are at present no professional fishermen in the town, and no fishing-vessels are owned at the village. A few men go to the outer islands occasionally in small boats during the summer months, for cod and pollock, fishing more for pleasure than for profit. Mr. H. V. Knight, who keeps the only fish market in the place, estimates the total catch by these parties at 50 quintals yearly. The supply of fish, lobsters, and clams comes overland from the vicinity of Jonesport.

JONESBORO'.—The town of Jonesboro', situated to the north and east of Mason's Bay, has a population of 550, engaged chiefly in farming in summer and in lumbering in winter. The only settlement of note is a village of fifteen to twenty houses on a small stream known as Chandler's River. There are no important fisheries in the town. Ten men fish for lobsters from April to August, and, later in the season, some of them go out occasionally with hand-lines to catch a few fish for their own tables. There are four small brush-weirs, which in 1880 caught 12 barrels of mackerel (*Scomber scombrus*), in addition to a quantity of herring and other species that were used for bait or as a dressing for the land. A small vessel owned in the town took 25 quintals of fish in 1879, but in 1880 she was not employed in the fisheries.

The shores of Mason's Bay, especially those of Rogue Island, are bordered by extensive mud-flats, in which clams (*Mya arenaria*) are peculiarly abundant, this being a favorite resort for the clam-diggers of the adjoining towns. Large quantities are dug here annually by the residents of other places, but only two of the Jonesboro people engage in the work.

10. JONESPORT AND ITS FISHERIES.

GENERAL ACCOUNT.—The town of Jonesport, lying between Jonesboro' and Addison, was incorporated in 1832, and has at present 1,300 inhabitants. It is situated on Moose-a-bee Reach, an inside passage for vessels and steamers between the mainland and the outlying islands. It has a fair harbor, protected from the ocean by the ledges and islands, and is one of the principal steamboat landings of the region, having direct communication with Rockland and Portland. The people of the town divide their attention about equally between the land and the water. Many of them "follow the sea" during a greater part of the year, while others catch fish and lobsters in summer and dig clams in winter, most of them having small garden spots, on which they raise a few vegetables to supply their own tables.

Seven small fishing-vessels, valued at over $3,000 and carrying thirty-two men, are owned by the villagers and the inhabitants of the outlying islands. Six of these are engaged in the shore fisheries, landing an average of $1,200 worth of fish each, and one is employed in "running" lobsters to Boston and to the cannery at Jonesport.

THE LOBSTER INDUSTRY.—The catching of lobsters constitutes an important business, and seventy-one men, with an average of sixty-five pots each, are engaged in the fishery. The best lobstermen make $300 yearly, while the average is about $125 for the season, which lasts from April to August. Prior to 1855 no lobsters were shipped from the town, the few secured being taken with gaffs or hoop-nets for local supply. At this time Capt. John D. Piper arrived at Jonesport in a well-smack, bringing a crew of fishermen, who were provided with pots for catching the lobsters, which he purposed taking to Boston. As soon as this fact became known great excitement prevailed, the local fishermen fearing that the supply of lobsters would soon be exhausted. According to Captain Piper, a town meeting was at once called to consider the subject, and it was

only after he had convinced them of the extent and importance of the lobster fisheries in other localities, and of the advantages which they might derive from the capture of lobsters, that he was permitted to engage in the work. From the first the fishery was very successful, many of the fishermen soon providing themselves with pots, and from that date the industry has been of peculiar importance. In 1863 a lobster cannery was built at Jonesport, since which time it has been in successful operation. It now does a flourishing business in the canning of lobsters, clams, and mackerel, employing over forty hands during the height of the season.

THE BOAT-FISHERY FOR COD.—After the lobster season is over many of the men turn their attention for several months to line and trawl fishing, catching cod and other species for local supply and for shipment. Fifty-nine men were employed in this way in the fall of 1880, seven of them being professional boat-fishermen.

THE CLAM FISHERY.—In the winter the principal business of the people is clamming. Jonesport and Jonesboro' have each very extensive clam-flats, which, barring those about Sedgwick, are the most important on this portion of the coast. Small vessels come to the locality from Portland, Booth Bay, Deer Isle, and other points along the shore, and engage in clamming during the season, which lasts from December to April. Some crews dig large quantities, which they shuck and salt for sale to the offshore fishing-vessels, and others merely lay in their stock of bait for the following summer. Aside from the non-residents above mentioned, seventy-nine of the local fishermen made clamming a regular business during the winter of 1879–'80. These dug over 16,000 bushels, a part of which were sold to the cannery at Jonesport, the remainder being shucked and salted in barrels for use as bait.

THE HERRING FISHERY.—Jonesport has taken little interest in the herring fisheries of late, and at present there is but one weir within the limits of the town, though small herring are reported fairly abundant. During the summer of 1880 a sardine cannery was built, and in the fall several thousand cans of fish were put up. The building will be enlarged in 1881, and it is thought that herring can be taken in sufficient numbers to make the business both extensive and profitable. An Eastport firm located at the village in the summer of 1880 for the purpose of putting up Russian sardines, and succeeded in packing several hundred barrels during the season. The supply of fish was obtained largely from Millbridge. In the spring of 1881 it intends building a large cannery for the preparation of oil sardines.

11. MILLBRIDGE, STEUBEN, AND OTHER TOWNS IN THE VICINITY.

ADDISON.—The town of Addison is situated to the westward of Moose-a-bee Reach, between Harrington and Jonesport. It has a population of over 1,200, composed chiefly of sea-faring men and farmers. There are two post-offices; one, called Addison, is a village of several hundred inhabitants at the head of navigation of Pleasant River; the other, known as Indian River, is a scattered settlement of farmers and fishermen. Formerly considerable ship building was done in the town, but this business has gradually died out, and no vessels have been built for several years.

As early as 1835 Addison sent two or three vessels each season to the Gulf of Saint Lawrence for codfish. In 1857 its fleet consisted of three vessels engaged in the Bay of Fundy cod-fisheries, and one "hooking" mackerel in the Gulf of Saint Lawrence. In 1880 there was but one fishing-vessel, of 10.58 tons, owned in the place. This vessel carried three men, and landed 100 quintals of cod and haddock, taken during occasional visits to the inshore grounds. There are thirty-seven semi-professional fishermen, with fifteen boats, engaged in trawling and hand-lining along the shore, at intervals, from May to October. About half of the catch is sold fresh,

while the remainder is dried for local use. Twenty-four men fish for lobsters from April to August, selling their catch to the lobster cannery that was built in the lower part of the town in the spring of 1879. Four brush weirs are fished by the people of Addison for herring, mackerel, flounders, and smelt. The catch in 1880 amounted to 350 hogsheads of herring and 340 barrels of mackerel, in addition to a quantity of refuse fish that was used for lobster bait. There are two smoke-houses, in which a few herring are cured each season; the quantity for 1880 amounted to 3,200 boxes.

HARRINGTON.—Harrington, which includes the coast-line between Millbridge and Addison, is a town of 1,280 inhabitants. Its shores are very irregular, being cut up by numerous bays, the principal ones being Pleasant Bay, Harrington River, and Flat Bay, each separated from the other by long but narrow peninsulas. There are two post-offices in the town. The larger, called Harrington, is a village of 600 inhabitants at the head of navigation of Harrington River. Formerly there was considerable ship-building at this place, but for several years nothing has been done in that line. The other post-office, called West Harrington, is an agricultural district, with no village worthy of note. Most of the inhabitants are interested in farming, while the remainder "follow the sea" during the greater part of the year.

The fisheries of the town are of little importance, as there are no vessels engaged in the business, and no boats going regularly to the shore fishing grounds. Nine men pursue lobsters during the season, selling their catch to the Gouldsboro' and Addison canneries. These men fish occasionally with hand-lines near the shore, catching cod, haddock, and hake for family use and for sale in the neighborhood.

There are three brush weirs, two being fished for smelt (*Osmerus mordax*) and other anadromous species, while the third takes a small quantity of herring, flounders, and mackerel, the greater part being used for lobster bait and as a fertilizer. Two men engage in clamming, selling about 600 bushels yearly to the local trade.

MILLBRIDGE.—Millbridge was set off from Harrington and incorporated as a separate town in 1848. It had at that time about 1,100 inhabitants. In 1870 its population had increased to 1,558. The town forms the shore-line between Harrington and Steuben, and is divided by the Narraguagus River. It has a thriving village of nearly 1,000 inhabitants, extensively engaged in coasting and ship-building.

Millbridge has never been engaged in the offshore fisheries, and only to a limited extent in boat fishing, aside from that for herring and lobsters. Its people, in common with those of Steuben, are more or less interested in the herring fisheries, and, according to Mr. Sanborn, an old resident of the place, the first herring weir was built just opposite the village about 1820. From that date the business increased very slowly up to 1850, when parties came from Lubec and built large smoke-houses and presses for utilizing the catch. The fishery was at its height between 1858 and 1863, when 12 weirs were fished regularly and 75,000 to 100,000 boxes of herring were smoked annually. Many herring were pressed for their oil, the pomace being used locally as a fertilizer. None have been pressed since 1870, and the trade in smoked herring also gradually declined, until in 1880 only 500 boxes were put up. Though large herring are abundant on the spawning-grounds, a few miles of the village, and many vessels from other places catch large numbers of them, none of the local fishermen have provided themselves with nets for their capture, and for several years the weirs have been fished simply to secure bait for the lobster-men and to obtain manure for the land.

In the fall of 1880 Eastport parties decided to build a sardine cannery at Millbridge for the purpose of utilizing the small herring that are said to be abundant. It is purposed to have it in

readiness for the season of 1881. This will doubtless throw new life into the fishery, and, if the herring are as plenty as the residents claim, it seems destined to assume important proportions.

The shore fishing is confined largely to the capture of lobsters, which are sold to the cannery near the village and to the Portland and Boston smacks. Many of the farmers of the region devote part of their time between the first of April and the middle of August to lobstering, and other persons depend wholly upon it for a livelihood during these months. Lobsters are very abundant, and the catch is often large, some of the more industrious fishermen making $200 or even $300 during this short season.

Aside from lobster fishing, the boat-fisheries of the town are of little importance, and we learn of but 10 men who give any considerable portion of their time to the work. These go to the inshore grounds in large boats at intervals between May and November. A few others fish for home supply, and fully forty of the lobster fishermen of Millbridge and Steuben fish occasionally with hand-lines after the lobster season is over.

CHERRYFIELD.—Cherryfield is an inland town of 1,760 inhabitants, lying to the north of Millbridge and Steuben, on the Narraguagus River, with extensive lumbering interests. It is fully 10 miles from the fishing grounds and has no commercial fisheries, though a few people fish occasionally for pleasure during the summer months.

STEUBEN; GENERAL STATEMENTS.—Steuben is a town of 1,000 inhabitants, lying between Millbridge and Gouldsboro'. Its southern shore is formed by two long and narrow peninsulas, which are nearly surrounded by the waters of Pigeon Hill, Dyer's, and Gouldsboro' Bays. Several small outlying islands also belong to the town. There are no villages of note, the houses being grouped together in little settlements along the country roads and about the numerous coves. The people are chiefly engaged in farming and the coasting trade, while a few find employment in the small tide-mills of the region.

THE HERRING FISHERY OFF BOISBUBERT ISLAND.—As a fishing town Steuben is of little importance, though the ledges in the vicinity of the island are noted as an important spawning ground for the herring; and weirs were built for their capture as early as 1850 by Lubec fishermen, who came to Boisbubert Island to engage in the capture of the herring, which they either smoked or pressed for their oil. This business reached its height between 1858 and 1862, and has since gradually declined until during the present season (1880) there were but two weirs fished within the limits of the town. These caught 350 hogsheads of herring and 150 barrels of mackerel, half of the former being turned out for want of a market. No herring have been smoked since 1879. The herring netting at Boisbubert begins about August 1, when the large fish "strike in" for the purpose of spawning. The first vessel that fished on these spawning grounds came from Deer Isle about 1868, and in 1874 there were twenty-eight to thirty small ones fishing in the region, some of them making two trips. In 1880 eight sail visited the locality, catching a total of 700 to 900 barrels of herring, which they sold in Boston and Portland and Booth Bay.

OTHER FISHERIES.—The lobster fisheries are quite important, as the species is abundant about the southern headlands and among the outer islands. Eighty men from Millbridge and Steuben engage in this fishery from April to August, selling their catch largely to the canneries at Millbridge and Prospect Harbor. Over half of these fishermen live in Steuben. The line-fisheries for cod, haddock, and hake are of little importance, a few of the lobster fishermen going out occasionally to supply the local demand, though the greater part of the fish consumed in the district are brought from the town of Gouldsboro.'

D.—THE FRENCHMAN'S BAY DISTRICT.

12. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

EXTENT OF THE FISHERIES.—The Frenchman's Bay customs district, which includes the coast-line between Gouldsboro' and Blue Hill, is not an important fishing district, though several towns send a number of vessels to the distant banks for cod, and quite a fleet of small vessels is employed in the shore-fisheries. Both the offshore and inshore fisheries were formerly more extensive than at present. Thirty to fifty years ago several vessels were employed in the Labrador cod fishery and in the herring fishery at Magdalen Islands. The former fishery was abandoned some years since, and in 1880 no vessels were sent to the Magdalens, though up to that time a number had made yearly trips to that region. About 1810 parties came to Gouldsboro' to engage in the whale fishery, going out from the shore in small boats in pursuit of the whales whenever they came in sight. Later, small vessels were employed, and the fishery was continued up to 1860.

THE FRENCHMAN'S BAY HAKE FISHERY.—A large fleet of small vessels was engaged in the Bay of Fundy cod fisheries for a number of years, but this interest gradually declined, and the fishermen turned their attention to the capture of hake in Frenchman's Bay. This fishery has been, perhaps, the most important one in the district. It began in 1840, when vessels from different parts of Maine and Massachusetts were regularly employed in this fishery, securing large fares of hake which were sold in Portland and Boston. For some years not less than a hundred sail came regularly to the region, and as many more made occasional visits, but since 1865 few vessels have visited the locality, and the fishery is now practically abandoned.

THE MENHADEN FISHERY.—It is claimed by the fishermen of Surry that the menhaden fishery of the United States originated with the people of that town. For many years menhaden were abundant in all of the shore-waters of the district, being particularly so in Frenchman's and Union Bays. At first they were taken only in small numbers for use as bait in the shore-fisheries, but later, when it was discovered that marketable oil could be obtained from them, the fishery increased enormously, and hundreds of fishermen provided themselves with nets and kettles for engaging in the work. Between 1855 and 1863 it is estimated that not less than a hundred try-houses, with two to four kettles each, were in operation between Lamoine and Gouldsboro'. Since 1870 the fishery has been less important, and for a number of years, owing to the absence of menhaden from these waters, it has been entirely discontinued.

THE LOBSTER FISHERY.—The lobster fisheries of the district have been important for some time, and the majority of the shore-fishermen devote their attention to the capture of this species. Several canneries have been built for utilizing the catch of small lobsters, while a fleet of well-smacks is regularly employed in "running" the larger ones to Portland, Boston, and New York.

THE HERRING FISHERY.—The herring fisheries were formerly of little importance. At present, however, a number of brush weirs are fished in the vicinity of Mount Desert, and a good many herring are taken. The majority are sold fresh to be used as bait in the shore and bank vessel-fisheries, while considerable quantities are smoked and boxed for shipment.

STATISTICAL RECAPITULATION FOR 1880.—The fishing fleet of the district at present numbers fifty-two sail, forty-six of them being actively employed. The majority are small craft, engaged in the shore-fisheries in the vicinity of Mount Desert Island. Several others are large vessels belonging at Hancock and Lamoine. These are among the largest fishing-vessels in the State, and are employed regularly in the Grand Bank cod fishery.

STATISTICAL RECAPITULATION FOR 1880.—In the following statement may be found a summary of the fisheries of the district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	318	Capital in vessels and boats	$136,311
Number of boat-fishermen	408	Capital in nets and traps	22,799
Number of curers, packers, fitters, &c	69	Other fixed and circulating capital	a105,775
Number of factory hands	107	Total	264,885
Total	902		

a *Other fixed and circulating capital.*—Cash capital, $70,200; wharves, shorehouses, and fixtures, $24,575; factory buildings and apparatus, $11,000; total, $105,775.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fisheries:							Gill-nets:		
Active	46	1,489.17	$49,855	$8,245	$43,015	101,115	In vessel fisheries	128	$1,920
Idle	6	296.48	10,800			10,800	In boat fisheries	350	4,200
In lobster fishery	2	26.97	600	20	320	940	Purse-seines:		
Total	54	1,812.62	61,255	8,265	43,335	112,855	In vessel fisheries	7	3,800
Boats.							Haul-seines:		
In vessel fisheries	193		4,370			4,370	In boat fisheries	17	425
In shore fisheries	439		13,506	4,080	1,500	19,086	Total	502	10,345
Total	632		17,876	4,080	1,500	23,456	*Traps.*		
							Weirs	17	2,612
							Fykes	20	100
							Lobster-pots	12,990	9,742
							Total	13,027	12,454

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	17,438,857			$250,402
Fresh fish.				
For food	797,800			10,637
For bait	2,287,000		11,435 barrels	8,576
For fertilizer	60,000		300 barrels	150
Total	3,144,800			19,363
Dry fish.				
Cod	6,534,125	2,251,760		70,368
Hake	1,642,950	681,520		9,127
Haddock	1,512,000	537,600		10,800
Pollock	210,250	81,200		1,450
Cusk	101,400	43,680		1,073
Total	10,000,725	3,595,760		92,818
Pickled fish.				
Mackerel	918,900	612,600	3,063 barrels	17,612
Herring:				
Ordinary	631,250	505,000	2,525 barrels	7,575
Miscellaneous	26,000	13,000	65 barrels	325
Total	1,576,150	1,130,600	5,653 barrels	25,512
Smoked fish.				
Herring:				
Ordinary	802,141	579,547	68,182 boxes	13,636

Detailed statement of the quantities and values of the product—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Canned fish.				
Mackerel	104,125		70,536 cans	$7,695
Miscellaneous	21,660		12,996 cans	1,928
Total	125,785		83,532 cans	9,623
Lobsters.				
Fresh	269,000			9,863
Canned	1,368,726		316,381 cans	46,587
Total	1,637,726			56,450
Clams.				
For food	63,850		6,385 bushels	2,235
For bait	13,300		1,330 bushels = 95 barrels	475
Canned	74,380		7,438 bushels = 127,476 cans	13,855
Total	151,530			16,565
Miscellaneous.				
Fish-oil			16,053 gallons	6,421
Sounds		9,127		8,214
Marine products used for fertilizers				1,800
Total				16,435

13. GOULDSBORO' AND ITS FISHERIES.

GOULDSBORO'.—The town of Gouldsboro' occupies a rocky peninsula lying between Gouldsboro' Bay and Frenchman's Bay. It includes several small settlements, the chief of which are Prospect Harbor, Winter Harbor, and West Gouldsboro'. The town has a population of 1,700. Many of the inhabitants devote their attention to farming, while others "follow the sea," being engaged in the coasting or foreign trade.

Fifty years ago the people of Gouldsboro' were largely interested in the fisheries, and each season a fleet of vessels was fitted for the cod and hake fisheries of the Bay of Fundy and Frenchman's Bay. Later a good many boat fishermen were employed in the Frenchman's Bay hake fisheries; while others devoted their attention to the menhaden fisheries, which were, at one time, very important in this locality.

SHORE WHALING.—According to Capt. George A. Clark and Captain Bickford, whaling was extensively carried on from Prospect Harbor for many years. The fishing began about 1810, when Stephen Clark and Mr. L. Hiller, of Rochester, Mass., came to the region, and built try-works on the shore, having their lookout station on the top of an adjoining hill. The whales usually followed the menhaden to the shore, arriving about the 1st of June, and remaining till September. When one was seen the men, armed with harpoons and lances, would immediately launch their boats and start in pursuit. If they succeeded in killing the whale, it was towed to the flats of the harbor at high-water, where it was secured and left to be cut up at low tide. Ten years later they began using small vessels in the fishery, and by this means were enabled to go farther from land. The fishery was at its height between 1835 and 1840, when an average of six or seven whales were taken yearly. The largest number taken in any one season was ten. The average yield of oil was 25 to 30 barrels for each whale. The business was discontinued about 1860, since which date but one or two whales have been taken.

OFFSHORE VESSEL FISHERIES.—It is stated by Mr. Curtis Stephens, that Gouldsboro' has never sent any vessels to Labrador or to the Magdalen Islands. She sent two sail to Grand Banks for several years, beginning with 1867. The first mackerel vessels were sent to the Gulf of Saint Lawrence in 1855, from which time to 1863 four or five sail were sent annually to that locality.

THE HAKE FISHERY.—Perhaps the most important fishery in which the people of Gouldsboro' have been interested is that for hake in Frenchman's Bay. According to Mr. Stephens, this fishery began about 1840, when vessels from the westward, probably from Massachusetts, first resorted to the region. The fleet increased yearly until 1858 to 1860, when there were often 100 sail in the bay at one time, and fully twice that number came occasionally to the locality. Between 1860 and 1865, owing to the Rebellion, which necessitated the absence of a large percentage of the male population, the fishery declined very rapidly. A few years later the hake are said to have left the bay, and for this reason the fishery has never been revived.

THE MENHADEN FISHERIES.—Menhaden were formerly very abundant in the waters of this region, but for many years they were taken only in limited quantities for use as bait in the hake fisheries. When the value of their oil became known, the Gouldsboro' fishermen at once engaged extensively in their capture. The business began about 1855, and by 1863 there were, according to Mr. D. D. Hodgkins, of Lamoine, fully one hundred try-houses, with two to four kettles each, in active operation along the shore between Jordan's River and Winter Harbor. Each of these "stands" is said to have produced an average of fifty casks of oil yearly. By 1870 the business began to decline, and now, owing to the absence of the fish from these waters, it is wholly discontinued.

THE PRESENT CONDITION OF THE FISHERIES.—At the present time Gouldsboro' has but two vessels engaged in the fisheries; one, fishing for herring at Wood Island in the fall; while the other fishes for cod and other species along the shore. In addition to the above there are two smaller craft engaged in the lobster trade. The four vessels, valued at $1,300, measure but 75 tons in the aggregate, and furnish employment for only twelve men.

The principal fishing of the town is for lobsters. In the summer of 1880 seventy-eight men were engaged in this work, setting an average of sixty pots each. Two canneries, established in 1863 and 1870, respectively, are at present in operation. These use all of the small lobsters taken by the fishermen, and the larger ones are sold to Portland and Boston smacks. The two factories employ over fifty hands during the height of the season.

Most of the professional boat-fishermen of the town have small camps and flake-yards on the outer headlands or islands. When the fishing season arrives they repair to their camps with provisions and cooking utensils, and spend the summer in catching and curing the cod, hake, and haddock, which they often take in considerable numbers. There are fourteen of these camps, with twenty-five regular fishermen, and eight others that fish occasionally during the summer months. In addition to these, nearly all of the lobstermen fish, more or less, with handline and trawl after the lobster season is over.

In the early spring, eight men make a business of clamming on the flats, near West Gouldsboro', shucking and salting their catch, which they sell to the Hancock vessel fishermen.

14. SULLIVAN, HANCOCK, AND LAMOINE.

SULLIVAN.—Sullivan is a town of 1,200 inhabitants, lying to the north of Gouldsboro', with important mining interests. It is too far from the fishing grounds to have any extensive fisheries. One small fishing-schooner, of 7.65 tons, is owned here, but the captain usually makes his headquarters at other places. Aside from this, the fishing is confined to eight lobstermen, who

fish for the Gouldsboro' canneries during the summer months. The residents of the town go out occasionally to catch a supply of fish for their own tables, but none fish extensively for profit.

HANCOCK.—The town of Hancock, lying to the north of Frenchman's Bay, between Gouldsboro' and Lamoine, was first settled in 1776. It has at present about 1,000 inhabitants, the majority of whom are engaged in agricultural pursuits. Comparatively few follow fishing for a livelihood, as the town is too far removed from the fishing-grounds to warrant them in making daily trips in their boats. As in many of the adjoining towns, however, a few take a supply of provisions and such other things as may be necessary and proceed to the outer islands where they spend several months each summer in catching fish and lobsters, for which they find a ready market.

According to Mr. Charles Wooster, small fishing vessels were owned in the town during the early part of the present century, but they fished wholly in the vicinity of Gouldsboro', and it was not until 1845 that the people became interested in the fisheries of the Bay of Fundy. Two larger craft were sent to the Western Banks for three or four years, beginning with 1852. Hancock vessels were first sent to the Magdalen Islands for herring about 1860, one to three going yearly from that time till 1878, when the business was discontinued. The herring were mostly smoked and shipped to Boston and the West Indies. At that time from 30,000 to 40,000 boxes were put up annually in the town.

In 1860 the schooner Laurel was sent to the Grand Banks for codfish, this being the first vessel from the town to visit that locality; in 1868 and 1870 five vessels were engaged regularly in the fishery, and the business has been continued to the present time.

In 1880 there were four fishing vessels owned in Hancock, of which three went to the Grand Banks, and the other fished along the shore. The vessels have a total value of $12,650, and furnished employment to fifty-nine men. They landed during the season 5,300 quintals of fish. This fleet includes the schooner Mary Jane Lee, of 128.23 tons, which is the largest fishing vessel owned in the State, and the schooner Omaha, of 116.77 tons.

LAMOINE.—Lamoine, a small town set off from Trenton in 1870, has a population of 650, of whom the greater part are engaged in farming. It lies between Hancock and Trenton, to the north of Mount Desert Island.

According to Mr. D. D. Hodgkins, the people of the region became interested in the fisheries about 1835, when they began sending "pinkies" of 30 to 40 tons to the Bay of Fundy, and in 1848 the fleet numbered 20 to 25 sail with six to eight men each.

This fishery began to decline about 1850, and in 1857 it was discontinued, the smaller vessels being sold to the fishermen of the Fox Islands, Deer Isle, and Eastport, while the larger ones were retained and sent to the Grand Banks and other offshore grounds. The first was sent to Grand Banks in 1857, since which time this fishery has been continuously prosecuted, though for a number of years it has been on the decline. The business was at its height about 1866, when ten vessels were sent annually; the average has been about six sail. Men employed in the Grand Bank fishery from this town have always worked for wages instead of on shares as in most localities.

Two vessels went to Labrador for cod in 1850, but none have since been sent. Occasionally, after returning from the banks, the vessels have fished for mackerel along the shore for a number of weeks, though none have made the mackerel fisheries a specialty, and no purse-seines have been used.

Lamoine has been extensively engaged in herring smoking for about thirty years, and as the catch of herring in the brush weirs of the locality was much too small, a fleet of vessels was fitted out for the Magdalen Islands for an additional supply. The first schooner was sent by N. B. Coolidge in 1855; and from that date till 1880 vessels were sent yearly, their cargoes being smoked and

shipped to Boston and New York. In 1865 or 1866 six cargoes, equal to 125,000 boxes, were landed and smoked here. The average for the different years has been 30,000 to 40,000 boxes. Twenty-four smoke-houses are owned in the town, though few of them are now in use.

The shore fishermen of Lamoine were at one time extensively engaged in the manufacture of menhaden oil in common with the fishermen of Hancock and Gouldsboro'.

At present there are five vessels, aggregating 409.93 tons, valued at $14,700, and furnishing employment to 68 men, fishing from Lamoine; while two others, formerly engaged in the fisheries, have remained idle the present season. The catch in 1879 amounted to 10,570 quintals, and in 1880 to 6,350 quintals.

The shore fisheries are prosecuted by a few men who fish from small boats for lobsters and cod during the summer months. Three small brush weirs are fished for herring, but they are not properly cared for and the catch is unimportant.

In the fall of 1880, Eastport capitalists, hearing of the abundance of herring in the locality, built a sardine cannery at Lamoine, and put up a small quantity of fish. They intend erecting larger buildings in 1881 and hope to do an extensive business. A large number of weirs will be built for catching the fish.

15. MOUNT DESERT ISLAND AND ITS FISHERIES.

GENERAL DESCRIPTION.—The island of Mount Desert, containing the towns of Eden, Mount Desert, and Tremont, is about 18 miles long by 12 to 15 miles wide. It lies between Frenchman's and Union Bays, being separated from the shore by a narrow channel which is spanned by a toll-bridge. It was first settled by the French in 1608, but eight years later the settlement was broken up by the Virginians. In 1760 it was resettled by the English, and in 1789 was incorporated as a town under the name of Mount Desert. Since that time it has been divided into three townships, that portion lying along the eastern shore retaining the original name. The island is peculiarly attractive on account of its native wildness and picturesque scenery, and is the most popular summer resort on the coast of Maine. It has at present over 4,000 inhabitants. Several small islands, or groups of islands, lying within a few miles of its shores are very naturally included with it. The more important of these are Cranberry Isles, and Gott's, Bartlett's, and Tinker's Islands. If these be included, Mount Desert has a very important relation to the fisheries. The northern portion, including the greater part of the towns of Eden and Mount Desert, has no fishing interests, aside from a few brush-weirs and smoke-houses for the capture and preparation of herring, but the southern portion has a large fishing fleet, and many of its people are wholly dependent upon the fisheries for a livelihood. The residents in the vicinity of many of the small harbors and coves along the southern shore own vessels, and nearly every cove of importance has extensive boat-fisheries. The two principal fishing stations, however, are Southwest Harbor, in the town of Tremont, and Cranberry Islands, lying two or three miles to the eastward. These places have long been noted for their fisheries, and they are still the principal fishery centers.

THE VESSEL-FISHERIES.—According to J. S. Mayo, vessels from the island were engaged in the Labrador cod fisheries early in the present century, and by 1840 not less than seven or eight sail were employed in this way. The business continued to be important for a number of years, after which it gradually diminished and was wholly abandoned in 1862. Many of the same vessels were engaged in the herring fisheries at the same time, and in the early spring, before starting for Labrador, a majority of them made a trip to the Magdalen Islands and secured a cargo of herring, which were salted and brought home for pickling or smoking. Prior to 1864, no vessels from the

locality were sent to the Grand Banks, but from this date to 1875, two or three sail were employed regularly in this fishery.

At present, two fishing vessels are owned in the town of Mount Desert, eighteen in Tremont, and thirteen at the Cranberry Islands, making a total of thirty-three sail, aggregating 621.86 tons. These vessels, which furnish employment to 152 men, are valued at $16,650. All are engaged in fishing along the shore for cod, mackerel, and other species, and in 1880 none of them went beyond the limits of the Gulf of Maine.

THE CATCHING AND CANNING OF LOBSTERS.—The principal boat-fishing is for lobsters, and eighty-two men were employed in this work from April to August of the present year. Each man tends about ninety pots. The lobster fisheries of the island are among the oldest on this portion of the coast. As early as 1853, a lobster cannery was built by Boston parties at Southwest Harbor. It has continued in operation to the present day, still doing a large business. In addition to lobsters, clams and mackerel are canned in considerable quantities. The first "shell lobsters" canned in North America were put up at this place in 1879. This brand is the outgrowth of a demand by wealthy British customers for whole lobsters for garnishing purposes. Finding it difficult to get lobsters as commonly prepared for the trade sufficiently fresh for this purpose, the London agent for one of our leading packing establishments suggested the idea of meeting this demand, and, after a certain amount of experimenting, methods were hit upon by which satisfactory results were obtained. The "shell lobsters," as they are called, are selected of uniform size and perfect condition from the general stock, and are placed, without being removed from the shell, in long cylindrical cans, made expressly for the purpose. The method of boiling is similar to that for ordinary canned lobsters, the only difference being that they are boiled a little longer that the heat may penetrate the shell and thoroughly preserve the meat. During the height of the season this cannery furnishes employment to fifty hands.

THE BOAT-FISHERIES.—The regular boat-fishermen number sixty-two, and thirty-four others fish occasionally in summer. About thirty of the lobstermen also spend more or less time in fishing after the close of the lobster season. Some of the fishermen have large boats, and venture quite a distance from the shore, while others remain constantly within three or four miles of the harbor.

EXTENT OF THE FISHERIES IN 1880.—There are thirteen brush-weirs, valued at $2,300, owned in the region. In these were caught, in 1880, over $11,000 worth of herring and mackerel. The principal business in this line is at Tucker's and Gott's Islands, where large weirs are fished for supplying the fishermen with bait. Some of the weir-fishermen have built ice-houses, and now furnish both ice and bait to the vessels. Any surplus of large herring taken in the weirs is smoked. In 1880 there were twenty-eight smoke-houses, in which 38,000 boxes of fish were prepared, the bulk of these being put up at Bar Harbor, in the town of Eden.

Five firms are engaged in buying and curing fish taken by the vessels and boats, the principal business being at Cranberry Isles and Southwest Harbor. In 1880 these parties employed thirteen men and handled 11,000 quintals of cod, hake, and haddock. Fully three-fourths of this entire quantity were sold in Boston.

16. TRENTON, ELLSWORTH, AND SURRY.

TRENTON.—Trenton is a small town lying to the west of Lamoine and to the north of Mount Desert. It has at present no interest in the fisheries of the coast beyond the digging of a few clams that are sold to the cannery at Southwest Harbor, in the town of Tremont. Formerly a few

boat-fishermen and five or six small vessels were engaged in the Frenchman's Bay hake fishery, but none of its people have been employed in this way since 1868. Two vessels were sent to the Grand Banks for cod each season from 1868 to 1873, after which they were sold and the fisheries were abandoned.

ELLSWORTH.—Ellsworth, a town of 5,257 inhabitants was first settled in 1763; it was incorporated in 1800. A city of the same name at the head of navigation of Union River is next to Bangor the leading commercial settlement along this portion of the coast. Its people, in addition to their mercantile trade, are extensively engaged in the manufacture and shipment of lumber.

The town is too far removed from the sea to have any extensive fishing interests. One fishing schooner of 68.11 tons is owned by a resident merchant, but the catch is landed at Penobscot, where the fish are cured for the Boston market. The boat-fishing for salt-water species is confined to the capture of mackerel at the mouth of Union River during the summer months. Two fresh-fish dealers are engaged in supplying the city and country trade. They depend chiefly upon the fishermen of the outer islands for their supply, and, on account of the distance, find it necessary to keep a steam launch plying between the city and the fishing grounds.

SURRY.—The town of Surry forms the shore-line between Ellsworth and Blue Hill. Formerly some of its inhabitants were engaged in the manufacture of menhaden oil from fish taken in the locality, each fisherman being provided with nets and kettles for this work. At the present time, no fishing-fleet is owned in the town, and only four men are extensively engaged in the fisheries. These go out in small open boats for cod, hake, and mackerel in summer. During the height of the mackerel season they are joined by some of the farmers of the region. The entire catch is sold in the locality.

E.—THE CASTINE DISTRICT.

17. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

ORIGIN AND DEVELOPMENT OF THE FISHERIES.—The Castine district, including the eastern shore of Penobscot Bay and the larger islands off the eastern headlands, was settled about 1760 by parties who came to the region to engage in the fisheries. The land is more arable than that of the districts further east, and a large percentage of the population is engaged in farming. A majority of the early settlers, however, devoted their entire attention to the fisheries, and for many years fishing was the principal occupation of the people. It was at one time the most important fishing district of Eastern Maine. A number of the towns had large fleets engaged in the Grand Bank cod fisheries; others sent a good many vessels to the Gulf of Saint Lawrence for mackerel, while nearly all had fleets of small vessels and Chebacco boats engaged in the shore fisheries along the coast of Maine and in the Bay of Fundy. Early in the present century the fishing vessels were very small, and the number was comparatively limited, a majority of the fishermen using small open boats for the prosecution of the work. Gradually, larger and better vessels were introduced, and, between 1850 and 1865, from 200 to 300 sail of the different sizes were actively employed. In 1860, Deer Island alone sent nearly 100 vessels to the different fishing-grounds, this fleet being larger than that of any other town in the district. About this time the vessel fisheries began to decline, and many of the larger schooners were sold to the westward, the men engaging in the boat fisheries or seeking employment on the land. By 1865 the fishing interests of most localities had been greatly reduced, and until recently they remained in this con-

dition. At present, however, there are indications of a revival of the industry, and in some localities vessels are being purchased and extensive preparations are being made for the work, but in in others there is no disposition to resume the business, as the profits to be derived from it are not satisfactory.

CASTINE'S TRADE WITH FISHING VESSELS.—Prior to 1825, a majority of the vessels of the region were obliged to visit Portland to secure their fishing outfit, including salt and provisions. About this time a Castine merchant, knowing the importance of this trade, turned his attention to it, and began the importation of salt from Liverpool and Cadiz. He also secured such other articles as were needed by the fishing vessels, and soon built up an extensive trade with the local fleet. Other merchants soon engaged in the business, and within a few years most of the vessels of Eastern and Central Maine came regularly to Castine to secure their outfits, and not less than 2,000 tons of salt were imported annually to be used in the vessel fisheries. It is said that between 1850 and 1860, when the business began to decline, fully five hundred vessels were fitted at Castine. At present, however, the business is practically discontinued, and less than a dozen small vessels are fitted from the place, the majority of these belonging to Deer and Swan's Islands.

THE LOBSTER FISHERY AND CANNERY INTERESTS.—The lobster fisheries, which now furnish employment to the boat-fishermen during the greater part of the fishing season, began about 1850, when parties from the westward brought pots to Deer Isle to catch lobsters, which were carried to Portland and Boston. Soon a number of the local fishermen became interested in the capture of the species, and since that date the lobster fisheries have continued to increase in importance. In 1880, 311 men were engaged in the capture of lobsters during some portion of the year; many of them following the business during the entire season, while others fished only for a few weeks or months in the spring and early summer. Fifty additional persons were employed in marketing the catch, which amounted to 2,967,860 pounds. Five canneries are now in successful operation, three of them being located on Deer Island. In 1880, these furnished employment to 190 persons, and upwards of 2,000,000 pounds of lobsters were canned, the products having a value of over $52,000.

THE CLAM FISHERY.—The clamming interests of the Castine district are quite important, a large number of men finding employment on the mud-flats during the winter months, when there is little else to occupy their attention. Nearly 60,000 bushels of soft clams are dug annually, three-fourths of them being shucked and salted to be used for bait in the vessel-fisheries. Nearly half of the remainder are sold to the canneries.

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows the extent of the fisheries of the district for 1880:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	623	Capital in vessels and boats	$228,000
Number of boat-fishermen	605	Capital in nets and traps	46,010
Number of curers, packers, fitters, &c	59	Other fixed and circulating capital	*a* 71,550
Number of factory-hands	165	Total	350,160
Total	1,452		

a Other fixed and circulating capital.—Cash capital, $44,200; wharves, shorehouses, and fixtures, $11,800; factory buildings and apparatus $15,550; total, $71,550.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.
Vessels.						
In food-fish fishery:						
Active	90	2,902.87	$81,435	$13,110	$77,505	$172,050
Idle	10	457.18	14,500	.....	.....	14,500
In lobster fishery	9	128.04	3,250	100	1,580	4,930
Total	109	3,488.09	99,185	13,210	79,085	191,480
Boats.						
In vessel fisheries	275	.....	16,915	.....	.....	16,915
In shore fisheries	656	.....	21,555	6,050	2,000	29,605
Total	931	.....	38,470	6,050	2,000	46,520

Nets and traps.	No.	Value.
Nets.		
Gill-nets:		
In vessel fisheries	205	$3,872
In boat fisheries	600	7,200
Purse-seines:		
In vessel fisheries	25	13,750
Haul-seines:		
In boat fisheries	8	200
Total	898	25,022
Traps.		
Weirs	8	450
Fykes	20	100
Lobster-pots	28,050	21,038
Total	28,078	21,588

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	24,853,257	.....	.....	$407,335
Fresh fish.				
For food	421,500	.....	.....	5,620
For bait	4,430,000	.....	22,150 barrels	16,613
For fertilizer	30,000	.....	150 barrels	75
Total	4,881,500	.....	.....	22,308
Dry fish.				
Cod	5,600,725	1,930,096	.....	60,316
Hake	1,465,290	607,824	.....	8,140
Haddock	480,675	173,040	.....	3,476
Pollock	97,730	37,744	.....	674
Cusk	22,880	9,856	.....	242
Total	7,673,300	2,758,560	.....	72,848
Pickled fish.				
Mackerel	7,130,700	4,753,800	23,769 barrels	136,672
Herring:				
Ordinary	990,250	792,200	3,961 barrels	11,883
Total	8,120,950	5,546,000	27,730 barrels	148,555
Smoked fish.				
Herring:				
Ordinary	117,047	85,000	10,000 boxes	2,000
Canned fish.				
Mackerel	506,800	.....	333,408 cans	34,730
Lobsters.				
Fresh	868,500	.....	.....	31,845
Canned	2,099,360	.....	425,220 cans	52,387
Total	2,967,860	.....	.....	84,232
Clams.				
For food	75,000	.....	7,500 bushels	2,625
For bait	445,200	.....	44,520 bushels=3,180 barrels	15,900
Canned	65,000	.....	6,500 bushels=97,932 cans	9,385
Total	585,200	.....	.....	27,910
Miscellaneous.				
Fish-oil	.....	.....	12,315 gallons	4,926
Sounds	.....	8,140	.....	7,326
Marine products used for fertilizers	.....	.....	.....	2,500
Total	.....	.....	.....	14,752

Below is given a brief account of the past and present fishing interests of the different towns:

18. BLUE HILL, BROOKLIN, AND SWAN'S ISLAND.

BLUE HILL.—Blue Hill, a town of 1,700 inhabitants, was first settled in 1762, and incorporated as a town in 1789. It forms the shore-line between Surry and Brooklin. The principal business of the town is quarrying and mining, and at present the mining for copper and silver is more extensive here than anywhere else in the State.

Blue Hill seems never to have been extensively interested in the fisheries, though about 1863 many of its people were engaged in the manufacture of menhaden oil from fish taken in nets along the shore. At the present time nothing is done in this line, and the fishing is confined largely to lobstering, clamming, and weir-fishing in the shore waters. Seven lobstermen, set an average of seventy pots each; after the lobster season is over they fish with lines and trawls for cod and other species, landing an average of fifty quintals to the man. Others fish occasionally during the mackerel season for home supply and for sale to the canneries. Six weirs are owned in the town, most of them being located on the outlying islands. The value of the weir catch in 1880, including mackerel and herring, was $1,850. Eleven men are engaged in this fishery. In the fall and spring fifteen men are extensively engaged in clamming. The quantity dug in 1880 was 2,900 bushels, most of them being shucked and sold as bait. There are two small vessels, with crews of two and three men, respectively, fishing on the inshore grounds. Their catch is usually very small; in 1880 it amounted in value to only $500.

BROOKLIN.—The fisheries of Brooklin are quite similar to those of Blue Hill, though the number of people employed is considerably larger. Twenty-eight men fish from April to August for lobsters, setting about one hundred and twenty-five pots each. There are no professional boat-fishermen, but a number go out occasionally for local supply. Six small vessels fish along the shore with trawls, lines, and nets for cod, mackerel, and herring. In 1879 a large schooner was fitted with a purse-seine for catching mackerel. She engaged in the southern fishery in the spring, went to the Gulf of Saint Lawrence in summer, and returned in the fall to fish on the coasts of Maine and Massachusetts. She was sold to Portland in 1880. Two small vessels owned by residents of the town are employed in "running" lobsters to the various canneries of the region. The entire fleet, numbering nine sail, is valued at $5,875; they aggregate 194.13 tons, and carry a total of forty-two men.

Brush weirs were first fished at Brooklin about 1860. In 1880 there were two small ones, the catch of which amounted to 150 barrels of mackerel and 650 barrels of herring, in addition to 10,000 boxes of herring that were smoked by the weir-fishermen.

There are extensive mud-flats in the region, where long-necked clams (*Mya arenaria*) are peculiarly abundant. An investigation showed that one hundred and seventeen men made a business of digging and shucking clams to be used for bait in the vessel fisheries. The quantity dug is enormous. In the winter of 1879–'80 over 13,000 bushels were shucked and salted, and 1,000 more were used fresh. The value of the catch was about $4,000. The clamming season lasts from October to the middle of the following May, though little is done in midwinter. Four bushels of shell clams is an average catch for a tide, and the total for the year is about eight barrels of shucked clams to the man.

When menhaden were abundant a good many small try-houses were built upon the shore for utilizing the catch of the net-fishermen. At present, on account of the absence of the fish, nothing is done in this line.

In 1870 a lobster cannery was built at Brooklin by Portland capitalists; it has since been in successful operation, and during the present season furnished employment to twenty-five hands.

SWAN'S ISLAND; ITS EARLY FISHERIES.—Swan's Island, formerly known as Burnt Coat, lies a few miles south-by-west of Mount Desert. It is 6 or 7 miles long by 4 or 5 broad, and has about 450 inhabitants. According to Capt. John Staples it was settled in 1775. From the first the people have been largely dependent upon the water for a livelihood, though the soil is capable of producing bountifully after it has once been cleared. Formerly, in common with other portions of the coast, it had small vessels engaged in the shore and Bay of Fundy fisheries. In 1853 the first large vessel, the schooner Constitution, was brought to the island and fitted for the Grand Bank cod fisheries. Soon three or four others were purchased and sent to the same locality, the majority fishing for mackerel after their return in the fall.

THE MACKEREL FISHERY.—About 1868 the Bank fisheries were almost wholly discontinued, and the vessels turned their attention to the capture of mackerel. This fishery has continued to develop, until Swan's Island has now, next to Portland, the largest mackerel fleet of any town on the coast of Maine. Purse-seines were first used by these fishermen in 1870, and within a few years all of the vessels were provided with them. Five of the mackerel vessels go south in the spring, and the remaining four are usually hauled up till July, when the fish reach the coast of Maine; the crews in the mean time devoting their attention to the lobster fisheries. From the beginning of the fishery to the present day, according to Mr. G. M. Staples, only three or four trips of mackerel have been inspected on the island, the vessels almost invariably landing and packing at Portland, Boston, or Gloucester. In 1879 the Swan's Island fleet landed 14,966 barrels of mackerel, two of them being among the high-line vessels of the American fleet.

THE VESSEL-FISHERIES OF THE ISLAND.—In addition to the mackerel vessels, a fleet of twelve sail are engaged in the shore fisheries, five of them going to Wood Island for herring after the fishing for cod and hake is over. The herring are usually packed in Portland, and many of the "ground-fish" are sold at Deer Island and Mount Desert.

A summation of the vessel-fisheries of the island for 1879 shows twenty-one sail, aggregating 885.05 tons. These had a value of $30,000, and furnished employment to 186 men. The catch for the season was 14,966 barrels of mackerel, 1,055 barrels of herring, and 1,623 quintals of cod, hake, and haddock.

Two menhaden oil and guano factories were built on the island in 1875, one of them being provided with boilers and hydraulic presses for doing an extensive business. They were run a portion of three seasons, after which, owing to a scarcity of fish in the locality, the business was discontinued.

THE LOBSTER FISHERY.—Next to mackereling, the trapping of lobsters is the principal business of the people. According to Mr. David Smith, the first persons to engage in the capture of lobsters for profit were fishermen from Gloucester, Mass., who came to the island on a smack about 1850, bringing their traps with them. They hired one or two of the resident fishermen to assist, and the smack remained until her well had been filled, when she sailed for Boston. The following season some of the islanders became interested in this fishery, and about 1855 ten men were regularly employed in this way during the summer months, smacks coming frequently to purchase the catch. Fewer lobsters were taken from this time up to 1860, when the fishery was again revived, and has continued to increase to the present time. There are now twenty-three men who devote their attention to the capture of lobsters during the entire season, with fifty-one others, who lobster from the middle of March till the 10th of July, when they pile their pots upon the beach and ship in the vessels to engage in the mackerel fisheries.

Over 8,000 lobster pots are owned by the fishermen of the island, and about 5,600 barrels of

herring, flounders, and sculpins (*Cottus octodecimspinosus* and *C. grœnlandicus*) are used for bait in this fishery alone during the season.

FISH-CURING.—A few of the boat-fishermen engage in the capture of cod, mackerel, &c., in the fall for home supply, selling a few to the three curing stands on the island. In 1879 these parties cured 1,000 quintals of fish, a larger part of which were bought from small vessels.

19. DEER ISLAND AND ITS FISHERIES.

HISTORY OF THE FISHERIES FROM 1800 TO 1880.—The town of Deer Isle, lying to the south of Sedgwick, is separated from the mainland by Eggemoggin Reach. It includes Great Deer Isle, Little Deer Isle, and Eagle Island. The first is by far the largest and most important of the group; it is about 9 miles long by 7 or 8 miles broad. It has a very irregular coast, being indented by long and narrow bays and coves that nearly meet from opposite sides. The region was first settled by William Eaton in 1762, and was incorporated as a town in 1789. In 1790 it had 682 inhabitants; in 1812, about 1,250; in 1850, 3,037; and in 1870, 3,414.

The following facts relative to the early history of the town were gathered during several interviews with Mr. William Webb, for many years one of the leading officials of the town. Mr. Webb was born on the island in 1803, and was actively engaged in its fisheries as early as 1818. Up to this time there were but two vessels of over 40 tons burden and twelve to fifteen Chebacco boats fishing from the island, though many of the residents had been employed on fishing vessels belonging to Newburyport. The principal business at that time was the trade in lumber, and half a dozen large saw-mills were in active operation. About one-fourth of the inhabitants were then dependent on the fisheries. In 1830 twelve large vessels were sent to the more distant fishing grounds, and forty smaller ones fished along the shore. In 1840 the fleet had increased to thirty large vessels (over 40 tons old measurement) and fifty small ones. The height of the fishing business for the island occurred between 1860 and 1865, by which time a better class of vessels had been introduced, and about thirty-five sail of large schooners and fifty smaller craft were actively employed. The large vessels were almost without exception engaged in the mackerel fishery, most of them being employed in freighting from the close of the season in November till the following June, when they sailed for the Gulf of Saint Lawrence. They usually landed two trips each during the season. The first Deer Isle vessel to fish for mackerel in that locality was sent in 1834. The fishing was wholly with hand-lines up to 1873, when purse-seines were introduced. The smaller vessels fished on the inner grounds, some of them frequenting the Bay of Fundy regularly for many years.

Since 1868 the fisheries have rapidly declined, all of the better and larger vessels having been sold to other localities, and Deer Isle to-day owns the poorest class of vessels of any town on the entire coast. Some of the merchants claim that this decline is largely due to the difficulty of making suitable arrangements with the custom-house authorities for obtaining their salt free of duty. It seems that they made an effort to have a quantity kept on the island to supply the vessel fleet, but, failing in this, they were obliged to make the trip to Castine or pay the duty, which they often did to avoid the delay. A more probable cause for the rapid decline is found in the relations that existed between the fitters and crews, whereby a settlement with the fishermen was often delayed for nearly a year, during which time they were subjected to all the disadvantages of the credit system in its worst forms. In this way the Deer Island fishermen were seriously inconvenienced, and they were gradually driven to seek employment on the vessels of other fishing ports, even to the neglect of their own fleet. This practice has been continued, and there are now not less than

seventy-five men who go to Gloucester and Portland each spring to ship in the fishing vessels of these cities.

As early as 1815 one of the Deer Isle vessels was engaged in the Gulf of Saint Lawrence cod-fisheries. In 1822, two vessels were sent to Labrador for cod, a vessel from Newburyport accompanying them and taking their catch direct to Spain. Only three vessels have been engaged in the Labrador fisheries since that time, none of them going more than four or five years. Crews from the island have, however, frequently visited the Labrador coast in vessels belonging to Newburyport.

Next to Isle au Haut, Deer Isle was the first to engage in the Magdalen Island herring fishery. In 1830 she fitted out six vessels for this fishery, but since that date only one or two have been sent yearly. In 1829 the schooner Caleb, 54 tons, was engaged in sealing, taking her catch at the Magdalen Islands. Two vessels from Mount Desert were engaged in the seal fishery the same season. Only one Deer Isle vessel has ever fished on Grand Banks; none have fished on George's, and none have engaged regularly in the capture of halibut. Up to 1836 the vessels sailed without charts; in 1845 stoves were substituted for fire-places, and in 1849 the patent steering-wheel was introduced in place of the old-fashioned tiller.

EXTENT OF THE VESSEL AND BOAT FISHERIES IN 1879.—In 1879 Deer Isle had forty-two vessels, aggregating 915.35 tons, engaged in the fisheries. This fleet, valued at $18,910, furnished employment to one hundred and ninety-nine men. Four of the vessels fished wholly for mackerel; thirty-three were engaged in the shore-fisheries for cod, hake, haddock, herring, and mackerel; and the five remaining ones were employed exclusively in the lobster trade. Seven of the shore fleet carried lobsters to the canneries of the locality in spring and summer. The vessel catch was sold largely to the fish-merchants of other places; but there were cured on the island during the season about 1,800 quintals of cod and hake. In addition to these, 200 barrels of mackerel were put up by the dealers.

Not less than one hundred and forty men are engaged in fishing from small boats. These, with few exceptions, fish for lobsters from March till August; they then engage in the shore mackerel fishery for a few weeks; and the remainder of the season is spent in fishing with line and trawl for other species. A few parties clam more or less during a greater part of the year, and by the middle of November a large number of the boat and vessel fishermen resort regularly to the mud-flats, where they spend a considerable portion of their time in clamming till the following April. The fishermen of Little Deer Isle are almost wholly dependent upon the clam-flats for a livelihood, and many of them are engaged in clamming during the entire year. The clams, after being shucked and salted, are sold to the dealers on the island, or to those of Brooklin and Sedgwick. These in turn ship them to the larger fishery ports to be used for bait. The island merchants alone handled 1,500 barrels during the season of 1879–'80.

THE LOBSTER FISHERY.—The lobster ranks first in importance among the species taken along the shore. Prior to 1853 none of the residents had any knowledge of the abundance of lobsters in the locality, as up to this time they were taken only with gaffs among the rocks and sea-weeds where they had been left dry at low water. In the spring of that year Capt. John D. Piper, who owned a smack for carrying lobsters to market, brought traps to the island and hired men to engage in the fishery. The business proved very profitable, and by 1860 twenty men were employed in this way, the bulk of the catch being sold to Portland and Boston smacks. In 1858 the first lobster cannery was established on the island, and in 1877 two others were built. In 1880 these canneries employed about one hundred persons, paying out $10,000 in wages. During the same season 10,500 lobster pots were fished by the residents of the town.

20. ISLE AU HAUT, SEDGWICK, AND BROOKSVILLE.

ISLE AU HAUT.—Isle au Haut is a small island lying several miles to the southeast of Deer Isle. It was permanently settled about 1790. Being surrounded by excellent fishery grounds on three sides, it has from the first been largely interested in the fisheries; and as early as 1825, according to Capt. James Turner, there were forty sail of vessels fitting at Castine and landing their catch at the island. Several of these vessels were engaged in the herring fishery during a portion of the season, and between 10,000 and 15,000 boxes were smoked annually on the island. Later vessels were sent to the Magdalen Islands for herring, and both smoked and pickled herring were put up in considerable quantities.

The vessel-fisheries continued with but little diminution up to 1855, after which they declined very rapidly, and the fleet at present consists of three small vessels, none of which do any extensive business. A majority of the people are now engaged in the boat-fisheries. They fish for lobsters about the many rocky islands and ledges in the locality from April to August, after which they turn their attention to the capture of cod and other species with line or trawl, as is most desirable. Not less than forty persons are employed in this way. About 1860 a lobster cannery was built at Isle au Haut for utilizing the catch, but, owing to an unpleasantness between the owners and the fishermen, it was closed in 1873.

According to Captain Collins, many herring were netted about the shores of the island at certain seasons of the year up to 1850, and even in later years they have often been quite plenty. In 1874 a Sedgwick vessel anchored in one of the small harbors, and with eight nets and a crew of two men succeeded in taking 150 barrels in three weeks. It is said that two schools of herring visit the locality, one arriving about the middle of July and leaving early in August, the other coming by the 15th of September and remaining about a month. Little has been done in this fishery by the islanders, beyond the capture of a limited quantity for bait, for several years.

SEDGWICK.—Sedgwick, formerly known as Naskeag, was first settled in 1763. It was incorporated as a town, under its present name, in 1789, since which time the towns of Brooklin and Brooksville have been taken from it. In 1870 it had a population of 1,113. Mr. Samuel Wasson, of Surry, in his Survey of Hancock County, refers to it in the following language:

"Sedgwick . . . is another of our misshapen towns. The 'pompet' which darkens its agriculture is its maritime facility. A large portion of this town is non-arable or grazing land, the bushy acres of which should be made to turn out annually tons of superior mutton. From Sargentsville to Sedgwick, following the shore of Eggmoggin Reach, the soil is easy of cultivation and is quite productive. Like most of our seaboard towns, the sea and not the soil furnishes the bread. The industrial establishments are mainly those which are related to the fishing industry."

At the present time Sedgwick has four vessels, valued at $6,200, engaged in the fisheries. Two of these are employed in the shore fishery, another visits Grand Banks for cod, and the fourth fishes for mackerel between Cape Hatteras and the Gulf of Saint Lawrence.

There are extensive clam-flats along its shores, and during five months of the year thirty-eight men depend on clamming for a livelihood. In the winter of 1879–'80 there were dug, according to the estimate of Herrick & Byard and W. G. Sargent & Son, over 5,000 bushels of clams. Of the entire quantity about 4,300 bushels were shucked and salted, the remainder being sold fresh in the locality. The two firms above mentioned handled during the season 2,326 barrels of shelled clams, all of which were bought from the fishermen of the surrounding towns. The catch was shipped to the principal fishery centers of Maine and Massachusetts for use as bait in the offshore cod fisheries. Beyond the vessel fisheries and the clamming interests almost nothing is done, though three men fish

occasionally from small boats to furnish residents of the locality with fresh fish, and others catch a supply for their own tables.

BROOKSVILLE.—Brooksville, lying to the south of Penobscot between Castine and Sedgwick, is almost an island, being connected with the main shore by two very narrow necks of land. It was incorporated in 1817, and named in honor of Governor Brooks, of Massachusetts. In 1870 it had 1,276 inhabitants. Its principal interests are in connection with agriculture, quarrying, and coasting. Mr. Samuel Wasson says of it: "West Brooksville is the Coastville of Western Hancock [Hancock County]. Nearly every man sails, helps to man, or is part owner of a 'coaster,' which gives a peculiar idiom to their language, which is perfect Greek to a backwoodsman."

At present Brooksville has one vessel of 6.50 tons with a crew of two men engaged in the shore-fisheries. About thirteen men fish for lobsters from April to August, selling the bulk of their catch to the Castine cannery. Seven men clam in winter, and an equal number make a business of line-fishing in summer. In addition to these, fully seventy-five men fish for mackerel from two to six weeks in summer, most of their catch being canned at Castine. There are also extensive smelt fisheries in the town.

21. CASTINE AND ITS FISHERIES.

ITS FISHERIES, PAST AND PRESENT.—Castine is a small town lying to the south of Penobscot, between the Penobscot River and South Bay. It contains the village of Castine, which is one of the oldest and most interesting settlements in the State. Members of the Plymouth colony occupied it as a trading post as early as 1630, when it was known as Pentagoet; it was permanently settled by the English in 1760. In 1796 it was set off from Penobscot and incorporated. From its earliest settlement it has been the scene of bloody conflicts, and has been frequently taken and retaken by the armies of the French, Dutch, and British. In 1850 it had 1,260 inhabitants and the census of 1870 showed a gain of only 44.

Its history as a fishing town is both peculiar and interesting. Its distance from the shore fishing grounds prevents any extensive boat-fisheries, though several parties are engaged in the capture of lobsters and mackerel in summer, and a number of others dig a few clams from the mud-flats in winter. In 1880 ten men were engaged for a number of weeks in the shore mackerel fishery, selling their catch to the cannery at the village. All of these "clam" to a greater or less extent in winter, and four of them fish for lobsters from April to August. Aside from this and the smelt fisheries which will be mentioned elsewhere, there is at present no fishing of importance from the town.

Though the boat-fisheries have never been extensive, the excellent harbor gave Castine an advantage in the vessel-fisheries which she retained for many years. By the beginning of the present century she had a few large vessels engaged in the various offshore fisheries; and the number continued to increase until her vessels frequented all of the important fishing grounds, including Grand and Western Banks, Labrador, Bay of Chaleur, and the Magdalen Islands. The Grand Banks cod fisheries are said to have been peculiarly important. They began early in the century, and by 1833 a large number of vessels were employed in this work. The fishing continued to be extensively prosecuted till 1855, after which it rapidly declined, the vessels being sold to other places or employed in the coasting trade. In 1878 the offshore fleet had been reduced to two sail. These returned from the fishing grounds with small fares, whereupon their owners became discouraged and decided to give up the business. Both vessels were immediately stripped and secured to the wharves, where they have since remained.

During the years of greatest activity a considerable number of small vessels were fitted out for

the shore and Bay of Fundy fisheries. These went regularly to the nearer grounds and returned with good catches. But the causes that led to the reduction of the offshore fleet had their influence upon the smaller craft, and though some of them were kept for a number of years they gradually disappeared, and to-day not a fishing vessel sails from Castine. True, several small ones have been granted fishing licenses, but on examination it is found that they are employed chiefly in other work, and it would be misleading to include them with the fishing vessels of the coast.

THE TRADE WITH FISHING VESSELS.—While the fisheries proper of the town have been important, the trade with the fishing fleet of other places has been of much greater value to the people, and Castine was for a number years, next to Portland, the principal fisheries center of the State.

Up to 1824, according to Mr. William Webb, of Deer Isle, little attention was paid to the vessel trade by the merchants of the city, and some of them even sent their own schooners to Portland for their salt and other outfits. About this time the first cargo of salt was imported by one of the Castine dealers. This was the beginning of a large trade, and vessels from the surrounding country, including Deer Isle, Swan's Isle, Fox Islands, Mount Desert, and many other fishing towns along the shore, soon came to depend wholly on Castine for their fittings, including salt, gear, and provisions. The business continued to increase, and by 1845, according to a correspondent of the Bangor Whig, fully three hundred vessels, carrying upwards of two thousand men, "fitted" at Castine for the various bank and shore fisheries, while 2,000 tons of salt were annually imported and consumed. The most of this came direct from Cadiz and Liverpool.

Mr. Webb informs us that the trade began to decrease just prior to the rebellion, and that since 1870 "bankers" have gone elsewhere for their supplies, and the shore vessels have gradually sought other markets. At present the trade is confined to eight or ten small vessels belonging at Deer and Swan's Isles, and it is practically of no importance.

Aside from the interests already mentioned Castine has one of the largest line factories in the country, where most of the cod and mackerel lines used by the New England fishermen are made.

THE CANNING OF FISHERY PRODUCTS.—A large cannery was built at the village in 1871 and is now doing an extensive business in the canning of lobsters, mackerel, clams, and various kinds of berries and fruits. About fifty hands are employed during the working season. This cannery was probably the first to use a steamer for gathering its supplies of sea products from the fishermen of the adjoining shore and the numerous outlying islands. The change from sailing vessels to steamers has proved thoroughly satisfactory and it seems probable that steamers will soon be generally introduced for this work.

22. PENOBSCOT, ORLAND, AND BUCKSPORT.

PENOBSCOT.—The town of Penobscot is too far from the fishing grounds of the coast to have any extensive salt-water fisheries. The only business in this line is the curing of a cargo of codfish caught by a vessel belonging in Ellsworth.

Penobscot has extensive smelt fisheries, and a few of its inhabitants go to the outer islands occasionally and fish for cod and mackerel for home supply. Beyond this no fishing of any kind is done.

BUCKSPORT AND ORLAND.—The towns of Bucksport and Orland, situated on the eastern bank of the Penobscot, 18 miles below Bangor, are so intimately connected in their fishing interests that they should properly be considered together. The region was first settled in 1762, and as early as 1825 Mr. Joseph Cook and one or two others had fair-sized vessels engaged in the offshore fisheries. The business continued to increase till 1855, when, according to Mr. N. H. Powers, there were about 20 vessels, ranging from 50 to 125 tons, carpenter's measurement, landing a total

of 20,000 quintals of fish during the season. Most of the vessels went to "the Bay" for mackerel after their return from the banks. The "ground-fish" were dried by professional curers at Orland and sold in Boston, and the mackerel were packed at various places. From 1858 the fishing interests began to decline, and in 1870, according to Mr. Powers, the fishing fleet of the two towns numbered only three or four sail, the majority of the old vessels being employed in the coasting trade.

In 1877 the business again revived, and in 1880 Orland had 6 schooners, aggregating 373.02 tons, engaged in the Grand Bank cod fisheries. The vessels are valued at $10,500. During the same season Bucksport had 6 large vessels fishing on Grand Banks, and two smaller ones engaged in the shore fisheries; this fleet was valued at $13,600, and aggregated 459.03 tons. About 150 men are employed in the vessel fisheries of the two towns. The crews are usually hired at wages varying from $120 to $150 for the season. The vessels, as a rule, make but one trip during the summer, starting late in the spring and returning early in the fall. Nearly all land their catch at Orland, where the fish are cured before being shipped to Boston and other places.

In 1880 there were six curing-stands in the vicinity. These had an aggregate value of $3,000, and furnished employment to 27 men for two months. The quantity of fish cured was 13,200 quintals, all but 400 quintals of which were cod.

F.—THE BELFAST DISTRICT.

23. GENERAL REVIEW OF THE FISHERIES.

A DESCRIPTION OF THE DISTRICT AND ITS FISHERIES.—The Belfast customs district extends along the western border of Penobscot Bay, from Stockton to Rockland. It also includes the Fox Islands, lying in the mouth of the bay, about midway between its eastern and western shores. The soil of the mainland is well suited for agriculture, which occupies the attention of a majority of the people. The residents of the Fox Islands are engaged chiefly in quarrying and fishing. At the principal harbors along the main shore are settlements of greater or less importance. The largest of these are the cities of Belfast and Camden. The people of these places, as well as those of the smaller villages, are extensively interested in the coasting and foreign vessel trade, and many large merchantmen are owned and manned by them.

Camden and Belfast are the only places on the mainland that have been extensively engaged in the fisheries. The residents of these cities became interested in the fisheries about 1825, and for a quarter of a century the business continued to increase in importance, though it has since declined, and the vessel-fisheries are now almost discontinued. The residents still continue to engage in the shore fisheries to a greater or less extent in summer, catching lobsters, mackerel, cod, and other species for local supply. The river fisheries of the region are quite extensive, many salmon, alewives, and smelt being secured.

The only islands of importance in the group known as the Fox Islands are North Haven and Vinal Haven. These were settled about 1765 by parties from other localities, who came to Vinal Haven for the more successful prosecution of the fisheries. Up to 1830 the vessels owned in this locality were small craft, most of them being under 30 tons, carpenter's measurement. A majority of these were owned at Vinal Haven, this island, owing to its nearness to the fishing-grounds, having the largest fishing interests. A little later better vessels were added to the Vinal Haven fleet, but the North Haven fishermen continued to use small ones up to 1850, since which time her fish-

ing interests have been constantly increasing. To-day each island has twenty vessels, those of North Haven averaging about 40 tons, while those of Vinal Haven are only half as large.

The shore boat-fisheries furnish employment to 180 men, all but 10 of these being engaged in the lobster fisheries during the spring and early summer, while the remainder of the season is spent in the capture of mackerel and other fishes.

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows the extent of the fisheries of the district for 1880:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	343	Capital in vessels and boats	$134,705
Number of boat-fishermen	490	Capital in nets and traps	28,468
Number of curers, packers, fitters, &c	32	Other fixed and circulating capital	*a* 59,455
Number of factory-hands	84	Total	222,628
Total	949		

a Other fixed and circulating capital.—Cash capital, $34,200; wharves, shorehouses, and fixtures, $14,255; factory buildings and apparatus, $11,000; total, $59,455.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	53	1,330.84	$48,375	$10,155	$43,870	$102,400	In vessel-fisheries	118	$1,770
Idle	3	31.90	550			550	In boat-fisheries	400	4,800
In lobster fishery	5	120.49	6,400	50	800	7,250	Purse-seines:		
Total	61	1,483.23	55,325	10,205	44,670	110,200	In vessel-fisheries	14	7,500
Boats.							Haul-seines:		
In vessel-fisheries	153		4,835			4,835	In boat-fisheries	13	325
In shore-fisheries	474		12,770	4,900	2,000	19,670	Total	545	14,395
Total	627		17,605	4,900	2,000	24,505	*Traps.*		
							Weirs	13	1,975
							Fykes	30	150
							Lobster-pots	15,930	11,948
							Total	15,973	14,073

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	15,192,662			$247,558
Fresh fish.				
For food	472,000			6,293
For bait	1,441,000		7,205 barrels	5,404
For fertilizer	20,000		100 barrels	50
Total	1,933,000			11,747
Dry fish.				
Cod	1,898,000	654,080		20,440
Hake	3,284,820	1,362,592		18,249
Haddock	1,004,850	357,280		7,178
Pollock	120,930	46,704		834
Cusk	67,080	28,896		710
Total	6,375,680	2,449,552		47,411

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Pickled fish.				
Mackerel	4,476,000	2,984,400	14,922 barrels	$85,802
Herring:				
Ordinary	195,000	156,000	780 barrels	2,340
Miscellaneous	10,000	5,000	25 barrels	125
Total	4,681,000	3,145,400	15,727 barrels	88,267
Smoked fish.				
Herring:				
Ordinary	14,118	10,200	1,200 boxes	240
Haddock (Finnan haddies)	6,800	3,000		175
Total	20,918	13,200		415
Canned fish.				
Mackerel	232,350		108,612 cans	19,874
Lobsters.				
Fresh	699,000			25,630
Canned	1,177,464		207,612 cans	28,335
Total	1,876,464			53,965
Clams.				
For food	18,750		1,875 bushels	656
For bait	46,900		4,690 bushels=335 barrels	1,675
Canned	7,000		700 bushels=7,824 cans	750
Total	72,650			3,081
Miscellaneous.				
Fish-oil			10,935 gallons	4,374
Sounds		18,249		16,424
Marine products used for fertilizers				2,000
Total				22,798

24. BELFAST AND ADJACENT TOWNS.

STOCKTON.—Stockton is situated about five or six miles below Bucksport, on the west side of the Penobscot River. It has a resident population of about 1,550, including a village of 500 inhabitants at Cape Jellison Harbor. The people of the town are largely interested in agriculture, and in vessels employed in the foreign or coasting trade. Many of the inhabitants "follow the sea" for a livelihood. The fisheries of the town are very limited. One vessel of 8 tons is engaged in the shore fisheries during a part of the summer, and another of 16 tons "runs" lobsters and clams to the Castine cannery; these two comprise the fishing fleet of the town. In 1880 seven or eight men were engaged in the lobster fisheries, and twenty or more fished for mackerel for several weeks in midsummer, some of them fishing for pleasure only. A few of the residents go down the river to fish for cod and hake for home supply, but none follow the business regularly. The river fisheries for salmon and alewives are quite important. They will be described in the chapter on the fresh-water fisheries of the State.

SEARSPORT.—The town of Searsport, forming the western boundary of Penobscot River, between Stockton and Belfast, has about 2,200 inhabitants. It has a village of the same name, with about 1,000 inhabitants. Many of the residents are extensively interested in the coasting trade, while others own or man larger vessels that run between the United States and various European countries; the remainder are engaged in farming. The fishing interests of the town

are very similar to those of Stockton. It has one vessel of 18 tons engaged in the shore fisheries, landing her catch at the curing-stands at North Haven. Eight men are interested in the lobster fisheries, and seventy or eighty fish for mackerel during the height of the season. Some catch enough for home use only, while others fish more extensively, selling their catch to the residents of the village. It is estimated by Mr. W. H. Matthews that 160 barrels of mackerel were taken by the local fishermen in 1880. The salmon and alewife fisheries are quite extensive, and a number of weirs have been built for their capture by the fishermen of the town.

BELFAST.—The town of Belfast, on the west bank of the Penobscot River, 25 to 30 miles above Rockland, was first settled in 1770. It was incorporated in 1773 and named in honor of Belfast, Ireland. In 1776 it had 229 inhabitants, and in 1870, 5,278. Williamson, in his History of Belfast, says: "The first settlers were of course strangers to the luxuries of living. For several years they depended for the means of subsistence almost exclusively upon their crops and upon fishing and hunting. The rich, newly-burnt land produced a plentiful supply of cereals and potatoes. Moose, deer, and even bears were abundant, and the river furnished salmon, shad, and alewives."

Capt. Charles H. Wording informs us that Belfast was interested in the fisheries to a limited extent only prior to 1826, when she built or purchased a fleet of small vessels. About 1835 a better class of vessels were introduced, and soon twenty sail were owned in the town, the larger ones fishing on the nearer offshore banks for cod in spring, and in the Gulf of Saint Lawrence and along the Maine shore for mackerel later in the season. Most of the cod were cured on the lower islands, and prior to 1840 the mackerel were packed in Boston. A considerable portion of the fleet "fitted" at Castine. About 1855 the business became less prosperous, and it was almost wholly discontinued before the war. Since that time Belfast has had a few vessels engaged in the shore fisheries each season, but the catch has usually been so small as to be quite unimportant. In 1879 she had five fishing vessels, averaging 20 tons each, fishing on the inshore grounds. The fleet was valued at $1,650, and furnished employment to twenty-nine men.

The boat-fisheries vary considerably, and are at times quite important. The principal fishing occurs in midsummer, when the mackerel enter the bay. They are very abundant for several weeks, and many of the inhabitants, including men and boys of all classes, engage in the fisheries to a greater or less extent for pleasure and profit. Some fish only occasionally for home supply, others devote their entire time to fishing while the mackerel remain, and realize a considerable profit from their sales. It is said that there are at times over one hundred boats, with one to four men each, fishing within a few miles of the city.

Mr. Frank W. Collins, of Belfast, sends us the following account of the boat-fisheries for 1879:

"It is estimated by competent judges that, during the season of 1879, there were 1,000 barrels of mackerel caught in our bay (mostly by hand-lines); of this amount about one-third were shipped to Boston, and the larger cities of our own State.

"The smelt-fishing has been poorer here this season than for many years. Owing to the prevailing warm weather, and ruling low prices, not more than half of the usual number have engaged in this fishery. (The smelts here are all caught with hand-lines.) From December 1, 1879, to the present time [March, 1880], there have been about five tons of smelts caught here; of these, nearly two tons have been shipped to Portland, Boston, and New York.

"The past season there were twelve men engaged in lobster fisheries, using a total of 375 traps. Although the season was considered a poor one by the fishermen, about 75,000 lobsters were caught, one-third of them being sold to the smacks, and shipped to Boston, and towns in this State.

"From the most careful inquiries among the clam-diggers, and other persons having a knowledge of our local fisheries, we learn that there have been 5,000 bushels of clams dug here the past year,

though none have been salted for fish-bait this season as in previous years. Of the 5,000 bushels dug, about one-half have been shipped to other places. On account of their fine flavor the Belfast clams are considered superior to those of any other locality, and they always find a ready market in our neighboring cities and towns where they are known. It would be impossible to form any correct estimate of the large quantity of flounders taken here during the year. This branch of the fishing is followed, not only by our local fishermen, but there is a little multitude of boys who throng the heads of the piers and the bridge for weeks, to fish for flounders. The fish are neatly dressed and strung in bunches (usually twelve in a bunch) for the market. Thousands of bunches are shipped to cities and towns in this vicinity.

"Although Belfast is not engaged in the salmon fishery to any great extent, there is probably no place in the State where more Penobscot salmon are sold. The past season, 1879, there were about 25,000 pounds of Penobscot salmon sold (by the fishermen in this vicinity) to the marketmen and inhabitants here; of this amount not more than 2,000 pounds were shipped to other places, the rest being consumed locally. Salmon are no longer a luxury here, to be enjoyed by the rich only, but during plentiful seasons they are now often sold by our local dealers as low as ten cents per pound. Through the untiring efforts of the Fish Commission, for the past eight years, in restocking the Penobscot River, this once rare and delicate fish has been placed within the reach of the poor as well as the rich, and to-day the Penobscot is, in every respect, a salmon stream."

NORTHPORT.—Northport, lying just south of Belfast, on Belfast Bay, is a town with a scattered population, engaged largely in agriculture, though a few of its inhabitants are more or less dependent upon the sea. A number of small coasting vessels are owned by the residents and some of the men are interested in the salmon fisheries during a portion of the year. As the town has no fishing fleet, the catch of marine species is very limited, the work being largely confined to the capture of mackerel during a few weeks in mid-summer, while a number of parties take lobsters and clams to a limited extent for local supply.

25. CAMDEN AND ITS FISHERIES.

The town of Camden, which includes the villages of Camden and Rockport, forms the western bank of the Penobscot River between Rockland and Lincolnville. It was settled in 1769, and incorporated in 1791.

According to Messrs. J. and B. C. Adams, Camden was for many years extensively interested in the fisheries, and had a fleet of 15 to 20 schooners engaged in the Labrador, Magdalen, bank, and shore fisheries, with a considerable number of others from the Fox Islands that came to Camden for their fittings. Later the causes that led to the decline of the fisheries of the region affected Camden equally with the other places, and, after a few unprosperous years, the business was almost wholly discontinued. At present the fishing fleet of the town, including the two lobster smacks owned at Rockport, is made up of five sail vessels and one steamer. Three of the vessels are engaged exclusively in the mackerel fisheries, and the others, including the steamer, are employed in the transportation of fishery products. The steamer carries herring, mackerel, and clams to the canneries at the village, and the smacks "run" lobsters to Portland and Boston.

The boat fisheries are of little importance. A number of men from both Camden and Rockport are interested in the lobster fisheries; others go to the outer islands occasionally to fish for cod and other species; while all, with many of the shoresmen, are engaged in "hooking" mackerel for several weeks in summer.

A lobster cannery was built at Camden, by Portland capital, in 1878, and during the past season thirty hands were employed in canning lobsters and mackerel. In the summer of 1880 a sardine

cannery was located here for the purpose of utilizing the small herring that were reported as peculiarly abundant in the region. Weirs were built at different points along the mainland, and about the various islands, but thus far the catch, with few exceptions, has been so small that the cannery has not been fully supplied. A scarcity of herring has resulted in experiments in the canning of mackerel, and Mr. Sellmann, the proprietor, has succeeded in producing a very palatable article which is now being placed upon the market under the name of "broiled mackerel." The fish are received with great favor by the trade, and the demand for them is constantly increasing. The process of preparation is radically different from that heretofore employed in the canning of this species. Fat mackerel of small size are selected, and after their heads and tails have been removed, the fish are thoroughly cleaned and washed; they are then spread on wire trays and placed on a revolving frame in a large oven, where they are broiled for several minutes in a manner similar to that by which the sardines are prepared. When thoroughly cooked, they are taken out, and, after cooling, packed in tin cans with tomato or other sauce and hermetically sealed. Mr. Sellmann has certainly made an important discovery, and there is every reason to believe that the business begun by him will develop enormously within the next few years.

26. THE FOX ISLANDS.

THE LOCATION AND IMPORTANCE OF THE ISLANDS.—The Fox Islands, including the islands of Vinal Haven and North Haven, are situated in the mouth of the Penobscot River, about midway between either shore. They were first permanently settled in 1765, and incorporated under the name of Vinal Haven in 1789, North Haven being set off in 1846. The southern island is one huge mass of granite, with hardly a patch of soil large enough to warrant any one in engaging in agriculture. For this reason nine-tenths of the men are employed in the granite quarries at Carver's Harbor, which rank among the most important on the continent. The northern island is quite different, and though very rocky in parts has much arable land, and a large part of its people are engaged in farming.

The location of the islands in the vicinity of excellent fishing-grounds has naturally led many of the inhabitants to engage extensively in the fisheries. The first settlers are said to have been fishermen who came to the region for the purpose of prosecuting their work to better advantage.

THE FISHERIES OF VINAL HAVEN.—According to Mr. James Roberts, Vinal Haven had twelve to fifteen sail of Chebacco boats, ranging from 15 to 30 tons, engaged in the fisheries as early as 1817, the smaller ones fishing along the shore while the larger ones went to the Seal Island grounds and Brown's Bank. The fleet was gradually increased by purchase from Cape Ann and elsewhere, and before 1830 a larger and better class of vessels had been brought to the town.

The Labrador fisheries, says Mr. Roberts, began in 1804, and were continued to 1840, though the business was never extensive. One season two or three vessels would engage in this fishery, and for several years following none would be sent.

The Magdalen herring fisheries have been peculiarly important and extensive. They began about 1830 and continued without interruption till 1858. The height of the fishery was from 1840 to 1850, when eight or nine sail went yearly, starting early in April and returning late in May. The herring were landed on the island, where the bulk of them were smoked. Some crews contracted their catch in advance to the Vinal Haven dealers, agreeing to land their cargoes at a stipulated price. The crews often purchased their fish from the natives, though this practice was not universal, and many of them "went on shares," catching, salting, and smoking their fish, and carrying them to Boston to be marketed. As far as we could learn, but one vessel from Vinal Haven has fished on Grand Banks, and this for but one or two years only. One vessel, the

Black Swan, made two trips to George's in the winter of 1861-'62, after which the business was abandoned on account of the danger attending the work.

As has been said, the fisheries continued to increase from year to year from the first settlement of the island to the middle of the present century. They were most prosperous between 1845 and 1858, when from ninety to one hundred sail were owned at Vinal Haven, and thirty-five or forty belonged at North Haven. Probably four-fifths of these were under 50 tons, carpenter's measurement. These vessels usually fitted at Castine, but cured their fish at home and sold them to the Boston dealers. According to Mr. David Vinal, Vinal Haven alone marketed $70,000 worth of dry fish in 1855.

The first real hindrance to the prosecution of the fisheries was the civil war, which called many of the fishermen to the South. Later, large quarries were opened, and as these furnish regular employment to the men at good wages, many have sold their vessels and remain at home. Others have gradually drifted into the lobster fishery, finding it more profitable than any other branch of the fisheries of the region.

THE FISHERIES OF NORTH HAVEN.—North Haven continued to use small vessels and Chebacco boats for many years. Mr. Nelson Mullin informs us that in 1845 the largest vessel on the island was the Hawk, of 44 tons, old measurement. About 1850 a larger class of vessels was purchased, and as the fisheries of Vinal Haven decreased those of North Haven became more extensive. Soon a number of these vessels were sent regularly to the banks for cod in the spring, after which they fitted for "the Bay" mackerel fishery. By 1861 some of the larger craft were engaged in the mackerel fishery during the entire season, going south in spring and following the fish northward as the season advanced.

In 1879 there were twenty vessels, aggregating 636.09 tons, fishing from North Haven. These were valued at $22,625, and required the services of one hundred and forty-five men. Of the entire fleet six were engaged exclusively in the mackerel fisheries, three of them going south in the spring. Three of the remaining fourteen fished for cod, and the rest were engaged in the shore fisheries for cod, haddock, pollock, hake, mackerel, and herring. During the same year Vinal Haven had twenty vessels aggregating 390.55 tons, engaged in the fisheries during some part of the year. The fleet was valued at $15,550, and carried ninety-eight men. Two of the vessels were engaged in carrying lobsters to the local canneries, and all but two of the remainder fish on the inshore grounds.

The boat-fishermen of the island engage chiefly in the capture of lobsters during the spring and early summer, and in a limited fishery for mackerel in midsummer, and for hake in the fall. The lobster fishery, according to Mr. Vinal, began about 1851, when J. B. Hamden, of Boston, built a cannery at Carver's Harbor. This was operated regularly up to 1859, when it was closed. From that date nothing was done till 1870, when Portland parties bought the property, and have continued the business to the present time. Mr. Mullin informs us that a cannery was built at North Haven in 1857. Each of these canneries puts up both lobsters and mackerel, the two employing a total of sixty-five hands during the height of the season. There are now 180 boat-fishermen living on the islands. About 170 of these are engaged in the lobster fishery from early spring till the 1st of August, some of them continuing the work throughout the entire year. The small lobsters are usually sold to the canneries, and the large ones are carried to Portland, Boston, and New York by the smacks that come regularly to the region. The men tend about sixty pots each, setting them on almost any of the rocky ledges in the vicinity of the island. When the mackerel arrive many of the above fishermen, together with a number of farmers and quarrymen, spend a few

weeks in their capture, after which the landsmen return to their work on shore and the others fish for cod, hake, and haddock till cold weather sets in.

A greater part of the fish caught by the small vessels and boats are sold to dealers, or landed at the stand of some professional curer to be prepared for the market. In 1879 there were nine curing stands on the two islands, employing an average of two men each. The quantity of fish cured during the season, including 1,060 quintals handled by the boat-fishermen, was 18,400 quintals, the greater part being sold in Boston.

G.—THE WALDOBORO' DISTRICT.

27. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

ORIGIN AND DEVELOPMENT OF THE FISHERIES.—The Waldoboro' customs district, which includes the coast-line between Camden and Booth Bay, as well as the islands of Matinicus and Monhegan, is from a historical standpoint one of the most interesting in the United States. It was visited by European voyagers as early as 1602, and by 1617 British merchants sent vessels regularly to Monhegan to engage in the fisheries. It was originally included under the Pemaquid patent, granted by King Charles I to Elbridge and Aldsworth in 1629. According to Williamson, the section lying between Sagadahoc and Saint George had a population of 500 as early as 1630; of this number it may fairly be inferred that two-thirds were within the present limits of the Waldoboro district. Nearly all of the early settlers came to the region to engage in the fisheries, which at that time formed the principal occupation of the people.

The district is now quite thickly settled. It includes the cities of Rockland, Thomaston, and Damariscotta, and several small villages. Many of the inhabitants devote their attention to agriculture, but a majority of those living along the coast are engaged in the fisheries, while not a few are employed in ship-building or are dependent upon the coasting trade.

THE VESSEL AND BOAT FISHERIES.—The fishing vessels of the region have, as a rule, been quite small, and now as in the past, only a few large ones are owned in the district. Those of suitable size are sent to the more important fishing grounds, but the majority are engaged in the shore fisheries only. The present fleet numbers 111 sail, these averaging about 22 tons each.

The boat-fisheries have long been important, though owing to the menhaden fisheries they have decreased somewhat in certain towns during the last ten or fifteen years. They now furnish employment to 483 men, only one hundred less than the number on the vessels. Of these, 250 are engaged in the capture of lobsters during some portion of the year. The catch for the season reached 1,695,882 pounds, of which quantity 748,182 pounds were put up at the Port Clyde cannery. The remainder of the boat fishermen are engaged in the capture of cod, herring, mackerel, and other species along the shores of the outer headlands and islands.

THE MENHADEN INDUSTRY.—The menhaden fisheries of Maine began in a small way more than twenty years ago. In 1864, a factory was built at Bristol near the eastern boundary of the district. Later, the business became very important, and Bristol came to be the center of the industry for the State. In 1878, according to reliable authorities, there were eleven factories at Bristol, valued, with machinery and fixtures, at three-quarters of a million dollars. Twenty-nine steamers with five hundred fishermen were employed, and two hundred additional hands were engaged in manipulating the catch. The production of these establishments during the season was

1,176,310 gallons of oil, and 12,588 tons of guano. In 1880 no menhaden were taken and all of the factories were necessarily closed.

STATISTICAL RECAPITULATION FOR 1880.—The extent of the fishing interests of the district for 1880 will be found in the accompanying statement.

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	575	Capital in vessels and boats	$228,075
Number of boat-fishermen	483	Capital in nets and traps	33,542
Number of curers, packers, fitters, &c	70	Other fixed and circulating capital	*a* 251,125
Number of factory hands	41	Total	512,742
Total	1,169		

a Other fixed and circulating capital.—Cash capital, $16,200; wharves, shorehouses, and fixtures, $34,125; factory buildings and apparatus (including $190,800 for menhaden oil and guano factories not in use since 1878), $200,800; total, 251,125.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	111	2,435.79	$80 935	$18,275	$72,815	$172,025	In vessel-fisheries	588	$9,837
Idle	4	33.46	650			650	In boat-fisheries	580	7,000
In menhaden fishery	1	79.20	7,000			7,000	Purse-seines:		
In lobster fishery	11	211.01	5,800	110	1,760	7,670	In vessel-fisheries	10	5,500
In oyster fishery							In boat-fisheries	1	300
Total	127	2,760.36	94,385	18,385	74,575	187,345	Haul-seines:		
Boats.							In boat-fisheries	8	550
In vessel-fisheries	290		7,175			7,175	Total	1,187	23,187
In shore-fisheries	437		26,925	4,830	1,800	33,555	*Traps.*		
Total	727		34,100	4,830	1,800	40,730	Weirs	6	480
							Fykes	100	500
							Lobster pots	12,500	9,375
							Total	12,606	10,355

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	22,976,515			$290,465
Fresh fish.				
For food	337,300			4,497
For bait	2,710,000		13,550 barrels	10,162
For fertilizer	160,000		800 barrels	400
Total	3,207,300			15,059
Dry fish.				
Cod	6,550,700	2,257,472		70,546
Hake	5,368,050	2,227,120		29,828
Haddock	1,411,515	501,872		10,082
Pollock	782,420	302,176		5,396
Cusk	260,520	112,224		2,756
Total	14,974,105	5,400,864		118,608

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Pickled fish.				
Mackerel	2,462,100	1,041,400	8,207 barrels	$47,190
Herring:				
Ordinary	1,012,750	810,200	4,051 barrels	12,153
Miscellaneous	12,000	8,000	40 barrels	200
Total	3,486,850	2,459,600	12,298 barrels	59,543
Smoked fish.				
Herring:				
Ordinary	9,118	6,588	775 boxes	155
Canned fish.				
Mackerel	55,280		38,064 cans	4,308
Lobsters.				
Fresh	947,700			34,740
Canned	748,182		138,264 cans	17,790
Total	1,695,882			52,530
Clams.				
For food	29,400		2,940 bushels	1,029
For bait	118,580		11,858 bushels=847 barrels	4,235
Total	147,980			5,264
Miscellaneous.				
Fish-oil			24,111 gallons	9,644
Sounds		29,828		20,845
Marine products used for fertilizers				4,500
Total				40,989

A description of the past and present fishery interests of the various towns of the Waldoboro' district may be found in the following pages.

28. ROCKLAND, THOMASTON, AND SAINT GEORGE.

ROCKLAND.—Up to 1848 Rockland was a part of Thomaston. At that time it was set off and incorporated under the name of East Thomaston, and in 1850 the present name was adopted. Its population in 1870 was 7,073. The principal business of the town is the quarrying of limestone for the manufacture of lime. Nearly all of the inhabitants are employed at the kilns and quarries or on the vessels engaged in the transportation of the products.

Rockland has never been a fishing town and has had very few fishing-vessels sailing from its harbor. The largest fleet at any time has not exceeded ten sail. In 1879 there were four vessels engaged in the fisheries to a greater or less extent, only one of them being constantly employed. Other small vessels were sailing under fishing license, but they fished so little that they should not be considered as dependent upon the fisheries. In 1880 a small steamer, the Hurricane, was fitted out with a purse-seine for menhaden, but not finding any of that species the captain turned his attention to the capture of mackerel. This is the first instance of a steamer being employed extensively in the mackerel fishery, and it is not impossible that this small beginning may result in such a change in the methods of fishing as to completely revolutionize the mackerel fisheries of the country.

The boat-fisheries of the town are very limited, and scarcely a dozen men follow fishing for a livelihood, though fully fifty fish for mackerel for four or five weeks each summer. The bulk of the catch is sold fresh, though some are salted and sold to the local dealers. Rockland is obliged to send to Saint George and South Thomaston for a large part of her fresh fish.

The merchants of the place have a limited trade with the fishing-vessels of the islands, and they fit out fifteen to twenty-five sail each season. The greater part of these belong at Matinicus Island, which is a large fishing center. The merchants also buy many dry fish from these people to supply their country trade. According to Mr. R. F. Crie, there were handled by the four firms engaged in the fish trade at Rockland, in 1880, about 1,000 quintals of cod, 300 quintals of haddock, 200 quintals of pollock, and 50 quintals of hake, in addition to 700 barrels of mackerel, 250 barrels of pickled herring, and 100 barrels of smoked herring.

SOUTH THOMASTON.—South Thomaston, about 4 miles below Rockland, was set off from Thomaston and incorporated in 1848. It has a population of 1,693, with a small village of two or three hundred inhabitants located on the Weskeag River. It depends largely for its trade upon the surrounding country and the quarrymen of Dix and adjoining islands. There is no fishing of importance from the village, a few parties going out occasionally for pleasure during the summer only. Clams are dug in small quantities from the extensive flats in the vicinity. The town gets its supply of fish and clams, mostly through peddlers, from the boat-fishermen of Ash Point and Owl's Head.

THOMASTON.—Thomaston, at the head of navigation of the Saint George River, 3 miles southwest of Rockland, was known as a trading post as early as 1630, and was permanently settled about 1719. It was incorporated as a town in 1777, and up to 1848 included both South Thomaston and Rockland. It has a present population of 3,092. The residents are largely engaged in ship-building, confining themselves almost exclusively to the larger class of ships, brigs, and barks; and it is said more tonnage is owned in Thomaston in proportion to its population than in any other American city. Formerly the people were somewhat interested in the sea-fisheries, having a small fleet engaged regularly in the shore-fisheries; but, owing to the distance from the fishing grounds, this business has gradually died out, and now not a fishing vessel is owned here.

Clams abound in the Saint George River, near by, and several hundred barrels are dug each winter by the inhabitants. A number of parties are extensively engaged in the river fisheries, and 15 to 20 tons of smelt, with 10,000 alewives, are taken annually by means of weirs located just below the city. Mackerel and menhaden occasionally ascend the river to this point, but none of the other important salt-water species occur. Some of the inhabitants go to the lower islands in summer for a few days' fishing, but the catch is of little importance. The town is usually supplied with fish by peddlers who drive in from the fishing settlements at Owl's Head and Cushing, while a few shore-fishermen of Cushing and Friendship "run" fresh fish to the market in their boats.

SAINT GEORGE.—Saint George occupies a peninsula of land 10 miles long by 3 or 4 miles wide, lying just south of Thomaston, between the Saint George River and Penobscot Bay. It includes two groups of small islands known as George's Islands and the Mussel Ridges. The town was included in the Muscongus patent, and was visited by fishermen and others at a very early date. Williamson, in his History of Maine, says: "In 1636 there were a few settlers at the river Saint George and upon George's Island within the Muscongus patent, though they were principally fishermen." The town was set off from Cushing and incorporated in 1803, and has a present population of 2,318. It has four small settlements or post-office centers. These are Tenant's Harbor, Saint George, Martinsville, and Port Clyde. The last-named, formerly known as Herring-gut, is the principal fishing center, while the first is a village of some note with a large fleet of vessels engaged in the coasting trade.

As already mentioned, Saint George was formerly a fishing town of considerable importance, and in 1838 there were three firms that did an extensive "fitting" business, and cured annually about 6,000 quintals of fish. Many were also cured by the fishermen of the town. At that time

fish are said to have been very plenty in the vicinity, and the vessels, which, with few exceptions, were quite small, fished along the shore or in the vicinity of Matinicus Island. About 1845 the business began to decline and the dealers soon removed to other localities, thus compelling the fishermen to cure their own catch or to seek a market elsewhere. During the "war period," or from 1860 to 1868, on account of the more encouraging prospects, the business was revived, and a fleet of 25 to 30 sail of small schooners were owned in the town, most of them belonging at Herring-gut, which, from its nearness to the fishing ground, has from the first maintained its lead in the fisheries. Gradually, however, the fisheries became less important, and the people, who were already considerably interested in the coasting trade, turned their attention more largely to that business.

In 1879 fifteen small schooners were licensed for the fisheries from the various harbors of the town. Of these, only three measured over 20 tons, and some of the smaller ones were engaged largely in other work, fishing only occasionally during the season. There were no professional dealers on the mainland, but one firm located at George's Island did a considerable business, buying large quantities of fish from the fishermen of Friendship, Bristol, Cushing, and other places. About 3,500 quintals of the various species were cured during the season. This quantity includes those dried by the fishermen, as well as those handled by the dealers.

The shore-fishermen, numbering about 100, are extensively engaged in the capture of lobsters, selling their catch to the Boston and Portland smacks and to the lobster cannery at Port Clyde. Lobsters are perhaps more abundant in this district than in any other locality east of the Penobscot River. The Mussel Ridges have been continuously fished since 1850, and have probably furnished more lobsters than any grounds of similar size on this portion of the coast. During the summer months, when mackerel are abundant, many of the fishermen turn their attention to their capture for both pleasure and profit, and a good many barrels are annually taken. Most of them are sold fresh for canning, while a few are salted and shipped to market.

Other parties, including ship-builders, sailmakers, blacksmiths, and ice dealers, were formerly dependent on the fisheries, to a considerable extent, but the business is now of little importance, and they are turning their attention to the trade with vessels engaged in coasting.

29. MATINICUS ISLAND AND ITS FISHERIES.

EARLY SETTLEMENT OF THE ISLAND.—Matinicus is an important island, situated 17 miles southeast of Owl's Head. It is the largest of several rocky islands which together constitute Matinicus Plantation. It contains about 800 acres of excellent land, and has a population, including those of Ragged Island, of 250, devoted exclusively to fishing and farming. This island, on account of its early settlement, is of considerable historic interest. Williamson in his History of Maine, published in 1832, says: "The island of Matinicus was inhabited very early, and 'remains of stone houses are still apparent, generally supposed to have been built by French or Dutch fishermen,' though unknown." He also adds that "there are about 100 souls on the island, in sixteen families," saying of them: "They are a very industrious, humane, and moral people; the men are engaged mostly in fishing and farming; they own six fishing crafts from 10 to 50 tons each, and raise annually about 400 bushels of wheat and abundance of vegetables; living together in prosperity, quietude, and happiness, without law and without rulers."

THE HERRING FISHERY.—We learn from the inhabitants that as early as 1800 Matinicus vessels were engaged in the Bay of Fundy cod fisheries. The island has been a favorite resort for the herring for many years, and by 1840 there were seven smoke-houses, where 10,000

boxes of these fish were cured annually for the Boston market. This trade seems to have gradually died out, until at present there is but one smoke-house, curing in 1878 about 2,700 boxes. Herring are still quite plenty during the summer months, when many of the vessels of Cape Ann and Portland come regularly to the region to procure fresh bait. In addition to the resident fishermen, many of the smaller fishing vessels from the adjoining towns are provided with nets, and their crews often engage extensively in the herring fisheries when the fish are abundant. They not only catch bait for themselves, but sell large quantities to the vessels that come only to purchase. The herring fisheries of Matinicus yielded during the summer of 1879 about 1,870 barrels, these being used almost wholly for bait.

Haul-seines were first used at the island for the capture of mackerel in 1840, and they have been employed to a limited extent in this fishery to the present time. Purse-seines were first introduced in 1870. Trawls were frequently used as early as 1866, and are now almost universally adopted. The lobster fisheries were inaugurated in 1867, and from that time the shore fishermen have taken them in considerable numbers.

THE BOAT AND VESSEL FISHERIES.—About forty of the residents engage in the shore fisheries to a considerable extent, some of them spending a part of their time in farming. On account of the location, many of the fishermen on the mainland camp on the island during the summer months that they may be convenient to the fishing grounds, which they visit in small open boats during pleasant weather. Some of them fish for any species that happens to be abundant, while others devote themselves exclusively to some particular fishery. The vessel fleet, which numbers eleven sail, aggregates 248.51 tons, and is valued at $10,250. The quantity of fish cured on the island in 1879, including the catch of the boat fishermen, was about 3,600 quintals. With a good harbor Matinicus might develop a large fishing business, but there is little shelter for the vessels, and to guard against serious loss great care must be taken in mooring them. During a gale in 1841 nine were driven ashore, where they became a total loss. After the fishing season is over most of the fleet are now taken to Carver's Harbor for the winter.

BOAT-BUILDING.—During their leisure hours in winter many of the fishermen give their attention to boat-building. They build a peculiar style of boat that has won for itself an enviable reputation on account of its seaworthiness and its sailing qualities. They are sloop-rigged, open boats, of large size, and fine appearance, suitable for the prosecution of the winter fisheries in the vicinity of the various harbors. Since 1867 upwards of one hundred and fifty of these boats and twenty dories have been built on the island.

30. CUSHING, FRIENDSHIP, WALDOBORO', AND BREMEN.

CUSHING.—Cushing, a small farming district lying on the west bank of the Saint George River between Thomaston and Friendship, was incorporated as a town in 1789, at which time it included Saint George. Its population, numbering 704, are interested chiefly in agricultural pursuits.

Owing to its location it has been interested in the fisheries from its first settlement, but the industry has been of little importance, as it has been chiefly confined to a class of semi-professional farmers who fished only during the height of the season, and few have followed fishing exclusively.

Several traps or pounds are employed by people of the town for taking alewives as they ascend the Saint George River in spring, and three or four smelt-weirs are located along the shore, the catch being mostly sent to New York. The shore boat fishermen, eight in all, are engaged in fishing and lobstering; most of the catch being sold fresh to peddlers who carry them into the

country. Aside from these a few farmers go out occasionally, retaining the bulk of their catch for their own use. There are seventeen small fishing vessels belonging in Cushing; seven of these are lobster smacks "running" to Boston and Portland, while the others are engaged in "dragging" and "hooking" mackerel, netting herring, and trawling for cod, hake, and other species.

FRIENDSHIP; GENERAL DESCRIPTION OF THE TOWN AND ITS FISHERIES.—The town of Friendship, which includes a number of the adjoining islands, was formerly known as Meduncook. It is located just west of Cushing at the southern extremity of the peninsula formed by the Medomak and Saint George Rivers. It was first settled in 1775, and was incorporated as a town in 1807. In 1870 it had a population of 890 scattered about the town or living in the small village half a mile from the principal harbor.

From the first many of the people of Friendship have been dependent upon the fisheries. They have engaged extensively in the shore fisheries, and have had a considerable number of small vessels employed in the capture of the different species. Almost no large vessels have been owned in the town, and few of the fleet have ever ventured beyond the Bay of Fundy.

MACKEREL DRAGGING.—About 1868 the method of "dragging" for mackerel was introduced into the region from Monhegan Island, where it was employed by the Cape Cod fishermen as early as 1845. Within a few years of its first introduction nearly every vessel was provided with nets for mackerel fishing. Some of them devoted their attention to this work during the entire season, while others fished for cod till late in June, when the mackerel usually became abundant along this portion of the coast. They then laid aside their trawls and turned their attention to the capture of mackerel, following the fish as far south as Cape Cod in the fall. Up to 1877 they met with remarkable success, but from that date, owing partially to the smaller size of the fish and thier comparative scarcity, many of them failed to pay expenses and were compelled to abandon the work, and in 1879 only one was employed in this way.

THE VESSEL-FISHERIES IN 1879.—In 1879 there were thirty-four vessels owned in the town, aggregating 688.86 tons, and valued at $22,375. These furnish employment to one hundred and twenty-three men. The largest of the fleet measures but 45 tons, while the majority are under 20 tons, many of them being old and comparatively worthless. Of the entire fleet five vessels are engaged in the lobster-carrying trade, and one fishes on the Western Banks; the remainder are engaged in the shore fisheries. A greater part of the fleet "fit out" for the herring fisheries in the vicinity of Wood Island in the fall, and some of the crews succeed in catching large quantities, which they sell to the Portland and Booth Bay dealers.

FISH CURING.—A number of the Friendship farmers make a business of curing fish at a certain percentage of their value. The schooners usually take their fish directly to these persons and have them cured, after which they are sent by vessels to Portland and Boston. Including those salted and dried by the boat fishermen, fully 8,000 quintals were cured in Friendship during 1879.

THE BOAT-FISHERIES.—On account of the distance from the fishing grounds, the boat-fishermen have been obliged to build large sloop-rigged boats which are provided with small cuddies. These are known as lobster boats, and, although too small to "paper," they are sufficiently seaworthy to warrant the fishermen in venturing a considerable distance from the shore. In fact, during pleasant weather, they often remain away nearly a week at a time, though they always return to some convenient harbor at the approach of a storm. Most of the catch is "sold from the knife" to the curers at New Harbor, Brown's Cove, and other places. Much of the bait used by these parties is taken from a weir owned by several of the local fishermen.

The boats already described are admirably adapted to the winter lobster fisheries, and after the fishing season is over, many of the men devote their time exclusively to the capture of this

species. On account of the scarcity of lobsters in market at this season, the price advances, and the catch is readily sold at a good figure to the smackmen who run regularly between Friendship and Portland.

Clams are fairly abundant in the numerous mud-flats, and many are dug for bait by the local fishermen, while a few are shelled and salted to be sold to the Bremen vessels engaged in the bank fisheries.

BOAT AND VESSEL BUILDING.—As early as 1830 Friendship parties became interested in ship-building, and from that date to the present time fourteen fishing-vessels have been built. Some of these were sent to other localities, but the majority have been purchased by the Friendship fishermen. A number of the fishermen spend their leisure hours, in winter, in building boats and dories; and, during the last 15 years, twenty-five to thirty lobster-boats and upwards of one hundred and fifty dories have been built by them.

WALDOBORO'.—Waldoboro' township is located about sixteen miles southwest of Rockland. It has a population of 4,140. This region, which was first settled in 1748 by German emigrants, has important agricultural interests but small fisheries. The principal settlement is a village of several hundred inhabitants at the head of navigation of the Medomak River. The chief business of the place is ship-building and milling, though several traders depend upon the fine agricultural neighborhood for a large business. Ship-building was formerly extensive, and on one occasion fifteen ships and barks were on the stocks at once. Of late, however, the industry has declined, and in 1879 only two vessels were built.

Thirty years ago twenty-five or thirty small boats from Bremen and Bristol came regularly to the village for a market, exchanging their fish for vegetables and produce brought in by the farmers; but of late there are few transactions of this kind. There have never been any vessels from the village engaged in the fisheries, though we find two or three small schooners hailing from Waldoboro' that are owned and run by parties living a few miles down the river. Six men from the village engage in the boat-fisheries in summer, selling their catch mostly to the curers at Round Pond and New Harbor. On visiting their homes, which they do once in eight or ten days, they usually take a quantity of fish for the markets, of which there are three in the village.

The principal fishing interest of Waldoboro' is the smelt-fishery, which is carried on through the ice in winter. This began in the winter of 1876–'77, when it was accidentally found that smelt could be taken in that locality. The fishery developed with surprising rapidity, for within three weeks after the first smelts were taken over a hundred people were making a business of catching them. In the winter of 1878–'79, 103 shanties with about 225 people (men and boys) were on the ice daily during the height of the season. Some ship their fish direct to New York, others pack together and ship in larger quantities, and still others (perhaps one-half of all) sell to local dealers. Mr. G. H. Matthews estimates that during the winter of 1878–'79 not far from 16 tons were shipped. They go wholly to New York and Boston, netting the fishermen about 5 cents per pound. The best fishing is said to be on the last half of the flood-tide, though it sometimes lasts well into the ebb. The largest catch for one person during any one tide was 45 pounds, equal to about 200 fish, while the average was 15 to 20 pounds per man.

After the ice went out in the spring, some went to the shoal water near the falls and secured great quantities of the spawning smelt with dip-nets, but on account of the warm weather they could not be shipped and most of them were thrown away. One party reported his catch at 30 bushels in a single day. The law now forbids this kind of fishing.

Fishways have been built over the different dams in the vicinity, and in 1874 laws were enacted

forbidding the capture of alewives for six years. Assisted and protected in this way the fish have grown to be very abundant.

BREMEN.—Bremen, a small town with a scattered population of 796, is located on the west side of the Medomak, between Bristol and Waldoboro'. It was first settled in 1735, and was a part of Bristol until 1828. There is no village of importance, and it even lacks the advantages of a country post-office.

The fishing interests seem to have been small in early times, but they gradually increased, reaching their maximum between 1865 and 1872, when six large vessels went regularly to Western Banks and Quereau, and nine or ten smaller ones engaged in the shore-fisheries.

The first "banker" was sent from the town about 1860; vessels began going south for mackerel in the spring of 1868; and one vessel went on a halibut-fletching trip in 1869.

The only mackerel seining from this vicinity is by small vessels that fish along the coast of Maine.

The present fleet consists of ten vessels, four of these being engaged in the bank-fisheries. Besides the vessel-fleet, about forty small boats are engaged in the shore-fisheries, taking lobsters, mackerel, cod, and other species. The residents dig several hundred barrels of clam-bait each season for the Bremen and Portland bankers. About 7,000 quintals of fish are cured annually in the town.

For a number of years several parties have been more or less interested in boat-building, and since 1865 about eighty lobster-boats and thirty dories have been built.

31. BRISTOL AND ITS FISHERY INTERESTS.

EARLY SETTLEMENT OF BRISTOL.—Bristol township including within its limits Pemaquid, one of the oldest settlements on the coast, belonged to the Pemaquid patent granted to Elbridge and Aldsworth of Bristol, England, in 1629. It was visited by Gosnold in 1602, and settled as early as 1625, under a title from the Indian chief Samoset—"probably the first Indian deed to a white man."

In the fifth volume of the Maine Historical Collections we read that "in 1607 Popham and Gilbert had not been at anchor near Pemaquid two hours when they were visited by a party of savages in a Spanish shallop"; thus showing that the place had been visited earlier by Spaniards, who doubtless came not only on a voyage of discovery, but also to fish in the vicinity. Williamson, in his History of Maine, gives a table of populations of different portions of the coast for 1630, in which he claims 500 inhabitants for Sagadahock, Sheepscott, Pemaquid, Saint George, and George's Islands. He does not give the number for each place separately. The town was incorporated in 1765, and in 1790 had a population of 896, at which time it included the present town of Bremen. It now has 2,916 inhabitants. It is situated a few miles south of Waldoboro', and occupies most of the large neck of land lying between the Damariscotta River on the west and the Medomak River and Muscongus Sound on the east. The peninsula is divided in its lower half by John's Bay and River, and the larger part is again partially subdivided by the Pemaquid River, thus giving it an extensive shore-line in the near vicinity of the fishing grounds.

THE VESSEL-FISHERIES.—Bristol has long been noted for the number of its small vessels and the interest it has taken in the shore-fisheries. As early as 1830, twenty-five vessels were owned there, three or four of them being large enough to visit the Gulf of Saint Lawrence for cod, while the rest, ranging from 5 to 25 tons, were engaged in the shore-fisheries. In 1846 the first vessel was sent to Grand Banks; in 1854 the Western Bank fisheries were inaugurated; dories were first used by the Bristol vessels engaged in the latter fishery in 1868. The fishermen of the

town have never engaged in either the Labrador or George's cod fisheries, or in the bank halibut fisheries; they have sent no vessels south for mackerel, and have used purse seines only to a limited extent.

The fleet at present numbers thirty-three sail, all but nine being under 25 tons. Two fish on Quereau and Western Banks, one visits Cape Sable and the Gulf of Saint Lawrence, while the remaining thirty are interested in shore trawling, herring netting, and mackerel dragging.

THE BOAT-FISHERIES.—One hundred and ten men are employed in the boat-fisheries from Bristol, and twenty others are engaged in lobstering and clamming for three or four months. Several fish-dealers do a large business, buying extensively from the boats and vessels of the region; and parties at South Bristol have a number of vessels engaged in the offshore cod fisheries. If we include the quantity dried for family use, there were not less than 14,700 quintals of fish cured in the town in 1879.

THE MENHADEN INDUSTRY.—During the past fifteen years the menhaden fisheries of Maine have grown to enormous proportions, and Bristol has come to be the center of the fishery for the entire State. This industry has had a decided influence in reducing the value of the boat-fisheries of the town, which are now far less important than they were ten to twenty years ago. The first oil and guano factory was built here in 1864, and in 1878 the number had increased to eleven factories, valued, with machinery and fixtures, at $750,000. Twenty-nine steamers were engaged in the fishery, and five hundred fishermen with two hundred additional factory hands were employed. According to Mr. Luther Maddocks, secretary of the Maine Oil and Guano Association, these factories produced 1,176,310 gallons of oil and 12,588 tons of crude guano from 431,000 barrels of fish; and in addition sold 8,000 barrels of bait to the fishermen of the coast. Since 1878, owing to the absence of the fish, the factories have not been in operation.

OTHER FISHERY INTERESTS.—Bristol has four or five deep-water traps, in which considerable bait is taken for the shore-fishermen; and there are several small weirs in the rivers for the capture of alewives and smelts. The catch is of little importance, the greater part being used locally. Lobsters are abundant in the shore waters, and many are taken at certain seasons, the winter lobster fisheries being quite important. Clams also are quite plenty, and a good many are dug by the fishermen of John's Bay and John's River; but in other localities little attention is paid to them.

BOAT AND VESSEL BUILDING.—Capitalists of Bristol have been extensively engaged in ship-building for many years, and since 1853 sixty-three fishing vessels and ten menhaden steamers have been built in the town. The ship-yards are mostly at South Bristol, and a majority of the business has been done at that village. The town probably ranks second only to Boothbay for the entire State in this particular industry. Several firms are extensively engaged in boat-building, and quite a number of dories and other boats are built yearly for the fishermen of this and adjoining towns. One party has been employed in this work regularly for eighteen years, and has built as high as twenty boats in a single season.

MUSCONGUS ISLAND.—Muscongus Island, locally known as Loud's Island, is so closely connected with Bristol in its fishing interests as to be properly considered with that town. It is about three miles long by half to three-fourths of a mile wide. It lies a little to the eastward of the town of Bristol and has a population of 142, engaged in farming and fishing. Several small fishing vessels have been owned there from time to time, but at present the largest are mere boats, all being too small to "paper". The boat-fishermen engage in lobstering, trawling, and hand-lining during a greater part of the year, selling their catch of fish mostly to dealers at Round Pond and

New Harbor in the town of Bristol. The principal business connected with the fisheries was, up to 1879, at the menhaden oil and guano factory known as the Loud's Island Oil Works, built on the island in 1873.

32. MONHEGAN ISLAND AND ITS FISHERIES.

REVIEW OF MONHEGAN AND ITS FISHERIES FROM ITS EARLIEST SETTLEMENT.—The island of Monhegan, lying 12 miles southeast of Pemaquid Point, is about 1 mile wide by 2½ miles long. It is historically one of the most interesting localities in the State, and the early voyagers in their descriptions of the country refer to it as bearing an important relation to the early fisheries of America. Being situated at so short a distance from the land, with excellent fishing grounds on every side, it is natural that it should be a favorite resort for the Europeans who came both to catch fish and to exchange trinkets and merchandise with the natives for furs.

Capt. John Smith, in his description of New England, gives the following account of an early visit to this island:

"In the month of April, 1614, with 2 ships from London, of a few merchants, I chanced to arrive in New England, a part of America, at the Isle of Monahiggan, in forty-three and a half of northerly latitude. Our plot was there to take whales and make trials of a mine of gold and copper. If this failed, fish and furs was then our refuge, to make ourselves savers howsoever. We found this whale-fishing a costly conclusion. We saw many, and spent much time in chasing them; but could not kill any, they being a kind of jubartes, and not the whale that yields fins and oil, as we expected. For our gold, it was rather the master's device to get a voyage that projected it than any knowledge he had at all of any such matter. Fish and furs was now our guard; and by our late arrival and long lingering about the whale, the prime of both those seasons were past ere we perceived it; we thinking that their seasons served at all times, but we found it otherwise; for, by the midst of June the fishing failed. Yet in July and August some were taken, but not sufficient to defray so great a charge as our stay required. Of dry fish we made about 40,000, of corfish about 7,000. Whilst the sailors fished, myself, with eight or nine others of them might best be spared, ranging the coast in a small boat, we got for trifles near 1,100 beaver skins, 100 martens, and near as many otters; and the most of them within a distance of twenty leagues. We ranged the coast both east and west much further; but eastwards our commodities were not esteemed, they were so near the French who afford them better; and right against us in the main was a ship of Sir Francis Popham's, that had there such acquaintance, having many years used only that port, that the most part there was had by him. And forty leagues westward were two French ships, that had made there a great voyage by trade, during the time we tried those conclusions, not knowing the coast nor salvages' habitation. With these furs, the train and corfish, I returned for England in the barque; where, within six months after our departure from the Downs, we arrived safe back. The best of these fish was sold for five pound the hundredth, the rest by ill-usage betwixt three pound and fifty shillings. The other ship stayed here to fit herself for Spain with the dry fish, which was sold, by the sailor's report that returned, at forty rials the quintal, each hundred weighing two quintals and a half."*

Mr. Lorenzo Sabine, in his Report on the Principal Fisheries of the American Seas, says: "At the time the Pilgrims landed at Plymouth the island of Monhegan, in Maine, had become a noted fishing station. In 1622 no less than thirty-five ships from London and the west counties of England made profitable voyages to our shores. 'Where, in Newfoundland,' says Smith, 'a common fisherman shared six or seven pounds,' in New England he 'shared fourteen pounds.'"

* Col. Mass. Hist. Soc., vol. VI, 3d series, pp. 103, 104.

W. D. Williamson, who wrote in 1832, gave the following account of Monhegan:

"Monhegan Island was in ancient times, without exception, the most famous one on the seaboard of this State. It was the land aimed at and first mentioned by the original voyagers and fishermen about these waters, and was so noted a stage for the latter as to be sometimes called a plantation. To this the New Plymouth settlers resorted early and frequently to exchange furs for provisions. In 1626 Abraham Shurte was sent over by Elbridge and Aldsworth to purchase the island of the owner, Abraham Jennings, of Plymouth, for which he gave £50. It is situated 9 miles southerly of George's Islands, 5 leagues east-southeast of Townsend, and 3 leagues westwardly of Metinic. It contains upward of a thousand acres of good land, has a bold shore on all its sides, a large projection of rocks at its northeastward part, and has one good harbor. On its south side is the Menanah Island, of two acres, distant a cable's length, and the harbor is between the two islands, the entrance into it, on the southwest of Monhegan, being safe and easy.

"The number of people on the island is between seventy-five and one hundred, who inhabit twelve or fourteen dwelling-houses, and are the owners of the soil, industrious, moral, and well informed. They have a school-house, where their children are educated and religious meetings are attended. Fishing and agriculture are the employments of the men. They own several vessels, and while the more able-bodied are engaged in the former business at home and in the codfishery on the Grand Banks, the old men and boys cultivate the land, raising good crops, keeping cows, swine, and sheep.

"The island, though within the county of Lincoln, belongs to no town. It is a democratic community. It has no officers of any kind, not even a justice of the peace. The people's affairs are governed and guided by themselves conformably to certain prudential rules and usages which they have mutually established. They have paid one United States direct tax, otherwise they are strangers to taxation, except what they pay toward the support of their school."*

THE FISHERIES SINCE 1820.—From a conversation with Mr. Henry T. Studley, one of the oldest fishermen of the island, Captain Collins gathered the following information relative to the more recent fishing interests of Monhegan:

As early as 1820 residents of the island commenced building small vessels for use in the fisheries. This business continued till 1837, since which time little has been done. The two principal builders were Henry Trefethen and Josiah Sterling, these building eighteen vessels, aggregating about 525 tons. Some of the larger vessels built by these parties were engaged in the Grand Bank cod fisheries, while others went to the Gulf of Saint Lawrence for cod and mackerel. Mr. Studley estimates that from 1830 to 1840 eight vessels were engaged regularly in the bank fisheries, and that 9,000 quintals of fish were cured yearly on the island. From this time the bank fisheries declined very rapidly, and were soon wholly discontinued.

The method of "dragging" for mackerel, which has been so extensively employed by the fishermen of the island, was first introduced into the locality by Capt. N. E. Atwood, of Provincetown. In the summer of 1845 he, in company with a brother, came to the island with a "gang" of nets and fished from dories, going out from the shore every night when the weather was suitable. In speaking of his work, he says: "We were gone from home four weeks, and made $90 to a share." Other Cape Cod fishermen joined him the following season, and soon the island fishermen provided themselves with nets and took part in the fishery. In 1859 there were seventeen boats, with two men each, engaged in mackerel dragging from the island. In 1862 four purse-seines were bought by the residents and fished from small boats. This method has been fairly successful, and three seines are still owned by the Monhegan fishermen, who use them dur-

* Williamson's History of Maine, vol. I, p. 61.

ing the height of the mackerel season. In 1868 some of the fishermen from other towns in the vicinity engaged in mackerel dragging more extensively, using small vessels and going further from the shore. About the same time a few small vessels were bought for this purpose by the islanders, who found the business a profitable one.

PRESENT CONDITION OF THE BOAT-FISHERIES.—With the exception of the early Grand Bank fisheries, boat-fishing has been the chief occupation of the people. Mr. Studley places the height of this business in 1864, when $35,000 worth of fish were taken by fifty men, the "high-liner" stocking $1,600. Few, if any, lobsters were taken prior to 1876, and now only eight men are engaged in this fishery. The catch is sold largely to the Portland and Boston smacks.

There are now about 150 inhabitants on the island. In 1879 forty-two men and eight boys engaged in the boat-fisheries, while several others fished from the two small schooners that composed the Monhegan vessel fleet. The quantity of fish cured was 3,460 quintals, the greater part of which were sold in Portland.

33. DAMARISCOTTA AND ADJOINING TOWNS.

DAMARISCOTTA.—Damariscotta is situated at the head of navigation on the Damariscotta River, about 15 miles from its mouth. Originally a part of the Pemaquid patent, it was separated from Bristol and Nobleborough and incorporated in 1847. Its present population is 1,332. The principal village, bearing the same name, is situated on the river two miles below the head of tide-water. It has long been engaged in ship-building, the work being confined chiefly to vessels of large size, and only five fishing vessels and four menhaden steamers have been built during the past twenty years.

The town has never been engaged to any extent in the sea fisheries, and though small parts of several menhaden steamers are owned by the residents, neither steamers nor schooners make their headquarters in Damariscotta, and they may be properly considered as belonging to other localities.

The fish dealers get their supply of fresh and salt fish at the mouth of the river in summer, but in winter all of the fresh fish are shipped by rail from Portland and Gloucester.

Quite a number of farmers and mechanics visit the fishing grounds once or twice each season, combining pleasure and profit. They usually catch and salt enough fish to supply their families during the greater part of the year. In addition, some of the inhabitants of the place engage extensively in the winter smelt fisheries of Broad Bay, near Damariscotta Mills, sending their catch to New York and Boston.

DAMARISCOTTA MILLS.—Damariscotta Mills is a village of 200 inhabitants at the head of tide-water on the Damariscotta River, two miles above the city. It is located on the stream that connects Damariscotta pond with the river. This pond—a sheet of fresh water twelve miles long by one-fourth to one and a half miles wide—has long been a favorite breeding place for the alewives. During their spring migrations great quantities are caught by means of dip-nets, one man frequently dipping 2,000, and occasionally as many as 10,000 fish in an hour. In 1879 it is estimated that about 600,000 fish were taken, the town letting the fishing privilege for $2,000.

There is a very extensive smelt fishery in the bay just below the village. Mr. T. J. York informs us that about 25 tons are taken yearly, four-fifths of them being shipped to New York and Boston for a market.

Eels are also taken from their winter quarters in the mud by means of spears.

The above are the only fisheries of note from the place, as it is too far from the fishing or clamming grounds to admit of a profitable business. Occasionally some of the farmers and mechanics

of the vicinity, in common with those of Damariscotta and New Castle, go down the river on a fishing trip during the summer, but the catch is unimportant.

NOBLEBORO'.—Nobleboro' is an agricultural section lying to the north of Damariscotta. It has a small interest in the smelt and alewive fisheries in common with the people of Damariscotta Mills. Aside from this it has no fishery interests, for the town, which is devoted almost exclusively to agricultural pursuits, is 20 miles from the sea, with only fresh water within its boundaries. It is not uncommon for some of the residents to visit the fishing grounds at intervals during the summer months to catch a supply of cod and hake for their own tables.

H.—THE WISCASSET DISTRICT.

34. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

ORIGIN AND DEVELOPMENT OF THE FISHERIES.—The Wiscasset customs district, extending from Damariscotta River to Georgetown, was settled as early as 1630 by families who came to the region to engage in the fisheries. The first residents located in the vicinity of Booth Bay. We know little of the fishing interests of the district prior to 1800, but at this time a fleet of small vessels was sent to the Bay of Fundy and to Cape Sable for cod, while vessels of similar size were engaged in the shore fisheries along the coast of Maine. By 1817 large schooners were built to engage in the Labrador fisheries. Between 1840 and 1845 ten to twelve sail of vessels were sent annually to Labrador, and the fishery was continued to a comparatively recent date, though it is now entirely abandoned. Considerable attention has been paid to the capture of mackerel from the beginning of the century, and by 1825 jigs were introduced.

In 1837 several vessels were sent to the Bay of Chaleur for mackerel, this locality having since been visited regularly by a large fleet.

The first purse-seine used by the fishermen of Maine for the capture of mackerel was brought to Damariscove in 1860, and in 1861 it was taken to Southport, where it was used by the boat-fishermen for one or two seasons, after which it was manipulated by the crew of a small schooner. No vessels were interested in the Southern mackerel fishery off the coasts of Virginia and New Jersey prior to 1867.

THE HERRING AND MENHADEN FISHERIES.—The herring fishery in the vicinity of Southport was formerly quite important, and a number of small craft from different localities came to the region to secure cargoes. A large part of the catch was smoked and many of the fishermen owned small smoke-houses for preparing their fish. By 1830 vessels were sent to the Magdalen Islands to catch or purchase herring which were to be smoked for the West India trade. This business continued to be important up to 1855, and cargoes have been landed from time to time since that date.

Six menhaden oil and guano factories are located in the town of Booth Bay. The first was built in 1866, and the fishery was prosecuted with much vigor up to the spring of 1879, Booth Bay having, next to Bristol, the most extensive menhaden fisheries in the State.

SHIP-BUILDING.—Nearly all of the towns of the district have been more or less interested in ship-building, and not less than three hundred fishing vessels have been launched during the last fifty years. The ship-builders of East Booth Bay at the mouth of the Damariscotta River have built

fully half of the entire number, while those of Booth Bay proper, North Booth Bay, and Westport, have been extensively engaged in the work.

PRESENT CONDITION OF THE BOAT AND VESSEL FISHERIES.—The fishing fleet at present numbers sixty-three sail, sixty of them being actively employed. Nearly half of the fleet are engaged in the shore fisheries, the remainder being employed in the offshore fisheries for cod and mackerel.

There are in the district one hundred and forty-six boat-fishermen. These spend a greater part of their time in the capture of "ground-fish," though some of them are extensively interested in the lobster fishery, which is fairly important.

STATISTICAL RECAPITULATION FOR 1880.—The following table gives a detailed statement of the fishing interests of the district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	561	Capital in vessels and boats	$227,620
Number of boat-fishermen	146	Capital in nets and traps	23,586
Number of curers, packers, fitters, &c	87	Other fixed and circulating capital	a 159,237
Number of factory-hands	27	Total	410,443
Total	821		

a *Other fixed and circulating capital.*—Cash capital, $28,000; wharves, shorehouses, and fixtures, $30,100; factory buildings and apparatus, $92,137 (of this amount $88,367 is for menhaden oil and guano factories not used since 1878); total, $159,237.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	60	2,461.87	$87,275	$15,795	$97,385	$200,455	In vessel fisheries	51	$815
Idle	2	152.98	4,900	.....	.....	4,900	In boat fisheries	125	1,500
In menhaden fishery	1	35.95	2,500	.....	.....	2,500	Purse-seines:		
Total	63	2,650.80	94,675	15,795	97,385	207,855	In vessel fisheries	30	16,500
Boats.							Haul-seines:		
In vessel fisheries	422	.....	11,750	.....	.....	11,750	In boat fisheries	2	250
In shore fisheries	128	.....	5,855	1,460	700	8,015	Total	208	19,065
Total	550	.....	17,605	1,460	700	19,765	*Traps.*		
							Fykes	20	100
							Lobster-pots	5,895	4,421
							Total	5,915	4,521

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	17,111,000	.....	.....	$261,685
Fresh fish.				
For food	198,000	.....	.....	2,640
For bait	592,000	.....	2,960 barrels	2,220
For fertilizer	100,000	.....	500 barrels	250
Total	890,000	.....	.....	5,110
Dry fish.				
Cod	7,402,325	2,571,632	.....	80,363
Hake	1,731,510	718,256	.....	9,620
Haddock	337,095	120,176	.....	2,414
Pollock	285,070	110,096	.....	1,966
Cusk	316,680	136,416	.....	3,349
Total	10,193,580	3,656,576	.....	97,712

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Pickled fish.				
Mackerel	4,969,500	3,313,000	16,565 barrels	$95,249
Herring:				
Ordinary	20,000	16,000	80 barrels	240
Miscellaneous	3,000	2,000	10 barrels	50
Total	4,992,500	3,331,000	16,655 barrels	95,539
Smoked fish.				
Herring:				
Ordinary	18,824	13,600	1,600 boxes	320
Canned fish.				
Mackerel	200,000		166,308 cans	17,324
Lobsters.				
Fresh	428,800			15,723
Canned	367,342		68,988 cans	8,896
Total	796,142			24,619
Clams.				
For food	9,500		950 bushels	333
For bait	71,120		7,112 bushels=508 barrels	2,540
Total	80,620			2,873
Miscellaneous.				
Fish-oil			16,324 gallons	6,530
Sounds		9,620		8,658
Marine products used for fertilizers				3,000
Total				18,188

35. NEW CASTLE AND EDGECOMB.

NEW CASTLE.—New Castle is practically a part of Damariscotta, though it is on the opposite side of the river and has a separate municipal government. The residents of the village, like those of Damariscotta, engage to a greater or less extent in the smelt and eel fisheries of Damariscotta Mills during the winter months. Two or three "hedges" have been placed in the river for the capture of alewives on their way to the spawning grounds, but these are fished to a limited extent only, and the catch is very small. The supply of fish is obtained largely from the towns at the mouth of the river in summer, and from Portland, Boston, and Gloucester in winter.

EDGECOMB.—The town of Edgecomb, lying just north of Booth Bay, extends from the Sheepscott River on the west to the Damariscotta on the east. It has a population of 1,056, the majority being engaged in agriculture. Two small fishing boats are owned in the town. These visit the fishing grounds occasionally during the summer months and return with small fares of cod, hake, and mackerel, which are peddled among the residents of the region, since there are neither fish markets nor curing-stands in the town. A few of the inhabitants of the lower part of the town lobster and clam to a limited extent, and a number of small weirs have been built along the banks of both rivers for the capture of smelt and alewives, but the catch is so small that it may be wholly neglected.

36. BOOTH BAY AND ITS FISHERIES.

EAST BOOTH BAY.—East Booth Bay, locally known as Hodgdon's Mills, is a little village in the eastern part of the town of Booth Bay, at the mouth of the Damariscotta River. It has a fleet of nine vessels. Eight of these are engaged in the shore and Bay of Fundy fisheries and one visits

the Western Banks in early summer and fishes for mackerel later in the season. Twenty-five residents of the village and adjoining shores are engaged in the boat-fisheries. The principal part of their catch consists of cod, hake, mackerel, and lobsters.

The quantity of fish cured annually at East Booth Bay varies greatly. At the present time it is about 3,500 quintals. Most of the menhaden factories are situated in this part of the town. The village has long been noted for the number and quality of the fishing vessels launched from its ship-yards, and they are now found in all the principal fishing towns from Cape Cod to Eastport. Over one hundred and fifty sail have been built within the past fifty years, some of them being among the staunchest and swiftest on the coast. The subject is treated more fully under the Booth-Bay fisheries.

BOOTH BAY AND ITS EARLY FISHERIES.—The town of Booth Bay occupies the southern portion of the peninsula formed by the Sheepscott and Damariscotta Rivers. It was first settled about 1630, and was known as Cape Newagen for many years. Later the name was changed to Townshend, and in 1842 it was again changed to Booth Bay, the first name being reserved for the extreme southern point of the island of Southport and the second for the principal harbor of the town. It was incorporated in 1764, and at the present time includes the post-office districts of Booth Bay, North Booth Bay, and East Booth Bay, with a total of 3,200 inhabitants.

The location is an excellent one for the prosecution of the sea-fisheries, and fishing has been the principal occupation of a large number of the inhabitants from the time of the earliest settlement. We find no records dating back of the present century, but in 1800 the fleet was composed almost exclusively of small craft fishing along the shore or visiting the grounds in the vicinity of Cape Sable. The fleet continued to increase slowly, reaching its maximum shortly after the close of the rebellion.

The Labrador fisheries were prosecuted from this region as early as 1817, when the schooner Ruby was sent out from North Booth Bay. This fishery continued to be followed quite regularly by a few vessels from this and other ports of the town for some time. It reached its height about 1844, when the fleet numbered eight or ten sail. Six years later it was entirely discontinued. The smallest craft that ventured to these distant grounds was the schooner Frederick, of 45 tons, carpenter's measurement, belonging at East Booth Bay.

The fishermen of the town have been largely interested in the mackerel fisheries for upward of seventy-five years. Jigs were introduced from the westward by 1825. The first bait-mill was bought before 1830. Seines were first used about 1865; and the first vessels were sent South to engage in the spring mackerel fisheries in 1867. During the early days the mackerel were sent to Boston, Gloucester, and Portland for inspection; later they were landed at Southport; and it was not until 1864 that Booth Bay firms became interested in packing and inspecting their own catch. Since that time the business has been quite important.

Trawls were first introduced in 1858, when the schooner Albatross fitted out with them for a trip to the banks. In 1860 dories were first used for hand-lining on the Western and Grand Banks. The Grand Bank fisheries have never been extensively prosecuted.

PRESENT CONDITION OF THE FISHERIES.—At present the town owns forty-three vessels of over 5 tons burden. These are distributed in the different fisheries as follows: Mackerel seining, eight; seining and trawling, six; Western Banks and Quereau cod fisheries, six; Grand Banks cod fisheries, one; and shore fisheries, twenty-two. A number of the vessels are partly owned by Portland capital, and a few land their catch in that city, while others sell at Boston and Gloucester. The boat-fishermen, of which there are ninety-seven, fish during the summer for cod, hake, and lobsters,

some going to the outer headlands or islands to camp during the height of the season. The quantity of fish annually cured in the town is about 17,000 quintals.

Lobstering and clamming are not much followed by the fishermen, as neither species seem to be as plenty as in the districts on either side. A lobster cannery was built here by Portland parties in 1876, and by sending its smacks as far as Pemaquid Point on one side and to Small Point on the other a fair supply is obtained. A good many mackerel are put up at the cannery during the season.

THE MENHADEN INDUSTRY.—Between 1867 and 1878, the principal fishing interests of the town centered in the menhaden oil and guano factories located at East Booth Bay. In this fishery the town ranked second in importance in the State. Four of the factories were built in 1866 and a fifth the following year. About the same time another was transferred to the town from Southport, where it had been in operation but a short time. These six factories had a total value in 1878 of $146,612. At this time the firms owned and equipped seventeen steamers at a cost of $216,800, and captured 170,380 barrels of fish. They employed two hundred and twenty-one fishermen and eighty-six factory hands, and made 475,247 gallons of oil and 4,948 tons of fish guano.

INDUSTRIES DEPENDENT ON THE FISHERIES.—The principal business depending upon the fisheries for its support is ship-building, and in the number of fishing vessels launched from the yards Booth Bay ranks first in the State, the little village of East Booth Bay alone having built over one hundred and fifty sail within the last fifty years, while those built in other parts of the town would swell the aggregate to about one hundred and seventy-five, most of them being of large size. Quite a number of schooners, ships, and brigs have been built during the same period. One firm now does a small business in boat-building.

The entire commercial interests of the town are largely dependent upon the fisheries, and most of a vessel's needs, in the way of repairs, gear, or provisions, can be supplied. There are four sail-lofts and two marine railways, with a considerable number of mechanics who are busy in keeping the schooners in repair. In 1870 store-houses were built to supply the fishing-fleet with ice for the preservation of bait and market-fish. In 1874 the Cumberland Bone Company built extensive works in the lower part of the town for the manufacture of fertilizers, and in 1878 they used 1,500 tons of "green" fish-chum, valued at $15,000, in the preparation of their products.

A company for the manufacture of sea-weed fertilizers, known as the Algæ Fertilizer Company, was formed in 1869; the work was continued for about three years, when the small demand for the products forbade further operations.

NORTH BOOTH BAY.—North Booth Bay, including Sawyer's, Barter's, and Hodgdon's Islands is an agricultural section extending along the east side of the Sheepscott River. There is no village of note, the population being considerably scattered. Formerly quite an extensive fishing business was carried on by people living along or near the shore, and vessels were sent to Labrador for cod, and to Magdalen Islands for herring, beginning with 1831, only a few years after the origin of these fisheries. It has now a fleet of seven vessels engaged in the fisheries: three of these divide their time between trawling and seining; one goes only to Western Banks and Quereau, and three fish along the shore. Fifteen men are employed in boat-fishing during a greater part of the summer, and in lobstering and clamming in the spring and fall. The majority of the vessels are fitted and owned by two firms that cure annually about 4,200 quintals of codfish, which are sold largely in Boston and Portland.

37. SOUTHPORT AND ITS FISHERIES.

SOUTHPORT.—Southport, a high rocky island about 6 miles long by 3 miles wide, lying to the south of Booth Bay, is separated from the mainland by a deep but narrow channel. It formed a part of Booth Bay until 1842, when it was incorporated under the name of Townsend; in 1850 it received the name of Southport, which it has since retained. The island has a population of 684, all being largely dependent upon the fisheries for a livelihood.

Its fishing interests have been extensive for many years, and its vessels have met with more than average success, bringing considerable money to the inhabitants, who are at the present time in a better financial condition than those of the average fishing community. The fisheries of this island, like those of Booth Bay, originated with the earliest settlers, when boats and small vessels fished only in the immediate vicinity. The residents engaged to a limited extent in the Labrador cod fisheries, sending their last vessel as late as 1856.

Vessels from this place visited the banks near Cape Sable and Sable Island before 1825, and they have continued to resort to these grounds ever since. Mackereling came into prominence about this time, and in 1827 the first bait-mill was brought here from Gloucester by the schooner Echo. The first vessel sent from Southport to the Gulf of Saint Lawrence was the schooner Olinda, in 1837. Mackerel were inspected here as early as 1855. In 1861 a purse-seine was purchased by resident fishermen from parties living at Damariscove; it was used for several years by boat-fishermen, who rowed out from the shore after the fish had been discovered. In 1868 vessels from the island engaged for the first time in the spring mackerel-fisheries off the shores of Virginia and New Jersey. The schooner American Eagle was the first to supply herself with dories for bank-fishing in 1858, and in 1860 trawls were introduced by the schooner Island Queen.

Southport has occasionally sent vessels to engage in the winter fisheries of George's Banks; two schooners went to this locality in 1859; one in 1862; and two, several years later; but the hardships and dangers encountered soon caused the fishermen to abandon the business.

The smoking of herring for family use dates back beyond the present century, and in 1806 quite a quantity of herring were smoked annually by the inhabitants of the island. Each fisherman had a little smoke-house on the shore, and took large quantities of "sperling" (young herring) from the waters of Ebenecook Harbor, which has long been a favorite resort of the species. A little later twenty-five sail of vessels frequented this locality from different fishing towns along the shore, and either smoked their catch on the island or carried it elsewhere for that purpose. The business has not yet entirely died out, and in 1879 four fishermen smoked 1,600 boxes for the Boston market.

The fishing fleet from the island now numbers thirteen sail, distributed as follows: Eight in the bank fisheries, four seining and trawling during different parts of the same season, and one employed in seining. In addition to these, half a dozen small craft just under 5 tons engage in the shore-fisheries. The boat-fishermen, numbering twenty-seven men, reside mostly at Cape Newagen, near the southern extremity of the island. They usually fish during the summer months, after which they turn their attention to lobstering and clamming. The quantity of fish cured on the island is annually decreasing, and is now about 10,300 quintals.

38. WISCASSET AND WESTPORT.

WISCASSET.—The town of Wiscasset, on the west bank of the Sheepscott River, near the head of navigation, was first settled in 1663 under the name of Pownalboro. The present name was adopted in 1802. In 1840 it had a population of 2,314, which in 1870 was reduced to 1,978. The business of the place is chiefly dependent on the large lumber interests.

According to Mr. W. P. Lennox, Wiscasset was formerly extensively engaged in the fisheries, and being the only port in the district all of the vessels of the region were obliged to go there to paper. The business began about 1822, and increased so rapidly that in 1832 $3,000 was paid in bounties to the fishermen belonging to the Wiscasset district.

The fishery was at its height between 1858 and 1860, when thirty to thirty-five sail of "bankers" and an equal number of shore-vessels fitted at Wiscasset. Many of them were owned wholly or in part in the town, and the rest belonged to the towns of Woolwich, Southport, Westport, and Booth Bay, where the bulk of the catch was landed to be cured for market. The vessels usually made short trips in the early spring to Cape Sable, after which they went to "the Cape shore" for cod, returning in time to engage in the mackerel fisheries of the New England coast in the late summer and fall.

The method of trawling was introduced into the region about 1845, and from the first was remarkably successful among the "bankers," the vessels securing full cargoes of larger and better fish in about two-thirds of the time required with hand-lines. Very little bait was carried by the Wiscasset vessels, the greater part of them using herring that were taken in gill-nets from day to day while the vessel lay at anchor on the fishing grounds The vessels were "fitted at the halves," and the crews were gathered from the surrounding country.

From 1860 the fishing interests of the town gradually declined, and by 1873 Wiscasset had entirely lost the trade in this line, the vessels for the most part fitting in Booth Bay and Portland.

At the present time Wiscasset has only one vessel, a schooner of 53.59 tons, engaged in the fisheries. This vessel carries twelve men, and lands her catch wholly at Gloucester and Portland, seldom returning home during the fishing season. There are no boat-fisheries of note, and, aside from the vessel mentioned, the only fishing consists in the capture of a few fish and lobsters for the Wiscasset market by fishermen belonging at Edgecomb and other towns nearer the fishing grounds.

A small part of the business of the town is indirectly dependent on the fisheries. One of the largest saw-mills is extensively engaged in the manufacture of fish-box shooks, shipping annually to Gloucester and Provincetown from 22,000 to 25,000 in number, valued at $10,000. The mill employs about fifty men and boys, and is engaged chiefly in the manufacture of sugar-box shooks and hogshead heads for the West India trade; and it is only the refuse lumber, that cannot be used for this purpose, that is worked up for fish-boxes. The shooks are shipped by vessel, fully nine-tenths of the entire quantity going to Gloucester. About one-fourth of the business of the mill is dependent upon this trade.

WESTPORT.—Westport is a narrow island forming the western bank of Sheepscott Bay. It lies just south of Wiscasset, extending to the lower part of Georgetown, a distance of 10 or 11 miles. It was formerly a part of Edgecomb, but was set off and incorporated in 1828. In 1870 it had a population of 699.

Many dilapidated buildings along the shores of the island mark the location of defunct curing-stands, where formerly an extensive business was done, showing that Westport must have taken a prominent place among the fishing towns of the State. Ship-building was carried on to some extent, and two or three yards furnished a good many vessels to this and adjoining towns. Westport vessels joined the Booth Bay fleet in the Labrador fisheries in 1819, and three or four schooners were sent yearly until 1850. Vessels were sent from Westport to the Magdalen Islands for herring at an early date, the schooner Banner visiting the locality before 1830. By 1840 six sail of large vessels went regularly to these islands in the early spring, bringing their catch home in bulk, where the fish were smoked and boxed for the Boston market. Several parties engaged extensively in the business, and large smoke-houses were built in different parts of the town.

Mackerel jigging was introduced about 1820, and the method is still in use. Attempts were made to introduce purse-seines into the fisheries of the island in 1872, and again in 1875, but the experiments resulted in considerable loss to the parties interested, and the method was finally abandoned. Captain McCarty was the first to supply himself with dories in the bank fisheries, in 1872, but they have never come into general use.

The present fleet consists of seven vessels, three visiting the banks with hand-lines during a part of the year, and joining the other four in the shore fisheries during the balance of the season, which with some of them lasts through a greater part of the winter.

The boat-fishermen, numbering twenty-eight, generally camp on the outer islands during the height of the fishing season in summer, returning to their homes occasionally for a supply of provisions. These follow fishing during a few months only, spending the rest of their time in farming.

There are at present three curing-stands on the island, only one of them doing any extensive business. The amount of fish handled varies considerably from year to year. In 1878, according to Mr. B. F. Jewett, the quantity, including those cured by the boat-fishermen, was about 3,400 quintals. In 1879 not over 2,500 quintals were handled, as a considerable portion of the catch was landed in other places.

I.—THE BATH DISTRICT.

39. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

The Bath customs district, including the coast-line between Westport and Harpswell, contains some of the oldest settlements on the coast of Maine. It includes the Kennebec River, which was the favorite resort for the Europeans who came in early times to trade with the natives. European fishermen came to the locality during the first quarter of the seventeenth century, and the region has never since been wholly deserted. Between 1800 and 1870 the fisheries were extensively prosecuted from a number of the more important settlements. Since that time they have been less important, and, if we neglect the residents of Georgetown, few persons are at present extensively interested in them. Bath had formerly a large trade with the fishing-vessels of the vicinity, and at present has anchor and cordage factories which supply a considerable percentage of the local fleet, besides shipping large quantities of their goods to other localities. It has also extensive ship-building interests, and many of the best fishing-schooners of New England have been built here.

STATISTICAL RECAPITULATION FOR 1880.—The following statements show in detail the present condition of the fishing interests of the district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	73	Capital in vessels and boats	$36,545
Number of boat-fishermen	191	Capital in nets and traps	7,026
Number of curers, packers, fitters, &c	30	Other fixed and circulating capital	a25,600
Total	294	Total	69,171

a Other fixed and circulating capital.—Cash capital, $13,200; wharves, shorehouses, and fixtures, $12,400; total, $25,600.

Detailed statement of capital invested in vessels, boats, nets and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.
Vessels.						
In food-fish fishery:						
Active	16	253.45	$10,850	$4,550	$9,300	$24,700
Total	16	253.45	10,850	4,550	9,300	24,700
Boats.						
In vessel fisheries	48	.....	960	.....	.....	960
In shore fisheries	140	.....	8,225	1,860	800	10,885
Total	188	.....	9,185	1,860	800	11,845

Nets and traps.	No.	Value.
Nets.		
Gill-nets:		
In vessel fisheries	20	$300
In boat fisheries	150	1,800
Total	170	2,100
Traps.		
Weirs	3	2,000
Fykes	10	50
Lobster-pots	3,835	2,876
Total	3,848	4,926

Detailed statement of the quantities and values of the products.

Products specified.	Pounds fresh.	Pounds prepared.	Bulk.	Value as sold.
Grand total	6,233,615	.....	.....	$72,250
Fresh fish.				
For food	522,500	.....	.....	6,067
For bait	785,000	.....	.....	2,944
For fertilizer	240,000	.....	1,200 barrels	600
Total	1,547,500	.....	.....	10,511
Dry fish.				
Cod	2,134,275	735,504	.....	22,985
Hake	967,680	401,408	.....	5,376
Haddock	506,520	180,096	.....	3,618
Pollock	380,480	146,944	.....	2,624
Cusk	122,200	52,640	.....	1,292
Total	4,111,155	1,516,592	.....	35,895
Pickled fish.				
Mackerel	227,400	151,600	758 barrels	4,358
Herring:				
Ordinary	42,500	34,000	170 barrels	510
Miscellaneous	6,000	4,000	20 barrels	100
Total	275,900	180,600	948 barrels	4,968
Lobsters.				
Fresh	213,400	.....	.....	7,825
Clams.				
For food	76,000	.....	7,600 bushels	2,600
For bait	9,660	.....	966 bushels = 60 barrels	345
Total	85,660	.....	.....	3,005
Miscellaneous.				
Fish-oil	.....	.....	6,770 gallons	2,708
Sounds	.....	5,376	.....	4,838
Marine products used for fertilizers	.....	.....	.....	2,500
Total	.....	.....	.....	10,046

40. GEORGETOWN AND ITS FISHERIES.

Georgetown is an island forming the eastern boundary of the Kennebec, a few miles south of Bath. It is said to have been first settled by John Parker in 1629. The town formerly included a number of islands in the mouth of the Kennebec and the present towns of Woolwich, Bath,

Arrowsic, and Phipsburg. It now includes only the island, originally known as Eraskohegan, and later as Parker's Island, about nine miles long by an average of two miles wide.

The locality was visited by John Smith as early as 1614, and from his writings we learn that French fishermen visited it at an earlier date. The first permanent settlers were engaged in the fisheries, which, from that date to the present time, have been continued without interruption. Though little has been written of the extent of its early fisheries, it is said that as early as 1794 a Mr. Riggs was engaged in fitting vessels and in curing the fish landed by them. His business continued to increase, and by 1812, according to the estimates of his son, Moses Riggs, about twenty-five "bankers" and an equal number of shore vessels fitted and cured their fish at his place. Others soon engaged in the trade, and in 1843, according to the same authority, between 25,000 and 30,000 quintals of fish were cured at Riggs Cove alone.

Up to this time few fish had been cured on other parts of the island, it being the custom for the catch to be handled by the professional curers, who either charged one-sixteenth of the market value of the fish or reserved one quintal of fish out of every sixteen for their services. Gradually, however, the fishermen began to build small curing-stands of their own, and they usually kenched the fish that were landed from time to time until the close of the season, when they could give their attention to "making" them, or, as was not unfrequently the case, their wives and children cured the first cargo while they were out after another trip.

Both the shore and bank fisheries increased in importance until 1868, when, according to Mr. W. K. Riggs, one of the largest dealers, Georgetown handled annually nearly $250,000 worth of fishery products, the greater part of which were landed by the fishermen of Georgetown and the adjacent towns of Westport, Woolwich, and Phipsburg.

The fleet has since been gradually reduced, until there are now but six fishing vessels, aggregating 91.65 tons, owned on the island. These are valued at $5,600, and carry a total of thirty men. In 1879 there were six curing-stands, each doing a small business, the total quantity of fish cured being about 5,500 quintals, of which more than one-third were hake.

The boat fisheries of Georgetown are quite varied. The fishermen of the western part of the island are chiefly engaged in the river fisheries for alewives, shad, salmon, and other species, though a few go to the outer islands to fish for cod, haddock, and hake. The residents of the eastern and southern sides of the island are more largely dependent upon the fisheries, and, while they work on land during a portion of the year, a greater part of their revenue comes from the water.

About the 1st of April the trawling season begins, continuing till September, when a small school of herring reach the shore. These remain for several weeks, and the fishermen engage in their capture as long as they find it profitable, after which most of them fish for lobsters. Some continue in the lobster fisheries till the following spring, while others "haul out" at the approach of stormy winter weather, and devote their attention to clamming till the spring trawling season arrives. In 1879 there were thirty boats, with fifty-two men, engaged in the shore fisheries, the average stock to a man being about $125 to $150. This is said to have been from $50 to $75 below the average for other years.

Ship-building was formerly an important business in the town. The fishermen began giving their attention to this work during the winter months as early as 1835. From that date they have built a greater part of their own vessels, in addition to a number that have been sold elsewhere. Nine different firms have been engaged in this business to a greater or less extent since 1835, and from that time to 1878 thirty-eight fishing vessels have been built, in addition to a considerable number of larger crafts for the coasting and foreign trade.

41. BATH AND OTHER LESS IMPORTANT TOWNS.

WOOLWICH.—Woolwich is a settlement of two or three hundred inhabitants, on the west bank of the Kennebec, nearly opposite the city of Bath. It is surrounded by an agricultural district, on which it is largely dependent for its trade. About thirty or forty years ago a few fishing schooners were built at the village for the resident fishermen, as well as for those of Wiscasset, Westport, and Georgetown; but though ship building is still carried on to a limited extent, it is now confined wholly to vessels of larger size.

As early as 1825 Woolwich became interested in the bank-fisheries, and about 1855 there were not less than twelve sail of "bankers" belonging to the town. At this time two large curing-stands were located at the village, both of which handled considerable quantities of fish. Later the fishing interests gradually declined, and by 1865 not a "banker" remained. For the past fifteen years the people of the town have wholly neglected the sea fisheries, though they still engage in those of the river, catching considerable quantities of shad, alewives, smelt, and other species.

BATH; AN ACCOUNT OF ITS COMMERCIAL INTERESTS.—The city of Bath is situated on the west bank of the Kennebec River, fifteen miles above its mouth. The region was first explored in 1604. It was a part of Georgetown up to 1781, when it was set off and incorporated under its present name. In 1840 it had a population of 5,143, which in 1870 was increased to 7,371.

It has long been noted for its extensive ship-building interests, being at one time more largely engaged in this industry than any other city on the continent. The banks of the river in the vicinity of the city are lined with large ship-yards; but the recent depression in this business has had its effect upon them, and at the present time they present an appearance of lifeless inactivity.

THE FISHERIES AND THE TRADE WITH FISHING VESSELS.—As a fishing town Bath has never taken an important rank, though, like Wiscasset, it has served as a market where the vessels from the lower islands could secure their outfit. The merchants of the city have been interested in the fisheries to the extent of owning parts of many different vessels in order that they might more effectually control their trade; but even when the fleet was owned in this way the catch was usually landed at the lower fishing towns, and at no time has Bath served as a market for any considerable quantity of fish. The trade with the fishing fleet began before 1840, and in 1850 fifty to sixty sail from the lower towns came to the city for provisions, gear, salt, and other necessary outfit. The height of the business was between 1860 and 1864, when upwards of seventy vessels fitted at Bath. At that time several cargoes of salt were imported annually for this trade. The repeal of the "bounty law" is said to have virtually put an end to the business, and at the present time few vessels resort to this place for their fittings, and the business is almost wholly discontinued. The local fleet has been greatly reduced, and there are now but two fishing vessels, aggregating 23 tons, owned in the town, and these do not fish with any regularity.

INDUSTRIES DEPENDENT ON THE FISHERIES.—The people have been indirectly dependent upon the fisheries in other ways. Several of the ship-builders have been engaged, to a limited extent, in building fishing vessels, two of the firms, Thomas M. Hogan, and Deering & Donnell, having built twenty-four vessels each since 1866, when this particular branch of ship-building began.

In 1843 a cordage factory was built at Bath by Mr. Donnell, of Newburyport, Mass., who had been in business at the latter place since 1804. He soon developed a trade with the Maine fishing fleet, selling an average of $2,000 worth of cordage yearly up to 1870. At this time an agency was established at Gloucester, Mass., and by 1873 the business had increased to $10,000

annually. Later a further increase was noticeable, and from 1874 to the present time the trade with fishing vessels alone has averaged $16,000.

In 1840 an anchor foundry was built at Bath. This from the first depended largely on its trade with fishing vessels. In 1850 its sales to this class of vessels had increased to about $5,000 yearly. The anchors averaged 100 to 150 pounds each, the largest made here up to that time being 211 pounds. This was considered too large for use by the fishing fleet, and it was held for over a year before a purchaser could be found. About 1850 the demand for larger anchors began, and by 1864 those of 700 pounds weight were sometimes made. During the height of the business anchors were shipped extensively to the principal fishing ports of Massachusetts, the sales amounting to $20,000 annually. Little is done in this line at present, and the firm has turned its attention to the trade with the coasting fleet.

PHIPSBURG.—The town of Phipsburg occupies the western bank of Kennebec River between Bath and the ocean. It is an agricultural region with few commercial interests, and has no villages of importance. Several small fishing vessels are owned in the town, these being employed in the shore fisheries, the captains selling their catch to the Georgetown dealers or "running it" fresh to Bath and Portland. A number of weirs are built for the capture of salmon, alewives, and other river species, and a few parties fish for lobsters and cod along the outer shore during the summer months. Aside from this, the fishing interests of the town are at present quite limited, though in former years they were of considerable importance.

J.—THE DISTRICT OF PORTLAND AND FALMOUTH.

42. GENERAL REVIEW OF THE FISHERIES OF THE DISTRICT.

RELATIVE IMPORTANCE OF THE FISHERIES OF DIFFERENT LOCALITIES.—The Portland and Falmouth district includes the coast-line between Cape Small Point and Cape Elizabeth, which mark the limits of Casco Bay. This region, like many other portions of the State, was early visited by people interested in the fisheries. For many years fishing was the principal occupation, and the fishermen were distributed along many portions of the coast and on the principal islands, so that all sections were equally interested. Since 1840 the fisheries of the central portion of the district have decreased greatly in importance, while those of Portland have increased enormously, and this city now practically controls the fishing interests, not only of the district, but also of the greater portion of Western Maine. The people of Harpswell still continue to engage in the shore fisheries to a considerable extent, and the fisheries of that town are to-day nearly as important as at any time since its first settlement.

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows, in detail, the extent of the fisheries of the district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	776	Capital in vessels and boats	$343,030
Number of boat-fishermen	570	Capital in nets and traps	45,421
Number of curers, packers, fitters, &c	234	Other fixed and circulating capital	a 366,600
Number of factory-hands	71	Total	755,051
Total	1,651		

a *Other fixed and circulating capital.*—Cash capital, $80,800; wharves, storehouses, and fixtures, $224,800; factory buildings and apparatus, $55,000; total, $366,600. Of the $55,000 for factory buildings and apparatus $1,500 is for menhaden oil and guano factories not in use since 1878.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total Value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill nets:		
Active	91	3,259.18	$134,050	$25,325	$117,745	$277,720	In vessel fisheries	374	$6,460
Idle	1	32.24	500			500	In boat fisheries	500	6,000
In menhaden fishery	3	205.83	10,500			10,500	Purse-seines:		
In lobster fishery	10	227.82	6,975	300	1,600	8,875	In vessel fisheries	40	22,000
In oyster fishery	1	69.06	3,000		150	3,150	Total	914	34,460
Total	106	3,795.03	155,025	25,625	119,495	300,745	*Traps.*		
Boats.							Fykes	700	4,200
In vessel fisheries	518		14,895			14,895	Lobster-pots	9,015	6,761
In shore fisheries	489		21,240	5,050	2,000	28,290	Total	9,715	10,961
Total	1,007		36,135	5,050	2,000	43,185			

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	42,230,420			$649,153
Fresh fish.				
For food	6,896,000			91,947
For bait	1,040,000		5,200 barrels	3,900
For fertilizer	80,000		400 barrels	200
Total	8,016,000			96,047
Dry fish.				
Cod	14,495,000	4,995,200		156,100
Hake	4,036,500	1,674,400		22,425
Haddock	1,291,500	459,200		9,225
Pollock	913,500	352,800		6,300
Cusk	689,000	296,800		7,287
Total	21,425,500	7,778,400		201,337
Pickled fish.				
Mackerel	6,884,400	4,589,600	22,948 barrels	131,951
Herring:				
Ordinary	600,000	480,000	2,400 barrels	7,200
Miscellaneous	1,260,000	720,000	3,600 barrels	18,000
Total	8,744,400	5,789,600	28,948 barrels	157,151
Smoked fish.				
Herring:				
Bloaters	400,000	233,333	7,000 boxes	4,000
Haddock (Finnan haddies)	2,400,000	1,200,000		66,000
Total	2,800,000	1,433,333		70,000
Canned fish.				
Mackerel	75,000		51,804 cans	5,390
Lobsters.				
Fresh	241,000			8,830
Canned	305,000		50,400 cans	7,763
Total	546,000			16,590
Clams.				
For food	56,500		5,650 bushels	1,977
For bait	517,020		51,702 bushels=3,693 barrels	18,465
Canned	50,000		5,000 bushels=69,996 cans	6,708
Total	623,520			27,150

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Miscellaneous.				
Fish-oil			34,725 gallons	$13,890
Sounds		22,425		20,183
Marine products used for fertilizers				3,000
Enhancement in value of southern oysters, in transporting and transplanting				37,500
Total				74,573

43. HARPSWELL AND ITS FISHERIES.

The town of Harpswell consists of three long and rocky peninsulas, separated from each other by deep but narrow channels. It also includes a number of islands, some of which are quite small, while others are of considerable importance. It is situated about 15 miles from Portland, near Cape Small Point, which marks the eastern limit of Casco Bay. The region was first settled in 1720, when it was known as Merryconeag. The town was incorporated in 1758, and in 1840 had a population of 1,440, which had increased to 1,749 in 1870. The inhabitants are principally occupied in farming or fishing. Those on the upper part of the peninsulas devote the greater part of their time to the land, while the fishermen live about the southern headlands or on the islands convenient to the fishing-grounds.

It seems that Harpswell has been engaged in the fisheries to a considerable extent from its earliest settlement, and many of the early writers refer to it as a fishing town. Some of its vessels were sent to Labrador as early as 1825, and it is said that others engaged in the Grand Bank fisheries for many years.

EXTENT OF THE FISHERIES IN 1879.—In 1879 there were seven curing-stands, and 20,575 quintals of cod, hake, haddock, pollock, and cusk were dried by the fishermen and dealers, in addition to 175,000 pounds of the same species reserved for local consumption or for the country trade. A large quantity of haddock are taken by Harpswell vessels in winter and sold directly to the Portland dealers. In 1879 there were twenty-one fishing vessels, aggregating 451.92 tons, and valued at $20,350, owned at Harpswell. These furnished employment to one hundred and four men, nearly all of whom were Americans. Twelve of the vessels engaged exclusively in the shore fisheries; five others, after fishing along the shore in summer, engaged in the winter haddock fishery for the Portland market; and the remaining four were employed in "running" lobsters to Portland and to the Harpswell cannery.

THE BOAT-FISHERIES.—The boat-fisheries of the region are quite important, giving employment in 1879 to one hundred and fifty-two men. Some of them fish for lobsters in the early spring, and the remainder for cod and other species. In summer nearly all are engaged in the cod and hake fisheries with lines and trawls. Early in September the herring arrive in considerable numbers, and a greater part of the vessels, with many of the boats, engage in their capture with nets. Part of the catch is salted, and the remainder is sold fresh in Portland.

THE MENHADEN FISHERY.—Prior to the disappearance of the menhaden many of the fishermen engaged extensively in their capture, the catch being salted and sold for bait to the offshore fleet. Between 1870 and 1878 several thousand barrels were put up annually. Casco Bay has been a favorite resort for the menhaden for many years; and in 1876 an oil and guano factory was

built on Sebascodegan Island, a few miles from Cundy's Harbor. The following season another factory was built on the same island. Each of these employed a seining vessel and two "carry-aways." The business was continued till the fall of 1878, when, owing to a scarcity of fish, both factories were closed. About 25,000 barrels of fish were landed at the two establishments while they were in operation.

THE CLAM FISHERIES.—In winter many of the farmers and fishermen spend their spare hours digging, shucking, and salting clams, which are very abundant on the mud-flats along the shores. According to Mr. A. T. Trufant, this business is on the decline and now amounts to only 12,200 bushels annually, while formerly the quantity was considerably greater.

Quahaugs are said to be fairly abundant in Quahaug Bay, in the eastern part of the town. This practically marks the northern limit of the species on the Atlantic coast, for though they may be occasionally seen beyond it, they do not occur in any numbers.

THE LOBSTER FISHERY AND CANNING INTERESTS.—Next to Eastport, Harpswell was the first town in the State to engage in the canning of lobsters. A cannery was located here by Boston parties about 1849, and was run for five or six years. About 1858 Portland parties came to the town and engaged in the same work for one season. From that date till 1877, when the present cannery was erected, nothing was done in this line. Since 1877 the business has been prosecuted with considerable vigor, and during the past two or three years both lobsters and mackerel have been put up. The packing-season formerly lasted from April to November, with a suspension of work, on account of the poor condition of the lobsters, during two months in midsummer. The season, as now regulated by law, lasts from the 1st of April to the 1st of August.

In addition to the canning interests, Harpswell has shipped many fresh lobsters to Portland, Boston, and New York, in smacks. This business began as early as 1830, and had assumed important proportions before the fishermen living farther east had any knowledge of the value of the lobster fisheries. Owing to long continued and excessive fishing, the species is not so abundant as formerly, and few of the fishermen depend wholly upon this fishery for a livelihood, though many engage extensively in it in the spring, and some do so at other seasons.

44. THE FISHING TOWNS OF CASCO BAY.

The towns lying along the shores of Casco Bay between Harpswell and Portland, including Brunswick, Freeport, Yarmouth, Cumberland, Falmouth, and Westbrook, were in former times engaged extensively in the fisheries.

BRUNSWICK AND VICINITY.—Wheeler's history of the region contains the following statement about the early fisheries of Brunswick:

"The earliest business carried on here, in addition to farming and trading in furs, was salmon and sturgeon fishing. Thomas Purchase, soon after his settlement here in 1628, caught, cured, and packed salmon and sturgeon for a foreign market, and it is stated that there were at one time 'saved in about three weeks thirty-nine barrels of salmon, besides what was spoiled for lack of salt, and about ninety kegs and as many barrels of sturgeon, and that if they had been fitted out with salt and apt and skillful men, they might have taken abundance more.' It is also stated in Douglas's history that there was a company formed in London for the purpose of importing cured or dried sturgeon, and that they had an agent at the foot of Pejepscot Falls and a building erected there. This was no doubt, as McKeen observes, a very considerable business, and it was carried on upon quite a large scale, from time to time, until into the last century; and until the commencement of King Philip's war, in 1675, it was doubtless a great business with Mr. Purchase. The business has not been carried on to any extent within the present century, the salmon having entirely dis-

appeared from the river, and there being fewer sturgeon than formerly and a lessened demand for the latter. Present indications betoken, however, a return of the salmon fishery before very many years."*

One hundred and twenty-one years later, judging from another passage in the same volume, the fisheries were still important. Wheeler says:

"The town, at a special meeting in January, 1749, appointed Ensign William Vincent to inspect the fishery at Brunswick, and to regulate the same according to instructions from the selectmen."†

These statements evidently relate to the river rather than the sea fisheries. It is, however, known that the people of the region were also interested in the bay fisheries to a considerable extent for many years. But later, other industries sprang up, and the fisheries were neglected.

The inhabitants are now principally engaged in agriculture, having large and fertile fields, to which they devote most of their energies. Ship-building has been extensive, and a considerable number of mechanics have, until a very recent date, found constant employment in building large vessels for the coasting and foreign trade. None are wholly dependent upon the fisheries for a livelihood, and, barring those living on the islands, few visit the fishing-grounds with any regularity except in midsummer, when the mackerel are abundant.

THE CLAMMING INTERESTS.—The shores of the bay abound in clams, and almost every cove between Portland and Harpswell has extensive mud and sand flats where the species is peculiarly abundant. During the winter and early spring the farmers have many spare hours, and the mechanics, carpenters, and ship-builders are out of employment. At such times many of them engage extensively in clamming, and after selling as many as possible in shell to the peddlers and to Portland dealers, they "shuck" the remainder for use as bait in the vessel fisheries.

A few parties begin digging as early as October, but the majority usually find other employment until late in December. From this time till the following May not less than one hundred and eighty-five men and boys engage in this work, some of them continuing till the first of June.

In addition to the above, quite a number of fishermen from the adjoining towns and numerous islands engage in this business to a greater or less extent. The men build small shanties along the shore where they spend the hours of high water in shucking their clams. At about half-ebb they start for the flats, following the water line as it recedes, and gradually working back with it as it advances. Several crews often occupy the same shanty, and two or three frequently join in the purchase of a small boat, which enables them to visit the more distant flats. When the tides "serve" they can spend a greater part of the day in digging, but ordinarily only one tide is utilized. The average clammer will dig from 2½ to 3 bushels at a tide, while a rapid worker who knows the grounds will often get twice that quantity.

One of the largest dealers of the locality, Mr. Hamilton, of Chebeague Island, estimates the quantity of clams dug during the season of 1878–'79 at 46,100 bushels, over 39,000 bushels of which were shelled and salted for bait. If to this quantity we add the catch of the Portland and Harpswell fishermen it is seen that not less than 60,000 bushels are taken annually from the flats along the shores of Casco Bay. The price, according to the same authority, varies greatly from year to year, the average for shell clams being from 75 cents to $1 per bushel. The shelled, or salted clams, range from $3 to $6.50 per barrel, according to the supply and demand. These figures represent the value received by the fishermen for the clam-meats, as the salt and barrels are always furnished by the dealers. In 1875 the fishermen received $6 per barrel, and in 1879 the price had dropped to $3.

* Wheeler's History of Brunswick, Topsham, and Harpswell, Maine, p. 115. † *Ibid.*, p. 552.

THE FLOUNDER FISHERY.—Another business in which the fishermen of the Casco Bay islands, Portland, and Cape Elizabeth are interested, is the winter flounder fishery. The first to engage in the capture of this species for market along this portion of the coast was Mr. Fowler, of New London, Conn. Hearing of the abundance of flounders about Portland, he came to the region with twelve fyke-nets in the winter of 1871–'72, and after renting an old sloop which was to answer both as home and packing-house, set his fykes on the soft bottom of the outer harbor in 3 to 8 feet of water at mean low tide. Finding no market for his flounders in Portland he shipped them by rail and steamer to New York. From this beginning the business has gradually increased until in the winter of 1878–'79, according to Mr. Robert Hamilton, of Chebeague, twenty-five men from Portland, and twenty-four from the various islands of the bay were employed regularly in this fishery. The season lasts from October to April, the average weekly catch being about 1,500 pounds for each fisherman. A portion of the flounders are now sold in Portland for shipment to Canada, but a greater part still go to New York.

THE CANNING OF FISHERY PRODUCTS.—Several canneries have been built along the shore of Casco Bay for putting up fruits, vegetables, and meats. One of these, located at South Freeport, began the canning of lobsters and clams in the summer of 1876. The business has been continued regularly since that time, with a gradual increase in the quantity of clams put up. In the summer of 1879 the canning of mackerel was begun at this place. The supply of clams is obtained wholly from the people of the locality, while small vessels are sent to the outer islands to purchase lobsters and mackerel from the professional fishermen.

45. PORTLAND AND ITS FISHERY INTERESTS.

THE EARLY FISHERIES OF PORTLAND.—Portland, the metropolis of Maine, is located on one of the best harbors of the coast, a few miles above Cape Elizabeth. It was first settled in 1632, and was included in the town of Falmouth up to 1786, when it was incorporated as a separate town. The city charter was adopted in 1832. The place has suffered much from wars and fires, having been on several occasions almost completely destroyed. In 1790 it had a population of 2,246, which had increased to 12,815 in 1850 and to 33,810 in 1880. Its location on so excellent a harbor, in the very center of one of the best fishing districts of the coast, has given it a prominence in this industry from its earliest settlement. Richmond's Island, but a few miles from the harbor, was one of the most important fishing stations of New England for many years, beginning with 1630, and was annually visited by fishing vessels from different parts of Europe.

A few extracts from those who have examined into the early history of the region will suffice to show that fishing occupied the attention of a majority of the early settlers. Hon. William Gould, in writing of the early history of Portland, says:

"Of course the first business at Casco, like most other localities in New England, was to choose a favorable place, fell the forest, and build the trunks of the trees into a habitation; and while doing this, and preparing a clearing for cultivation, the early settlers could get the quickest returns from their labor from the sea, such as wild fowl, shell and other fish, because these required no cultivation. To know how well this was improved in our harbor it is only necessary to examine the shell heaps at Cushing's Point. Some idea of the facilities for fishing and of those engaged in it may be obtained from an account of 'Two Voyages to New England; * * * * a description of the country, natives, and creatures, by John Jocelyn, gentleman, London, 1675.' The author had a brother, Henry Jocelyn, at Black Point, who was a leading man in the infant colony, whom he first visited in 1638. He was a close observer of men and things, and describes all he saw in a quaint style. He was the first European traveler who remained long enough to get a correct idea

of the country and people. After speaking of the immense number of alewives in all the streams in April, he says, 'Trout there be good store in every brook, ordinarily two and twenty inches long.' He further says, 'A wonderful number of herring were cast up on shore at high water in Black Point Harbor, so that they might have gone half way the leg in them for a mile together.'"*

He continues:

"Our first trader established himself on an outlying island when the mainland was a howling wilderness, dealt with Indians and fishermen, and was killed for cheating his customers. * * * His successor, John Winter, was an honorable man, and carried on an important foreign trade. There is a halo of romance about those early days when dried fish, which, with skins of wild animals, were the only products of the country, were shipped direct to Spain and cargoes of wine brought back in return."

In another place he again refers to Mr. Winter, who seems to have been acting as agent for an English company that had obtained a grant of Richmond's Island and the present town of Cape Elizabeth in 1631. He says of him:

"He soon built a ship on the island and settled a place for fishing, and employed many servants in fishing and planting."

In March, 1634, says Winthrop: "Seventeen fishing-ships were come to Richmond Island and the Isle of Shoals."

These were from Europe to load with fish cured at the several stages which must have employed a large number of men. These ships brought all the stores needed at the settlement from England.

Winthrop says:

"In the spring of 1635 a ship of 80 tons and a pinnace of 10 tons arrived at Richmond's Island."

In 1636 (after a change in proprietors of the land) Winter was to receive one-tenth of the profits and £40 premium in cash annually. They employed the ships Hercules and Margery and one other whose name is not mentioned. In 1638 Trelawney (the land proprietor) sent a ship of 300 tons from England to the island laden with wine, probably the proceeds of a cargo of fish sent to Spain or Portugal. The returns sent to the proprietor in England were oak pipe-staves, beaver skins, fish, and oil.†

The site of the present city was visited by two fishermen, who made it their home as early as 1632. Mr. Gould refers to the matter as follows:

"In 1630 Richard Tucker, joined soon after by George Cleaves, established himself at Spurwink River in planting, trading, and fishing, where both remained till 1632, when they were 'ejected by Winter' and 'sought refuge on the north side of Casco, on Fore River, and laid the foundation for the first settlement upon the Neck, now Portland,' where they continued many years."

Other trading posts were established in the vicinity at a later date, of which Mr. Gould mentions several. He says:

"Just outside the breakwater is Cushing's Point, which was another business center. Col. Ezekiel Cushing, its owner, came here from Provincetown about 1738. He was largely engaged in the fisheries and the West India trade, and owned several whalers, which were engaged in the business when whales could be taken nearer home than now."

As the settlement grew in size and importance its people gradually came to own a large fleet of vessels, that were sent to different parts of the United States and to foreign countries. About

* Elwell's Successful Business Houses of Portland, pp. 168, 169.
† *Ibid.*, pp. 166, 170, 171.

the beginning of last century a limited trade sprang up between Portland and the West Indies, and large quantities of lumber were shipped to that region.

In addition to lumber, according to Mr. Gould, these West Indiamen soon began carrying out soap, candles, and dried codfish in "drums" of the weight of 500 to 800 pounds each. These were consigned to the captain, who sold his cargo, bought another of sugar, molasses, and rum, and returned, paying no commission to the foreign merchant.

The business continued to increase, and soon a greater part of the Portland fish were sent there for a market.

"After the war," says Mr. Gould, "the West India trade, which had grown before the Revolution to be an object of considerable importance, was revived, and a profitable business was done in exchanging lumber and fish for rum, sugar, and molasses."

This trade was extensive up to 1850, and even later a few vessels were sent, the last one going in 1878.

From the first, Portland has taken a leading rank as a fishing port, and by the beginning of the present century she had a fleet of vessels engaged in the Grand Bank cod fishery. A little later she sent vessels to Labrador for cod, and in 1832 the first vessel from the town started for the Gulf of Saint Lawrence for mackerel. She has had no vessels regularly engaged in the George's Bank cod fishery, and has been interested only to a limited extent in the fresh-halibut fishery; but aside from these her fishermen have been engaged in all the leading sea-fisheries of the New England coast.

Space forbids a review of the Portland fisheries during the years of their development, and though it might be interesting to trace each branch of the business through its various stages of growth, and to show the causes that have led to the transfer of many of the fishing vessels from the smaller towns of the State to Portland, we must confine ourselves to a description of the fisheries as they are found at the present time.

THE VESSEL FISHERIES.—In the summer of 1879 the Portland fishing fleet numbered seventy-nine sail, valued at $114,775. These vessels aggregated 3,004.13 tons and carried six hundred and sixty-one men. Of the entire fleet sixteen visited the more distant fishing grounds for cod, twenty-one were provided with purse-seines for catching mackerel, thirty-two engaged in the shore fisheries, four were employed in the halibut fisheries to a limited extent in summer, and six carried lobsters to the Portland market. Six of the codfish fleet, after returning from their first trip, were fitted out for the mackerel fishery, and nineteen of the shore fleet joined them during the height of the season, making a total of forty-six vessels engaged in the mackerel fishery during the summer months. About the 1st of November nine of the vessels are fitted for the winter haddock fishery, continuing the business till the following spring.

The vessels are usually owned by a number of parties rather than by a single individual. In most cases the ship-builders, riggers, sail-makers, fitters, and packers each own a part, in order that they may control the trade of the vessel in their respective lines. It is also customary to induce the captain of the vessel to buy a small part, thus causing him to feel a deeper interest in the work and to give more attention to the interests of all concerned. One of the owners is selected as the "managing owner," and it becomes his duty to act as agent for the vessel and to keep full and accurate accounts of all expenditures and receipts. This party is usually selected on account of his knowledge of the business, and is frequently the captain of the schooner or the merchant who furnishes the supplies.

The vessels are usually "fitted at the halves," the owners furnishing provisions, gear, and

salt. The crew must man and sail the vessel, and catch, dress, and salt the fish. They usually pay for half of the bait and ice, and hire their own cook.

Nearly all of the Portland vessels engaged in the bank cod fisheries carry dories for hand-lining, none of them being provided with trawls on account of the additional expense involved in their use. These vessels as fitted for an average trip usually carry from 125 to 150 hogsheads of salt and about 40 barrels of clam-bait. On their return the men are expected to land and wash the fish and to put the vessel in order. This done their work is completed, and they are at liberty to turn their attention to other occupations or to ship in other vessels. The fish are "made" by professional curers, who take one quintal in twelve in payment for their labor.

As a rule the fisherman has no ready money, and must be furnished with a certain quantity of provisions for his family during his absence. The owners usually assume the responsibility of furnishing a limited quantity of goods to each man, but care is now taken that their value shall not exceed $30. Each member of the crew keeps his fish separate, and receives a share in proportion to the number taken by him. On his return his proportional part of the trip is figured up, and more goods are advanced, if necessary, provided his share of the trip is thought to considerably exceed the value of the goods already furnished. He must wait, however, until the fish have been cured and sold, and the money has been received by the owners before he can settle his accounts in full. Some of the men being anxious to get their money immediately, will sell their interest in the catch as soon as they arrive, to the fitters or owners, at a considerable sacrifice.

In the mackerel fishery the vessels fit "at the halves," the fish being usually sold at the end of each trip, though they are occasionally retained till the close of the season. Portland was among the first towns to send vessels to the Gulf of Saint Lawrence for mackerel. According to Mr. Cushing, one of the oldest inspectors in the city, she sent her first vessel to that region in 1832, and has continued the business regularly ever since. She has now, next to Gloucester, the largest mackerel fleet in the United States, having twenty-eight sail of vessels owned by Portland capital engaged in the purse-seine mackerel fishery.

In 1879 sixteen of the vessels fished wholly in the Gulf of Maine; seven fished from Cape Hatteras to Mount Desert Island; two spent a greater part of the season in the Gulf of Saint Lawrence, and two divided their time between the Gulf of Saint Lawrence and the Gulf of Maine. In 1880, so far as we have been able to learn, none of the fleet fished in British waters. In addition to the above, nineteen of the shore vessels engaged in the mackerel fishery with line or net during the height of the season.

The shore-fishing vessels, numbering thirty-two sail, are engaged in the capture of cod, hake, haddock, pollock, cusk, mackerel, and herring, fishing first for one kind and then another, according to the season, or the relative abundance of the different species. The fishing season begins about the first of April and continues till late in November. Formerly many of the smaller craft fished for menhaden with gill-nets, but as none of these fish have visited the waters of the State since 1878, they have been obliged to engage in other fisheries.

Early in September large schools of herring make their appearance along the outer shores, and most of the smaller vessels, with many of the boats, are engaged in their capture for a number of weeks. The herring are taken in gill-nets, and sold to the packers and smokers.

During the winter months haddock are quite abundant, and nine of the local vessels, together with some from other places, are engaged in this fishery, selling their catch to the smokers, who prepare them for shipment to Canada and different parts of the United States. Trawls are used in this fishery, and the catch is often enormous, while the price paid makes the profits to the fishermen larger than those of any other fishery.

THE BOAT FISHERIES.—The boat fishermen of Portland, about one hundred and forty in number, are almost wholly Americans. Few of them live in the city, the greater part being scattered about on the islands in the vicinity and at Cape Elizabeth, both for cheapness of living and for convenience in getting to and from the fishing grounds. They use lap-streak, keeled, and center-board boats, 18 to 22 feet in length. These are provided with two movable masts, with sprit sails, and have an average value of $50 to $75 each. The fishing begins late in March and continues till November, when most of the boats are hauled up, though a few fish more or less all winter.

At first trawls are extensively used, the fishermen setting from 800 to 1,200 hooks each; but as the season advances and bait becomes scarce hand-lines are substituted for them, as the dog-fish are usually so plenty at this season as to seriously interfere with trawl-fishing. "Conch" (*Natica clausa*) constitute the principal bait in summer, the fishermen gathering them on the flats at low water and keeping them in live-cars till needed. The catch is composed largely of cod, pollock, hake, and mackerel. Some of the boat-fishermen are beginning to carry harpoons for sword-fish, and nearly all own a "gang" of lobster-pots, which they fish with more or less regularly. The fish are sold to the fresh-fish dealers, or to the hawkers, at prices depending largely upon the quantity in market. The supply is usually greater than the demand, and in order to be sure of a market each fisherman must find some one who will agree to take his catch at a stated price; otherwise he does not care to venture out. On account of the uncertainty of finding a market much time is lost that might otherwise be profitably employed. The curers on the islands usually buy all the fish that are offered, but they require the fishermen to split them, and cannot afford to pay as much as the fresh-fish dealers in the city. For this reason many do not care to sell to the curers, though if the time gained through the certainty of a market be considered, they could doubtless make good wages in this way. This condition of affairs occurs only in summer, for at other seasons the market readily consumes all the fish that are offered.

FISH-CURING IN PORTLAND.—The fish landed in Portland are, with few exceptions, cured by parties making a specialty of this work. Land in the heart of the city, where the fish-wharves are located, is quite valuable, and the fish dealers do not have curing-stands of their own, as is the case with those in smaller cities, but are dependent on the curers for "making" any fish that their vessels may bring. Two firms, however, have utilized the roofs of their buildings as flake-yards, and in this way cure several thousand quintals annually. The principal curing-stands are on the islands of the outer harbor, where suitable buildings and flake-yards have been constructed. On arriving from the banks the vessels proceed to these islands, the crews landing and washing the fish, after which they wheel them to the flake-yard, when the curer takes charge of them and prepares them for the market, taking one quintal in twelve for his services. If they cannot be cured at once, the crew pitch them out of the vessel and carry them to the buildings, where they are "kenched" until they are needed. In this case the curer "washes them out" before they are placed on the flakes, charging six cents per quintal additional for this work.

In some localities the flakes are provided with cloth covers, which are spread over the fish to protect them from the heat of the sun, which is often so great at mid-day as to render them nearly worthless. In other localities the fish are "bunched" early in the day before the sun becomes too warm, and spread again late in the afternoon. In many places along the coast no attempt is made to dry the fish in summer on account of the danger of burning them, and the catch is "kenched" till fall.

In Portland, however, the curers have a very simple way of overcoming the difficulty, and

continue their work with little or no loss during the hottest weather. Their flakes are built so as to run nearly east and west, and are so arranged that the tops may be easily turned on a central axis. The fish are spread in the morning, and as the day advances and the heat increases the flakes are tilted toward the north, so that the sun's rays shall fall obliquely on the fish, and thus have little effect upon them.

The property devoted to the curing of fish in Portland is valued at $26,000. The business furnishes employment to twenty-one men during eight months of the year and to several additional ones during the busy season. The quantity cured in 1880 was somewhat larger than for several years past, though Portland has long been extensively interested in the business. The figures furnished by Messrs. C. & H. Trefethen, who are more extensively engaged in curing than any other firm, show the business for 1880 to have been 49,426 quintals, of which nearly seven-eighths were landed by Portland vessels. The catch was divided as follows: 21,788 quintals large cod; 16,813 quintals small cod; 6,626 quintals hake; 1,437 quintals cusk; 1,369 quintals pollock, and 1,193 quintals haddock.

INSPECTION OF FISH.—Portland is largely interested in packing and inspecting fish of different kinds, including mackerel, herring, cod, haddock, sword-fish, and other species. She is more extensively engaged in this business than any other city in the State, leading all cities in the United States in the quantity of herring inspected, and is excelled only by Gloucester in the quantity of mackerel packed. The mackerel are mostly taken by vessels belonging in Portland and other Maine fishing towns, though a few vessels belonging to Cape Ann, Cape Cod, and other fishing districts of Massachusetts pack in Portland to a greater or less extent. Nine firms engage regularly in this branch of the business. They occupy property valued at $89,000 and furnish employment to ninety-three men, forty-three of them being employed throughout the year. Up to 1879 the inspection charges were $1.50 per barrel, but in the spring of that year the price was reduced to $1.25.

Mr. Charles Dyer, one of the leading packers in Portland, in referring to the business of the city for 1880, writes:

"Portland has packed, in round numbers, 75,000 barrels [76,417] of mackerel, valued, clear of salt and packing, at about $5 a barrel. This has been a very prosperous year, and, were it not for the English mackerel coming into the country free of duty, it would have been more so."

After speaking of the habit of packing English fish under American brands by the fish inspectors of other cities, and of the injury to the trade resulting therefrom, he continues:

"Portland does not handle any English-caught mackerel, and for this reason Portland mackerel stand highest in market."

The nearness to the extensive fall herring fisheries brings Portland into prominence in connection with this trade. She has a fleet of her own engaged in the herring fishery, and, in addition, buys nearly all of the fish taken by fleets of other portions of the coast, though Boothbay handles a small percentage and Boston secures a considerable quantity.

The figures furnished by Mr. E. G. Willard show 12,000 barrels to be the quantity of herring handled in 1880. In addition to the above, Portland handled 1,800 barrels of pickled haddock and cod, and a few barrels of sword-fish and alewives.

SMOKED HERRING AND HADDOCK.—Several Portland dealers have large smoke-houses, and are engaged in the preparation of Finnan haddies and bloater herring. These parties have a monopoly of the Finnan haddie trade of America. Eastport, the only other city extensively engaged in the preparation of these fish, is working wholly under contract with the Portland dealers, who purchase the products and distribute them to the trade. Jonesport, Vinal Haven,

and Rockland, in Maine, Portsmouth in New Hampshire, and Boston in Massachusetts have each smoked a few haddock, but their trade has been wholly local and of comparatively little importance.

From Messrs. Wyer Brothers and John Lovett & Co., the two largest dealers in the country, we gathered the following facts about the origin and growth of the Finnan haddie trade:

The haddock was first smoked in America at Montreal, Canada, by Mr. Thomas McEwan, a Scotchman, who had become familiar with the method of preparation before removing to this country. He began the business in a small way about 1860, sending to Portland for his fish. The first few lots, consisting of only 100 to 300 pounds each, were smoked in barrels. The trade soon increased so that smoke-houses were built, and, finding the expense of transportation so great, Mr. McEwan removed to Portland for engaging more extensively in the work. He soon formed a partnership with Mr. Lovett, one of the leading fish dealers of Portland, and continued the business on a larger scale than ever. At first the trade was wholly with Canada, and largely among the Scotch. Later the Americans commenced eating smoked haddock, and at the present time nearly one-third of the trade is with the United States. Up to 1868 Portland was the only town engaged in the business. At this time Portland dealers, learning of the abundance of haddock along the eastern part of the coast of Maine, located at Eastport to engage in the work, and the business has been continued to the present time, the season lasting through the winter only. During the season of 1879–'80, according to Mr. R. C. Green, Eastport smoked and shipped to Portland dealers about 211,000 pounds of cured fish, valued at over $12,000.

The following extract from a letter received from Wyer Brothers, of Portland, gives the extent of the business of that city. They write:

"The quantity of haddock cured here in the season of 1879–'80 did not vary materially from that put up the previous season. Though the demand increased, the catch of haddock from which the supply must be obtained fell a little short of that of previous winters, and it was often quite difficult to get a sufficient quantity for smoking. * * * We have carefully estimated the amount of haddock used for this purpose and find it to be about 2,100,000 of fresh fish, and, as they shrink almost one-half in curing, the whole amount of smoked fish would be about 1,200,000 pounds."

Adding to these the quantity shipped from Eastport we find that Portland now handles nearly 2,500,000 pounds of Finnan haddies annually. Property valued at $8,000 is used by the smokers, and twenty-four men are employed for six months of the year in preparing the fish.

Wyer Brothers place the quantity of bloater herring smoked in Portland during the winter of 1879–'80 at 2,000 barrels of 350 fish each, equal to 700,000 herring in number. These were largely sold in Canada with the haddock. No hard herring are smoked in the city.

THE LOBSTER FISHERY AND THE LOBSTER TRADE.—Lobsters are caught off Portland during the entire year, though the fishing is most extensive from March to July, and again from October to December. Thirty men, living chiefly on the islands or at Cape Elizabeth, fish exclusively for lobsters, while nearly all of the boat-fishermen have a few pots which they tend with more or less regularity at certain seasons. The local fishing-grounds are around Hog, Peak's, and Cushing's Islands and near Portland light in summer, and along the outer shore of Cape Elizabeth in winter. The traps are set in from three to twenty fathoms of water, one man tending from forty to sixty-five of them, usually visiting them once a day when the weather is suitable. During the height of the season some haul their pots twice a day. Twenty-five years ago, according to Mr. Trefethen, of House Island, an average catch was six or seven lobsters, weighing 4 to 6 pounds each to the pot. From that time they have gradually diminished, and, according to the same authority, the catch in 1879 averaged only one marketable lobster (which must be 10½ inches long), and three

smaller ones to the pot, the average weight of the former being 2 pounds and of the latter 1 pound. The fishermen in the vicinity of the city bring their catch direct to market, while those living farther off are obliged to depend upon the smacks.

The Portland lobster market is largely controlled by two firms, while a third does a limited business. Thirteen smacks, aggregating 287.68 tons, valued at $9,575, make frequent and regular visits to different portions of the coast between Cape Porpoise and the Grand Manan and buy the "count lobsters" of the fishermen, carrying them to the Portland markets. Others, though not regularly employed, bring occasional cargoes to the city. The fisherman keeps his lobsters in live cars until the smack arrives, when he sorts them out, those of marketable size being purchased by the captain, while the smaller and soft-shelled ones are retained to be sold to the boats running to the canning establishments. The time required for the round trip varies from one to two weeks, according to the weather, the abundance of lobsters, and the distance traveled. The average smack carries from 4,000 to 5,000 lobsters each trip; if the well is overcrowded, many die in transit, the loss in this way, especially in summer, being often very great. The price paid to the fishermen ranges from three to four cents each, and the selling price in Portland averages about six cents. On the arrival of the smack, the live lobsters are transferred to the cars of the dealers, where they remain until needed. When an order is received for them they are taken out, boiled, and packed in boxes or barrels for shipment to the trade. A few live ones are shipped to the principal dealers of Boston, but this method is not usually adopted, as many are killed by the jarring to which they are subjected on the train. Live lobsters are received in considerable quantities from Eastport, the usual method being to pack them in barrels with a quantity of ice: when carefully packed in this way they will keep from two to three days.

As already stated, three firms are more or less interested in the lobster trade of Portland. These occupy property worth $12,000, and furnish employment to nine men. According to Mr. A. L. Johnson, one of the principal dealers, Portland, in 1880, handled 800,000 lobsters in number These cost the dealers about six cents each, making the total cost at first hands $48,000. The lobsters are variously estimated at from 1½ to 2 pounds each; allowing them to average 1¾ pounds, the total weight would be 1,400,000 pounds. Of this quantity about one-half goes to Boston, one-fourth to New York, and the remainder to the country trade in Maine, New Hampshire, Massachusetts, and Canada.

LOBSTER-CANNING BY PORTLAND CAPITAL.—Portland capitalists are more extensively interested in the canning of lobsters than those of any other city in the United States. The business was begun at Eastport nearly forty years ago, and three or four years later a cannery was built in Boston. Before 1850 Portland people had become interested in the work, and from that date they have taken the lead in the business, showing remarkable energy and judgment. At first a good many lobsters were put up in the city, but as the demand increased the supply became insufficient, and they were obliged to establish canneries at different points along the coast, gradually increasing the number and going farther and farther from home, until to-day Portland has twelve canneries on the coast of Maine, employing about 300 laborers on shore and nearly 1,000 fishermen.

These canneries, with their fixtures, are worth $38,000, and it requires an additional capital of $80,000 to carry on the business. The three firms controlling this trade are the Portland Packing Company, Burnham & Morrill, and J. Winslow Jones. These firms have consulted their books and furnished figures from which the following summary of the business for 1880 has been obtained: 4,731,988 pounds of lobsters were used, and 849,8971 one-pound and 99,371 two-pound cans were put up. In addition, 267,943 one-pound and 5,597 two-pound cans of mackerel (*Scomber scombrus*) were packed, 516,864 pounds of round fish being required for this purpose. About 3,500 bushels of soft-

shelled clams (*Mya arenaria*) were used, from which 38,400 cans of clams and 14,400 cans of clam-chowder were prepared. Over $53,000 were paid to the fishermen for their catch; $19,000 were paid to the employés for their labor; and the manufactured products, including cans, cases, &c., had a market value of $157,500.

In addition to their work on the coast of Maine, the above firms have seventeen canneries in the British Provinces, distributed as follows: Three in New Brunswick, 11 in Nova Scotia, 1 on Prince Edward Island, 1 on the Magdalen Islands, and 1 in Newfoundland. About $214,000 capital is required for carrying on their business, and the figures for 1880 showed that 10,588,578 pounds of live lobsters were used in packing 1,916,096 one-pound cans, and 281,928 cans of other brands. Owing to the duty on the tin in which the lobsters are packed, over 95 per cent. of the products were sent directly to England, France, and Germany, or passed through the United States, in bond, en route for those countries.

The above firms have storehouses, can-factories, and offices in and about Portland valued at over $50,000, and eighty men are employed for three or four months each winter in making the cans that are to be used during the following season, which, in Maine, is limited by law to the months of April, May, June, and July.

THE FRESH-FISH TRADE.—The wholesale fresh-fish trade of Portland is controlled by seven firms located in the vicinity of Custom-house and Commercial Wharves. They obtain a greater part of their cod and haddock in summer from the local fishermen, who set their trawls off the outer islands of Casco Bay in from thirty to forty fathoms of water. The boats land about 400 pounds each trip, making an average of three trips a week during the fishing season. Formerly the mackerel were furnished by the numerous "drag-boats" of the locality, but of late, owing to the scarcity and small size of the fish, the number of these boats has greatly diminished, and the supply is now obtained from the seining fleet, or is occasionally brought from Boston. Sword-fish are landed in considerable numbers by the boats and vessels fishing along the shore from the 1st of July till the 15th of August. Three or four small schooners visit different localities from Cape Elizabeth to the Bay of Fundy for halibut, but the catch is usually very limited and a large part of the supply is brought from Gloucester. Late in the fall some of the larger vessels that have previously been employed in the offshore cod and mackerel fisheries fit out with trawls for the winter shore fisheries, catching cod, hake, and haddock, which are usually sold fresh in Portland.

The wholesale dealers handle between seven and eight million pounds of fresh fish annually. Probably three-eighths of the entire quantity, if we include those used for smoking, are haddock, one-fourth are cod, the bulk of the remainder being composed of mackerel, hake, pollock, sword-fish, salmon, and herring.

About half of the fresh fish are sold in Canada and the greater part of the remainder are sent to Boston and the interior cities of Maine, New Hampshire, and New York. The dealers occupy property valued at $24,000, and have $10,000 additional capital invested in the business. Twenty-four men are constantly employed in boxing and icing fish, and twenty-seven others are required to assist during the busy season, which lasts about five or six months.

The retail fish trade is divided between the regular merchants, who rent buildings and deal exclusively in sea products, and the peddlers that vend fish from hand-carts and wagons through the city and surrounding country. There are eight regular retail dealers, each doing a fair trade. They buy chiefly of the wholesalers and seldom deal directly with the fishermen. The number of peddlers varies considerably with the season, the average being about forty. This class is made up largely of aged fishermen who have worn themselves out by exposure in their open boats, and are now satisfied with the small amount of money that can be made in this way.

THE TRADE IN FISH OIL.—A large part of the oil saved by the Maine fishermen is carried directly to Boston for a market, and outside of Portland and Eastport there are no oil dealers in the State of Maine. Eastport handles but a limited quantity, the greater part of which is obtained from the provincial fishermen. The firm of John Conley & Son controls the oil trade of the city, less than 5 per cent. of the total quantity brought to Portland being handled by other parties. Mr. Conley furnishes the following statement of the trade for 1880:

"On account of the higher prices paid for oil in the West, we have allowed much that is usually landed in Portland to go to Boston and other places. The quantity handled in this city was 49,851 gallons of liver oil from the coast of Maine, and 2,475 gallons from Nova Scotia; also 595 gallons of herring and 2,372 gallons of menhaden oil from different sources. This gives a total of 52,818 gallons, costing at first hands $20,422.36. About 4,464 gallons of the above were sold to dealers in New York, and the rest was shipped direct to the consumers throughout the country."

THE TRADE IN PROVISIONS AND OUTFITS.—With so large a fishing fleet of its own, and so many outside vessels visiting the city for a market, it is reasonable to suppose that Portland does a large business in supplying the fishermen with provisions, salt, and ice. Five firms depend wholly on their trade with fishermen and fishing vessels, and a sixth supplies a large amount of ship-chandlery to the vessels of the port. The dealers depend largely on Boston for their provisions and other supplies, but a portion of their stock comes direct from the factories along the coast. The lines and trawls are made in Castine; the cordage in Plymouth and Boston; the nets in Boston; the seine-boats in Gloucester, and the dories in Salisbury, Newburyport, Gloucester, and Harpswell. The trade amounts to $150,000 annually, and requires the services of sixteen clerks and accountants.

The salt trade has been extensive for many years. From 1812 to 1866, it was largely controlled by Dana & Co., and by E. G. Willard from 1867 to the close of 1878. Mr. Willard acted as agent for the large importing house of J. P. & G. C. Robinson, of New York, and for the thirteen years during which he controlled the fishing trade in salt he estimates that 30,000 hogsheads were sold annually at $1.50 to $1.75 per hogshead. About one-half of the entire quantity was used by Portland vessels, and the remainder was sold to vessels belonging in Southport, Westport, Boothbay, and other towns along the coast of Maine.

With so extensive a trade in fresh fish and so large a market fleet, Portland requires a large supply of ice. This is supplied by several firms, the principal one being D. W. Clark & Co., who estimate the annual quantity consumed by the fishing trade to be about 2,200 tons, worth $6,600. This is divided as follows: 1,000 tons to the fresh-fish dealers, 700 tons to the large vessels in the mackerel and halibut fishery, and 500 tons to the smaller market vessels and boats.

THE TRADE IN DRY AND PICKLED FISH.—Having spoken of the quantity of fish cured and inspected in Portland, we now consider the city as a distributing center. We are indebted to Mr. E. G. Willard, who buys a greater part of the fish landed in Portland either for himself or on commission for the largest houses in New York and Boston, for many of the following facts which, though only estimates, probably vary but little from the actual figures.

Most of the Portland cod are kench-cured, many of them being prepared for exportation to the West Indies. Formerly nearly all of the cod were packed in drums before shipping, but now the curers on the islands are beginning to carry their large fish in bulk to Boston and New York. At the present time, fully 50 per cent. of the cod are packed in drums and sold to the larger dealers of Boston and New York, by whom they are exported to the West Indies. The remainder are purchased by the same parties for shipment to the Western and Southern States. In 1880, Portland

dealers handled 27,000 quintals, in addition to those shipped by the curers of the islands. A considerable portion of them were brought from the fishing towns farther east.

The hake trade of Portland is largely controlled by Mr. Willard, who buys nearly all that are caught by Portland vessels, as well as those from other portions of the State. The quantity handled annually varies from 12,000 to 14,000 quintals, but in 1880 it reached fully 15,000. These fish are all hard-dried and packed in eight-quintal drums. The greater part are sold to J. Van Prague & Co., of Boston, who in turn export them to Surinam.

No city in the United States offers so good a market for dried pollock as Portland. The trade is controlled largely by the wholesale grocers, who buy all that are offered by the Maine fishermen, and send to Cape Ann and the British Provinces for an additional supply. Mr. George Trefethen, the principal dealer in pollock, writes as follows:

"In reply to your inquiries about the pollock trade of Portland for 1880, I will state that the catch has been very light. At Eastport [which has the most extensive fishery in the country], it was almost a total failure. * * * I think there were about 18,000 quintals sold in Portland in 1880. Of those handled by us, 30 per cent. were from Nova Scotia, 15 per cent. from Cape Ann, 40 per cent. from the Portland district, and the balance from the eastern part of the State, including Eastport. The prices have ruled about 50 cents per quintal higher than in 1879, or $2 to $2.50 per quintal. The demand has been good all through the season, and the stock now on hand is not more than 50 per cent. of what it was last year at this time. The prices are now [January 22, 1881] higher than for several years, owing to the small catch of last season, good light salted dry-cured fish bringing 3 to 3¼ cents per pound."

The grocers depend almost wholly for their trade on the counties of Cumberland and York, in Maine, and Rockingham, Strafford, Belknap, and Merrimac, in New Hampshire. In most places there is a foolish prejudice against pollock, and outside of the above-named and adjoining counties there is little demand for them. Here, however, according to Mr. Trefethen, they are esteemed equally with the cod by a majority of the people, and some even prefer them to the latter species.

About 3,000 quintals of haddock, and 2,500 quintals of cusk are handled here annually. These are mostly sold in Boston, Gloucester, and Plymouth, to be cut up and shipped to the West as "boneless cod". Boston takes about three-fourths of all, and Gloucester and Plymouth divide the remainder equally.

Portland's trade in mackerel is rapidly increasing. The city has the second largest fleet of "seiners" in the country and, in addition to the quantity landed by these, many vessels from other places fishing along the coast of Maine in summer find it convenient to pack a portion of their catch in Portland. Mackerel are also sent here for a market from other fishing ports in the State. Mr. Willard estimates that an average of 40,000 barrels were handled annually for several years; the quantity for 1880 was 76,417 barrels. Over two-thirds of the entire quantity are sold in New York, the remainder going chiefly to Boston, Philadelphia, Baltimore, and the West.

The quantity of herring handled in Portland from year to year depends largely upon the size of the school that visits the shore. In 1876, the catch was unusually large, and 25,000 to 30,000 barrels were brought in for a market. In 1878, the school was smaller than for many years, and only 10,000 barrels were received. In 1880, the quantity reached 12,000 barrels. Half of the products of this fishery are sold in New York, and the remainder are usually shipped to Boston and Canada.

About 2,000 barrels of pickled cod and haddock reach the Portland market yearly. Three-fourths of these are sent to Philadelphia and New York, and from thence to the mining districts of

Pennsylvania; the remainder go mostly to Boston. In 1880, only about 1,800 barrels were received.

CAPE ELIZABETH.—Cape Elizabeth has no fisheries that can be treated separately from those of Portland. The two places are separated only by the waters of Portland Harbor, and being so unequal in size the larger has naturally absorbed the business of the smaller. Cape Elizabeth has at the present time not even a retail fish market, and the forty boat-fishermen living in the town are obliged to take their catch to Portland for a market. A number of fishing vessels are officered and manned by fishermen from the Cape, and some are largely owned by these people; but all fit and sell in Portland, and are largely controlled by the Portland dealers. The two places are so intimately related to each other in the fisheries that the smaller is very naturally included with the larger, and the vessels and boats of the former are treated as a part of the Portland fleet.

K.—THE SACO, KENNEBUNK, AND YORK DISTRICTS.

46. GENERAL REVIEW OF THE FISHERIES.

THE GENERAL FISHERIES.—The Saco, Kennebunk, and York customs districts extend from Cape Elizabeth to the southern boundary of the State. The region was visited in the fall of 1880 by Mr. W. A. Wilcox, secretary of the Boston Fish Bureau, for the purpose of making a careful study of the past and present condition of the fisheries. From his report we learn that the section was formerly extensively engaged in the fisheries, and had quite a fleet of vessels visiting the off-shore banks. Of late, however, the vessel interests have declined, and the fisheries are now chiefly confined to the capture of ground-fish, herring, lobsters, and clams in the inshore waters. A few small vessels are still owned, but a majority of the men are provided with small open boats for engaging in the work.

THE CLAM FISHERIES.—The clam flats are very extensive, and enormous quantities of soft clams are dug annually, many being sold fresh, while the remainder are used as bait by the shore and vessel fishermen.

THE HERRING FISHERY.—The fall herring fisheries in the vicinity of Wood Island are also important, these waters being visited by larger schools of spawning fish than those of any other locality on the New England coast. In fact, the Wood Island region is the principal herring spawning ground in the United States, and each season immense numbers of fish visit the locality, where they remain until their eggs have been deposited, after which they return to the deeper waters. During the season, which lasts for several weeks, hundreds of vessels are engaged in the fishery, the catch, which varies greatly from year to year, being marketed in Portland, Boston, and Boothbay.

STATISTICAL RECAPITULATION OF THE SACO DISTRICT FOR 1880.—The following statements show separately the extent of the fisheries of the region for 1880, a separate statement being given for each district. The data from which these statements are derived were gathered by Mr. Wilcox:

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows in detail the condition of the sea fisheries of the Saco customs district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	37	Capital in vessels and boats	$18,825
Number of boat-fishermen	152	Capital in nets and traps	3,225
Number of curers, packers, fitters, etc	10	Other fixed and circulating capital	a 8,500
Number of factory hands	53	Total	30,550
Total	252		

* *Other fixed and circulating capital.*—Cash capital, $4,800; wharves, shorehouses, and fixtures, $2,500; factory buildings and apparatus, $1,200; total, $8,500.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	Number.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	10	86.04	$5,750	$2,850	$4,000	$13,500	In vessel fisheries	50	$750
Total	10	86.04	5,750	2,850	4,000	13,500	In boat fisheries	60	720
Boats.							Total	110	1,470
In vessel fisheries	30		600			600	*Traps.*		
In shore fisheries	124		2,505	1,520	700	4,725	Fykes	60	360
Total	154		3,105	1,520	700	5,325	Lobster-pots	1,860	1,395
							Total	1,920	1,755

Detailed statement of the quantities and values of the product.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	3,538,340			$71,254
Fresh fish.				
For food	240,000			3,200
For bait	225,000		1,125 barrels	844
For fertilizer	40,000		200 barrels	100
Total	505,000			4,144
Dry fish.				
Cod	942,500	324,800		10,150
Hake	324,000	134,400		1,800
Haddock	252,000	89,600		1,800
Pollock	87,000	83,600		600
Cusk	59,800	25,760		632
Total	1,665,300	608,160		14,982
Pickled fish.				
Mackerel	60,000	40,000	200 barrels	1,150
Herring:				
Ordinary	212,500	170,000	850 barrels	2,550
Total	272,500	210,000	1,050 barrels	3,700
Lobsters.				
Fresh	405,600			14,872
Clams.				
For food	225,000		22,500 bushels	7,875
For bait	420,940		42,994 bushels = 3,071 barrels	15,355
Canned	35,000		3,500 bushels = 52,800 cans	6,620
Total	689,940			29,850
Miscellaneous.				
Fish-oil			2,715 gallons	1,086
Sounds		1,800		1,620
Marine products used for fertilizers				1,000
Total				3,706

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows in detail the condition of the sea fisheries of the Kennebunk customs district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	68	Capital in vessels and boats	$27,610
Number of boat-fishermen	189	Capital in nets and traps	3,748
Number of curers, packers, fitters, &c.	12	Other fixed and circulating capital	a6,500
Total	269	Total	37,858

a Other fixed and circulating capital.—Cash capital, $2,500; wharves, shorehouses, and fixtures, $4,000; total, $6,500.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
In food-fish fishery:							*Nets.*		
Active	13	206.16	$12,700	$3,950	$5,640	$22,290	Gill-nets:		
Total	13	206.16	12,700	3,950	5,640	22,290	In vessel fisheries	40	$650
Boats.							In boat fisheries	80	960
							Total	120	1,610
In vessel fisheries	46		920			920	*Traps.*		
In shore fisheries	79		3,110	890	400	4,400	Fykes	75	450
Total	125		4,030	890	400	5,320	Lobster-pots	2,250	1,688
							Total	2,325	2,138

Detailed statement of the quantities and values of the product.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	7,502,425			$82,556
Fresh fish.				
For food	452,000			6,027
For bait	310,000		1,550 barrels	1,162
For fertilizer	80,000		400 barrels	200
Total	842,000			7,389
Dry fish.				
Cod	2,233,725	769,776		24,055
Hake	1,601,100	664,160		8,895
Haddock	1,376,550	489,440		9,833
Pollock	469,800	181,440		3,240
Cusk	140,400	60,480		1,485
Total	5,821,575	2,165,296		47,508
Pickled fish.				
Mackerel	142,500	95,000	475 barrels	2,731
Herring:				
Ordinary	550,750	440,600	2,203 barrels	6,609
Total	693,250	535,600	2,678 barrels	9,340
Lobsters.				
Fresh	108,600			3,982
Clams.				
For food	37,000		3,700 bushels	1,295
Miscellaneous.				
Fish-oil			9,666 gallons	3,866
Sounds		8,895		8,006
Marine products used for fertilizers				1,200
Total				13,072

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows in detail the condition of the fisheries of the York district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	15	Capital in vessels and boats	$13,693
Number of boat-fishermen	290	Capital in nets and traps	6,494
Number of curers, packers, fitters, &c	8	Other fixed and circulating capital	a3,000
Total	313	Total	23,187

a *Other fixed and circulating capital.*—Cash capital, $1,500; wharves, shorehouses, and fixtures, $1,500; total, $3,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fisheries:							Gill-nets:		
Active	3	45.73	$2,550	$858	$1,185	$4,593	In vessel fisheries	6	$90
Total	3	45.73	2,550	858	1,185	4,593	In boat fisheries	225	2,700
Boats.							Haul-seines:		
In vessel fisheries	11		200			200	In boat fisheries	3	75
In shore fisheries	193		5,000	2,900	1,000	8,900	Total	234	2,865
Total	204		5,200	2,900	1,000	9,100	*Traps.*		
							Weirs	3	2,500
							Fykes	50	300
							Lobster-pots	1,105	829
							Total	1,158	3,629

Detailed statement of the quantities and values of the product.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value as sold.
Grand total	5,958,980			$76,803
Fresh fish.				
For food	1,595,000			21,267
For bait	828,000		4,140 barrels	8,105
For fertilizer	20,000		100 barrels	50
Total	2,443,000		4,240 barrels	24,422
Dry fish.				
Cod	975,000	336,000		10,500
Hake	837,000	347,200		4,650
Haddock	567,000	201,600		4,050
Pollock	304,500	117,600		2,100
Cusk	104,000	44,800		1,100
Total	2,787,500	1,047,200		22,400
Pickled fish.				
Mackerel	42,000	28,000	140 barrels	805
Herring:				
Ordinary	93,750	75,000	375 barrels	1,125
Total	135,750	103,000	515 barrels	1,930
Lobsters.				
Fresh	99,000			3,630
Clams.				
For food	373,750		37,375 bushels	13,081
For bait	119,980		11,998 bushels=857 barrels	4,285
Total	493,730			17,366
Miscellaneous.				
Fish-oil			4,675 gallons	1,870
Sounds		4,650		4,185
Marine products used for fertilizers				1,000
Total				7,055

47. SCARBOROUGH BEACH, PINE POINT, AND SACO BAY.

SCARBOROUGH BEACH.—The settlement at Scarborough Beach is situated 6 miles south of Portland and 3 miles from the village of Scarborough. The only branch of the fisheries to which the inhabitants give any attention is clam-digging; in this they are almost as largely interested as the residents of the adjoining settlement of Pine Point. About twenty men from the Beach are at work on the clam-flats the year round, and from September to April the number is increased to forty. Formerly a large part of the clams dug by the people of this settlement, after being shelled and salted, were sold for bait to the fishermen at various places along the coast. Fully 3,000 barrels were frequently disposed of in this way during a single season; but owing to the establishment of a cannery, the quantity salted for bait in 1880 did not exceed 1,000 barrels, the bulk of those taken being used for canning purposes. Many are shipped in shell during the year to the Boston and Portland markets, while a few are sold to peddlers from the smaller towns of the interior. The total catch for 1879 was about 30,400 bushels.

PINE POINT.—At the eastern end of Old Orchard Beach, 8 miles west of Portland, is the railroad station of Pine Point. The place is by many supposed to have been named from Mr. Charles Pine, one of the early settlers, while others contend that the name was suggested by the abundance of pine trees in the locality. The ocean shore in this neighborhood is neither more nor less than a low sandy plain a mile and a half in width, extending inland to the base of a series of elevated ridges known in colonial times as Blue Point Hills. From these heights the spires of Portland are distinctly visible, and during the war of 1812 a signal station was established here to give notice at Portland in case any strange vessels should be seen in the offing.

Although clams are abundant everywhere in this vicinity, they are taken in greatest numbers on the flats bordering the estuaries of the Dunstan, Spirwink, Libby, and Nonesuch Rivers. The clam-beds on the Dunstan are a quarter of a mile wide, lining both sides of the stream for 2 miles from its mouth; on the Spirwink they extend one and a half miles, and are only one-eighth of a mile wide; on the Libby they are a mile in length, and one-fourth of a mile across; while the Nonesuch has a belt of the same width, along either bank, 3 miles long. It will thus be seen that their total area is equal to that of a strip 7½ miles long by a quarter to half a mile broad. These clam-flats are among the most important along this portion of the coast, and it is here that the well-known "Scarboro' clams", which have the reputation of being the best on the New England coast, are obtained. They have an excellent flavor, and are more attractive in appearance than those found in many places, the shells, as well as their contents, looking very white and clean. Some claim that there is danger that such immense numbers of clams will be dug that the species will ultimately become extinct in this region, where they are now so plenty. To guard against such a contingency, the following State law, which is almost wholly neglected elsewhere, is strictly enforced in the town of Scarborough.

"No person shall take or destroy any shell-fish, or obstruct their growth in their beds, unless the municipal officers of the town grant him a permit in writing, for an agreed sum for the use of the town, under a penalty of not less than twenty nor more than five hundred dollars."

In this town licenses are granted for the year, beginning with April 1, to any of the resident fishermen, on the payment of a fee of 25 cents; no one living outside of the limits of the town being allowed to engage in the fishery.

A cannery was established here in 1869 by Messrs. Burnham & Morrill, of Portland, since which time a considerable quantity of clams have been packed annually. The work begins in October and continues till the end of the year. From 60 to 80 bushels of clams are used daily,

and an average of twenty-three persons, the greater part of whom are children, are employed in the work of gathering them. Besides those used by the canneries, large numbers of clams are sold during the summer to the numerous seaside hotels, and many are shipped at all seasons of the year to the Boston and Portland markets; some are also carried to the interior by peddlers.

Fifty men are employed on the various sand-flats of the town. The average annual production is about 36,000 bushels of clams in shell, valued at upwards of $12,000. One bushel in the shell will yield a gallon and a half when shucked; but, owing to the extra labor required in shelling them, a gallon of meats is considered equal in value to a bushel in the shell. The usual price is about 35 cents per bushel.

Mr. Reuben Snow, who has given us valuable information respecting the clamming interests, informs us that there are fourteen men, owning ten dories and two small sail-boats, engaged in the shore fisheries between Wood Island and Cape Elizabeth for six months of the year. The catch consists for the most part of ground fish, mackerel, herring, and lobsters. In the fall and winter fishing is discontinued, and the men turn their attention to clamming.

SACO BAY.—Saco Bay lies 15 miles south of Portland, in latitude 43°, longitude 70°. It extends from Prout's Neck on the north to Fletcher's Neck on the south, a distance of 5 miles. On the point of the last-named peninsula is Biddeford Pool, a place of some interest historically, which, though extensively engaged in the fisheries, is more generally known for its attractions as a summer resort.

The towns of Biddeford, Saco, and Scarborough border on the bay, but the largest cities of the first two, each named after the town in which it is located, are 8 miles inland, on opposite banks of the Saco River. From the mouth of this stream, which enters the bay at Biddeford Pool, to that of the Dunstan River, 6 miles to the east, the shore is one continuous sand bank. The northern part of this stretch of sand lying within the town of Scarborough is known as Pine Point, and the central portion is called Old Orchard.

There are several islands in the bay, the largest of which is Wood Island, the great resort for the shore herring fleet during the months of September and October. It lies just off the entrance to Saco River, forming a natural breakwater for the protection of Biddeford Pool. On the eastern end of the island, which is about 800 yards long, is the Wood Island Light-house, which, being provided with a red flash-light and a fog-bell, is of considerable importance to the fishermen. About 250 yards west of Wood Island is Negro Island, and 800 yards further on is an island 400 yards long, known as Stage Island, on the northeastern end of which is Stage Island Monument, the daylight guide to the harbor of the Pool. At the mouth of the Saco River is a granite breakwater which extends about 1,100 yards from the shore. The channel leading to the river is between the monument and this breakwater, and a constantly changing sand-bar makes its navigation, without the aid of a pilot, both difficult and dangerous.

This bay has been the home of fishermen since the earliest settlements upon its banks, over two hundred and fifty years ago, and to this day the locality is noted for its abundance of herring, ground fish, lobsters, and clams; while the river was once scarcely less famed for its salmon and other fresh-water species.

48. MR. WILCOX'S ACCOUNT OF BIDDEFORD POOL AND ITS FISHERIES.

BIDDEFORD POOL.—Biddeford Pool, a settlement of several hundred inhabitants, is situated about 15 miles south of Portland, at the southern extremity of Saco Bay. The "Pool," from which the village has derived its name, is a well-sheltered haven about a mile square, connected by a narrow passage with a larger and more exposed outer harbor. It is wholly inaccessible at low

tide, and even at high water only small and medium-sized vessels, such as those usually employed in fishing and coasting, can enter.

The first recorded residence of Europeans on this portion of the coast was in the latter part of 1616. During that year an expedition, consisting of thirty-two men, under the leadership of Capt. Richard Vines, was sent over from England by Sir Ferdinando Gorges, for the purpose of prospecting the territory granted to the Plymouth Company by King James ten years earlier. The company arrived in September and spent the winter at Biddeford Pool, which they christened Winter Harbor, a name that is still retained by the outer harbor. At that time there were no whites in Massachusetts, and the nearest English neighbors were at Jamestown, Va. For much of the time during the next seven years Captain Vines and others were engaged in transporting colonists to this coast, and numerous settlements were made before the close of that period.

The first settlers, we are told, derived their principal support from the sea, which furnished them not only with food, but with a ready article of barter. So absolutely dependent were they upon the fisheries that between the years 1661 and 1665 the greater part of the salary of the resident minister, Rev. Seth Fletcher, was paid in sea-products. We may add that to this day fishing has continued to be the most important industry of the place, and that at the present time the pulpit is filled by a fisherman from Cape Porpoise.

The small vessels owned at Biddeford Pool are engaged principally in fishing for ground fish along the coast between Boon Island and Cape Elizabeth. The catch is taken with hand-lines and trawls, and consists principally of cod, hake, haddock, and pollock.

A portion of the fleet is engaged in the lobster fisheries during part of the year. Over 1,200 lobster-pots are fished among the islands in Saco Bay and along the outer shore. Eleven men engage in the business for ten months in the year, and ten more, who are employed in the capture of ground fish during the summer, go lobstering for five months.

As the water grows cold in the fall, the lobsters gradually work into deeper water, and pots are set as far as seven miles southeast of Wood Island at a depth of from 30 to 50 fathoms, where individuals of large size are frequently taken. Lobsters have decreased both in number and size of late years. In 1876, sixty-five would fill a barrel, but now (1880) ninety are required. The total catch of lobsters in the town during 1879 reached 238,000 in number.

Those engaged in the lobster fisheries report considerable quantities of large shrimp in the deeper waters of the vicinity. Thus far no one has engaged in their capture to any extent, and, none having been sent to market, the fishermen have very little idea of their value. If the species is abundant as represented, there is every reason to believe that a fishery will soon be developed, and that it will be found to yield large returns to those who engage in it.

The bottom of the pool is covered with well-stocked clam beds, which are exposed at low tide, when, with the exception of one narrow channel, it is left entirely dry. These flats are "worked" by ten men for eight months in the year, and produce annually 2,600 bushels of clams, which are usually sold to the large hotels of the town or carried by peddlers to the villages of the interior.

The State allows any and all fishermen to dig clams for bait whenever they desire, but by law of the town none but its own citizens are permitted to take them for sale. This law, however, is not very strictly enforced. A cannery was built here in 1868, and, with the exception of the seasons of 1872 and 1873, from 4,000 to 7,000 bushels of clams were packed annually up to 1876, when the business was discontinued. The working season lasted during October and November of each year. The supply of clams was purchased from the local fishermen at prices varying from 30 to 50 cents a bushel.

For many years large schools of spawning herring have annually made their appearance in the

vicinity of Wood Island, Cape Porpoise, and Boon Island. They arrive between the 7th and 20th of September and remain for two or three weeks, after which they work their way southward, often going as far as the entrance to Boston Harbor. There they are met by quite a fleet of the so-called "Irish boats" from Boston, and by numerous small vessels from Gloucester, Marblehead, Salem, and Beverly; but although these all help to swell the total catch, the bulk of the fish are always taken off Biddeford Pool and vicinity. An extensive fleet of small schooners from Maine, New Hampshire, and Massachusetts resorts yearly to this region, and as many as 185 sail have been seen fishing here at one time. They take their catch with gill-nets, which are fished from dories manned by two men each. The vessels use from six to twenty nets according to their size, an average being from ten to twelve. The largest vessels carry six or seven dories and from twelve to fifteen men. The nets used are forty yards long, twenty-one feet deep, and have a mesh varying from two and a half to three inches. They are set in the afternoon and "run" or "picked" the next morning. The fish usually "mesh" in the night, but in exceptional instances they have been known to do so in the daytime. In this case the nets are visited twice a day. The average catch is 10 barrels to the net, although as high as 50 barrels are sometimes taken.

The herring are generally marketed at Portland, where they are packed "round" (*i. e.*, as they come from the water) in barrels filled with a salt-water pickle. The greater part are distributed through the Southern and Western States. The total quantity taken by the fleet in 1879 was 15,000 barrels, while in 1880 it was diminished to 7,500. The average annual catch is between 10,000 and 12,000 barrels.

A life-saving station was established near Biddeford Pool in 1874, the captain and crew of which are selected from the fishermen of the region. Captain Goldthwaite, who is in charge of the station, has shown us many courtesies and given us much valuable information about the fisheries of the place. From him and others we learn that the fleet of the town numbers ten vessels, valued at $5,750 and carrying thirty-seven men. There are, in addition, forty-eight men, with thirty boats, engaged in the capture of fish, lobsters, and clams during a greater part of the year. The value of the sea-products taken by these parties during the average season is about $22,000.

49. MR. WILCOX'S ACCOUNT OF THE FISHERIES OF KENNEBUNK AND KENNEBUNKPORT.

KENNEBUNK AND KENNEBUNKPORT.—About 25 miles south of Portland are the towns of Kennebunk and Kennebunkport. They are separated from each other by a river, at the mouth of which is a small harbor that affords shelter for the boats and vessels owned in the vicinity. Two villages, known as Kennebunk and Kennebunkport, respectively, are, with the exception of Cape Porpoise, the only settlements of importance.

The people of these villages have given little attention to the fisheries, their time being largely employed in ship-building, which for many years has been their principal business, and they have won an enviable reputation for the superior quality of their work, especially in the vessels of large size. Though the business has, for some years past, been less extensive than formerly, the four ship-yards constructed, between the years 1873 and 1879, sixty-four vessels, having a total of 25,863.20 tons. Thirty-eight of these, aggregating 1,078.97 tons (including seven menhaden steamers), were for the fisheries. A number of other fishing vessels, too small for enrollment, have been built here.

The few boat-fishermen of these towns fish from April to November along the outer shore and in Wells Bay, using hand-lines and trawls for ground fish, and nets for mackerel and herring. About one-third of the ground-fish taken are cod; the rest are mostly hake and haddock, the

proportion of cusk and pollock being rather small. Most of the catch is marketed at Portland. The value of the fish taken in 1879, including the mackerel and herring, was about $5,000.

Clams are found in considerable numbers on both sides of the river for a mile and a half from its mouth. About 500 bushels are dug during the season, some of which are used for bait by the fishermen, and others are distributed by peddlers through the surrounding country. Lobsters are caught near the mouth of the river, and four hundred pots are set for them during the spring and summer, the fishing being discontinued during the winter. The catch in 1879 amounted to thirty-eight thousand in number, valued at $2,280.

CAPE PORPOISE.—Three miles east of Kennebunkport is the little settlement of Cape Porpoise, which belongs to the town of Kennebunkport. The ground in the neighborhood is exceedingly rocky, and the soil is quite poor. The inhabitants being thus debarred from the pursuit of agriculture must turn their attention to other employments, and according to Mr. S. H. Pinkham, who has furnished us with much valuable information, nearly all of the men and boys are engaged in fishing. The harbor, although difficult of entrance, is otherwise well adapted for the small vessels and boats which are used in the fisheries of the region. A dozen schooners, varying from 8 to 32 tons each, are registered at the custom-house, and an equal number of smaller craft, measuring from 3 to 5 tons, with twenty-eight dories, are owned in the village. Including the vessel-fishermen, there are at the Cape one hundred and seventeen men and boys who depend chiefly on the fisheries for a livelihood. The fishing is confined largely to trawling for ground-fish in Wells Bay and along the shore from Boon Island to Cape Elizabeth, only one vessel going as far as Banquereau for codfish. Herring are usually plenty, in September or October, just outside the harbor, where they are taken in considerable numbers. The fishermen also engage largely in the herring fisheries of Wood Island. Little attention is given to the capture of mackerel, though a few are taken with nets in the fall. About one-fifth of the ground-fish taken by the fleet are cod, the remainder being principally hake and haddock.

During the winter months, when few fish are taken, some of the men turn their attention to the capture of lobsters, while others resort to the harbor flats for clams. About 2,000 bushels of the latter are dug annually for bait and food. From 1,200 to 1,400 lobster-pots are fished within 4 miles of the harbor at this season, the usual method being to set them on trawls containing 50 or 60 each. In the spring, when the fishery is at its height, 2,000 pots are often used. An average catch for a season is, at present, about thirty-five thousand lobsters in number, though formerly it is said to have been much larger.

50. MR. WILCOX'S DESCRIPTION OF THE FISHERIES BETWEEN WELLS AND KITTERY.

WELLS.—Thirty-six miles southwest from Portland, in Wells Bay, are situated the fishing stations of Wells Beach, Perkins Cove, and Ogunquit Harbor, all included in the town of Wells. The beach is 6 miles long, the eastern half being sandy while the western part is broken and rocky. The harbor being exposed and shallow, few vessels are owned here, and most of the fishing, according to Mr. S. S. Perkins, to whom we are indebted for the facts given below, is carried on from small sail-boats of from 13 to 20 foot keel. These are provided with movable masts; they carry from one to two men each. Twenty-five of the fishermen live at Wells Beach, the most northerly of the stations mentioned, twenty others reside at Ogunquit, on the southwest, while fifty-five belong to Perkins Cove, which is situated midway between the other two. The total fleet of the town is seventy-five boats, manned by one hundred fishermen.

The fishing is chiefly with hand-lines and trawls between Cape Porpoise and Nubble Light, which are about 8 miles apart. The men continue the work, whenever the weather is favorable, throughout the entire year, cod being the principal species taken in the winter, hake in the fall, and haddock in the spring. Mackerel, also, are captured in their season by means of hand-lines and gill-nets; and herring and menhaden are often taken in considerable numbers to be used as bait in the other branches of the fishery. The total catch, including the various edible and non-edible species, amounted in 1879 to 2,930,000 pounds of round fish. About one-half of the catch, exclusive of herring and menhaden, is cured and sold in Boston or Gloucester, and the remainder is purchased by peddlers and by the various dealers of the interior towns of Massachusetts and New Hampshire.

Lobsters have not been very plenty for several years, but many are still caught, both with pots and with the old-fashioned hoop-net. The latter consists of an iron ring, 2½ feet in diameter, covered with netting. When it is to be fished, the bait is fastened in the middle, and the whole is lowered through the water to the bottom, its position being marked by a wooden buoy, which floats at the surface. About 250 of these simple traps and 75 of the common lath pots are used. The catch amounts to about 7,000 lobsters annually.

Clams are found in large numbers along the shore near the mouths of the Ogunquit and Webhannet Rivers. One hundred and twenty-five men are employed in digging them during nine months of the year, or from September to the following June. One man will get about 4 bushels in a day; but, on account of unfavorable tides and bad weather, the average number of working days to a month is only 16. It is estimated by Mr. Perkins, and others, that 72,000 bushels were dug during the season of 1879–'80. A large proportion of the clams are used as bait by the local fishermen, and the remainder are sold to peddlers from the inland towns.

Prior to 1874 vessels for fishing and coasting were built at Wells, to some extent, but since that date the business in this line has been confined wholly to the construction of the small sail-boats to be used in the shore fisheries; during the season of 1879 sixty-five of these were made by one firm.

CAPE NEDDOCK.—The village of Cape Neddock, including the little settlement of Donald's Cove, has twenty-one men engaged in the fisheries during six months of the year. These devote their attention to the capture of cod, hake, and haddock, with hand-lines and trawls, in Wells Bay and other neighboring fishing grounds; but from April to July a number of them engage in the lobster fisheries. The catch of lobsters, which amounts to 21,000 in number, is sold in Boston, while the cod and other species are marketed at Portsmouth and Cape Ann. There were no fishing vessels from this place during 1879, though two or three small craft are usually owned in the locality.

YORK.—The port of York, 12 miles to the northwest of Portsmouth, N. H., has a history of considerable interest, for it is said to have been the first English city incorporated on this continent. A charter from King James I, in 1606, embraced the province of Maine as far north as the forty-fifth parallel of latitude, and supplies were sent out from England, as early as 1616, to the colonists who had settled under its provisions at various points along the coast from Saco to the Piscataqua River. In 1620 the Plymouth Company received a new grant, extending north to the forty-eighth parallel, and covering the entire province of Maine. Three years later, the first permanent settlement at the place where York now stands was made, under the auspices of Sir Ferdinando Gorges, a friend of Charles I; though it seems probable that English subjects had resided in the vicinity prior to that date. On the 3d of April, 1639 (the charter of the Plymouth Company having been previously revoked), the territory lying between the Piscataqua and Kennebec Rivers was bestowed

upon Sir Ferdinando, who thus became sole proprietor of the town. It was probably Gorges's influence at court which secured its incorporation as a city, under the name of Gorgeana, on the first of May, 1611. On the 25th day of the March following the issuance of the city charter, Thomas Gorges, a relative of the proprietor, was chosen as the first mayor. The descendants of some of the aldermen elected at the same time still live in the place. In 1652, as a result of the difficulties between the King and Parliament, the colonial possessions of Sir Ferdinando were transferred to the Massachusetts Bay Company, which abrogated the charter of the city of Gorgeana and changed the name of the town to that by which it is now known.

Coming down to the last century, we find the port with its custom-house, and with quite a fleet engaged in trade with the West Indies and other foreign countries, together with numerous vessels employed in the fisheries. Its maritime importance is, however, wholly a thing of the past, for other neighboring ports have long since absorbed its commerce, and the fisheries have gradually declined until at the present time one vessel of over 20 tons burden, together with several large sail-boats and a few dories, comprise the entire fishing fleet of the town. These are used by the fishermen in the capture of cod and other ground-fish, which they take with trawl and line on Jeffries' Banks, off Boon Island, and along the shore.

Clams are dug on both sides of the York River for a mile and a half from its mouth, and about 2,375 bushels are taken annually, of which the greater part are sold to peddlers and sent to the interior; but of late years the species is said to have decreased in abundance.

Lobsters are trapped among the rocky ledges near the harbor from April to the middle of July. The catch has been small for a number of years, amounting in 1879 to only 20,000 lobsters, and those taken have been of inferior size. The same is said to be true for many other places along the coast of Maine, the cause of it usually being given by the residents as over-fishing. With the present State law, which forbids the canning of lobsters between the month of August and the following April of each year, rigidly enforced, a decided improvement may be expected.

KITTERY.—The old town of Kittery is situated directly opposite New Castle, N. H., on the north side of the Piscataqua River. At the present time it has forty-seven men engaged in fishing and lobstering during the summer months, or from March to November. Two large weirs are located on the outer beach, and a third one in the mouth of the river. During the season of 1879 there were taken from these weirs 180 barrels of mackerel, 325 barrels of herring, 100 barrels of alewives, and 1,740 barrels of menhaden, the whole having a value of over $3,000. Other species, including tautog, scup, and salmon, were taken, but in such limited quantities that they may be wholly neglected. Salmon were formerly quite abundant in the river, but they gradually disappeared until, for fifteen years prior to 1878, none were seen. Since that time a few have been secured. The catch of salmon in 1880, for the three weirs mentioned, amounted to nineteen good-sized fish, taken during the months of April and May.

Two small schooners and twenty-three boats are owned by the fishermen, who engage to a considerable extent in fishing for different species along the shore. The catch in 1879, exclusive of those taken in the weirs, amounted to 525,000 pounds of fish, valued at $5,250, and 18,000 lobsters, worth $900.

PART II.

THE FISHERIES OF NEW HAMPSHIRE.

By W. A. WILCOX.

ANALYSIS.

A.—Review of New Hampshire and its Fisheries:
51. General description with statistics.
B.—Portsmouth and Vicinity:
52.—The fisheries of Portsmouth and neighboring towns.
C.—The Isles of Shoals:
53. The Isles of Shoals as a fishing station.

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PART II.

THE FISHERIES OF NEW HAMPSHIRE.

A.—REVIEW OF NEW HAMPSHIRE AND ITS FISHERIES.

51. GENERAL DESCRIPTION WITH STATISTICS.

THE COAST LINE AND THE FISHERIES.—New Hampshire has an area of about 9,491 square miles, yet its only coast line is a short stretch of 18 miles wedged in between Maine and Massachusetts. In this limited space, there are some small coves for fishing vessels, but the only harbor for ships or the larger class of fishing vessels is that of Portsmouth, near the entrance of Piscataqua River. The ocean shore is mostly a sandy beach backed by salt marshes, and near the mouth of the river are some clam flats. A few miles off the coast in Ipswich Bay are the well-known Isles of Shoals which in years gone by were quite important as a fishing station, but now given over to summer hotels.

The entire coast and islands are included in one customs district, with Portsmouth as the port of entry. This is the principal city in the State, both in population and in commercial importance. The other places where fisheries are carried on are Exeter, New Market, New Castle, and the Isles of Shoals.

The inhabitants of the coast towns of New Hampshire have for very many years given attention to the fisheries as a means of support and profit. As early as 1623, "The Company of Laconia," organized by merchants from the west of England, obtained patents for a large tract of country, including portions of Maine, New Hampshire, and Massachusetts. This company established fishing stations in New Hampshire, on the Piscataqua River near Dover, and at Odiorne's Point. At Portsmouth a considerable foreign trade was carried on about a hundred years ago, and the bank fisheries for cod claimed much attention.

According to Belknap*, the fishery at Piscataqua and its neighborhood, for the year 1791, not including the fisheries at the Isles of Shoals, employed in the cod and scalefish fishery 27 schooners and 20 boats, measuring 630 tons, and 250 seamen. The products of the New Hampshire fisheries for the year 1791, including the fisheries of the Isles of Shoals, were 5,170 quintals merchantable fish, 14,217 quintals Jamaica fish, and 6,463 quintals scale fish; making the total, 25,850 quintals. The success of the fishery that season was uncommonly good. An estimate of the total number of seamen belonging to New Hampshire in the same year states that there were 500 in foreign trade, 50 in coasting trade, and 250 in the fisheries. Some of the seamen who in summer were employed in the fishery, were in the winter engaged in the coasting business or in foreign voyages.

The number of entries of vessels at Piscataqua in the coasting trade and cod fishery during the year ended October 1, 1791, was 50, and the tonnage was 1,166 tons.

THE FISHERIES FROM 1867 TO 1879.—From the records of the custom-house it appears that the fishing fleet of the Portsmouth district has at times numbered as high as from 100 to 125 sail.

* Belknap's History of New Hampshire. Boston: 1792. Vol. III.

There is no record of the value of the products prior to 1867. The returns from 1867 to 1879, as given by the collector of the port to the Bureau of Statistics, show the quantity and value of the different kinds of fish handled by Portsmouth dealers, and includes fish brought from the small fishing stations of Kittery and New Castle at the mouth of the harbor.

Fishery products of Portsmouth Customs District, 1867–1879.

Years.	Codfish, cured.		Mackerel, cured.		Herring, cured.		Other fish, cured.		Oysters.		Other shell-fish.	Fresh fish not shell-fish.		Oils, other than whale.		All other products of the fisheries.	Total value of all products.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	
	Cwt.	*Dolls.*	*Cwt.*	*Dolls.*	*Cwt.*	*Dolls.*	*Cwt.*	*Dolls.*	*Bush.*	*Dolls.*	*Dolls.*	*Lbs.*	*Dolls.*	*Gall.*	*Dolls.*	*Dolls.*	*Dolls.*
1867	2,236	11,700	20	160	2,474	6,536	12,067	34,010	5,500	3,300	950	630,806	13,875	5,016	3,316	.....	73,853
1868	2,505	12,537	164	1,423	6[illegible]	210	15,988	60,023	3,500	5,100	2,000	1,153,147	26,231	9,441	7,126	.....	114,650
1869	11,415	72,497	4,640	33,411	3,300	7,750	7,512	22,410	14,200	8,520	1,800	1,496,791	35,710	11,679	9,668	.....	191,775
1870	12,125	70,900	8,830	52,400	4,140	9,910	4,245	10,660	13,500	8,425	2,950	1,733,922	43,978	12,608	8,808	.....	208,031
1871	7,450	31,950	7,130	35,200	1,978	3,956	7,900	20,637	11,500	6,900	3,200	1,437,851	33,244	9,294	8,006	.....	143,093
1872	8,100	50,250	3,600	16,500	.....	.....	6,550	20,400	12,400	7,080	1,400	1,602,009	48,883	15,733	14,153	.....	159,266
1873	14,356	65,600	403,850	67,500	130	575	6,770	18,810	5,700	3,400	2,050	2,329,525	69,755	12,890	9,492	1,175	238,357
1874	12,480	159,881	20,170	104,360	380	172	10,145	26,657	.....	.....	.....	2,001,775	64,762	1,120	650	1,560	358,042
1875	12,664	59,072	6,024	49,120	933	2,538	5,240	14,500	.....	.....	1,700	1,888,868	56,531	12,886	8,103	1,895	193,459
1876	15,710	55,115	15,29[illegible]	60,024	1,235	3,040	6,136	16,895	.....	.....	900	2,389,067	48,224	6,540	3,608	2,017	190,980
1877	8,425	38,366	3,450	14,575	.....	.....	2,602	4,723	.....	.....	9,135	3,423,758	59,485	6,938	3,996	5,190	135,470
1878	25,049	79,256	7,900	17,700	1,056	1,656	4,892	9,856	6,600	2,970	80	3,785,815	44,167	5,900	2,725	770	159,180
1879	16,891	58,093	13,100	31,475	1,100	1,400	5,039	10,573	.....	.....	16,055	3,592,531	44,264	6,420	1,614	1,736	165,210

THE OYSTER INDUSTRY.—Mr. Ernest Ingersoll reports as follows concerning the oyster industry of this district:

"A few miles up from the mouth of the river Piscataqua, and the harbor of the city of Portsmouth, N. H., an extensive bay reaches southward from the river into the lowlands. It is divided into two portions: first, Little Bay, nearest the river, and second, Great Bay, with which the former is connected by Furber's Straits, where Durham River comes in. A portion of Great Bay, on the eastern side, is also known as Greenland Bay; and two rivers flow into it (the Exeter and Lamprey), besides a multitude of trout-brooks. This interior basin is perhaps 10 miles long and 5 to 7 wide, but the shores are very irregular. It is so shallow that a large portion of the shores are left as dry flats at every low tide, yet there are channels deep enough to allow large vessels to go up to New Market and Exeter, when the water is favorable. This spot was renowned among the Indians for the oysters living there, and considerable shell-heaps attest the constant use made of the bivalves. Whatever might have been its resources a century or half a century ago, it is certain that within more recent times the locality was forgotten, or at least made no account of, as oyster-ground, by the large population that inhabited the shores. It was therefore looked upon almost as an original discovery when, in 1874, the explorations of the Coast Survey, which was sounding and mapping out the channels, showed that there were oyster-beds still flourishing at many points from one end of the bay to the other; that is, in Great Bay, for none, to my knowledge, have ever been found in the outer Little Bay. There were no tools proper for the gathering of oysters in the neighborhood, and very little was done at first to make the knowledge gained available. There lived in New Market, however, an old Chesapeake oysterman by the name of Albert Tibbetts, who sent to Providence for oyster-tongs, procured boats, and began raking in earnest. Others imitated his example, and the following year witnessed great activity. For several months, I was told, there were probably a dozen boats, with two or three men in each boat,

raking every day, the average take being about five bushels to the man. They used not only tongs and rakes, but used also dredges. In the winter, also, they would cut long holes in the ice, and dredge the beds by horse-power, stripping them completely. It was seen that this rash and wholesale destruction would speedily exterminate the mollusks, and laws were passed by the State forbidding the use of the dredge under all circumstances, making the months of June, July, and August 'close time,' and forbidding fishing through the ice at any time. The last regulation was the greatest help of all, for the ice-rakers would not throw back the *débris* of dead shells, but pile it on the ice, where the hundreds of young oysters attached to it would freeze to death. But these beneficent restrictions came too late, and the business of oystering has steadily declined, until now only two or three boats keep up a desultory search for profitable beds, and a bushel and a half a day is considered good work for each man. Only seven or eight persons were engaged during the summer of 1879, and these not all of their time. All unite in ascribing the decline of the industry to over-raking of the beds, and feel disposed to pray for a law forbidding any raking whatever during several years, in order to give the oysters a chance to recuperate their depleted ranks. The beds, as I have said, are all in Great Bay. They occupy the channels at various points, and are each of considerable extent. There are perhaps a dozen well-known localities or clusters of beds. These are mainly situated in Greenland Bay, near Nannie's Island, along the Stratham Channel, up Exeter River to some distance beyond the bridge of the Concord Railroad, in the Little Channel near by, and up Lamprey and Durham Rivers. The chief raking now is done off Nannie's Island. The average of the water on the beds is hardly more than 10 feet deep, and it is pretty fresh. The tide-way, as a rule, is strong, and the bottom tough, clayey mud. The oysters are very large. I heard of specimens 15 inches long, and those of 9 and 10 are common. One man told me of a single specimen procured in 1877 which weighed 3 pounds 1 ounce in the shell, the fleshy part alone weighing 1 pound 1 ounce. These large ones, however, all have the appearance of extreme age, and are heavy, rough, sponge-eaten, and generally dead, though the ligament still holds the two valves of the shell together. In taste, this oyster is flat and rather insipid, which is laid to the too great freshness of the water. It takes a large quantity of them to 'open' a gallon of solid meat, a bushel not yielding more than two to two and a half quarts. As a consequence, there has not been a very great demand for them, though all that can be got now are readily disposed of. Formerly the price was $1 a bushel in New Market, where they were chiefly bought; but in 1879, 80 cents was the price. No culture of these or of imported oysters has ever been tried here, and the chances are against success."

In New Hampshire there are three wholesale oyster dealers; and the business of those dealers, together with the oyster business in other parts of the State, is summed up by Mr. Ingersoll as follows:

Number of wholesale dealers		3
Number of men fishing in summer for natives		6
Number of vessels and sail-boats engaged		5
Value of same		$300
Number of restaurant servants		6
Annual earnings of same		$2,500
Total number of persons supported		25
Annual sales of—		
I. Native oysters	bushels	1,000
Value of same		$800
II. Chesapeake "plants"	bushels	7,000
Value of same		$7,000
III. Fancy stock	bushels	800
Value of same		$1,000
IV. Value of Norfolk "opened stock"		$1,000
Total value of oysters sold annually		$9,800

PRESENT EXTENT OF THE FISHERIES.—The various fisheries engaged in by the New Hampshire fishing fleet of twenty-three vessels are for the capture of cod and other ground fish on the Grand and Western Banks and the New England coast, and the mackerel fishery in the Gulf of Maine. These vessels with their gear and outfit, including boats and nets, are valued at about $107,000. In the shore fisheries for alewives, herring, cod, and other species, and lobsters and clams, there are employed one hundred and seventeen boats, valued, with their nets, traps, and other gear, at $12,600. The capital in wharves, buildings, and other shore property, and the active cash capital, amounts to $89,800, making the total capital invested in the fisheries of the State $209,465. The total number of persons employed is four hundred and fourteen and the value of the products in first hands is $176,684.

STATISTICS OF THE FISHERIES OF NEW HAMPSHIRE FOR 1880.—The following statements show in detail the extent of the fisheries in this State:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	207	Capital in vessels and boats	$106,895
Number of boat-fishermen	169	Capital in nets and traps	12,770
Number of curers, packers, fitters, and factory-hands	38	Capital in wharves, buildings, fixtures, &c	89,800
Total	414	Total	209,465

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear and outfit, exclusive of boats and nets.	Total value.	Nets and traps.	No.	Value.
Vessels.						*Nets.*		
In food-fish fishery	23	1,019.05	$51,500	$43,005	$94,505	Gill-nets:		
Boats.						In vessel fisheries	21	$270
In vessel fisheries	117		4,590		4,590	In boat fisheries	125	1,500
In shore fisheries	94		3,190	4,610	7,800	Purse-seines	14	7,700
Total	211		7,780	4,610	12,390	Total	160	9,470
						Traps.		
						Weirs	10	1,500
						Lobster-pots	1,800	1,800
						Total	1,810	3,300

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Grand total	10,400,294			$176,684
Fresh fish.				
For food	4,395,134			63,575
For bait and fertilizers	200,000		1,000 barrels	375
Total	4,595,134			63,950
Cured fish.				
Dry fish	2,794,210	1,066,700		33,920
Pickled fish	2,573,350	1,741,400		48,434
Total	5,367,560	2,808,100		82,354

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Shell fish.				
Lobsters	250,000			$7,500
Clams	179,600		17,960 bushels	8,980
Oysters	8,000		1,000 bushels	a 6,050
Total	437,600			22,530
Miscellaneous.				
Fish oil			8,000 gallons	6,500
Fish sounds		1,500		1,350
Total				7,850

a Includes $5,250 enhancement in value of southern oysters.

NOTE.—The proportion of different species included in the fresh and cured fish is estimated as follows: Alewives, 425,000 pounds; cod, 5,447,597 pounds; cusk, 38,000 pounds; haddock, 644,347 pounds; hake, 397,500 pounds; halibut, 25,000 pounds; herring, 108,750 pounds; mackerel, 2,573,000 pounds; pollock, 75,500 pounds; swordfish, 20,000 pounds; mixed fish, 208,000 pounds.

B.—PORTSMOUTH AND VICINITY.

52. THE FISHERIES OF PORTSMOUTH AND NEIGHBORING TOWNS.

PRESENT CONDITION OF THE FISHERIES OF PORTSMOUTH.—Although New Hampshire has but one port of entry, yet this one is among the most important on the New England coast and possesses much of interest for its historic connections, as well as for its present commercial importance. It is situated on the Piscataqua River, 3 miles from its outlet into the ocean and 57 miles by rail northeast from Boston. The harbor is easy of access, has water enough at all times for the largest vessels, is well sheltered, and since the earliest settlement of the country has been a favorite harbor of refuge for coasting vessels. The river, which is the boundary between Maine and New Hampshire, has seven fathoms of water as far as 5 miles from its mouth. A swift current prevents its freezing or being blocked. There are numerous islands in the river both above and below the city. The following islands lie between Portsmouth and the river's mouth. Those belonging to New Hampshire are Leache's, Snuff Box, Oliver's or Goat, Shapleigh's or Jenkins's, Pierce's, Four-tree, and Salter's. Those within the limits of Maine are Seavey's, Clark's, Fishing, Pebble's, Gerrish, Cutt's, Moore's, and Fernald's or Navy-yard. At the mouth of the river are Wood, White, Horn, and Little Horn Islands.

Two of the islands below Portsmouth and three wharves at the city are devoted to the fishing industry. There is no direct foreign trade and but a small fleet of vessels compared with past years, yet the fisheries are at present on the increase. The vessels now engaged, though fewer in number than formerly, are of larger size, and with a prosperous season one vessel well equipped with the improved apparatus of capture will secure as large a catch as was once taken by several vessels of small size with the old methods of fishing.

The nearness of Portsmouth to the best fishing grounds and to the great fish-distributing centers of New England, a fine harbor, and the improved facilities for the capture and care of fish, all tend to the favorable development of the business.

The large vessels engage in the Grand Bank, Western Bank, and New England shore cod fisheries and in the mackerel fishery, trawls being mostly used in the former and purse-seines exclusively in the latter fishery. The small wherries used by the boat-fishermen are usually

schooner-rigged, and with a crew of one or two men are employed in trawl and hand-line fishing off the coasts of Maine, New Hampshire, and Massachusetts. This fishing is carried on for about six months of the year, and most of the catch is sold to Portsmouth dealers.

Lobster-pots are set around the ledges at the mouth of the harbor from Kittery, Me., to Odiorne's Point. The lobsters are mostly sold at Portsmouth, and distributed, boiled or alive, through the adjacent towns. A small part of the catch goes to Boston market. A State law prohibiting the capture of small lobsters is well observed, the lobsters being of very good size, though of late years not very abundant. As in other New England fishing ports, the fishermen of Portsmouth are accustomed to save the livers of fish for the manufacture of fish-oil. The firm of Marvin Brothers is engaged in the preparation of crude and medicinal cod-oil, and during the year 1879 produced 150 barrels of the former and 120 barrels of the latter grade of oil.

According to the census report on the oyster industry, by Ernest Ingersoll, published in 1881, "there are only two dealers in Portsmouth who trade in oysters by wholesale and at first hand. They each send a schooner to Virginia in April, the voyage lasting about three weeks, and bring a load of 2,300 to 2,600 bushels each. Nearly the same course is pursued here as in Boston. The captain is given sufficient money to probably fill his vessel, and told to do the best he can with it; but he is not given a rate of freight per bushel, as in Portland, but hired at a given sum, which, in 1878, was $425. This amounts, however, to about the same thing as the 18 cents a bushel paid for freight to Portland and Boston. All these 5,000 bushels of oysters are bedded down on the banks of the river in Portsmouth Harbor, a mile or so below the city, where the ebb-tide leaves them nearly dry. They last through to the middle of October, with the help of a few 'fancy' oysters from New York for the retail-counter. The cost per bushel of these oysters, as delivered in the establishment, varies from 40 to 50 cents, and the average selling price, at wholesale, is 75 cents.

"In the winter no vessels come from Virginia, and all supplies are drawn from Norfolk by steamer to Boston, and thence by rail, or, in emergency, by buying in Boston or Portland. These are almost wholly opened oysters, in barrels and kegs. Not more than 1,000 bushels, all told, are supposed to come into Portsmouth during the winter, in the shell. These cost 50 to 60 cents. Of the others, I could get nothing better than estimates from each dealer, which, added together, give about 45 barrels, or 1,350 gallons, as the combined importation. Perhaps 150 gallons more come from Boston, in emergencies. The whole consumption of Portsmouth, then, seems to cost about as follows:

Oysters in vessels, 5,000 bushels	$2,500
Oysters in shell, otherwise	500
Oysters opened (about)	750
Oysters, fancy and extra (about)	750
	4,500

"The oyster establishments employ 6 men, paid from $6 to $15 per week. In all, 25 persons are supported by the trade. No planting has ever been done at Portsmouth, and even those bedded down in the harbor show little growth of shell or body. To supply Dover, N. H., a few miles above, about 2,000 bushels of Chesapeake oysters are brought up each spring and laid down in Cocheco River, near the town. A proportionate winter supply comes by rail."

The fishing industry of Portsmouth in 1879 employed twenty-four vessels and thirty-five boats. Some 200 men were engaged in fishing, while about 30 men worked ashore in curing and packing the catch. The total capital invested in the business was about $200,000, and the value of the

product in first hands was about $150,000. The catch consisted of bank and shore codfish and other ground fish, mackerel, herring, and shell fish.

NEW CASTLE, EXETER, NEW MARKET, AND SEABROOK.—New Castle is at the mouth of the Piscataqua River, three miles east of Portsmouth. At the present time, as for more than two hundred and fifty years, the few inhabitants are mostly engaged in fishing, setting their trawls and lobster-pots near home off the coasts of Maine and New Hampshire. Their catch consists mainly of cod, hake, haddock, and lobsters, and is marketed at Portsmouth. With the exception of one small vessel of 22 tons, the fishing is carried on from dories or small wherries of sloop or schooner rig. The fishing is mostly done from April till the latter part of November. The amount of capital invested in the fisheries at this place is about $2,600; the number of men employed is forty-four; and the value of the catch is $10,000.

Exeter is 12 miles and New Market 10 miles from Portsmouth, on the Exeter River. During the months of May and June ten weirs are employed in securing the alewives that come up the Piscataqua into the Exeter River. The average yearly catch is 2,500 barrels, but has fallen short the past two years. In 1879 it was about 2,000 barrels, and was disposed of at Portsmouth. There are forty men employed and $3,000 capital invested in the fisheries at those two towns.

Seabrook is on the road from Portsmouth to Newburyport, about 16 miles from the former and 6 miles from the latter place. This town has been for over seventy-five years the chief place of manufacture for that peculiar class of fishing boat known as the "straight boat," or "Hampton boat." An account of this industry will be found in the chapter on boats and vessels.

C.—THE ISLES OF SHOALS.

53. THE ISLES OF SHOALS AS A FISHING STATION.

DESCRIPTION OF THE ISLANDS AND PRESENT CONDITION OF THE FISHERIES.—The Isles of Shoals is a group of rocky islands, eight in number, situated 9 miles southeast from Portsmouth light-house and 21 miles northeast from Newburyport light. The State line of Maine and New Hampshire passes through the group. On some of the islands not a blade of grass can be seen, while others have little patches of grass here and there. There is not a tree on any of the group and the largest vegetation is a few whortleberry bushes. The principal islands, their respective names and sizes are: Appledore, formerly Hog Island, about 350 acres; Star, 150 acres; Haley's, or Smutty Nose, 100 acres. With but few exceptions, these three islands are the home of the small resident population of the group. The other barren ledges, with here and there the solitary house of a lone fisherman or the light-house keeper, are named Cedar, White, Londonners, Malaga, and Duck Islands.

Quite a good harbor, and the only secure one, opens to the westward, with Smutty Nose Island to the northeast, Star Island to the southwest, and Cedar Island southeast.

These islands were discovered by the famous Capt. John Smith, in 1614, and named after himself the "Smith Isles"; but they did not long retain his name, for in a deed from the Indian sagamores to John Wheelright and others, in 1629, they are called the "Isles of Shoals."

From 1800 to 1880 there has been no record of the number of men engaged, or the extent of the fishing industry. Mr. L. B. Caswell, the leading fish dealer, who was born and has lived here over fifty years, reports that during his recollection quite an extensive business in fish has been

done; much more than at the present time. During 1872, there were 33 boats fishing from Star Island. That year Star and Appledore Islands were sold for hotel purposes, and large summer hotels were built, which are yearly crowded with guests during the summer months, giving the islands a lively appearance. This inroad of tourists has, however, driven the fishermen away from the two leading islands.

"Twenty years ago," wrote Celia Thaxter in 1873, "Star Island cove was charming with its tumble-down fish houses, and ancient cottages with low, shelving roofs, and porches covered with the golden lichen that so loves to embroider old weather-worn wood. Now there is not a vestige of those dilapidated buildings to be seen; almost everything is white and square and new; and they have even cleaned out the cove, and removed the great accumulation of fish-bones which made the beach so curious."

The fisheries of the islands in 1880 were carried on by thirty-five men, who owned a small schooner and twenty small sail or lapstreak boats. The catch consists of ground fish, herring, mackerel, and lobsters. The capital invested amounts to about $2,600, and the value of the products is about $8,000. Most of the fish are sold in Gloucester and Boston, though in the summer season the hotels take a considerable quantity.

PART III.

THE FISHERIES OF MASSACHUSETTS.

By A. HOWARD CLARK.

MATERIAL FOR WHALE FISHERY AND FOR GLOUCESTER DISTRICT GATHERED BY A. HOWARD CLARK; FOR NEWBURYPORT, SALEM, MARBLEHEAD, BOSTON, PLYMOUTH, NEW BEDFORD, AND FALL RIVER DISTRICTS, BY W. A. WILCOX; FOR BARNSTABLE, NANTUCKET, AND EDGARTOWN DISTRICTS, BY F. W. TRUE.

ANALYSIS.

A.—THE COAST OF MASSACHUSETTS AND ITS FISHERIES:
- 54. Outline and present condition of the fisheries.
- 55. History of Massachusetts fisheries.

B.—THE DISTRICT OF NEWBURYPORT:
- 56. Review of the district.
- 57. The fisheries of Newburyport and Ipswich.

C.—THE DISTRICT OF GLOUCESTER:
- 58. Review of the district.
- 59. The fisheries of Essex and Rockport.
- 60. Gloucester and its fishery industries.
- 61. The fisheries of Manchester.

D.—THE DISTRICT OF SALEM AND BEVERLY:
- 62. Review of the district.
- 63. The fisheries of Beverly and Salem.

E.—THE DISTRICT OF MARBLEHEAD:
- 64. Review of the district.
- 65. Marblehead, Swampscott, Nahant, and Lynn.

F.—THE DISTRICT OF BOSTON:
- 66. Review of the fishing interests of Boston district.
- 67. Boston and its fishery industries.
- 68. Medford, Braintree, and Quincy.
- 69. Fishing towns from Weymouth to Cohasset.

G.—THE DISTRICT OF PLYMOUTH:
- 70. General review of the district.
- 71. Scituate and Duxbury.
- 72. Plymouth and its fisheries.

H.—THE DISTRICT OF BARNSTABLE:
- 73. Review of the fisheries of Cape Cod.
- 74. Provincetown and its fisheries.
- 75. Truro and Wellfleet.
- 76. Fishing towns from Eastham to Dennis.
- 77. The fisheries of Yarmouth and Barnstable.
- 78. The fisheries of Sandwich and Falmouth.

I.—THE DISTRICT OF NANTUCKET:
- 79. General review of the district.
- 80. Nantucket and its fisheries.

J.—THE DISTRICT OF EDGARTOWN:
- 81. Review of the fisheries of the district.
- 82. Martha's Vineyard.
- 83. No Man's Land and its fisheries.
- 84. The Elizabeth Isles.

K.—THE DISTRICT OF NEW BEDFORD:
- 85. General review of New Bedford district.
- 86. Agawam to Fairhaven.
- 87. New Bedford to Westport.

L.—THE DISTRICT OF FALL RIVER:
- 88. General review of the district.
- 89. The fisheries of Fall River.
- 90. The oyster interests of Taunton River and vicinity.

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PART III.

THE FISHERIES OF MASSACHUSETTS.

A.—THE COAST OF MASSACHUSETTS AND ITS FISHERIES.

54. OUTLINE AND PRESENT CONDITION OF THE FISHERIES.

Massachusetts is the center of the sea-fisheries of the United States. From here are carried on all the various branches of the bank and shore cod, haddock, and halibut fisheries, the mackerel fishery, menhaden and whale fisheries, lobster, oyster, clam, and other fisheries; and numerous industries related to them have their headquarters here.

The coast of the State possesses excellent harbors and peculiar facilities for carrying on an extensive maritime business. For more than two hundred and fifty years the bays have abounded in fish of many kinds, and the inhabitants have looked to the sea as a means of support. Cape Cod, "the right arm of the State," has always been the home of hardy fishermen, and Cape Ann, on the northern side of Massachusetts Bay, is the headquarters of the largest fishing fleet belonging to any port in the country.

For convenience the coast towns are divided into eleven districts, corresponding to the eleven customs districts of the State. Commencing at the New Hampshire line, the first district is that of Newburyport, which includes the towns of Newburyport and Ipswich. Next in geographical order is the Gloucester district, embracing Essex, Rockport, Gloucester, and Manchester. The Salem district comes next, and includes Beverly and Salem. The other districts are Marblehead, including Marblehead, Swampscott, Nahant, and Lynn; Boston, including towns from Boston to Cohasset on the south shore of Massachusetts Bay; Plymouth, embracing Scituate, Duxbury, Kingston, and Plymouth; Barnstable, including Provincetown and other places in Barnstable County; Nantucket, embracing the fisheries of Nantucket Island; Edgartown, including Martha's Vineyard, No Man's Land, and the Elizabeth Isles; New Bedford, embracing all towns from Wareham to Westport; and the Fall River district, which embraces the fisheries of the Taunton and adjacent rivers, and in which is included the fishery for shad in the Connecticut River at Holyoke.

In the early history of the colonies, whales were abundant near shore and were easily captured by small boats. Later, as they became scarce inshore, they were pursued by vessels, and in time the whaling grounds extended to all parts of the world. The whaling fleet in the United States was largest in 1846, when 722 vessels were engaged in that business. Of this number 470 were owned in seventeen ports of Massachusetts, and the rest in towns of other New England States, New York, and Delaware. New Bedford owned 256, Nantucket 74, Fairhaven 48, and other towns from 1 to 23 sail. The fleet in the United States on January 1, 1880, numbered 170 sail, owned as follows: New Bedford, 125; Provincetown, 19; Boston, 5; Dartmouth, 2; Marion, 2; Westport, 3, and Edgartown 6—making a total of 162 in Massachusetts; New London, Conn., 5; and San Francisco, Cal., 3.

The products of the whale fishery were most profitable in 1854, when the total receipts from the American fleet were valued at $10,802,594.20, and included 2,315,924 gallons of sperm oil, 10,074,866 gallons of whale oil, and 3,445,200 pounds of whalebone. A large part of this enormous product was the result of Massachusetts industry. The capital now invested in this fishery in Massachusetts, including the value of vessels, outfit, shore property, and circulating capital, is $4,411,150. The value of products in 1879 was $2,089,337, and the number of persons employed 4,300.

Of the 2,099 vessels employed in the cod and mackerel fisheries in the United States in 1874, 1,026 of 49,578 tons belonged to Massachusetts. Accurate statistics of the combined fisheries of the State for any given year cannot be obtained. From the reports of the State inspector of pickled fish, we learn that the mackerel fleet in the United States in 1851 numbered 940 sail of 59,410 tons, and employed 9,993 men and boys. Of this fleet, 853 vessels of 53,705 tons were owned in Massachusetts, and the rest in other States.

United States mackerel fleet in 1851.

Where owned.	Vessels.	Tonnage.	Number of men and boys.
MASSACHUSETTS.			
Boston	7	596	85
Beverly	12	701	97
Barnstable	28	1,018	339
Brewster	4	259	47
Charlestown	2	74	14
Chatham	19	1,346	230
Cohasset	44	2,885	561
Dartmouth	1	117	16
Dennis	47	3,096	585
Eastham	3	170	23
Essex	1	71	10
Gloucester	241	13,639	2,326
Harwich	48	3,231	577
Hingham	37	2,492	491
Lynn	4	161	33
Manchester	1	45	3
Marblehead	1	30	5
Martha's Vineyard	6	420	65
Nantucket	3	168	30
Newburyport	67	4,343	707
Orleans	5	336	54
Plymouth	6	561	65
Provincetown	60	4,332	688
Rockport	43	1,527	283
Salem	1	80	9
Scituate	13	715	119
Salisbury	4	305	48
Truro	52	3,626	581
Wellfleet	79	5,411	852
Yarmouth	14	990	169
	853	53,705	9,112
OTHER STATES.			
Maine	47	3,019	446
New Hampshire	8	515	84
Rhode Island	7	479	71
Connecticut	23	1,551	255
Maryland	2	141	25
	940	59,410	9,993

The total amount of mackerel inspected in Massachusetts from 1808 to 1880 was about 12,120,000 barrels, more than one-fourth of which were packed in Gloucester. The largest amounted inspected in any single year was 383,658 barrels in 1831. The only other years in which the inspection exceeded 300,000 barrels were 1830, 1848, 1851, 1863, and 1870. This fishery in 1851 was distributed among a large number of fishing ports in the State, but like the cod and other fisheries is now centered in a few leading ports.

The fresh-halibut fishery has always had its headquarters at Gloucester. It began about the year 1830, by the visit of vessels to George's Banks. In 1844, the fleet at this port numbered 30 sail; in 1848, 63 sail; and in 1852, 75 sail. The value of halibut taken in 1851 was about $60,000. The fleet in 1879 numbered about 50 sail, and the receipts at Gloucester were worth to the fishermen upwards of $309,000.

The fishery for cod on George's, Western, and Grand Banks has been of first importance to Massachusetts, and has employed large fleets of vessels and thousands of men. The Grand Bank fishing has been prosecuted from Marblehead, Gloucester, and other ports for over 200 years, and trips were made to George's, by Marblehead vessels, as early as 1748. At that time the vessels were not generally anchored on George's, but drifted about while fishing. Gloucester vessels in 1821 are said to have been the first to anchor on this bank and to begin the active prosecution of a fishery that yields the best of cod, and which for many years has annually employed from 100 to 200 sail of vessels.

The oyster industry of the State in 1879 employed 896 persons, and a capital of $303,175. The value of this industry includes $41,800 worth of native oysters and $363,750 enhancement in the value of oysters brought from the South and transplanted in this region.

The menhaden fishery in the same year employed 271 persons, and a capital of $179,105. The value of the products, including $20,477 worth of menhaden sold to factories outside the State, was $61,769.

STATISTICAL SUMMARY FOR 1879.—The tabulated statement herewith presented shows in detail the census statistics of the Massachusetts fisheries. The number of persons employed is 20,117; the capital invested is $14,334,450; and the value of the products in first hands is $8,141,750.

These statistics show the production but do not exhibit the trade in fishery products, great quantities of fish and oil being received in Massachusetts from Maine and the British Provinces, and from here distributed throughout the country. The production is for the year 1879, and is estimated to have been 10 per cent. less in quantity and 20 per cent. less in value than the catch for 1880 or for 1881.

The table shows the number of persons employed in the several branches of the fishing industry, viz, the number of vessel-fishermen, the number of boat-fishermen, including those engaged in fishing with weirs and other stationary apparatus, and the number of factory hands, or those employed in the preparation of fish-oil and other products. The total number of persons actively employed in the industry is 20,117. To this number may be added about 5,000 persons engaged in manufacturing nets, hooks, lines, rigging, sails, spars, fish boxes and barrels, and in the building of vessels and boats used in the fisheries. Including the families of fishermen and of those engaged in preparing the products, it is estimated that 100,000 persons in Massachusetts rely upon this industry for their support.

The quantity of apparatus used in the fisheries is also shown, including the number of vessels and their tonnage, the number of boats in vessel and shore fisheries, the number of gill-nets, purse-seines, and drag-seines, and the number of weirs and other fishing traps. Sailing craft of over 5

tons burden having custom-house papers are classed as vessels; all other craft are classed as boats. The total number of vessels actively employed is 1,007, aggregating 81,080.49 tons. Forty-seven additional fishing-vessels, aggregating 2,151.68 tons, were idle throughout the year 1879, but actively employed in 1880. Several vessels not included in these statistics started on fishing trips in 1879, but never returned. The general distribution of the fleet in the different fisheries was as follows: 796 vessels, of 42,090.81 tons, in the food-fish fishery; 3 vessels, of 27.19 tons, in the lobster fishery; 6 vessels, of 557.54 tons, in the oyster fishery; 35 vessels, of 1,269.70 tons, in the menhaden fishery; 161 vessels, of 36,786.51 tons, in the whale fishery; 1 vessel, of 84.65 tons, in the Antarctic fur-seal fishery; and 5 vessels, of 264.09 tons, in the squid fishery. Some of those in the food-fish fishery were engaged for a part of the year in the oyster or the lobster fishery.

The amount of capital dependent upon the industry is also shown, including the value of vessels, boats, gear and outfit, netting, traps, wharves, shorehouses and fixtures, factories and their apparatus, and the amount of cash capital required to conduct the business. The value of vessels includes the value of hull, spars, rigging, anchors, and cables; the gear is the fishing apparatus, exclusive of boats, nets, and seines; and the outfit is the furniture of the vessel, the private equipment of the fishermen, and the provisions, salt, ice, bait, and barrels used in the vessels during the fishing season. The total capital in the business is $14,334,450, distributed as follows: Vessels, $3,171,189; boats, $351,736; gear and outfit, $3,159,055; netting, $264,468; traps, $105,402; shorehouses, and fixtures, $2,875,600; factories and their apparatus, $677,000; cash capital, $3,730,000.

The total yield of fish by the fisheries of Massachusetts, reduced to the original weight as taken from the water, is 341,935,982 pounds, and the quantity of various species is estimated as follows:

Kind.	Quantity.	Kind.	Quantity.	Kind.	Quantity.	Kind.	Quantity.
	Pounds.		*Pounds.*		*Pounds.*		*Pounds.*
Alewives	3,751,059	Cunners	160,500	Halibut	14,205,916	Scup	1,022,180
Bass, sea	80,500	Cusk	989,194	Herring	7,794,780	Shad	164,524
Bass, striped	287,955	Eels	395,100	Mackerel	61,422,668	Smelts	35,000
Blue-fish	4,273,841	Flounders	571,470	Menhaden	26,000,077	Squeteague	103,310
Bonito	97,000	Frost-fish	67,434	Perch	33,574	Sturgeon	9,650
Butterfish	5,000	Haddock	24,092,890	Pollock	4,751,495	Sword-fish	731,950
Cod	172,216,955	Hake	8,437,749	Salmon	220	Tautog	373,335

Mixed species, including those not elsewhere enumerated, or those used for bait and fertilizers that could not be classified, aggregate 9,791,600 pounds. It is estimated that in 1879 39,855,000 pounds of mackerel and other fish were caught but thrown away as useless, being generally too small for sale in the fresh or pickled state, but in 1880 several million pounds of such fish were canned and found a ready sale.

The quantity and the value of fish consumed fresh is 124,101,621 pounds, valued at $1,608,523. The leading kinds thus used for food are cod, haddock, mackerel, and halibut. About 8,385,000 pounds of different species are used for bait, 25,811,573 pounds of menhaden for the manufacture of oil and guano, a few million pounds for fish-manure, and the balance eaten fresh for food.

The different species included in the total quantity of fish consumed fresh are as follows:

Kind.	Quantity.	Kind.	Quantity.	Kind.	Quantity.	Kind.	Quantity.
Alewives:	*Pounds.*		*Pounds.*		*Pounds.*		*Pounds.*
For food	937,139	Eels	395,100	Menhaden:		Squeteague	103,310
For bait	1,774,995	Flounders	571,470	For bait	254,504	Sturgeon	9,650
Bass, sea	80,550	Frost-fish	67,434	For oil and		Sword-fish	514,950
Bass, striped	287,955	Haddock	21,226,371	guano	25,811,573	Tautog	373,335
Blue-fish	4,238,234	Hake	1,378,289	Perch	33,574	Mixed fish:	
Bonito	97,000	Halibut	9,111,216	Pollock	1,100,736	For food	1,692,600
Butterfish	5,000	Herring:		Salmon	220	For bait and	
Cod	23,796,570	For food	1,216,610	Scup	1,022,180	fertilizer	8,000,000
Cunners	100,500	For bait	2,610,514	Shad	164,524		
Cusk	334,144	Mackerel	16,896,368	Smelts	35,006		

The quantity of dried fish produced from 162,562,673 pounds fresh is 62,122,008 pounds, valued at $2,412,077. About 23,000,000 pounds of the dry fish are prepared as "boneless", thus losing about 5,000,000 pounds in weight. Pickled fish to the amount of 34,006,745 pounds, valued at $928,303, are produced from 50,049,488 pounds fresh. The amount of smoked fish produced from 5,367,575 pounds fresh is 1,435,800 pounds, worth $105,997. The value of fishery products canned is $58,300; shell-fish, $649,013; products of the whale fishery, $2,089,337; and miscellaneous products, $290,200. In addition to the canned products enumerated in the table, 463,152 cans of lobsters, valued at $57,894, and 403,200 cans fresh mackerel, $33,600, were put up outside of Massachusetts in factories owned by Boston firms. These are accounted for in statistics of Maine or elsewhere. The enhancement in value of dry, pickled, and smoked fish in process of curing is estimated at $1,557,646, about 60 per cent. of which may be credited to the vessel industry and 40 per cent. to the shore industry.

The total value of fish and fish products in the marketable condition is $8,141,750. To this amount may be added 25 per cent. as the expenses and profits of the wholesale dealers of the State, thus making the total wholesale value of the products of the Massachusetts fisheries $10,117,187.

Comparing the several districts of Massachusetts, the statistics of which are given in connection with each district, we find that the district of Gloucester produces 189,383,026 pounds of fish, or more than half the entire yield of the State. The capital invested in this district is $4,326,568, and the value of sea products $3,155,071, while the total capital of the State is $14,334,450, and the total value of products $8,141,750. Boston has a large distributing business, but is not so great a producing center. The capital invested in this district is $3,218,949, and the value of the products $1,026,360. In the district of New Bedford, which is the center of the whale fishery of the United States, we find that the total capital invested is $4,329,638, and the value of products $2,053,944.

There are several industries in Massachusetts closely related to the fisheries, the statistics of which are not included in the statistics except in foot-notes. One of these is the manufacture of isinglass from fish sounds, and of liquid glue from fish skins. There are eight such factories in this State, employing one hundred and eighty-two men and a capital of $315,000. During the year 1879 the value of isinglass and glue manufactured was $450,000. Another industry largely dependent on the fisheries is that of the fertilizer factories, which employ several hundred men and a large capital. The proportion of fish entering into their productions is valued in the prepared state at $198,333. These fish are accounted for in the tables at their unprepared value.

The manufacturers of spermaceti candles, whalebone, seines, nets, hooks and lines, cables and

anchors, the builders of vessels and boats, and many other industries, depend entirely or very largely upon the fisheries for their support.

The amount of ice used in the Massachusetts fisheries during 1879 for the preservation of fish is estimated at 75,000,000 pounds, and the quantity of salt used in curing fish at about 70,000,000 pounds.

STATISTICAL SUMMATION OF THE FISHERIES OF MASSACHUSETTS.—The following statements show in detail the extent of the fisheries of Massachusetts in 1879:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	a12,637	Capital in vessels and boats	$6,681,980
Number of boat-fishermen	4,528	Capital in nets and traps	369,870
Number of curers, packers, fitters, and factory hands	2,952	Other fixed and circulating capital	b7,282,600
Total	20,117	Total	14,334,450

a Of the vessel-fishermen, 8,289 are in the food-fish and lobster fishery; 3,991 in the whale fishery; 30 in the seal fishery; 266 in the menhaden fishery, and 30 in the oyster fishery. Some of the men engage in both the food-fish and the oyster fishery.

b Cash capital, $3,730,000; wharves, shorehouses, and fixtures, $2,875,600; factory buildings and apparatus, $677,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear and outfit, exclusive of boats and nets.	Total value.	Nets and traps.	No.	Value.
Vessels.						*Nets.*		
In food-fish and lobster fisheries	a799	a42,118.00	$1,908,389	$1,303,525	$3,271,914	Gill-nets:		
In menhaden fishery	35	1,269.70	106,400	17,105	123,505	In vessel fisheries	844	$10,518
In oyster fishery	6	557.54	20,000	600	20,600	In boat fisheries	3,293	40,030
In whale fishery	161	36,786.51	1,065,300	1,721,850	2,787,150	Purse-seines, in vessel fisheries	382	197,320
In seal fishery	1	84.65	3,000	5,000	8,000	Haul-seines; in shore fisheries	83	16,600
In squid fishery	5	264.09	8,100	2,500	10,600			
Total	1,007	81,080.49	3,171,189	3,050,580	6,221,769	Total	4,602	264,468
Boats.						*Traps.*		
In vessel fisheries	3,822	.....	176,006	.....	176,006	Pounds, weirs, &c	106	76,875
In shore fisheries	2,927	.....	175,730	108,475	284,205	Lobster and eel traps	28,527	28,527
Total	6,749	.....	351,736	108,475	460,211	Total	28,633	105,402

a Does not include 47 idle vessels, of 2,151.68 tons.

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Grand total	.....	.....	.....	$8,141,750
Fresh fish.				
For food	85,650,035	.....	.....	1,487,864
For bait, oil, and fertilizers	38,451,586	.....	192,257 barrels	120,659
Total	124,101,621	.....	.....	1,608,523
Dry fish.				
Cod	148,327,885	56,054,757	.....	2,176,881
Hake	7,059,460	3,181,296	.....	65,182
Haddock	2,866,519	1,089,137	.....	27,770
Pollock	3,653,759	1,469,293	.....	26,778
Cusk	655,050	327,525	.....	11,466
Total	162,562,673	62,122,008	.....	a2,412,077

a Includes $104,000 enhancement on fish prepared as "boneless" in Boston, but accounted for elsewhere.

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Pickled fish.				
Alewives	972,050	777,650		$15,553
Bluefish	29,607	18,220		455
Cod	92,500	46,250		1,156
Herring	3,967,656	3,174,125		47,612
Mackerel	44,526,300	29,684,200		853,420
Swordfish	217,000	124,000		4,020
Mixed species	99,000	66,000		1,650
Halibut fins	32,875	26,300		1,052
Tongues and sounds	112,500	90,000		3,375
Total	50,049,488	34,006,745		928,303
Smoked fish.				
Alewives	266,875	160,125		4,003
Bluefish	6,000	2,000		100
Halibut	5,094,700	1,273,675		101,894
Total	5,367,575	1,435,800		105,997
Canned fish.				
Smelts			38,400 cans	4,800
Fish balls			264,000 cans	38,500
Fish chowder			36,000 cans	7,500
Clam chowder			36,000 cans	7,500
Total			374,400 cans	58,300
Shell-fish.				
Lobsters	4,315,416			158,229
Clams (includes 31,832 bushels, $12,305, for bait)			158,626 bushels	76,105
Quahaugs and sea-clams			11,050 bushels	5,525
Scallops			7,028 gallons	3,514
Oysters			36,000 bushels	41,800
Enhancement on southern oysters				363,750
Total				649,013
Products of whale fishery.				
Sperm oil			1,200,469 gallons	1,199,450
Whale, walrus, and blackfish oils			698,442 gallons	297,896
Whalebone			256,454 pounds	579,845
Ivory			19,100 pounds	5,921
Ambergris			62¼ pounds	6,225
Total				2,080,337
Miscellaneous.				
Squid			1,125 barrels	6,750
Fish oil			333,699 gallons	144,208
Fish guano			6,271 tons	32,152
Fish spawn			3,725 barrels	12,105
Fish sounds, dried		124,000	124,000 pounds	70,820
Marine salt			340 tons	3,890
Irish moss		465,000		16,275
Seaweed			4,000 tons	4,000
Total				290,200

55. HISTORY OF MASSACHUSETTS FISHERIES.

EARLY HISTORY OF THE FISHERIES.—The Massachusetts fisheries date from the settlement of the colonies in the early part of the seventeenth century. The hope of acquiring gain from the pursuit of this industry was one of the inducements for the establishment of plantations at Cape Ann and other parts of the coast. In 1624, the colonists sent a ship to England laden with fish, and the next year two others followed with cargoes of fish and furs. In 1628, they were selling

fish to the Dutch at New Amsterdam. Fish were exported from Boston as early as 1633. In 1639, for the encouragement of the fisheries, the general court passed an act which exempted fishing vessels and their apparatus from taxes and duties for some years, and relieved fishermen during the fishing season, and ship-builders from military duty. This act was the origin of the system of protection. Says Sabine (Report on American Fisheries, 1853): "Such a law, in the infancy of the colony, when contributions from every State, and the personal service in arms of every citizen, were imperatively demanded by the exigencies of the times, shows the deep importance which was attached to this branch of business by the fathers of the Commonwealth."

The following extracts from Sabine will show the condition of the fisheries of this State at various periods:

"Of the year 1641, Lechford, in his 'Plain Dealing; or, News from New England' (printed in London, in 1642), says that the people were 'setting on the manufacture of linen and cotton cloth, and the fishing trade'; that they were 'building of ships, and had a good store of barks, lighters, shallops, and other vessels'; and that 'they had builded and planted to admiration for the time. We learn from Johnson's 'Wonder Working Providence', that the Rev. Richard Blindman had gathered a church at Cape Ann, 'a place of fishing, being peopled with fishermen'; and that 'their fishing trade would be very beneficial had they men of estates to manage it.' We read in Winthrop's Journal, that 'this year the men followed fishing so well that there was about 300,000 dry fish sent to the market'; and in Hubbard, that the colonists received letters from England by the English fishing ships that came to the Piscataqua. In 1642, we find in Winthrop that the same class of ships brought news of the civil wars between the King and the Parliament, 'whereupon the churches kept divers days of humiliation'; and that 'there arrived another ship with salt, which was put off for pipe-staves,' so that 'by an unexpected providence' there was 'a supply of salt to go on with fishing'; and in Holmes, that 'the settlement at Cape Ann was established to be a plantation, and called Gloucester.' Again, Winthrop records, in 1643, the return of the Trial, 'Mr. Thomas Graves, an able and a godly man, master,' from a voyage to Bilboa and Malaga. This was the first vessel built at Boston. Her outward cargo consisted of fish, 'which she sold at a good rate'; and she brought home 'wine, fruit, oil, iron, and wool, which was a great advantage to the country, and gave encouragement to trade.'

"In 1644, we have an incident pertinent to our purpose, which is related with some particularity in the chronicles of the time. It appears that a London ship of twenty-four guns, Captain Stagg, arrived at Boston with a cargo of wine from Teneriffe; that a Bristol ship, laden with fish, lay in the harbor at the same time; that Stagg, authorized by a commission from the Cromwell party in England to capture vessels belonging to Bristol, made prize of this ship; and that a Bristol merchant and others interested in the vessel and cargo seized by Stagg collected a mob and raised a tumult. It appears further that some of the citizens of Boston, apprehensive of serious consequences, made prisoners of the merchant and other strangers and carried them before Winthrop, who confined them under guard in a public house, and that the people of the town concerned in the affair were committed to prison. Stagg was next called to an account, but it was found that he had not transcended his authority. A great excitement was produced by the occurrence, and some of the ministers, participating in the common feeling, spoke harshly of Stagg in their sermons, and exhorted the magistrates to maintain the people's liberties, which they considered had been violated by his act. A part of the magistrates were of the opinion that the Bristol ship should be restored; but the majority expressed a different view of the case, and Stagg was allowed to retain his prize. But the merchants of Boston, who, it would seem, were owners of the cargo of fish, petitioned to be allowed to test the right of the captor to *their*

property by a suit at law. Their request was granted; yet when the governor, six other magistrates, and the jury assembled they were induced to refer the decision of the whole matter to the court of admiralty. Thus terminated an affair which, at the moment, wore a very serious aspect, and threatened to involve the government of Massachusetts in a controversy with their Puritan friends in England.

"Concluding our account of the year 1644 with the remark that one ship built at Cambridge, and another built at Boston, sailed from the latter place for the Canaries with cargoes of fish and pipe-staves, we come, in 1645, to the first voyage undertaken on the distant fishing grounds of Newfoundland. The projectors of the enterprise were merchants of Boston and Charlestown, who, according to Winthrop, 'sent forth a ship and other vessels' to the Bay of Bulls. The effects of the civil war between Charles and his people, felt, as we have just seen, in the capture of the Bristol ship in Boston, were disastrous even in those remote seas; for when these vessels had nearly completed their fares the ship and most of their fish were seized by a cruiser belonging to the King's party and retained, to the great loss of the merchants.

"By an act of Massachusetts, in 1647, every householder was allowed 'free fishing and fowling' in any of the great ponds, bays, coves, and rivers, as far 'as the sea ebbs and flows,' in their respective towns, unless 'the freemen' or the general court 'had otherwise appropriated them.' By a law of the following year fishermen and others were forbidden to continue the practice of cutting fuel and timber, without license, on lands owned by individuals or towns, though during the fishing season persons who belonged to the colony might still dry their fish and use wood and timber necessary for their business on all such lands by making satisfaction to the proprietors. These laws were followed, in 1652, by another, which provided for the appointment of sworn 'fish viewers' at 'every fishing place' within the jurisdiction, who were required to reject as unmerchantable all 'sun-burnt, salt-burnt, and dry fish that hath been first pickled,' and whose fees on merchantable fish were fixed at one penny the quintal, 'to be paid one-half by the deliverer and the other half by the receiver.'

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"To supply a circulating medium, Massachusetts, as early as 1652, commenced the coinage of the 'pine-tree' shilling pieces, at which Charles the Second was much displeased. The general court, in 1677, to appease him, ordered a present of 'ten barrels of cranberries, two hogsheads of samp, and three thousand codfish.' During the same year about twenty fishing vessels were captured by the Indians on the coast of Maine. Most of them were owned in Salem, and, having from three to six men each, could have made a successful resistance had they not been taken by surprise, or, as says Hubbard, had they not been 'a dull and heavy-moulded sort of people,' without 'either skill or courage to kill anything but fish.' In fact, some vessels did make a manful defense, lost a number of men killed, and carried home nineteen others wounded. A large vessel was immediately equipped by the merchants of Salem and dispatched to recapture their vessels and punish the captors. The Indians plundered the fishing-ketches, abandoned them, and eluded their pursuers.

"In 1692 Salem lost by removals about a quarter part of its whole population, in consequence of the trials for witchcraft. The world rings with the enormities of this delusion. It should wonder, rather, that witchcraft in America was so nearly confined to the fishing county of Essex, at a period when all England was peopled with witches and goblins, and when the venerable and devout Sir Matthew Hale doomed two women to be hanged for vexing with fits the child of a herring merchant! The prosperity of Salem was checked from other causes. In 1697 John Higginson wrote his brother Nathaniel, that in 1689 he had obtained a comfortable estate, and was as much

concerned in the fishing trade as most of his neighbors; but that, in the course of the war (then soon to be terminated), he had met with considerable losses; that trade had much diminished; that of upwards of sixty fishing vessels owned in that town at the commencement of hostilities, only six remained; and that he believed no place in Massachusetts had suffered more by the war than Salem.

"At the close of the century, as we learn from Neal, the merchants of Massachusetts exported about 100,000 quintals of dried codfish annually to Portugal, Spain, and Italy, of the value of $400,000; while from another source we are informed, that, disregarding the navigation act of England, a large contraband commerce was maintained by the merchants of Boston with most of Europe.

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"In 1731 the fisheries of Massachusetts employed between five and six thousand men. Three years later a township in Maine was granted to sixty inhabitants of Marblehead, and a similar grant was made to citizens of Gloucester in 1735. Possibly many of the fishermen of these ancient towns had become weary of the hazards of the sea, and desired repose; but whatever the motives of the grantees of these lands, the perils and hardships of the forest a century ago were quite equal to those encountered upon the ocean, and such was their particular experience.

"In 1741 the cod fishery was in a prosperous condition. The annual produce was about 230,000 quintals, and the value of the quantity exported nearly $700,000. The average size of vessels was 50 tons; and of these, one hundred and sixty were owned in Marblehead alone. The whole number of fishing *vessels* in Massachusetts was not less than four hundred, besides an equal number of ketches, shallops, and undecked boats.

"In the twenty years that succeeded there was a sensible decline, for which the causes were abundant. The emigrations to Maine just mentioned, from Marblehead and Gloucester, the settlements elsewhere in the eastern country by emigrants from Cape Cod, the depopulation and almost entire abandonment of Provincetown, the expedition against Louisbourg, the general events of the two wars that occurred during this period between France and England, in the calamities of which Massachusetts was deeply involved, the demand for fishermen to man privateers and to enter the naval ships of the crown, with several minor events, combined to injure the fisheries to a very considerable degree, and at times, indeed, to render attention to them nearly impossible. After the peace of 1763, maritime enterprises were again undertaken with spirit and success, and the fishing-towns shared in the general prosperity. But the controversies that produced civil war, and finally a dismemberment of the British empire, had already commenced, and soon disturbed every branch of industry. The fisheries suffered first, and at the shedding of blood were suspended.

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"Omitting notice of the acts of Parliament which do not relate specially to the subject before us, the first law to claim our attention was passed in 1733. This act, by imposing duties on rum, molasses, and sugar imported into the colonies from any West India islands other than British, was designed to break up an extensive and valuable trade with the French, Dutch, and Spanish islands, where those products of the plantations were exchanged for fish. It is said that previous to the commencement of the trade to these islands molasses was thrown away by the planters, and that this article which is now so extensively used in food was first saved and put into casks to be brought to New England to be distilled into rum. Certain it is that on the passage of the act of 1733 the people of the northern colonies insisted that unless they could continue to sell fish to the planters of the foreign islands, and to import molasses from thence to be manufactured into spirit for domestic consumption and for trade with the Indians, they could not prosecute the

fisheries without ruinous losses. The penalty for violating the act was the forfeiture of vessel and cargo. Yet New England never submitted, though a fleet was sent to enforce obedience; and the interdicted trade with the French, Dutch, and Spanish islands did not cease until a late period of the controversy which terminated in the Revolution. In fact, therefore, a measure which threatened to ruin the cod fishery of New England produced, as I incline to believe, no serious injury to it for quite thirty years.

"But in 1764 the act was renewed, and the collection of the duties it imposed on rum, molasses, and sugar was attempted by the officers of the crown in a manner to create the most anxious concern; for the jurisdiction of the admiralty courts was enlarged, and the people were deprived of the trial by jury in all cases arising between them and the Government under this law and the trade and navigation laws generally.

"The most alarming discontents followed the collisions and quarrels which constantly occurred between ship-master and merchants on the one hand and the officers of the customs on the other in various parts of New England, and especially in Boston, Salem, Gloucester, Falmouth (now Portland, Maine), and elsewhere in Massachusetts; and the impression became general among commercial men that their business and property were both to be sacrificed to appease the clamors of the planters of the British islands, and to test the ability of the mother country to 'raise a revenue in America' under the 'sugar and molasses acts,' as this odious law was called in the politics of the day.

"Meantime the southern colonies ridiculed the madness or folly of their northern brethren in resisting taxation upon so homely a commodity as *molasses*, and made themselves merry over the accounts of the quarrels of the Yankees for cheap '*sweetening*.'

"In truth, the South, from first to last, never seemed to understand or appreciate the North upon this question, and forbore to come to the rescue for years after the leading men of Massachusetts had wasted their energies in endeavors to induce the ministry to abandon a policy so ruinous to Northern industry. The '*petty dealers in codfish and molasses*' struggled long and manfully, but without success.

"The State papers of Massachusetts contain the most earnest remonstrances against the 'sugar and molasses acts.' In the answer of the council and house of representatives to the speech of the governor, in November, 1764, it is said that 'our pickled fish *wholly*, and a *great part* of our codfish, are only fit for the West India market. The British islands cannot take off *one-third of the quantity caught; the other two-thirds must be lost* or sent to foreign plantations, where molasses is given in exchange. The duty on this article will greatly diminish the importation hither; and being the only article allowed to be given in exchange for our fish, a less quantity of the latter will of course be exported, the obvious effect of which must be a diminution of the fish trade, not only to the West Indies but to Europe, fish suitable for both these markets being the produce of the same voyage. If, therefore, one of these markets be shut the other cannot be supplied. *The loss of one is the loss of both, as the fishery must fail with the loss of either.*' These representations cover the whole ground.

* * * * * * * * *

"A detailed account of the seizures of French and Spanish molasses, which, contrary to the acts of Parliament, was continually imported—or, to speak the exact truth, *smuggled*—would occupy too much space; yet, as the 'molasses excitement' was one of the earliest in the revolutionary controversy, some further notice of the course of events cannot well be omitted. The merchants, determined to maintain intercourse with the interdicted islands, devised a plan, finally,

which for a time enabled them to accomplish their purpose, and still avoid the penalties of the law. This plan was simply to lade their vessels with molasses at the French islands, as usual, but to purchase clearances, 'signed with the name, if not the handwriting, of the governor of Anguilla, who acted also as collector.' This island was so small as not to afford a cargo for a single vessel, as was well known to the collectors of the customs in New England; yet they permitted vessels furnished with the 'Anguilla clearances' to enter with their cargoes without inquiry for a considerable time; but, on a sudden, libels were filed, and prosecutions were commenced in the court of admiralty against those who had been concerned in such evasions of the statutes, and ruinous forfeitures of property and renewed clamors were the consequences.

"We pass to other topics. In 1762 the fishing towns of Massachusetts, alarmed at the news that the French had captured Saint John's, Newfoundland, petitioned the governor and council to fit out a ship and a sloop, then in the service of the province, to protect their vessels. Both vessels, in accordance with these petitions, were provided with additional men and means of defense, and sent to sea. The expense thus incurred became the subject of legislative inquiry, and was objected to because the executive branch of the Government had appropriated the public money without the consent or knowledge of the representatives of the people. The debate in the House was angry and protracted. James Otis, the popular leader, used expressions never before uttered in the colonies, and soon after the close of the session published a pamphlet, in which he justified himself for his conduct on the occasion, and defended with great ability the principles for which he had contended as a member of the House. 'This production has been considered the original source from which all subsequent arguments against taxation were derived,' while the whole affair created an intense excitement, and, in the judgment of the biographer of Otis, exerted very great influence in causing the Revolution.

"It is a singular fact that the fisheries furnished the advocates of the supremacy of Parliament with one of their best illustrations. They stated that the authority of the imperial legislature was indispensable in many cases, and that without it the colonies would often be involved in conflicts injurious to each other's interests. Governor Hutchinson, in his remarks upon the question, said, substantially, that it had been generally thought a public benefit to prevent fishing vessels from departing on their voyage until the month of April; but that if any colony engaged in the business failed to conform to a law imposing such a regulation, others that complied with it would suffer, because their fish, later caught, must of necessity be later in market; and he declares that a motion had actually been made in the legislature of Massachusetts a few years previously for parliamentary interposition in this behalf, which failed, not in consequence of any objection to the principle involved in the motion, but because a majority of the members disapproved of the restraint itself, and were willing that fishing vessels should depart from port before April, and whenever their owners and masters thought proper.

* * * * * * * * *

"These incidents will serve to show the connection of the fisheries with the questions which caused a dismemberment of the British empire. It remains to speak of the act of Parliament passed in 1775, which, by depriving the people of New England of the right of fishing, was designed to 'starve them into submission.' The trade arising from the cod fishery alone at that period furnished the northern colonies with nearly half of their remittances to the mother country, in payment for articles of British manufacture, and was thus the very life-blood of their commerce. The fishing towns had become populous and rich. Marblehead, for example, next to Boston, was the most important place in Massachusetts, and was second to the capital only in population and

taxable property. A fearful change awaited all. The dispute was now to be determined by an appeal to arms, and every maritime enterprise was to be interrupted and ruined."*

Sabine gives the following figures to show the condition of the Massachusetts cod fishery before and after the Revolutionary war:

Towns.	From 1765 to 1775.			From 1786 to 1790.		
	Vessels annually employed.	Tonnage.	No. of men.	Vessels annually employed.	Tonnage.	No. of men.
Marblehead	150	7,500	1,200	90	5,400	720
Gloucester	146	5,530	888	160	3,600	680
Manchester	25	1,500	200	15	900	120
Beverly	15	750	120	19	1,235	157
Salem	30	1,500	240	20	1,300	160
Newburyport	10	400	60	10	460	80
Ipswich	50	900	190	56	860	248
Plymouth	60	2,400	420	36	1,440	252
Cohasset	6	240	42	5	200	35
Hingham	6	240	42	4	180	32
Scituate	10	400	70	2	90	16
Duxbury	4	160	28	9	360	72
Kingston	6	240	42	4	160	28
Yarmouth	30	900	180	30	900	180
Wellfleet	3	90	21	.....	.....	.....
Truro	10	400	80	.....	.....	.....
Provincetown	4	160	32	11	550	88
Chatham	30	900	240	30	900	240
Nantucket	8	320	64	5	200	40
Weymouth	2	100	16	3	150	24
In Maine (a)	60	1,000	230	30	300	120
Total	665	25,630	4,405	539	19,185	3,202

a Maine was at this time a district or province of Massachusetts.

THE FISHERIES FROM 1790 TO 1860.—From the close of the Revolutionary war until the war of 1812 the Massachusetts fisheries were in a somewhat fluttering condition, and efforts were made by acts of Congress to encourage them. In 1789, an act was passed which granted a bounty of 5

* "The inhabitants of the sea-shore of Massachusetts, impelled by their necessities, commenced the manufacture of salt from sea-water early in the Revolution. From the accounts preserved it would seem that they boiled the water at first, but were compelled to relinquish the experiment because of the expense and of the impurity of the salt. The next attempt was by solar evaporation, on Boston Neck, by General Palmer, 'a worthy and enterprising gentleman, who failed in consequence of the rain-water which fell into his uncovered works. The third experiment is said to have been made in Dennis, Cape Cod, by Capt. John Sears, who, in the end, was successful. He constructed a vat with rafters and shutters, so arranged as to exclude the rain in storms and to expose the sea-water to the action of the sun in pleasant weather. The first year he obtained only 8 bushels of salt. His neighbors called his invention 'Sears's Folly'; yet he persevered. The second year he made 30 bushels of salt. The fourth year, instead of pouring water into his vat from buckets, he introduced a *hand*-pump. In 1785, at the suggestion of Maj. Nathaniel Freeman, of Harwich, he contrived a *wind*-pump, which he continued to use, and which saved a vast deal of labor. In 1793, Mr. Reuben Sears, of Harwich, invented covers for salt-vats, to move on shives, or small wheels, as in ships' blocks. Five years later, Mr. Hattil Kelley, of Dennis, constructed a new kind of vat and a new method of moving the covers. Various changes were made by different persons subsequently; and the manufacture of salt from sea-water, by solar evaporation, became extensive, and at times profitable. Capt. John Sears was assisted in the improvements in his works by Captain William, Capt. Christopher Crowell, and by Capt. Edward Sears, of Dennis. They resigned to him whatever claim they might have had for their aid; and in 1799 he obtained a patent from the Government. His right was, however, disputed by others, who asserted that he made no 'new discovery.'

"In 1802 the number of salt-works in the county of Barnstable, Massachusetts, was 136, containing 121,313 feet. These works were estimated to produce annually salt of the value of $41,700. The business increased rapidly; and in 1832 the number of feet of salt-works in the same county was 1,425,000; the quantity of salt manufactured, 358,250 bushels. The reduction of the duty on the foreign article and other causes produced a great change in the value of this description of property. In 1834 the manufacture was ruinously depressed; and salt-works, which for many years previously had been considered valuable, as affording a certain income, could hardly be sold at prices above the cost of the materials used in constructing them."

cents per quintal on dried and 5 cents per barrel on pickled fish exported, in lieu of a drawback of the duties on imported salt used in the cure, and imposed a duty of 50 cents per quintal on imported fish. Bounties were doubled. In 1792 the bounty on dried and pickled fish, exported, was discontinued and a specific allowance granted to vessels employed in the cod fishery. Sabine says:

"Boats between 5 and 20 tons were entitled to receive $1 per ton annually; those between 20 and 30 tons, 50 cents additional; and to those more than 30 tons, the allowance was fixed at $2.50 per ton; but no vessel could receive more than $170 in one season. By a subsequent act the same year, those several rates were increased one-fifth, to commence in January, 1793, to continue seven years, and thence to the end of the next session of Congress.

"Still further to encourage the prosecution of the fisheries, an act of 1793 authorized the collectors of customs to grant vessels duly licensed permits 'to touch and trade at any foreign port or place,' and under such documents to procure salt and other necessary outfits without being subjected to the payment of duties. This act, which is still [1853] in force, has proved extremely beneficial to our fishing vessels in certain emergencies; but it may be admitted that its privileges are liable to be abused. Four years later, the system of allowances to vessels employed in the cod fishery was revised. Under the law then passed, the smallest class were entitled to draw from the treasury $1.60 per ton annually; and vessels of upward of 20 tons, $2.40 the ton; while the maximum was increased to $272. A second revision occurred in the year 1800, which effected some changes in details, but which provided for the continuance of the rates of allowance then fixed until March, 1811.

"President Jefferson, in his message to Congress in 1802, spoke of 'fostering our fisheries as nurseries of navigation, and for the nurture of man,' as among 'the landmarks by which we were to be guided in all our proceedings;' and made further allusion to the subject in his annual communication of the following year. His remarks, in the second message, were referred to a committee of Congress, who, in their report, said that there was too much reason to believe that both the whale and cod fisheries had been for some time on the decline, and that it was more than doubtful whether the United States employed as many men and tons in these branches of industry as when they were colonies or previous to the Revolution. As a means to reanimate them, they recommended that ships and vessels actually and exclusively employed in these fisheries should not, in future, be subject to the payment of the tonnage-duty levied on other vessels; that fishermen and other persons actually employed in catching whales and fish should be exempt from the usual charge of hospital money; and that the bounty or allowance under existing laws should be paid in cases of shipwreck or loss of vessels without deduction.

* * * * * * * * *

"The embargo and other restrictive measures which preceded the war of 1812 produced the most disastrous results in New England. In 1808, and during the existence of the prohibitory acts, a number of citizens of Boston petitioned Congress for liberty to export a quantity of pickled and dried fish in their warehouses, and liable to rot or decay if kept during the summer months. But the Government declined interference, and property of this description was allowed to perish in most of the fishing towns, to the utter ruin of many of its owners. These losses were followed by others; and as the results of the policy of our own rulers, as well as the seizure and confiscation of cargoes of fish in ports of Europe under the memorable decrees of Napoleon, the distresses of all classes of persons engaged in the catching and curing the products of the sea became in the end general and alarming."

After the war of 1812, further efforts were made to encourage the fisheries. Duties were imposed on imported fish, and by the act of 1819 an allowance or bounty was granted to cod-fishing

vessels. This bounty continued in force until 1866, since which time the fishermen have had no further special national allowance than the privilege of free salt. The effects of the several acts of Congress and of the fishery treaties is discussed in another section. The bounty of 1819 allowed, under certain conditions, $3.50 per ton for the season on vessels under 30 tons, and $4 per ton on larger vessels, but no vessel could receive more than $360.

The Gloucester Telegraph, of August 15, 1829, gives the following "account of the fisheries of Massachusetts and its neighboring States from the year 1790 to 1810, said to have been made in the year 1815 by a gentleman who was well acquainted with the business, and who took considerable pains to make his statement correct, it having been made by particular request and for a special purpose."

"My calculation is, that there were employed in the Bank, Labrador, and Bay fisheries, in the years above mentioned, 1,232 vessels yearly, namely, 584 to the Banks and 648 to the Bay of Chaleur and Labrador. I think that the 584 bankers may be put down at 36,540 tons, navigated by 4,627 men and boys (each vessel carrying one boy). They take and cure 510,700 quintals of fish, and average about three fares a year, and consume annually 81,170 hogsheads of salt. The average cost of these vessels is about $2,000 each; the average price of these fish at foreign markets is $6 per quintal. These vessels also make from their fish annually 17,520 barrels of oil, which commands about $10 per barrel. Their equipments cost about $900 each, annually, exclusive of salt.

"The 648 vessels that fish at the Labrador and the Bay, I put down at 41,600 tons, navigated by 5,832 men and boys. They take and cure annually 648,000 quintals of fish. They go but one fare a year, and consume annually 97,200 hogsheads of salt. The average cost of the vessels is about $1,600, and their equipments, provisions, &c., $1,050 each. This description of vessels is not so valuable as the bankers, more particularly that class which goes from Maine, Connecticut, and Rhode Island, as they are mostly sloops and of no great value. Most of the vessels cure a part of their fish near the place where they catch them, on the beach, rocks, &c., and the rest after their return home. Several cargoes of dry fish are shipped yearly from Labrador directly for Europe. The usual markets for these fish are in the Mediterranean, say Alicante, Leghorn, Naples, Marseilles, &c., as small fish are preferred at these markets and the greater part of the fish caught in the Bay and at Labrador are very small. The average price of these fish is $5 per quintal. These vessels also make from their fish about 20,000 barrels of oil, which always meets a ready sale at a handsome price, say from $8 to $12 a barrel. Most of it is consumed in the United States.

Statistics of the Bank, Bay, and Labrador codfisheries of New England, 1790-1810.

Vessels employed in the Bank, Bay, and Labrador fisheries	1,232
Tonnage	85,140
Number of men	10,459
Number of hogsheads of salt consumed	178,370
Number of quintals of fish taken	1,158,700
Number of barrels of oil made	37,520

"There is also a description of vessels called jiggers, being small schooners of about 30 to 45 tons, which fish in the South channels, in the shoals, and near Cape Sable. They number 300 and carry about 4 or 5 hands each, say 1,200 men, and take about 75,000 quintals of fish annually and consume 1,200 hogsheads of salt and make about 4,000 barrels of oil. Their fish is generally sold for the West Indies and home consumption. There is still another description of fishing vessels commonly called 'Chebacco boats,' or 'pink-sterns.' Their number is 600, from 10 to 28 tons,

and carry 2 men and a boy each, say 1,800 hands, and consume annually 15,000 hogsheads of salt. They take and cure 120,000 quintals of fish, which are used for the home and West India markets, except the very first, which they take early in the spring, being of an excellent quality, are sent to the Bilboa market, in Spain, where they bring a great price. These vessels measure about 10,800 tons, and make 9,000 barrels of oil. There also were about 200 schooners employed in the mackerel fishery, measuring 8,000 tons, carrying 1,600 men and boys, take 50,000 barrels of mackerel annually, and consume 6,000 hogsheads of salt. The alewive, shad, salmon, and herring fisheries are immense, and consume a great quantity of salt.

Recapitulation of the cod and mackerel fisheries of New England, 1790-1810.

Vessels	2,332
Tonnage	115,940
Men	15,059
Salt, hogsheads	265,370
Fish, quintals	1,353,700
Oil, barrels	50,520
Mackerel, barrels	50,000

"There are many persons who assert that in one year there were at Labrador and up the Bay more than 1,700 vessels, besides the bankers, but I am very confident that they are much mistaken."

The extent of the fisheries of Massachusetts in 1837, as quoted from Macgregor's report by Hon. Hannibal Hamlin, of Maine, in a speech delivered in Congress August 5, 1852, was as follows:

Number of vessels employed in cod and mackerel fisheries	12,290
Tonnage of same	76,089
Number of quintals of codfish caught	510,554
Value of same	$1,569,517
Number of barrels of mackerel caught	234,059
Value of same	$1,639,049
Men employed	11,146
Total value of cod and mackerel	$3,208,866

Mr. Hamlin says:

"The number of seamen estimated there as being engaged in that year is placed at 11,146. That is the number of seamen actually engaged on the ocean. There is another class of men, very numerous, which serves to increase the number a considerable per cent., who are left upon the shore for the purpose of curing, preserving, and taking care of the fish, and who alternate with those who do the fishing; consequently the number of fishermen who are returned as actually employed in the business is not the actual number of those who devote their lives to that occupation. And the number of seamen who are engaged at different times in the fisheries cannot be accurately ascertained; but it is at least 50 per cent. above the number of those who are employed any given time in fishing."

The United States census statistics for 1840 give the following items concerning the Massachusetts fisheries, including the whale fishery:

Number of quintals of smoked and dry fish	389,715
Number of barrels of pickled fish	124,755
Number of gallons of spermaceti oil	3,630,972
Number of gallons of whale and other fish oil	3,364,725
Value of whalebone and other productions of the fisheries	$442,974
Number of men employed	16,000
Capital invested	$11,725,850

The extent of the cod and mackerel fisheries of Massachusetts for the year 1850, as reported by the census, was as follows:

Capital invested	$2,127,885
Men employed	7,917
Quintals of codfish	215,170
Barrels of mackerel	236,468
Value of products of the fisheries	$2,188,441

Hon. Lorenzo Sabine, in his report to the Boston Board of Trade for the year 1859, gives the following statistics of the fisheries of Massachusetts for that year:

Cod, mackerel, halibut, &c., fishery, tonnage	71,598
Persons employed	10,550
Value of fish and oil	$6,250,000
Capital invested	$3,700,000
Sperm and other whale fisheries, tonnage	154,048
Persons employed	11,800
Value of oil, bone, and candles	$14,500,000
Capital invested	$17,900,000

The following extract is from the Gloucester Telegraph of April 4, 1860:

"The fishing interest of this Commonwealth, owing to a variety of causes, is not an increasing one. Indeed, the tonnage employed in the cod, mackerel, halibut, &c., business is 6,349 tons less than in 1825, while the tonnage in the whale fishery is barely 13 tons more than in that year. The fisheries which produce food are rapidly concentrating at Gloucester. Thus the tonnage at that port was 19,394 in 1855, and 32,644 in 1859. So, too, a large part of the whale fishery has been transferred from Nantucket to New Bedford. The losses recently in this branch of industry have been great, and in New Bedford alone nearly $2,000,000 during the past year."

B.—THE DISTRICT OF NEWBURYPORT.

56. REVIEW OF THE FISHERIES OF NEWBURYPORT DISTRICT.

GENERAL DESCRIPTION.—Newburyport and the adjoining town of Ipswich comprise one customs district. The former place possesses a good harbor, and is important as a fishing center. Its maritime business is quite extensive. At the town of Salisbury, on the opposite bank of the Merrimac River, the dory originated about a hundred years ago. Newburyport, for many years, had a large fleet of vessels in the Labrador cod fishery, but the business is now discontinued. The fishing fleet of twenty-three sail now owned here, is engaged in the shore cod and mackerel fisheries. Large quantities of clams are annually dug from the sandy flats in the vicinity.

The Merrimac River, which empties into the ocean at Newburyport, takes its rise at an altitude of 6,000 feet among the White Mountains of New Hampshire, some 120 miles away, although the river by its course is said to be 260 miles long. It runs in a southerly direction through the center of the State of New Hampshire, and, passing into Massachusetts, for a few miles it continues south, and then turns to the northeast, which course it follows to the ocean. This stream is well known as furnishing the power for the great manufacturing interests of Nashua, in New Hampshire, and Lowell and Lawrence, in Massachusetts, as well as numerous places of less note. Twenty-five small rivers and numerous small streams are tributary to the Merrimac. The largest of these rivers are the Nashua, Contoocook, and the Winnepissoggee. The tide flows to Mitchell's

Falls, a few miles above Haverhill, and the river is navigable for small vessels to this point, 20 miles from its mouth. Within this limit are the once famous ship-building towns of Salisbury, Amesbury, and Haverhill on the north side, and Newbury, Bradford, and Newburyport on the south.

Although this part of the New England coast had been visited by explorers several years before the French explorer De Champlain, yet he is credited with the discovery of the Merrimac in 1605. The great importance and value of this stream at the present time is for the power given by its numerous falls to the great manufacturing interests along its course, yet we are reminded of the time before those industries had polluted its waters and destroyed its natural gifts. For an abundance of food-fishes of the best varieties this river then had no superior, and in the early history of the country was highly valued on their account. Even the present generation recall the time when the river was well stocked with fish. William Stark, esq., at the Manchester centennial celebration held October 22, 1851, says: "My father has seen the shad so thick as to crowd each other in their passage up the falls to gain the smooth water above, so that you could not put in your hand without touching some of them, and yet there were more alewives than shad, and more eels than both."

It is said enough eels were salted down annually to be equal in value to three hundred head of cattle. Salmon were also very abundant. Sturgeon, frequently alluded to in the early history, were plenty and caught to considerable extent. At present there is no fishing of importance carried on in the river. Alewives are taken to some extent, and during the summer New York parties camp along the banks and take sturgeon for their market. There is no record of the amount caught. Sturgeon are said to be quite plenty, but as they are not considered a food-fish in the New England markets no attention is paid to them by the New England fishermen.

The State of Massachusetts is trying to restock the river with shad and salmon, but with the numerous factories above and the non-enforcement of the protection laws below, the salmon have a hard time; yet a good progress is reported.

STATISTICAL SUMMATION OF THE FISHING INTERESTS FOR 1879.—The following statements give in detail the extent of the fishing interests of Newburyport district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	212	Capital in vessels and boats	$92, 170
Number of boat-fishermen	173	Capital in nets	8, 510
Number of curers, packers, fitters, &c	40	Other fixed and circulating capital	a100, 000
Total	425	Total	200, 680

a Cash capital, $25,000; wharves, shorehouses, and fixtures, $75,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Value.	Nets.	No.	Value.
Vessels.									
In food-fish fishery:							Gill-nets:		
Active	23	903. 30	$43, 350	$5, 025	$27, 175	$76, 150	In vessel fisheries	13	$:50
Idle	1	11. 31	500	.....	.....	500	In boat fisheries	45	560
Total	24	914. 70	43, 850	5, 025	27, 175	76, 650	Purse-seines:		
Boats.							In vessel fisheries	10	5, 600
In vessel fisheries	104	.....	3, 720	.....	.....	3, 720	Haul-seines:		
In shore fisheries	113	.....	3, 440	3, 230	5, 130	11, 800	In boat fisheries	11	2, 200
Total	217	.....	7, 160	3, 230	5, 130	15, 520	Total	79	8, 510

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$140,681
Fresh fish.				
Alewives	231,390			1,314
Bass, striped	125			13
Bluefish	18,530			556
Cod	1,093,125			29,807
Cunners	500			3
Cusk	500			4
Eels	2,186			100
Flounders	1,020			15
Haddock	576,875			7,072
Hake	5,000			30
Herring	818,675			13,308
Mackerel	375,000			4,987
Menhaden	16,050			60
Perch	600			18
Pollock	2,000			8
Shad	11,124			556
Sturgeon	5,000			150
Swordfish	10,500			315
Mixed fish	142,000			710
Total	4,240,209			59,728
Dry fish.				
Cod	2,789,935	1,115,974		40,175
Cusk	12,380	6,190		167
Haddock	81,300	30,896		618
Hake	102,000	49,595		793
Pollock	90,720	37,195		632
Total	3,076,335	1,239,850		42,385
Pickled fish.				
Herring	75,000	60,000		900
Mackerel	750,300	504,200		14,496
Swordfish	8,500	2,000		65
Mixed fish	9,000	6,000		150
Total	843,800	572,200		15,611
Smoked fish.				
Halibut	40,000	10,000		800
Shell fish.				
Oysters				a 2,375
Clams:				
For food			27,126 bushels	13,563
For bait			12,000 bushels	4,285
Total			39,126 bushels	20,223
Miscellaneous.				
Fish oil			2,000 gallons	800
Fish spawn			50 barrels	162
Fish sounds (dried)		750		675
Seaweed			300 tons	300
Total				1,037

a Enhancement on Southern oysters.

57. THE FISHERIES OF NEWBURYPORT AND IPSWICH.

NEWBURYPORT.—Newburyport is 36 miles northeast from Boston. As the paragraphs devoted to its past history will show, this town formerly gave much attention to the fisheries; but that interest has now very much decreased in importance. Among the numerous reasons for this

decline is the inconvenient entrance to the otherwise good and safe harbor. From the first settlement of the place to the present time the ever-shifting sands have been forming great obstructions at the mouth of the Merrimac.

In former years Newburyport sent a large fleet of fishing vessels to the coast of Labrador, but during 1879 not a single United States fishing vessel visited those waters. During 1880 only one vessel went there, and she returned with 1,000 quintals of cod and 400 barrels of herring.

We record, concerning the ship-building industry of Newburyport and near towns, that in Newburyport and the neighboring towns of Salisbury, Haverhill, Rowley, Newbury, Amesbury, Bradford, and Ipswich, 1,601 vessels were built from 1781 to 1881. During the same period 671 schooners were registered as built in the customs district of Newburyport, many of which were fishing vessels. From 1875 to 1880, out of the thirty vessels built on the Merrimac, nine, with an aggregate tonnage of 267.26, were fishing schooners.

The town of Salisbury, adjoining Newburyport, is the headquarters of the dory industry. Here the dory originated, many years ago. An account of this business will be given in the chapter on fishing vessels and boats.

Clams are found in abundance on both banks of the Merrimac River from the "hump-sands," just inside its mouth on the south, to the "black rocks" on the north, a distance of one mile; here the river is from one-fourth to one-half mile wide. The clam flats are free to all with no restrictions, and the diggers say that the more they dig, the more plentiful the clams become. On an average sixty men are working the beds during the whole year. The products are largely shipped to Boston and sold to cities in the vicinity; quantities are also used by the fishermen for fresh bait; none are barreled and salted.

Sperling, or small herring, are caught in November with seines or with dip-nets by torch-light. They are taken just outside the harbor when the torch is used. The light is placed in the bow of the boat, which is slowly rowed along near the shore. The fish, being attracted by the bright light of the torch, surround the boat and follow it in such numbers that they may easily be bailed or dipped in. This operation is continued until a load is obtained. Should the oarsmen cease rowing or draw away from the shore into deep water, the fish at once disappear; they are taken only for bait, usually by the clam-diggers. One thousand barrels were caught during the fall of 1879.

In 1879 Newburyport had 23 vessels, aggregating 903.39 tons, employed in the cod and mackerel fisheries; and about 60 boats in the shore-fisheries, including some 30 boats used by the clam-diggers. The capital employed in the fishing industry was $195,000, and the value of the products in first hands was about $120,000. The number of persons engaged in the fisheries was 332, and the number of shoremen was 40. The principal part of the product was sold fresh. Among other products was about 25,000 bushels of clams, some smoked halibut, dry and pickled fish, and oil.

From Salisbury Point, and other beaches in the neighborhood of Newburyport, a great quantity of sea sand is annually taken. Vessels of from 80 to 150 tons have some years taken as many as a thousand cargoes, aggregating 100,000 tons of this sand, carrying most of it to Boston.

In 1877, according to Capt. Moses Pettingell, Newburyport had twenty vessels engaged in the mackerel fishery, seven of which were fishing in the Gulf of Saint Lawrence. In summer eight vessels were engaged in fishing for mackerel with gill-nets. These vessels ranged from five to ten tons each, and carried each about thirty nets and three dories. One man manages a single dory and about ten nets. These same vessels are engaged in the winter cod fishery. Captain Pettingell estimated that the average catch to each of these vessels would be about 50,000 pounds of

mackerel in a season, valued at about $3,000. Some of them have stocked $5,000 in a season, taking fish in a seine in one night to the value of $100 to $150.

About forty open boats, nineteen-foot dories, are engaged in the winter cod fishery out of Newburyport. The fishery commences in December and continues till April. In summer the cod fishery is discontinued, the fishermen being employed in seining menhaden in the Merrimac River. In addition to these open boats there are about forty dories carried to the fishing grounds on the small schooners engaged in the gill-net fishery for mackerel. In all, about eighty dories and one hundred and sixty men are employed. A fair average return for a day's fishing was estimated by Captain Pettingell at 600 pounds of cod and similar fish.

Mr. John G. Plummer writes us the following historical sketch of the Labrador fishery from Newburyport:

"Capt. Charles Sandborn says that he went first in 1833, and there were then about eighteen or twenty large vessels. One was a ship of 360 tons. They went down to Salmon River, anchored in the river, and cruised along the shore in boats, and caught most of the cod with nets or seines. They used those seines that were knit flat and gathered at the sides, so as to have them bag some, and when they could not take all the fish in the boats they used to buoy up the lead line and leave the fish in the nets until they returned for them. Sometimes they used large bags made of nets, which they would fill with fish, and anchor them until the boats could return for them. The vessels carried fine mesh nets in which to catch capelin for bait. The voyage usually lasted about three months. The fish were dried at home, and the cost of drying (one-twelfth) was paid in shares. They were then packed in drums and shipped to the West Indies, to Bilboa, Spain, and up the Straits.

"The vessels employed were not very high cost, and were fitted at low rates. They had a codfish bounty from the Government, and so made good voyages; but after a while the Government cut off the bounty, and the cost of vessels and expense of fitting, including wages, increased so that there was no money in it. One after another the vessels were withdrawn until now (1881) not one is left. Last year there was one vessel and this year none.

"The cod that were dried here in Newburyport and packed in drums brought the best price in the West Indies of any in the world. They were not very salt and were thoroughly dry, so as to stand the heat.

"Fishermen all say that even now, with good large vessels and with a little assistance from the Government, they could compete with the French and English fishermen and make it pay; but where the French get a good bounty from Government and we get none, and the cost of fitting is higher than in France, it is impossible to make the fishery pay. These small Labrador fish have to be shipped to the same market as the English and French fish.

"Our vessels carried mostly young men and boys, and taught them to be sailors. Some of these men were in our Navy during the war, and one or two in the Kearsarge when she sank the Alabama. About twenty of them, I think, were in the Navy.

"We used to have great times here when the vessels came in from Labrador. All the men and boys we could scare up were employed in washing, hauling, drying, and packing the fish and shipping them to market. The oil was shipped mostly to Philadelphia, and the vessels usually brought back coal, corn, sugar, and molasses."

The first American vessel to engage in the Labrador cod fishery from Newburyport sailed about the year 1794, and from that time until the year 1879 there was scarcely a year when one or more vessels were not sent to that fishing ground. In 1806 this fleet numbered 45 sail; in 1817, 65 sail; in 1860, 60 sail; in 1874, 2 sail; in 1876, 2 sail; in 1879, none; in 1880, 1 sail.

IPSWICH.—The town of Ipswich is situated in Essex County, 27 miles northeast of Boston. A river of the same name, rising in the adjoining county of Middlesex, 25 miles to the southwest, flows through the town and into the bay, about 4 miles distant. The harbor, by reason of shifting sand-bars, affords an indifferent entrance to vessels. No improvement in these obstructions has been effected since the first settlement of the town.

The fishery industries of Ipswich have greatly diminished, owing to the desertion of the river by the salmon, bass, shad, and other fish. Manufacturing interests have increased, but at the same time have aided, by the emptying of unhealthy matter into the river from the factories, in the extermination of many fisheries which once were in a flourishing condition. One hundred and twenty years ago the fisheries of Ipswich had fallen 50 per cent., the number of fishing schooners being but six.

The clam industry, of especial importance in the early history of this place, has steadily decreased. The flats, out of which the clams were formerly dug in such profusion, extend from Rowley on the north to Essex on the south, including an area of 10 miles in length by half a mile in width. An attempt has been made to restore the clam flats to their former state of abundance by planting new beds, but this attempt has been fruitless. Between 1870 and 1880 there was no restriction as to the time for digging clams, but in 1880 a close season was declared by law, whereby clam digging was prohibited from May 15 to October 15. An exception to this town law was provided by a State law which allowed any fisherman to dig two bushels for bait. Permits are now required to be given to men before they are allowed to dig at all for clams. The permits are issued by the selectmen, into whose hands the town has intrusted the safe-keeping of the clam-flats. Those to whom such permits may be granted must be citizens of the place. Any offense against this town law renders the offender liable to arrest, and to a fine of $1 per bushel for all clams dug by him, and the confiscation of all tools and equipments.

Under these restrictions, seventy-five men were employed in clam digging from March 1 to June 1, 1879; and from November 1, 1879, to March, 1880, fifty men were engaged in the same business. The clams were sold for $1 per barrel in the shell, or 25 cents per gallon shelled. For fishing purposes they were sold by the water-bucketful for 50 cents, or at $4 a barrel shelled for fresh bait, and $3 a barrel for salt bait. A bushel of salt to a barrel of clams is required for "full-salted" bait, and for "slack-salted" from half a peck to half a bushel of salt. This mixture sells, according to the quantity of salt used, from $4 to $5 per barrel. In the season of 1879–'80 500 barrels were put up for bait. When this small number is contrasted with the several thousand barrels formerly prepared for the same purpose, the decrease is very apparent. It must be added, however, that a demand for clams formerly not in existence has lately sprung up; this is to supply clams as food in Boston and other neighboring cities. For this purpose, between June 15 and September 15, 1879, 40 barrels each week were shipped in the shell to Salem. Between December 1, 1879, and April 1, 1880, 60 barrels of clams in the shell and 280 gallons of shelled clams were shipped weekly to Boston and towns in the neighborhood.

The importance of the small herring, or sperling, fishery is still great, very large numbers being captured; the operation of taking them is curious and may be briefly told. Night is the time for capture. Three men go in a dory, 18 to 22 feet in length, at the bow of which a bright light is placed. This light attracts the fish round the boat, into which they are quickly bailed. A boat-load or the disappearance of the fish causes a homeward course to be taken. In 1879 fifteen boats caught about 200 barrels each, aggregating 3,000 barrels.

There is now a great interest taken in the manufacture of isinglass from fish sounds. In olden times the crude sounds were thoroughly cleaned and in that condition were sold and used as isin-

glass. In 1855 a factory for the manufacture of isinglass was built and is now actively engaged in that industry, turning out annually about 100,000 pounds of the manufactured article. The production for the year 1879 has outstripped that of any other, being 140,000 pounds. The greater portion of this quantity was made from hake sounds, chiefly supplied by American fishermen at from 75 cents to $1.15 per pound. Importations of sounds were also received from Hull and Liverpool, England; Hamburg, Germany; Bombay, India; and Maracaibo, South America; these costing 27½ cents to 80 cents per pound. A limited supply was received from Russia at $1.08 per pound. Most of this isinglass finds a market among the New York brewers and those of the Western States, at prices varying from $1.20 to $1.80 per pound.

C. THE DISTRICT OF GLOUCESTER.

58. REVIEW OF THE DISTRICT.

EXTENT OF THE FISHERIES OF GLOUCESTER DISTRICT.—The proximity of Cape Ann to the fishing grounds for cod and mackerel, and an excellent harbor for vessels of all sizes, has made this place famous in the history of the fisheries. On the north side of the cape is Ipswich Bay, which abounds with cod in the winter season, and which for more than two hundred years has been the resort of a large fleet of fishing vessels and boats. South of the cape is Boston Bay with its numerous fishing ledges and banks. Only 150 miles off the coast lies George's Bank, famous as the best of cod-fishing grounds. The principal town on the cape is Gloucester, and adjoining it are Rockport, Essex, and Manchester. These four places comprise the customs district of Gloucester.

The fisheries and vessel building have been the chief industries of the people since the first settlement of the region. At Rockport and at some of the outlying villages of Gloucester are large granite quarries which were opened many years ago by parties from Quincy. These now give employment to a considerable number of men.

The total capital invested in the fisheries in the district is $4,326,568, the value of the products in first hands $3,155,071, and the number of persons employed 6,206. These statistics are for the year 1879, which was a very disastrous and unfavorable one compared with subsequent years. The catch of the fleet in 1880 was considerably in excess of that in 1879, and prices much higher. The total weight of fish taken by the fishermen of this district in 1879 was 189,383,026 pounds as they came from the water. This quantity was reduced by dressing and curing to 106,116,499 pounds. In addition to the above amount 549,100 pounds of lobsters were taken along the shores, also 800 barrels of squid, 15,000 pounds of Irish moss, and 250 tons of seaweed. The most valuable part of the product was dry fish, of which 42,850,143 pounds were prepared, worth $1,634,103. The amount of fish sold fresh was 44,048,606 pounds, worth $727,099 to the fishermen. Pickled fish were sold to the amount of 17,967,750 pounds, worth $487,107. The smoked fish were worth $100,000; shell fish, $22,462; and miscellaneous products, $184,830.

The active fishing fleet in 1879 in this district numbered 414 sail, aggregating 23,453.72 tons, and manned by 4,505 men. Besides this active fleet there were eighteen vessels, measuring 1,136.12 tons and carrying 198 men, lost during the year on their first trip without producing any stock. There were also ten vessels measuring 431.23 tons which were idle throughout this year although employed in fishing in 1880. Included in the active fleet are several vessels which were lost during the year after making one or more fishing trips. The total losses for the year 1879, which was a very disastrous one, were twenty-nine vessels, measuring 1,893.36 tons, and 249 men.

STATISTICAL SUMMATION FOR 1879.—The following statements show in detail the extent of the fishing interests of Gloucester district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	4,505	Capital in vessels and boats	$2,060,375
Number of boat-fishermen	748	Capital in nets and traps	111,193
Number of curers, packers, fitters, &c	632	Other fixed and circulating capital	a2,155,000
Number of factory hands	321	Total	4,326,568
Total	6,206		

a Cash capital, $1,062,000; wharves, shorehouses, and fixtures, $882,000; factory building and apparatus, $211,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	419	23,006.66	$1,148,214	$89,050	$687,900	$1,925,164	In vessel fisheries	222	$2,844
Idle	10	431.23	12,300			12,300	In boat fisheries	370	4,300
In menhaden fishery	1	46.45	500	50	300	850	Purse-seines:		
In squid fishery	4	231.84	7,100	400	1,600	9,100	In vessel fisheries	190	95,000
Total	434	24,316.18	1,168,114	89,500	689,800	1,947,414	Total	782	102,144
Boats.							*Traps.*		
In vessel fisheries	1,783		64,541			64,541	Weirs, &c	14	6,500
In shore fisheries	467		21,320	12,200	14,900	48,420	Lobster and eel pots	2,549	2,549
Total	2,250		85,861	12,200	14,900	112,961	Total	2,563	9,049

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value prepared.
Grand total				$3,155,071
Fresh fish.				
Alewives	40,000			225
Bass, sea	250			15
Bass, striped	570			57
Bluefish	2,500			75
Cod	6,495,070			97,426
Cunners	20,000			100
Cusk	14,040			98
Eels	1,500			75
Flounders	150,000			2,250
Haddock	10,347,300			137,019
Hake	443,160			2,059
Halibut	8,836,716			309,285
Herring	1,200,000			16,000
Mackerel	9,226,000			122,700
Pollock	415,125			1,661
Salmon	200			30
Shad	325			16
Smelts	1,000			25
Sturgeon	150			5
Swordfish	99,050			2,980
Tautog	250			9
Mixed fish	6,754,800			33,774
Total	44,048,606			727,099

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value prepared.
Dry fish.				
Cod	102,313,000	37,856,000		$1,521,727
Cusk	582,600	201,330		10,488
Haddock	2,250,000	855,344		23,091
Hake	5,986,600	2,604,765		57,398
Pollock	2,881,760	1,152,704		21,396
Total	114,014,920	42,850,143		1,634,103
Pickled fish.				
Cod	31,500	15,750		394
Herring	2,750,000	2,200,000		33,000
Mackerel	23,415,000	15,610,000		448,788
Swordfish	105,000	60,000		1,950
Mixed fish	18,000	12,000		300
Halibut fins	25,000	20,000		800
Tongues and sounds	62,500	50,000		1,875
Total	26,407,000	17,967,750		487,107
Smoked fish.				
Halibut	5,000,000	1,250,000		100,000
Shell fish.				
Lobsters	285,510			10,468
Clams:				
For food			18,078 bushels	9,039
For bait			8,281 bushels	2,955
Total			26,359 bushels	22,462
Miscellaneous.				
Squid			800 barrels	4,800
Fish oil			183,000 gallons	84,225
Fish guano			3,000 tons	10,500
Fish spawn			3,200 barrels	10,400
Fish sounds (dried)		116,500		63,600
Irish moss		15,000		525
Seaweed			250 tons	250
Products of whale fishery—whale oil			2,520 gallons	1,000
Total				184,300

STATISTICS FOR GLOUCESTER DISTRICT, 1869–1876.—The following statistics of the fisheries of this district for the years 1869 to 1876 are compiled from the annual reports of the customs collector of the district to the United States Bureau of Statistics:

Value of the products of the fisheries of the district of Gloucester for the years 1869 *to* 1876.

Years.	Codfish, cured (quintals of 112 pounds).		Mackerel, cured (barrels of 200 pounds).		Herring, cured (barrels of 200 pounds).		Other fish (quintals of 112 pounds).		Fresh fish.		Fish oil.		Shell fish.	Manure.	All other products.	Total value of all products.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	Value.	Value.	Value.
	Quin.	*Dolls.*	*Bbls.*	*Dolls.*	*Bbls.*	*Dolls.*	*Quin.*	*Dolls.*	*Lbs.*	*Dolls.*	*Galls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1869	250,000	1,350,000	90,000	1,350,000	40,000	160,000	25,000	60,000	8,000,000	240,000	140,000	126,000	25,000	15,000	a6,000	3,602,500
1870	240,000	1,080,000	98,000	1,372,000	12,000	72,000	30,000	90,000	7,500,000	375,000	135,000	94,500	20,000	15,000	6,000	3,724,500
1871	320,000	1,440,000	104,000	1,040,000	15,000	52,500	35,000	70,000	8,250,000	250,000	180,000	108,000	18,000	20,000	8,000	3,006,500
1872	384,000	2,016,000	71,075	781,825	10,000	45,000	25,000	37,500	8,000,000	250,000	225,000	129,000	20,000	23,000	b135,000	3,437,325
1873	460,000	2,070,000	86,544	1,125,000	5,000	23,000	25,000	50,000	9,000,000	310,000	275,000	165,000	18,000	25,000	15,000	3,801,000
1874	475,000	2,375,000	120,000	1,200,000	10,000	40,000	30,000	75,000	11,000,000	450,000	300,000	171,000	15,000	24,000	c75,000	4,425,000
1875	451,100	2,508,000	52,783	581,000	38,000	153,000	41,000	123,000	12,000,000	816,000	300,000	141,000	10,000	24,000	d268,000	4,624,000
1876	425,000	2,295,000	98,800	888,000	30,000	127,500	40,000	120,000	11,000,000	745,000	275,000	132,000	10,000	23,000	e285,000	4,627,500

a Includes $2,000 worth of oysters.
b Includes 2,540,000 pounds fresh herring, $125,000.
c Includes 1,000,000 pounds salt halibut, $55,000.
d Includes 2,000,000 pounds smoked halibut, $260,000.
e Includes 2,750,000 pounds smoked halibut, $275,000.

Statement showing the number of men employed and the number and tonnage of vessels engaged in the fisheries of the district of Gloucester for the years 1869 to 1876.

Years.	Vessels employed.	Men employed.	Tonnage.
	Number.	*Number.*	*Tons.*
1869	510	6,120	24,891
1870	507	6,084	25,318
1871	491	5,900	24,904
1872	452	5,500	22,692
1873	365	5,000	21,083
1874	406	5,200	21,267
1875	397	5,100	21,537
1876	417	5,300	22,775

59. THE FISHERIES OF ESSEX AND ROCKPORT.

ESSEX.—Essex is situated 25 miles north-northeast of Boston, on the Essex Branch of the Eastern Railroad. It joins Gloucester on the east and Manchester on the south. The town was organized in 1819, when it became separate from Ipswich, which now bounds it on the north. The population of Essex in 1840 was 1,450; in 1880 about 1,800.

The place is not favorably located for fishing either from vessels or boats, as it possesses no harbor. The Essex River is a narrow stream that runs from the village to Ipswich Bay, a distance of 2 or 3 miles, and has sufficient depth of water at high tide to float the largest fishing schooners from the ship-yards to the sea.

The principal industry of the people is ship-building, upwards of 1,200 of the best fishing vessels in the New England fleet having been built here during the past fifty years. In the early history of vessel building the woodlands in the vicinity afforded most of the material needed, but at present the lumber is brought from all parts of the country. There are several saw-mills, blacksmith shops, and a spar-yard connected with the ship-yards, and a considerable number of anchor stocks and fish boxes are annually made in the town.

The only factory in the district of Gloucester for the manufacture of fishing-lines is located at Essex. The business was established in 1830, when hemp lines were used in the fisheries, but since 1845 cotton lines have taken the place of those made from hemp. The lines are tarred by steam, a process begun at Newburyport in 1875, prior to which time they were prepared in tar heated by fire. The production of the factory amounts to about $30,000 annually, all of which is sold at Gloucester for use principally in the deep-sea fisheries. The value of the buildings and machinery is about $4,000, and the number of men employed is six.

Clam-digging was formerly a profitable industry in this town, the extensive flats bordering the river affording an abundance of these bivalves. Mr. Moses Knowlton states that about 1830 upwards of two hundred men and boys were employed in digging clams, and that from 1860 to 1864 there were annually shipped from this place 3,000 barrels of shelled clams, most of which were used for bait in the cod fisheries, and sold at $13 per barrel. Since 1865 they have been used more largely for food. During the year 1879 only ten men were constantly employed in clam-digging, though at the height of the season, which lasted from October to May, there were sometimes seventy-five men and boys engaged in digging and shucking the clams. The production for the year was 11,500 bushels of clams in the shell, valued at $4,500 to the diggers. Of this quantity 9,000 bushels were shipped in the shell to Boston, Salem, and Marblehead; the remainder were shelled and sold in Gloucester, Rockport, and other places. Clams in the shell are worth

about 40 cents a bushel, while shucked they sell at $4.50 a barrel. If the shelled clams are for use as bait in the fisheries they are corned, using a peck of salt to a barrel of clams.

Some of the fishing vessels built in Essex retain their ownership here, and, although fitting and landing their catch in Gloucester, are recorded as Essex vessels. In 1879 there were two such vessels; tonnage, 156.91 tons; original cost, $11,000; present value, $9,500; number of crew, 30; gross stock for the year, $2,846. They were both engaged in the Bay of Saint Lawrence mackerel fishery, and brought home 650 barrels of mackerel.

ROCKPORT.—Rockport is on the eastern extremity of Cape Ann, 36 miles from Boston, and is the terminus of the Gloucester branch of the Eastern Railroad. It is small in area, covering only 3 miles from north to south and 1½ miles from east to west, while the coast line, because of numerous indentations, is 8 miles long. It is bounded by Gloucester on the west, and by the ocean on the east, north, and south, and is composed of two villages, situated a mile apart, and known as Sandy Bay and Pigeon Cove. These were a part of the town of Gloucester until 1840, when they were unitedly incorporated into a town under the name of Rockport. A stretch of land extending into the harbor is known as Bear's Neck. Here are located numerous small fish-houses, where hundreds of men were formerly employed in handling the catch of the many shore-boats that once sailed from here. Except for a few months in the year, Bear's Neck now appears like a deserted village. In the town are scores of veteran boat-fishermen who in earlier years found abundance of fish off this rocky shore. Most of the fishing is now carried on in large boats or vessels on more distant grounds.

Thatcher's Island, upon which are built the twin lights, often called Cape Ann lights, belongs to Rockport, and is well known to navigators. The light-houses are but a short distance apart, and are very tall, so that the lights can be seen for a long distance at sea. The town is built on a rocky headland, and from the summit the ocean view is grand. At Pigeon Cove there is a large number of handsome cottages, and the place is a favorite seaside resort.

In 1879 the fishery industries of Rockport, including vessel, boat, and lobster fisheries, and the manufacture of isinglass, were valued at $182,830, employing four hundred and sixty men and a capital of $160,100.

The shore-boat fishery in 1879 employed eighty-nine boats and one hundred and twenty-two men, and the weight of fish taken was about 2,500,000 pounds. The active fishing fleet of vessels comprised twenty-three sail, measuring 737.23 tons, valued, with their gear and outfit, at $70,450, and manned by one hundred and ninety-one men. Of this fleet, three vessels were engaged in the mackerel fishery, seven in the cod and mackerel fisheries, thirteen in the cod fishery, and one in the menhaden fishery. One of the cod vessels was engaged also in the winter haddock fishery. The production of the fleet in 1879 was 6,404 barrels mackerel, 939,600 pounds salt fish, and 1,130,000 pounds fresh fish. In the winter season a considerable share of the catch of cod by the Ipswich Bay fleet is landed at Rockport and shipped fresh to Boston. This business bids fair to add new enterprise to the fishing industry of the town.

Besides the active fleet, there were four fishing vessels idle throughout the year. These measured 113.56 tons and were valued at $3,500. They were all employed in fishing during the year 1880.

The lobster fishery gives employment to thirty men, and the number of lobsters taken in 1879 was 48,750, valued at $2,437. The number of dories in the business was nineteen, and the number of lobster pots five hundred. These pots are set along the shore and hauled daily. The bait used is generally fish heads and sculpins.

At Milk Island, and at other points off the shore, floating traps are set for the capture principally of herring and mackerel. This is a recent and not extensive fishery in this region, only one trap producing any amount in 1879, the other two that were set proving failures because of hostile opposition to this mode of fishing. The value of the traps was $1,500; number of men employed, eight; and value of the fish taken, $1,800.

The town possesses facilities for the quick distribution of fresh fish, being at the terminus of the railroad by which the fish are shipped to Boston and other places. There are five firms engaged in curing and packing fish, about two-thirds of their business consisting of salt fish that are mostly sold to Gloucester firms; the remaining third of their business is in fresh fish, principally cod and haddock. Three vessels, measuring 160.81 tons, and valued at $2,900, are employed in freighting fish and salt between Rockport, Gloucester, and other places.

Rockport has the honor of first producing isinglass from hake sounds, which is now in great demand by the brewers all over the country. A small factory was erected here and this industry started as early as 1821 or 1822, though the business was limited until about 1870, when large factories were erected and the manufacture largely increased. The first method of making the isinglass was to reduce the sounds to a pulp by grinding and then press the mass between large wooden rollers. The rollers were at first turned by hand, then horse-power was employed, and from time to time other improvements have been introduced. The rollers are now made of iron, being hollow cylinders through which cold water is allowed to pass to prevent the pulp from sticking to them, and are turned by steam. At present the sounds of codfish, weakfish, and various imported species are used in connection with hake sounds.

In 1879 there was only one factory in operation in Rockport, though there were several in other parts of the State. Another business related to this is the manufacture of glue from salt-fish skins. These two industries in 1879 represented about $50,000 capital and a product valued at $64,000. The number of persons employed was forty. In the fall of 1880 some Boston parties came to Rockport and started a new isinglass factory.

From the rocks along the shores a considerable quantity of Irish moss is annually gathered. During 1879 three men from Scituate, Mass., secured here $300 worth of that article. Seaweed is gathered by the farmers for fertilizing purposes. The cotton factory in the town was for many years busily employed in the manufacture of canvas for sails and tents.

Since the first settlement of the villages in 1695, when a grant of land was made to John Babson "to sett up fishing upon," Rockport has depended largely upon the fisheries for the support of the inhabitants. The absence of a suitable harbor for the accommodation of larger craft led the people to engage in shore or boat fishing rather than to send vessels to the offshore banks, and this branch of the fisheries has continued the favorite occupation of the people, though within thirty years the business has greatly decreased. A few Bank schooners and a considerable fleet of small craft being owned here in 1743, a wharf was built for their safety, and in 1746 another one was constructed. As they were made on the outside of logs, filled up with stones, they went to pieces in a few years. In 1810 a corporation was formed, called the Sandy Bay Pier Company, for the purpose of constructing an artificial harbor, which was accomplished at an expense of $30,000. At the North Village or Pigeon Cove a breakwater and pier were built in 1831 which cost $25,000.

According to the State census of 1865 the principal industry of the town, like that of Gloucester, was the fishing business. We find that Rockport, in that year, employed in the cod and mackerel fisheries, thirty-seven vessels, aggregating 1,386 tons, and manned by 343 men.

60. GLOUCESTER AND ITS FISHERY INDUSTRIES.

GENERAL DESCRIPTION.—Gloucester, the chief fishing port of the United States, is situated on Cape Ann, about 30 miles northeast of Boston. The harbor is one of the largest and safest on the whole coast, and is admirably adapted for carrying on an extensive maritime business. By railroad and by steam and sailing vessels, it is connected with all parts of the country, giving facilities for the rapid distribution of the products of the fisheries. Its line of sea-coast, exclusive of Rockport, with its 8 miles of shore, begins at Essex, on the north side of Cape Ann, and extends around to Manchester on the south side, a distance of 30 miles if measured from headland to headland, and if its frontage on the harbor and other indentations is included the entire coast line is over 50 miles in extent.

The business portion of the city, commonly called "the harbor," has several outlying settlements, among which is Annisquam, situated on Ipswich Bay, and having a small harbor, once the headquarters of a fleet of some fifty sail of fishing-vessels. Here are the ruins of wharves and buildings that were formerly the scene of a thriving business which is now transferred to the more capacious harbor on the other side of the cape. The Annisquam River, familiarly known as the 'Squam River, extends from Ipswich Bay to within a short distance of Gloucester Harbor, with which it is connected by a canal not much used except by pleasure boats, though large enough to admit the passage of good-sized vessels. In the river in the vicinity of Wheeler's Point and Riverdale are quite extensive clam beds, worked by some ninety men. On the opposite side of the 'Squam River is West Gloucester, known as West Parish. Some clams are dug here, and from the woods are cut many saplings, from which are made scrub-brooms and trawl buoy-staffs used in the fisheries.

Adjoining Annisquam on the north side of the cape are the villages of Bay View, Lanesville, and Folly Cove, having a bold rocky shore, with no natural harbors. These places are the homes of a hardy set of boat fishermen, who find considerable profit in the capture of lobsters and all varieties of shore fish. At both Bay View and Lanesville breakwaters have been built, making small harbors, used principally for the shelter of stone sloops, that are constantly employed in transporting granite from the extensive quarries situated here. A few small-sized fishing-vessels and numerous boats used in the shore fisheries also find shelter in these artificial basins. At Folly Cove the boats are hauled high up on the rocks on inclined platforms, where they are safe from the dashing waves. The style of boat mostly used here is a large dory, partly decked and fitted specially for sailing rather than for rowing.

The village of Magnolia, well known as a summer resort, and having a small fishery, lies to the westward of Gloucester Harbor. Off this shore is Kettle Island, where two or three floating fish-traps are set during the summer months. Returning to the harbor, we mention Norman's Woe, on the western side, at the entrance of the outer harbor. This is the spot made historic by Longfellow's poem, "The Wreck of the Hesperus." On the opposite side of the harbor is Eastern Point, a long and narrow projection, which keeps off much of the force of the winds and waves. A breakwater is greatly needed to protect the coasting and fishing fleets from storms that occasionally drive in here with great fury, and have caused the loss of numerous vessels. The inner harbor around which the wharves are built, is separated from the outer harbor by Ten Pound Island, which partly protects it from storms and makes it a good anchorage for the fleet of several hundred sail of fishing vessels.

With the exception of the granite quarries, there is no important industry carried on in Gloucester that is not dependent upon the fisheries. The prosperity of the place fluctuates according to

the scarcity or abundance of fish. There has been a steady growth in population from 7,786 in 1850, to 19,329 in 1880.(*a*) The valuation of the place, as shown by the assessors returns, was $1,635,787 in 1850, and $9,615,602 in 1877. In 1879, owing to severe losses by storms and the general depression of the fishing industry, the valuation had decreased to $8,022,623, but since 1879 an increased demand for fish, and a good catch has caused an increase to $8,977,559 valuation in 1881.

The general appearance of the city from a distance is quite inviting as it rises from the water's edge to hills of considerable size, upon which are many handsome residences. Were it not for the narrow, unpaved streets, with few sidewalks, the place would be far more attractive. There are many substantial public buildings including a fine city hall, several churches, and commodious school houses, while in the business part of the city are buildings well adapted to the fishing industry. The wharves are eighty-nine in number, seventy-four being used in the fisheries and the rest for coal and other purposes. They are well built, and have at high tide a sufficient depth of water to float large ships, a number of which annually visit the place with cargoes of salt. Close by the wharves and upon them are flake yards, where thousands of quintals of fish are daily spread to dry. Large sheds are seen on every wharf where are stowed hogsheads of fish in pickle or piles

(*a*) *Valuation and population of Gloucester from* 1845 *to* 1881.

Year.	Tax for $1,000.	Number polls.	Valuation.	Personal property.	Real estate.	Assessed	Population.
1845	$9 80	1448	$1,152,322	.....	.....	$11,273 00	
1846	10 00	1492	1,300,265	.....	.....	13,002 17	
1847	9 00	1480	1,441,215	.....	.....	15,189 60	
1848	9 00	1519	1,541,549	.....	.....	16,152 44	
1849	7 50	1591	1,605,113	.....	.....	14,412 85	
1850	11 50	2134	1,635,787	.....	.....	18,811 55	7,786
1851	12 20	2026	1,705,045	.....	.....	20,054 82	
1852	9 50	1792	2,373,488	.....	.....	24,967 26	
1853	9 50	1861	2,697,430	.....	.....	28,068 26	
1854	9 00	1803	3,272,593	.....	.....	30,937 00	
1855	10 00	1904	3,304,324	.....	.....	34,267 87	8,935
1856	9 60	1987	3,720,536	.....	.....	36,907 00	
1857	11 00	1994	3,727,214	.....	.....	42,120 00	
1858	9 00	2016	3,780,785	.....	.....	37,359 13	
1859	11 50	2157	4,051,265	.....	.....	43,457 00	
1860	9 50	2040	4,332,740	.....	.....	44,157 10	10,004
1861	9 50	2035	4,111,304	.....	.....	43,011 20	
1862	12 00	2494	4,021,033	.....	.....	53,239 33	
1863	13 00	2502	4,053,397	.....	.....	57,698 15	
1864	17 50	2499	3,036,387	.....	.....	73,887 67	
1865	22 00	2464	4,859,348	.....	.....	111,833 69	11,938
1866	15 00	2731	5,375,656	.....	.....	86,096 84	
1867	19 00	2774	6,511,754	.....	.....	129,271 32	
1868	20 00	3024	6,707,382	.....	.....	140,346 47	
1869	22 00	3030	6,993,533	.....	.....	161,170 85	
1870	20 05	3100	7,187,407	$3,110,493	$4,076,614	153,535 69	15,397
1871	20 05	3496	7,487,255	3,036,695	4,450,560	160,480 73	
1872	19 00	4117	7,809,276	2,942,834	4,956,442	158,303 67	
1873	20 00	3531	7,711,096	2,716,986	4,994,110	161,283 20	
1874	21 00	3390	8,472,329	3,031,308	5,441,021	184,699 11	
1875	19 00	3907	9,238,265	3,443,455	5,794,810	183,341 63	16,754
1876	18 00	3967	9,380,948	3,421,548	5,959,400	176,791 07	
1877	18 00	4106	9,615,602	3,452,122	6,163,480	181,292 84	
1878	18 00	4128	9,077,744	3,101,839	5,975,905	171,655 39	
1879	17 00	3678	8,022,623	2,616,238	5,406,385	142,563 63	
1880	22 00	3493	8,101,150	2,624,380	5,476,770	185,211 30	19,329
1881	18 00	3664	8,977,559	2,996,749	5,980,810	168,924 07	

of the dry fish ready for market. At the head of the wharves are the offices and stores of the outfitters. Along the water front are also many large buildings where boneless fish, mackerel, and all varieties of fish products are made ready for sale. There are in the city numerous buildings used in the manufacture and repair of boats, anchors, nets, sails, rigging, and all kinds of equipment for the fleet. Six marine railways afford facilities for hauling up and repairing the vessels. Two factories are constantly active in the preparation of copper paint, which is commonly used on the vessels' bottoms. On the outskirts of the city are buildings devoted to the manufacture of fish glue from the refuse of the boneless-fish factories. Those shore industries which cannot be strictly termed fishing industries, as boat and vessel building, sail-making, rigging, net-making, coopering, painting, and smithing, give employment to five hundred forty-one men and have an invested capital of about $400,000.

The shore industries which are directly fishing industries, as the curing and packing of fish, handling of fresh fish, manufacture of cod oil, and other fish products, employ about seven hundred men and have an invested capital of about $1,500,000.

The fishing year begins with the fitting away of the George's-men in January, when a hundred sail of stout and able craft are thoroughly equipped for a stormy season on those dangerous banks. In March the southern mackerel fleet as also the Western Bank cod fleet start on their voyages and are soon followed by the Grand Bank cod fleet. The fresh halibut vessels continue their arduous work throughout the year, only a few of them lying by for a brief period in the winter months. The fishing for mackerel in the Gulf of Maine begins in June upon the arrival home of the southern fleet, and is continued without interruption until November, when the winter haddock fishing commences and continues until the following April. In October the Grand and Western Bank cod fleet have all arrived home, and such of the vessels as are unfit for winter work are hauled up into winter quarters. In December a fleet of staunch vessels are equipped for the frozen-herring trade with Eastport and Newfoundland, those visiting the latter place being well prepared for storms on an icy coast. In this month begins also the shore fishery for cod in Ipswich Bay employing the smaller vessels of the fleet. The same vessel is often, in the course of the year, employed in several branches of the fisheries, commencing the season's work by fishing for cod, changing later to the mackerel fishery, and closing with the haddock fishery or the frozen-herring trade.

VESSEL-FITTERS AND FISHERMEN.—Most of the vessels are owned by the fitters, who run fleets of from two to twenty sail. The number of fitting firms is forty-two. These firms are owners or part owners of three hundred and seventeen schooners, which they fit out. The balance of the fleet is owned principally by the masters of the vessels, and have no regular place of fitting. Owners are expected to equip their vessels for fishing and to provision them for a cruise whether it be for a trip of a few days or six months. The common method of sharing the receipts is to subtract from the gross receipts the expense for bait, ice, and some other expenses called stock charges. The amount left is the net receipts, one-half of which belongs to the vessel owners and the other half to the crew. From the crew's half there is deducted some expenses charged to them, as for water and medicine. The balance is then divided among the men, either in equal shares or in proportion to each man's catch of fish. The captain receives an equal share with the crew and an additional percentage or commission from the vessel owners. The cook has a share with the crew and an extra amount paid by the crew, beside some perquisites. George's-men share according to the fish caught, each man cutting out the tongues of the fish as he takes them. The tongues are counted and a record kept by the captain. The best man is "high line," and the poorest or most unlucky fisherman is "low line." In the haddock fishery the fitting out and sharing is on a different basis—what is called "quarters" or "fifths." In this case the owners furnish the vessel with all her sailing

equipments and receive one-fourth or one-fifth of the receipts after the charges for wharfage and tonnage have been deducted; the crew pay for fishing-gear, dories, bait, ice, and provisions, and share equally in the balance. In the Grand Bank cod fishery and the Greenland halibut fishery part of the crew are sometimes hired by the month and have no personal share in the catch. In the frozen-herring trade the men are all hired. This cannot be called a fishery on the part of the Gloucester vessels, since the fish are all purchased.

The old method of settling with the crews in the cod-fishery vessels was to wait perhaps four or five months until the fish were cured and sold. A certain amount was charged for the expense of curing, and each man received a share in the crew's half of the net receipts. This method is still practiced at Cape Cod and at some other places in New England, but at Gloucester the voyage is at once settled, often on the same day the vessel arrives, or as soon as the fish are weighed off. Salt codfish are bought from the vessel at so much a hundredweight, usually about 60 or 75 per cent. of the value of dry cod. Mackerel are bought at so much per 200 pounds in fishermen's order, called selling "out of pickle," or they are packed and inspected and the crew paid their share after deducting from $1.50 to $2 per barrel for the expense of packing, which includes the cost of the barrel, salt, and labor.

The average annual amount realized by each fisherman is not over $300; those who are expert sometimes make double that amount, while many average less than $200 a year.

A large proportion of the Gloucester fishermen are foreigners, including many nationalities, British Provincials largely predominating, though there are many Swedes and Portuguese, and some Danes, Frenchmen, Irishmen, Scotchmen, and Englishmen. As a class they cannot be called economical, though many are prudent and save enough in a few years to buy part or the whole of a vessel. It is very gratifying to note that the number of vessels owned by the fishermen themselves is rapidly increasing, and that the deposits of money by fishermen in the savings bank is far in excess of what it was a few years ago. A good many fishermen, especially masters of vessels, own the houses in which they live. A great deal is said about the disorderly conduct of fishermen while ashore. The city marshal of Gloucester, in a recent report on the public order of the place, says:

"In this regard this city will not suffer by comparison with any other of equal size in the commonwealth. It is certainly a fact of which our citizens may well feel proud, that no city or large town in the State has a better criminal record than the city of Gloucester. In no one of them has there been so few crimes committed, and none where the class of crime has been of a lighter character. When it is considered that during much of the year numbers of our population consist of persons who have no permanent interests here, and come from all quarters of the world, it must be admitted that this is saying much; and no fact could be stated to prove more clearly the general regard of our people for public order, good morals, and law."

The vessels are insured on a mutual plan in an organization styled the Gloucester Mutual Fishing Insurance Company. At the close of each fishing year the shareholders in the company are called together to reorganize and adjust the losses of the year just past. Each vessel owner holds shares enough to cover the value of his vessel or fleet, a regular rate of premium being charged for insurance, depending somewhat on the kind of fishery in which a vessel is engaged and the season of the year. Out of the gross premiums the losses are paid, and if the premiums be not sufficient to pay these losses an assessment is made on each shareholder.

THE TRADE IN FISH.—The fishing business on shore, at Gloucester, is divided into several branches, including the trade in fresh fish, dry and pickled fish, smoked fish, boneless fish, oil and guano, sounds, and fish glue. The fisheries are divided into the shore boat-fishery and various vessel-fisheries for the capture of mackerel, haddock, and fresh halibut, the Grand Bank. Western

Banks, George's, and shore cod fisheries, the Greenland halibut fishery, and the bait-fisheries for herring, squid, and menhaden.

THE TRADE IN FRESH FISH.—Some fish have always been sold in a fresh condition, though it is only about twenty years since any great quantities have been distributed direct from Gloucester. Vessels belonging to this port generally took their catch to Boston, instead of landing it here. About 1860 a few freighters found considerable profit in buying fresh fish from the vessels, as they arrived from the Banks, and taking them to Boston. In this way time was saved to the fishermen and some profit realized by Gloucester dealers. Ice had been in use in the vessels for some fifteen years prior to that date, but very little had been done in packing fish in ice for transportation over the country until the year 1860. At that time Mr. William H Oakes and Mr. Seth Stockbridge, of Gloucester, were induced by some Boston dealers to try the experiment of shipping fresh fish from Gloucester to Boston and New York, packed with ice in old sugar-boxes. The experiment was entirely successful, and a profitable business soon developed, so that a large part of the shore catch of haddock and the catch of halibut by the George's Bank vessels were sent in this way by rail or steamer to Boston and other places.

At the present time almost the entire catch of the fresh halibut fleet, that of the boat-fisheries, and part of the catch of the haddock fleet is distributed direct from Gloucester to all parts of New England, and as far west as Chicago and Omaha. Boston remains the headquarters for the trade in fresh haddock, and most of the Gloucester vessels in that fishery go there for a market.

The fresh-fish business is carried on by several companies, who own wharves and sheds with all the conveniences for quickly packing the fish. Part of the capital of the companies is supplied by Boston and New York dealers.

The total quantity of fresh fish annually landed at this port and sent away in ice is from 13,000,000 to 16,000,000 pounds, the greater part of which is halibut. In 1879 the quantity of fresh halibut landed was 11,336,000 pounds. It was mostly brought here from the deep waters of the offshore banks by the fleet of some fifty vessels employed in that fishery. Part of the receipts of this fish is from the George's cod vessels, which usually take from a few hundred to some 4,000 or 5,000 pounds of halibut, which are iced and brought home with the salt codfish. Codfish taken by the shore boats are shipped fresh whenever the demand will warrant, though much of the catch of these boats is sold to the splitters and dried. About 2,000,000 pounds of fresh cod and haddock are annually sent in ice from Gloucester. Fresh mackerel are sent from here in considerable quantities, though most of the Gloucester vessels in the fresh-mackerel fishery take their catch direct to Boston.

There is considerable competition between the several fresh fish companies, whose agents board the vessels as they enter the harbor and make offers for the trip. A very spirited auction often occurs on the vessel's deck before the anchors are dropped. As soon as possible after a purchase has been effected, the vessel is hauled to the company's wharf and the cargo taken out by the crew, assisted by the company's men. The fish are at once weighed, cleaned, and packed in boxes holding from 300 to 450 pounds of fish, with sufficient crushed ice to insure their preservation. In the case of halibut, the heads are taken off and sold to the oil-makers, while codfish heads are generally carted back into the country to be used for guano. The boxes of fish are carted to the railway station and loaded in special cars chartered by the companies. It is nothing uncommon for a trip of 75,000 pounds of halibut to be taken from a vessel, weighed, packed, and loaded on the cars within a few hours in one forenoon, and by the next morning to be marketed in New York and Philadelphia.

The retail trade in fish is very small, there being only three fish-markets and four or five "fish-

carts" for the sale of fish, lobsters, and clams. The grocery stores keep but a small amount of cured fish on hand. A large amount of fresh and salt fish is consumed without being sold. It is a common practice among the fishermen and men who work at the packing stands to take to their homes a sample of the delicious fish for which they have toiled so faithfully; and these samples amount to a great deal in the aggregate. While on fishing trips, men who have familes to support often cure a lot of fish, which they carry to their homes on their arrival, to be used by the family during the winter. The men cure and use in this way as much as three or four hundred weight each during a year.

THE TRADE IN DRY AND PICKLED FISH.—This industry is carried on principally by the firms that own the vessels, though there are several "outside" establishments which have a large trade. At the wharves where the fish are landed are flake yards and sheds for curing and packing. Pickled fish, before they are sold outside the State, must be inspected and branded according to law. One of the firm dealing in this article is usually a deputy inspector, who is thus able to inspect and brand his own fish.

"Boneless fish" is the trade name for cured cod or other fish divested of skin and bones and cut in pieces from 3 to 8 inches in length for convenience in packing. This business was begun in Gloucester in 1869, when a limited quantity of the lower grades of cod and hake were packed in soap-boxes and peddled in Boston. The article soon met with a ready sale, and in a few years the packing of fish in this manner began rapidly to increase, so that in 1875 upwards of half a million pounds of boneless fish were prepared in Gloucester alone. From 1875 to 1879 the business made very rapid strides, nearly doubling itself in two years, so that in 1879 about 14,000,000 pounds were shipped from Gloucester to all parts of the United States. A shipment of boneless fish was made to Alaska in 1879, and this industry has since been started in that territory. There are twenty establishments in Gloucester in this business, employing 224 men and 16 women. When this method of packing fish began, men were paid $1 per hundredweight for its preparation, but competition has since reduced wages to 25 and 40 cents per hundredweight, according to quality, so that the average wages of the "skinner" is now about $1.75 per day, though expert workmen sometimes make $4.50 to $5 per day. One quintal of dried fish will make 89 pounds of boneless, thus leaving 21.9 per cent. waste in skin and bone. The method employed in the preparation of this product is described elsewhere. The fish are packed in boxes containing from 5 to 70 or 100 pounds each, and large quantities are put up in 200 or 400 pound boxes, to be repacked in smaller packages in other cities.

The manufacture of boxes for boneless fish has grown into an important industry employing a large number of persons in various parts of New England. In Gloucester there are two factories, with $10,000 capital, engaged in the business of nailing box-shooks together and in printing the ends with various brands. The average-sized box used in Gloucester for boneless fish contains 35 pounds, and upwards of 300,000 such boxes were used here in 1879.

The preparation of "desiccated fish," so called, was carried on at Gloucester for about two years prior to 1870, during which time about 500,000 pounds of salt codfish were distributed over the country under this trade name. The article was prepared by stripping the skin and bones from salt cod and then grinding the solid substance into a fibrous mass. As the product absorbed moisture it soon spoiled and proved a failure.

During the year 1880, a factory was established at Gloucester by New York parties for the manufacture of "evaporated fresh codfish." Little was done beyond experimenting as to the best methods of production. The process is a simple one and bids fair to prove a success. Fresh codfish are cleared of skin, bones, and all refuse substances and the solid flesh is subjected to heat

in large tin pans, when the substance separates into a fine fibrous mass and at the same time gives up all its moisture, so that the dry fish in a flaky state may be packed in paper boxes and shipped to all parts of the world, it being claimed by the inventor that it will keep for any length of time in any climate. Use is made of the refuse skin and bones in the manufacture of fish-glue and guano.

Mackerel are packed in barrels, half-barrels, and smaller wooden packages, also in 3 and 5-pound tin cans. As received from the vessel, the fish are not sufficiently salted, neither are they packed carefully enough to insure their preservation. They are therefore emptied from the barrels as they come from the vessel, and after being weighed, are culled into various legal grades and packed in barrels, with new salt, and the barrel filled with pickle. After being properly branded, they are ready for sale. The principal market for these fish is in the West, though large quantities are sold throughout New England.

THE TRADE IN SMOKED HALIBUT.—Gloucester is the headquarters for the manufacture and trade in smoked halibut. The usual annual production of the smoke-houses is about 2,000,000 pounds, but in 1879 only 1,250,000 pounds, valued at $100,000, were made. In 1880, the amount was still less, because of the comparatively small catch of the halibut vessels. There are two firms that own large smoke-houses and do the greater part of the business, while three other firms, with small establishments, have a limited trade. The halibut to be smoked are either received in salt flitches from the bankers and Greenland vessels, or they are bought from the fresh fish companies as landed from the fresh halibut vessels. Such fish as are not of suitable quality or freshness to send to market, are sold to the smokers and make about as good smoked fish as the best halibut. At some seasons of the year, when the demand for fresh fish is greatest, very few fresh halibut go to the smokers. Most of the smoking is done in the fall and winter.

The history of this business dates back to about 1840, when a small quantity of halibut was smoked in a house on the outskirts of Gloucester. In 1855, the quantity smoked was only 400,000 pounds, and it was not until about 1860 to 1865 that the business assumed any great proportions. At that time, some 3,000,000 pounds was the annual product. In 1876, the quantity made was 2,750,000 pounds.

There are several grades of smoked halibut, the principal kinds being known as George's, Shore, and Greenland. The last named is generally considered the best quality, and could be sold in great quantities if the fishery were more extensive. Some Gloucester smoked halibut were sent to Europe a few years ago, but no trade developed there. A small lot was exhibited at Berlin in 1880, for which the makers were awarded a medal.

THE UTILIZATION OF FISH SKINS.—Within a few years, there has been produced and invented by Gloucester parties, an article of fish-glue that bids fair to have a very extensive sale. It is made from the skins of dried cusk and codfish, the refuse of the boneless fish factories. Prior to 1876, this refuse, consisting of skins and bones, was considered worthless and was thrown away outside the harbor. The fertilizing properties found in it, and its value for making glue, has created such a demand that instead of throwing it away it was worth about $6 per ton in 1879, and is constantly advancing. Fish-glue is made from the salt skins by desalting and cooking them, when the crude glue is obtained, which is chemically treated and prepared in several qualities.

The general process for making this fish-glue is to desalt the skins by soaking in large vats of spring water. They are then steamed or cooked in tanks, when the crude glue is drained off and subjected to a patent process for evaporating the moisture. The thickened glue is then chemically treated, to prevent decomposition and to adapt it to various uses. It has found a ready sale and

is used as mucilage, as cement for broken crockery or wood work, in the manufacture of furniture, carriages, straw goods, floor oil cloths, and in many other ways.

Fish skins have been put to some other uses than the manufacture of glue or guano. The skins of cusk have been made into boots at Gloucester and the article patented, but it is doubtful whether the business will ever become profitable. Dogfish skins being rough like sand-paper or emery paper have been used by the fishermen to shine their mackerel jigs. In all parts of the world, experiments have been made with skins of different kinds of fish and they have been put to a variety of uses. Some very good looking gloves were made at Berlin in 1880, from the skins of cusk and codfish sent from Gloucester.

THE FISH-OIL INDUSTRY.—Fish oils are prepared at Gloucester from the livers of cod, hake, haddock, pollock, and dogfish, and from the heads of halibut. There are five fish-oil makers here with a capital of $105,300 and employing 50 men. The value of the product of these factories, in the census year, was $129,100.

On the cod-vessels fishing on the Grand and Western Banks, it is the common custom to have some large casks called "blubber butts" lashed upon deck just forward of the cabin. In the bilge of each cask is cut a square hole through which the livers are dropped into the cask and allowed to remain, until by the heat of the sun they are putrefied. The oil that exudes and floats upon the surface is skimmed off and stowed in barrels while the mass of refuse blubber is allowed to remain until the vessel arrives home, when it is boiled to extract the oil that may remain. George's-men and shore cod fishermen save the livers in a fresh condition and sell them direct to the oil merchants at so much a bucket or gallon. An average quantity of livers for 100,000 pounds of split fish is 450 gallons, valued at from 10 to 15 cents per gallon, according to their freshness.

A bucket of cod livers, holding about 2½ gallons, yields 1 gallon of medicinal oil, valued, when refined, at about 70 cents a gallon. In manufacturing medicinal oil, the livers are chopped up in small pieces, and then cooked by steam in tanks. The oil thus cooked out is put in 5-gallon cans and, packed in a large trough with ice and salt, is allowed to remain for about twelve hours to chill and granulate. The granulated oil is then quite thick, and is put in bags and submitted to a heavy pressure. Oil produced by this pressing is "bright," and will not congeal at 30° temperature. What is left in the bags is a sort of tallow, and is used by tanners, being sold at about 6 cents a pound. The oil weighs about 7½ pounds to a gallon, and varies in value according to the demand, ranging from 50 to 75 cents per gallon. After the oil is taken from the cooking tanks, a brownish substance remains, that is used in the manufacture of fertilizers.

The principal oil manufacturer in Gloucester annually makes from 1,000 to 1,500 barrels of medicinal or cod-liver oil, which is sent to all parts of the United States. The practice of chopping the livers has been in use but a few years, and it is claimed that more oil can thus be obtained from a quantity of livers than was formerly obtained by cooking them whole.

Tanner's oil is made from the crude oil and blubber brought home by the Grand and Western bankers, and from livers that are not fresh enough for making medicinal oil. It is worth from 40 to 50 cents per gallon.

The livers of dogfish and sharks are specially rich in quantity of oil, and these fish are sometimes taken for the sake of their livers, the bodies being cast aside as of no value. Dogfish are oftentimes very abundant in the spring of the year, when considerable quantities are taken by the shore fishermen, as well as by vessels on George's Banks, though by the fishermen who are in search of cod the dogfish are counted as annoying as thieves, stealing not only bait from their hooks, but the fish as well. George's-men are therefore not at all anxious to meet schools of dogfish, and frequently change their fishing ground at the approach of these scavengers.

Gloucester fishermen have never made a business of capturing sharks, though when large ones are accidentally taken on the lines the liver is generally saved for the oil, a large specimen of the ground or sleeper shark (*Somniosus microcephalus*) yielding many gallons of oil.

Besides cod, hake, and dogfish oil, a large amount is annually made from the heads of halibut. This business began in Gloucester about 1870, and is principally in the hands of two concerns, which consume annually about 1,000,000 pounds of halibut heads. A limited number of these heads were formerly salted for food, but the use of them for that purpose is now abandoned. Not only the heads cut from the fresh fish, but also the backbones and other refuse of halibut obtained from the smoking establishments are utilized for the production of oil. The process of manufacture is simple. The entire lot of refuse heads and bones are thrown together in a large tank and there treated with steam until thoroughly boiled. They are next placed in an open cylinder, and by means of an hydraulic press the oil is crushed out and refined for curriers' use or mixed with whale oil for various uses. The quantity of oil obtained from a ton of halibut heads is about forty gallons. From the scrap left after the oil is pressed out, a valuable use is made by manufacturers of fertilizers.

Herring, and also the heads and bones of fresh codfish, are used to a limited extent by the oil-makers. Occasional schools of black-fish are driven ashore on the north side of the cape and their heads and blubber sold to the oil factories. In 1879 about one hundred of these fish were captured at 'Squam and Coffin's beach. In the spring of 1880 several drift whales were towed into Gloucester Harbor and two of them were stripped of their blubber, which was "tried out" for the oil.

Very little menhaden oil has been made in Gloucester since 1878. Previous to that date menhaden were abundant north of Cape Cod, and a considerable quantity was brought to Gloucester to be ground up for oil and guano. The principal use made of menhaden by Gloucester fishermen has been for bait, and great quantities were once annually consumed by the mackerel and George's fleets.

When mackerel are very plenty inshore, as in the spring of 1880, there is sometimes an over-abundance of small fish, which are of no use except to be ground up for guano and oil. A factory has been built in Gloucester for canning fresh mackerel and herring, and many fish that were once thrown away or used only for guano now find a ready sale at this cannery.

FISH SOUNDS AND SPAWN.—Cod and hake sounds are used in the manufacture of ribbon-isinglass. Several firms buy these sounds of the fishermen, paying so much a pound for them pickled in barrels. The sounds are washed, cleaned, dried, and sold to the isinglass-makers. In 1879 the Gloucester fishermen saved enough of these sounds to weigh 116,500 pounds in the dry condition, and valued at $63,600. Hake sounds are worth more than twice or three times as much as the sounds of cod, the latter being mixed with the former in the production of an inferior quality of isinglass. Hake sounds have been saved for the past fifty or sixty years, though in no great quantities except during the past ten years, while cod sounds were not saved at all prior to about 1870.

The practice of saving the spawn of fish as a commercial product, was begun, by the Gloucester fishermen, about the year 1868, and has continued ever since, the demand for the article varying somewhat from year to year. The principal use of the spawn is for sardine bait, for which purpose it is exported to France, where there is an annual consumption of about 50,000 barrels, of which 40,000 barrels are Norwegian cod roe, and 10,000 barrels French and American roe. During the season commencing November, 1879, and ending April, 1880, Gloucester fishing vessels brought

home 3,200 barrels of roe, principally cod and pollock, valued at about $11,000. This was salted in barrels, and shipped to New York for exportation to France.

The quantity of spawn saved by the fishermen is limited only by the demand. Thousands of barrels of cod, haddock, halibut, pollock, and herring spawn might be brought to market if a sufficient price could be received for it. A great part of the spawn is brought to port by the George's-men in the spring of the year. It is salted in barrels on board the vessels, and upon being landed is resalted in butts or hogsheads, then taken out, drained, and packed in ordinary fish barrels. The fishermen received, during 1879, from $1.50 to $2 per barrel for spawn, without the barrel. The dealers sold it to the exporters for $3.75 to $4 per barrel, including the barrel.

THE MACKEREL FISHERY.—The mackerel fishery is perhaps the most important of any single fishery carried on at Gloucester. It employs from eighty to one hundred and fifty sail of vessels, and the annual catch is from 100,000 to 200,000 barrels. In 1879 the fleet numbered eighty-five sail that landed at Gloucester and other ports about 120,000 barrels of mackerel, including some 25,000 barrels of fresh fish sold at New York and Boston. It was formerly a hook-and-line fishery, but now the entire Gloucester fleet is fitted with purse-seines. The fishing grounds are from the capes of Virginia to the Bay of Fundy. A few years ago a large part of the fleet fished in the Bay of Saint Lawrence, but that ground has been abandoned and the fishery carried on only off the American coast. In the months of March and April the Southern fleet leave home, and, fishing off the coasts of New Jersey and Delaware, market their catch fresh in New York. As the fish move northward and eastward the fleet follow them and continue their capture as long as they can be found. In the latter part of June the Southern fleet becomes a Northern fleet, fishing in the Gulf of Maine, and is largely increased in numbers. By the last of July the fish have become much fatter and more valuable than earlier in the season. From this time until the close of the fishery in November the catch is mostly salted in barrels.

The improved methods of capture now in use enable an equal number of men to take many times more mackerel in a given period than were secured under the old methods. A single Gloucester vessel has been known to take over 1,000,000 pounds of fresh mackerel in a season. In 1880 the schooner Edward E. Webster, Capt. Solomon Jacobs, captured and landed 1,300 barrels of fresh mackerel and 2,600 barrels of pickled, which were sold for $19,745. Three or four hundred barrels of these fish are sometimes taken and salted in as many days by a single vessel. So diligently do the crews labor that when a big catch has been made they will often keep at work for forty consecutive hours without sleep.

Mackerel as they are landed in barrels from the vessels are called sea packed, and before they can be sent out of the State must be culled into grades, and inspected and branded under the laws of the State. In Gloucester a portion of the catch is sold out of pickle, or by the 200 pounds in fishermen's order. When thus sold the trip can be settled at once and the crew receive their share of the stock. The more general method of settling with the men has been to have the fish packed and inspected and charge each man a certain amount, from $1.50 to $2 per barrel, for the expense of packing, including cost of barrels, salt, and labor. Owners of vessels supply provisions, salt, gear, and barrels for the trip, but the crew are finally obliged to bear half the cost of the barrels and the salt for packing.

Mackerel have always been more or less abundant in Massachusetts Bay. Governor Winthrop saw quantities of them off Cape Ann in 1630. The colonies made regulations concerning the capture of these fish, but the industry was confined principally to towns on the south side of the bay, and little was done at Gloucester in this fishery until after this year 1800. Small fishing boats occasionally took a few fresh mackerel to Boston for a market, and some were salted, though the

entire quantity inspected in Gloucester prior to 1812 was only 1,171 barrels. An inspector was appointed for this place in 1808, but he had little to do until about 1820, when the great abundance of mackerel then in Boston Bay induced the fishermen to actively engage in their capture. Most of the vessels packed out their catch in Boston, and Gloucester had but a small share in the inspection until 1828, when 34,203 barrels were inspected here.

In 1830 this port had a tonnage of 9,643 tons employed in the fishery, and caught 51,613 barrels of mackerel entirely off the American shore.

In 1831 mackerel were so plenty off Cape Ann that the fishermen, for several days together, are said to have been employed all day in catching them and all night in splitting and salting. This was one of the most prosperous years in the history of the fishery, and the catch of the Massachusetts fleet was about 383,000 barrels. Gloucester's share of this catch, with a fleet of vessels measuring about 10,000 tons, was 69,759 barrels, all caught off the American shore. From 1831 to 1839 the mackerel business of Gloucester amounted to about 40,000 barrels annually. In 1840 the catch was only 10,241 barrels, and in each of the two following years it was less than 9,000 barrels. From 1842 to 1854 the average tonnage employed by Gloucester in this fishery was 20,000 tons, and the annual catch increased to an average of 40,000 barrels. In 1851 there were 241 vessels, measuring 13,639 tons, and manned by 2,326 men and boys.

In 1830 Gloucester mackerel vessels first began to visit the Bay of Saint Lawrence, and during the years 1854 to 1866, the period of reciprocity, a very prosperous fishery was developed in those waters. Several hundred vessels annually fitted out at Gloucester and caught large quantities of mackerel, many thousand barrels of which were shipped home in Provincial vessels, thus enabling the vessels to take two or more fares. The method of fishing was by hook and line, and enormous quantities of bait was thrown overboard to attract the fish alongside the vessel. Each vessel carried as many as 75 barrels of menhaden slivers that were chopped up for bait.

From 1854 to 1859, the first five years of reciprocity, the catch in the Bay of Saint Lawrence was not up to the average of some previous years, but the continual application of American enterprise and the use of large quantities of bait rendered the fishery more productive than it had ever been before.

The reciprocity treaty closed in 1866, and American vessels were forbidden the privilege previously granted of fishing inshore, unless they were provided with a license for which 50 cents per ton was charged. This tax was gradually increased to $2 per ton, and the consequence was that American vessels began to abandon the bay and fished in greater numbers off the coast of the United States. By the same methods used to develop the mackerel fisheries in British waters, Americans now increased the value of the fishery on our own shore, so that in 1870 the catch of the Massachusetts fleet on our coast was about 300,000 barrels, the largest since the year 1831. The share of the Gloucester fleet in this catch was 110,000 barrels. For a few years after the abolishment of the license system in the Bay of Saint Lawrence, American vessels were much annoyed in those waters, and several were seized and condemned by the British for alleged illegal fishing.

The treaty of Washington, made in 1873, gave to Americans the privilege of again engaging in the Bay of Saint Lawrence fishery without fear of cruising too near the shore. The general adoption of the purse-seine by the American fleet kept more vessels on our own shore, since the seine could not be used to good advantage in the Bay. The number of vessels visiting the bay consequently decreased until in 1879 the Gloucester fleet numbered only about twenty-five sail, and in 1881 only one or two vessels went there, and their voyages were very unprofitable.

The number of arrivals of mackerel vessels at Gloucester in 1877 was 86 from the Bay of Saint

Lawrence and 692 from the American shore; in 1878, 113 from the bay and 280 from the shore; in 1879, about 30 from the bay and 250 from the shore. In 1880 the mackerel industry of Gloucester employed 175 vessels and about 2,500 men; the number of fares landed was 724, and the catch was 135,794 barrels.

The largest quantity of mackerel inspected in this port in any one year was 164,938 barrels in 1864. In each of the years from 1862 to 1867, in 1870 and 1871, and in 1880, the amount inspected here was over 100,000 barrels. The year 1879 was a very poor one, the inspection returns crediting Gloucester with only 48,643 barrels. The total quantity of mackerel taken by Gloucester fishermen in that year was about 25,000 of fresh and 95,000 barrels pickled. The fresh and a large part of the pickled fish were sold in New York, Boston, Portland, and other places most convenient to the fishing grounds.

The total quantity of mackerel inspected in Gloucester from 1808 to 1880 was about 3,500,000 barrels, or more than one-fourth of the entire number of barrels—about 12,120,000—inspected in the whole State of Massachusetts in the same period.

THE GEORGE'S COD FISHERY.—The fishery for cod on George's Bank is one of the most important as well as most dangerous of all the fisheries carried on at Gloucester. The best season for its prosecution is in the spring, when immense schools of very large and fine fish visit this bank. The George's fleet numbers about one hundred sail of staunch schooners rigged specially for this fishery. Each vessel carries a crew numbering usually ten or eleven men. They fish entirely with hand-lines from the vessel's deck, the rail being marked off in spaces, and each man is assigned a space separated from his neighbor by wooden pegs some six or eight inches high, called "soldiers," which serve as guides in hauling in the lines that are drawn out away from the vessel's side by the current, which is at times very strong. The bait used is frozen herring, as long as they can be bought; then, as the season advances, alewives, herring, menhaden, or mackerel are taken, being purchased of trap or net fishermen along the coast. Much time is lost to the fleet in searching for bait.

The vessels start out from Gloucester early in February, and make their trips of from two to three weeks' duration. They keep at this work throughout the spring and summer, meeting with less success during the warm months, and late in the fall they usually haul up for two or three months before beginning another season. Some of the fleet make as many as thirteen or fourteen trips during the year, while others follow this fishery but a short time and then join the mackerel fleet. During the summer the George's-men find better fishing in the South Channel, on Brown's Bank, off Cape Negro, or in the Bay of Fundy, than on George's.

The catch of this fleet is principally cod of superior quality that have a national reputation, and bring the highest price of any cod in the market. They are usually split and salted on the vessel, though occasional cargoes are brought home round, to be split on shore. In earlier years more fish were brought home round than at present, and it is claimed by the fishermen that the present method of splitting nearly all the catch on the fishing grounds and throwing the gurry overboard has a tendency to drive the fish away. Each man receives a share in the profits of a trip according to the number of fish he catches, the tongues being cut out of the fish as they are caught, and saved to be counted each night by the captain, who keeps the record of each man's catch. Any halibut that may be taken are marked by the fortunate catcher. A greater or less quantity of halibut is taken on each trip, ranging from a few hundred weight to four or five thousand pounds. Besides cod and halibut, which comprise most of the catch on George's, a quantity of pollock, haddock, and cusk are taken, which, when weighed off, are counted as scale-fish, and bring only about half as much as the large cod. A distinction is made between large and small

cod, those measuring not less than 27 inches from tip of nose to fork of tail being called large and others small.

Nearly all the George's cod are pickle-cured, being resalted in butts as soon as landed. After remaining in pickle until needed for sale, they are slightly dried, and are then ready to be cut up into boneless or for shipment whole.

As recorded by the Cape Ann Advertiser, the catch of George's cod by Gloucester vessels was 186,758 quintals in 1875, 26,975,000 pounds in 1876, 23,755,000 pounds in 1877, 24,158,000 pounds in 1878, and 23,144,000 pounds in 1879. The records of the United States Fish Commission give the receipts as 30,249,580 pounds in 1880. The number of arrivals in 1880 was 1,393. In the first five of the above years the catch of George's cod was more than one-half of the entire catch of cod by Gloucester vessels on all the fishing banks, but in 1880 the catch of the Western and Grand Banks fleet reached larger proportions than in previous years, and thus reduced the relative importance of the George's fishery.

The largest recorded codfish fare ever received from George's was 123,115 pounds round, with 862 pounds of halibut, by schooner S. R. Lane, Capt. Solomon Jacobs, in 1875. The vessel stocked on this trip $2,554, and the crew shared $90.81. The schooner Triton on one trip took 54,000 pounds of split and 30,000 pounds of round codfish, equal to about 111,000 pounds round, and 3,000 pounds of halibut. Several other vessels have brought home fares of over a hundred thousand pounds round. On five George's trips in a recent year the schooner Proctor Brothers took 21,544 codfish in number, weighing 171,000 pounds. Of her crew of eleven men, Mr. George Williamson was high line, taking 2,417 fish, while the low line caught 1,431.

As early as the middle of the last century Marblehead fishing vessels were accustomed to visit George's Bank for cod, making one or two trips there in the summer or early fall. They did not anchor on the fishing grounds at that date, but drifted about. It does not appear that Gloucester vessels visited that bank until 1821, when the schooners Three Sisters, Eight Brothers, and Two Friends went there, but staid on the bank only one or two days, being afraid to anchor on account of the strong current. In 1830 the schooner Nautilus anchored on the bank and secured some halibut, and may be said to have inaugurated Gloucester's share in the George's fishery.

The fishing for cod on this bank was of little importance until after the introduction of frozen herring from Newfoundland in 1856. These frozen herring arrived early in the winter and were found to be an excellent bait for the great schools of cod that visit George's at this season of the year. A very successful season was made on George's by Capt. Peter Sinclair in the winter and spring of 1859, and it was not long before large fleets of Gloucester vessels were engaged in this fishery.

The George's fishing vessels were generally from 80 to 90 tons burden, and were manned by the bravest of the Cape Ann fishermen. The fleet fitted out immediately after the arrival of frozen herring from Newfoundland, early in January, and continued throughout the spring, as long as fish could be found. About 1867 the George's fleet became still larger because of the greater abundance of frozen herring at this time brought from New Brunswick as well as from Newfoundland. Among the most successful trips at this period was that of the schooner Montana which took 100,162 pounds on a fourteen days' voyage, and in two trips the same year landed 183,362 pounds, making a gross stock of $3,417.32. Other large fares were those of 99,338 pounds, by schooner Madame Roland, in 1866; 100,575 pounds, by schooner William J. Dale, in 1868; and 102,075 pounds, by schooner Everett Steele, in 1869. One of the most valuable George's codfish trips ever made was that of schooner Madame Roland in 1865, when $2,833.29 was stocked.

THE COD FISHERY ON GRAND AND WESTERN BANKS.—The Grand and Western Banks fishery

was for many years almost abandoned by Gloucester fishermen, but about 1860 it was begun anew, and now a fleet of from fifty to seventy or eighty sail of vessels visit those banks for the capture of cod, bringing home from 12,000,000 to 20,000,000 pounds annually. The vessels that fish mostly on the Western Bank start out the earliest in the year, some of them in the month of March, and fish until about October, fishing part of the time on Banquereau and bringing home several fares. Those of the fleet that go to the Grand Bank usually make one or two Western Bank trips first and then start on a long trip to the Grand Bank. These vessels all fish with trawls and carry crews of fourteen men. The bait used is mostly fresh herring or alewives, though in the case of the Grand Bankers some squid are used. While on the Banks sea-gulls are sometimes used for bait, being called "shack bait". The men on these vessels share alike according to the catch of each dory. Two men mate in each dory and count the fish as they are thrown aboard the vessel. The fish are sold at so much a hundred-weight as they come from the vessel, and after being landed are usually washed and then either pickle-cured or kench-cured, most of them being prepared in the former way.

A few vessels are accustomed to fish on Banquereau with hand lines from dories, using salt clams for bait. The number of Gloucester vessels that fished in this way was formerly quite large; this method was abandoned a number of years ago, but in 1880 it was begun anew. Many vessels belonging to other ports catch very fair trips with salt clams, but Gloucester fishermen much prefer fresh bait.

The fishery for cod on the Grand Bank was one of the most important in the early history of New England. For many years it was not extensively carried on from Gloucester, but was engaged in principally from Marblehead and other fishing ports. Just after the Revolutionary war about sixty Gloucester vessels made Grand Bank trips, but the number of these fishing vessels at this port rapidly declined, until in 1804 there were only about ten over 30 tons burden, most of the fleet having found more profitable employment in the foreign trade. In 1819 a company with $50,000 capital was organized for the purpose of reviving this fishery, and seven schooners were fitted out, but after operating for three years the enterprise proved unsuccessful and was abandoned.

The act of Congress passed in 1819, granting bounty to vessels engaged in the cod fisheries, gave a stimulus to the fisheries, so that by 1828 the fishing fleet of Gloucester numbered 154 schooners and 68 boats.

A notable fare in the Bank fishery was that of the British schooner Keelso which arrived from the Grand Bank in October, 1880, with about 320,000 pounds codfish and 1,000 pounds of flitched halibut. In one season, from March 8 to October 15, the Gloucester schooner Josie M. Calderwood made five trips to the Western and Grand Banks, and landed 400,000 pounds of codfish and 55,000 pounds of halibut, making a stock of $10,475. In a single week in September, 1880, fifteen fares, aggregating 2,057,000 pounds of Bank codfish, were landed at Gloucester. From a fourteen weeks' trip in 1872 the schooner Ben Perley Poore landed 180,695 pounds cod and 10,597 pounds of halibut.

The quantities of codfish taken by this fleet in several years past has been as follows: in 1876, 18,627,000 pounds; in 1877, 16,865,000 pounds; in 1878, 12,202,500 pounds; in 1879, 13,247,000 pounds; in 1880, 262 fares, 16,796,000 pounds. The receipts from this fishery in 1880, including the catch of Provincial vessels landed at Gloucester, were 18,922,000 pounds.

THE FRESH HALIBUT FISHERY.—The fresh halibut fishery is almost entirely confined to Gloucester, and has been found very profitable, some vessels catching over $20,000 worth in a single year. In 1879 some sixty sail of vessels were at some time of the year engaged in this fishery, and about forty vessels pursued the business all the year; but in 1880 the number was

much smaller. The principal fishing grounds are on the edges of the offshore banks, in water from 100 to 400 fathoms deep. Occasional trips are made to the southward of the Newfoundland coast, in the vicinity of Ramea Islands, and one or two vessels have taken fares in the neighborhood of Anticosti Island, in the Gulf of Saint Lawrence, but most of the fresh halibut brought to Gloucester in recent years has come from Grand, Saint Peter's, and Quereau Banks. The vessels all market their catch in Gloucester, two or three companies making a specialty of buying these fish and shipping them, boxed in ice, to New York, Chicago, and other points.

In former years, halibut were very plenty on all the inshore and offshore banks, but were considered of little value until about 1845, when ice began to be used on the vessels. George's Banks were formerly visited by a large fleet of vessels that made a specialty of this fishery. The halibut vessels all use trawls, and for bait for the first set of the trawls they purchase herring or alewives of the net fishermen along the coast of Maine or at the Provinces. After the first set, sufficient waste fish are caught for bait. This fishery, especially in winter, is extremely dangerous, and many lives and vessels are annually lost.

The largest fare of fresh halibut ever landed by a Gloucester vessel was 140,000 pounds, by the schooner G. P. Whitman, Capt. Jerome McDonald, in 1877. Several fares of over 100,000 pounds have been landed by other vessels, among them one in 1875, of 126,566 pounds, by the schooner Chester R. Lawrence, Capt. Thomas Hodgdon. The greatest amount of money realized from a single trip was $5,361, by the schooner N. H. Phillips, Capt. William McDonald, in 1871. The quantity of fish taken was 47,650 pounds of halibut and 9,390 pounds of codfish, on a trip lasting five weeks. The usual length of a trip is from three to six weeks, though some have been made to the banks in about fourteen days.

The first trip of a Gloucester halibut vessel to George's Bank was in the year 1830, by the schooner Nautilus, Capt. J. F. Wonson. This vessel sailed from Gloucester on March 5, and returned soon after with about 20 halibut. One of the next vessels to visit the bank was the Romeo, Capt. Henry Pew, which brought home some 3,000 pounds of halibut, and sold at 3 cents a pound. In a few years the fleet was considerably increased in numbers, and George's halibut-fishing became a regular branch of industry that has been pursued with greater or less success ever since. In 1847 this fishery was of such importance that more than 3,000,000 pounds of halibut, worth over $70,000, were taken. This was about two years after they began to use ice on the vessels to preserve the fish. Some of the fleet had been fitted with wells, in which the halibut were brought home alive and peddled out one at a time.

Prior to 1848 nearly all the fresh halibut had been marketed in Boston, but in that year a company was organized in Gloucester for the purpose of diverting the trade here. The opening of railroad communication with Gloucester in 1846, afforded facilities for sending the fish to the New England markets, and it was hoped that Gloucester rather than Boston could control the trade. The enterprise proved unsuccessful, for the catch was far in excess of the demand. A stipulated price had been agreed upon between the company and the fishermen, which proved more than could be realized in the market, and after paying out some $45,000 the company was dissolved.

The George's fishery for halibut continued to be successful as a separate fishery until these fish were found more abundant on other banks. Since 1876 halibut have been brought from George's in no great amount except by the vessels fitted for cod fishing, but the aggregate amount yearly landed by these vessels has been considerable, ranging from 1,000,000 to 3,000,000 pounds per year, against 7,000,000 to 14,000,000 pounds from the other banks.

In the spring of 1876 the fleet began fishing in the deep water on the edge of George's Bank, and from that time the greater part of the catch has been from the deep water on the edge of

that and other banks. The relative quantities of fresh halibut taken by Gloucester vessels on George's in distinction from that caught on the Grand, Western, and other fishing banks, since 1875, is recorded as follows by the Cape Ann Advertiser:

Year.	George's Bank.	Other banks.	Total.
	Pounds.	*Pounds.*	*Pounds.*
1875	2,462,364	7,248,413	9,710,777
1876	3,005,100	11,453,000	14,458,100
1877	1,814,000	14,319,000	16,133,000
1878	524,100	10,914,500	11,438,600
1879	995,500	11,717,400	12,712,900
1880	1,125,450	7,940,000	9,065,450

In addition to the above quantities landed fresh, a large amount of salt or flitched halibut has been brought home and sold to the smoking establishments.

THE GREENLAND HALIBUT FISHERY.—Since about 1870 a few Gloucester vessels have been accustomed to visit the west coast of Greenland in pursuit of halibut which are brought home salted in flitches to be smoked. This fleet has never numbered over six or eight sail, and in 1879 there were only three vessels—the schooners Bunker Hill, Herman Babson, and Mary E. The last-named vessel fished for a few weeks on the Flemish Cap, whence she sailed for Greenland. The fishing grounds have been off the village of Holsteinberg. In 1870 the schooner Caleb Eaton, Capt. John S. McQuinn, landed 177,300 pounds of flitches taken at Greenland, and stocked $20,000.

THE WINTER HADDOCK FISHERY.—Gloucester is largely interested in the winter haddock fishery, supplying the Boston market annually with nearly 12,000,000 pounds of haddock that are sold fresh throughout New England and New York. This enormous catch of fish, which is about seven-eighths of the total quantity of haddock brought to Boston, is taken between November and April by a fleet of some fifty sail of first-class craft, averaging 60 tons burden, manned by nearly 600 men.

During a recent season the fleet was unusually successful, for although numbering only thirty-eight sail, the average stock of the vessels was $6,000, and the total catch was 14,000,000 pounds of fish. The high line of the fleet landed nearly 600,000 pounds of fish, valued at $11,232, and captured 90,000 pounds in thirteen hours' fishing, on a single trip.

Haddock vessels are of the best class, such as are employed in the mackerel and bank fisheries the balance of the year. They are equipped with dories and trawls, and provisioned for trips of from two or three days to a fortnight's duration. The catch is iced in the hold, and marketed as soon as a fair amount is secured. The fishing grounds are principally offshore, from 75 to 200 or 300 miles from port, on Cashe's, La Have, and George's Banks. Fifteen years ago, haddock were abundant inshore, so that smaller vessels could engage in the business, but now the fishery has become essentially an offshore one, requiring large and able craft to carry it on.

Fishermen share differently in this fishery from any other, going on what is called "fourths" or "fifths." The vessel, with anchors and sails, is furnished by the owners who receive one-fourth or one-fifth of the net stock after the stock charges for wharfage and towage are deducted. The remaining three-fourths of the net stock is shared equally by the crew, who provide dories, fishing-gear, bait, ice, and provisions. The captain receives a commission or percentage from the owners in addition to an equal share with the crew.

Prior to 1864 this fishery was confined chiefly to boats from the shore or to the smaller vessels. In that year, a schooner of 66 tons was fitted out for haddocking under Capt. Daniel Douglass,

which created quite a talk, and people laughed at the idea of sending so large a vessel after haddock. Notwithstanding the derision of his neighbors, Captain Douglass was very successful, securing some excellent fares which he sold at 75 cents per hundred fish. Other vessels from time to time entered this fishery, and as the demand for fresh haddock, and their value as a table fish have been constantly increasing, a greater number of large vessels have engaged in their capture until now the haddock fleet includes many of the best vessels of Gloucester.

THE MENHADEN BAIT-FISHERY.—Gloucester vessels were formerly engaged in the menhaden fishery, and sold most of their catch to cod and mackerel vessels, to be used for bait. In 1873 some forty vessels owned here procured 60,000 barrels of menhaden, that made 20,000 barrels of slivers, worth $80,000. In 1879 one vessel followed the fishery with no success, and in 1880 none attempted it. The failure of the menhaden to make their appearance on the coast of Maine and Massachusetts since 1878 has proved a serious loss to the large oil factories on the coast of Maine, as well as to the fleet of fishing vessels that formerly obtained an ample supply of bait near home, but that are now compelled to spend several days and sometimes a week or more in search of bait along the coast. During the year 1879 it is estimated that each vessel engaged in the George's cod fishery lost two months' time in searching for bait. They sometimes cruised as far south as Greenport, Long Island, and as far east as Cape Sable, before bait could be procured. The menhaden vessels were known in Gloucester as the "seining" or "baiting" fleet. They sometimes anchored in the rivers and bought the menhaden whole of the net or weir fishermen, and slivered them on the vessel, salting the slivers in barrels. The method of slivering was very simple. With the head of the fish in his left hand and a knife in his right hand, the workman cut a slice from each side of the body, leaving the head, backbone, and tail to be thrown away. When not obtained by purchase, the menhaden were taken with purse-seines, in about the same manner as mackerel.

THE SQUID BAIT-FISHERY.—The common squid (*Loligo Pealii* Les.), found along the south side of Cape Cod and in Vineyard Sound, has been used to some extent as bait by the Gloucester fishermen. In 1877 Gloucester vessels began visiting these localities, and after procuring cargoes of squid took them to Saint Pierre, Newfoundland, where they were sold for bait to the French fishermen. The first vessel to engage in this business was the schooner Pescadore, Capt. Charles Dagle, in the spring of 1877. About 120 barrels of squid were obtained from the traps along the coast, and after being salted were taken to Saint Pierre. The venture proved a profitable one, and in 1878 the same vessel made another voyage, securing about 150 barrels. In 1879 a fleet of eight Gloucester vessels embarked in this new enterprise. The season proved an unprofitable one, squid being so scarce that the entire fleet procured only about 300 barrels. The most fortunate vessels, the schooner Crest of the Wave, Capt. James Melanson, and schooner Joseph Story, Capt. Charles Dagle, obtained each 75 barrels of squid, while the remaining six vessels, schooners Cadet, Capt. James Anderson; Piscataqua, Capt. Benjamin Cook; Lizzie J. Jones, Capt. Peter Thebadau; Massena, Capt. Daniel Norwood; Bay State, Capt. Thomas Goodwin; and Carrie F. Butler, Capt. Theodore Parsons, secured only about 20 barrels apiece, and made losing voyages. Most of this fleet proceeded to Saint Pierre, where they sold their small cargoes and obtained small fares of squid by purchase at ports in Newfoundland. Several of the vessels were fitted for netting the squid in Provincial waters, but were prevented by mobs from using the seines. The schooner Bay State encountered a mob at Saint Ann's and the Cadet at Aspee Bay. Both of these vessels, as also others of the fleet, afterwards purchased squid of the natives and sold them to French fishermen, thus in a measure preventing the total failure of their voyage. In 1880 two vessels, the schooners J. J. Clark and Joseph Story, went to Vineyard Sound, secured 447 barrels of squid, took them to Saint Pierre, and made profitable trips, afterwards buying squid at Cape Breton and selling them to the French. Two or three other

Gloucester vessels proceeded direct to Cape Breton and Newfoundland, where they purchased squid and sold their trips at Saint Pierre. All these vessels were desirous of seining instead of purchasing their squid in the Provinces, but the bitter opposition of the previous year deterred them from this method of getting cargoes.

The season of squidding in Vineyard Sound is during the month of May and early in June, when the squid enter the traps and pounds with other fish, and are thus secured. The vessels purchase them of the trap fishermen and salt them, either in bulk or in barrels, in the vessel's hold. In this condition they will keep good for a number of weeks, and, although not equal to the fresh squid of Newfoundland, they are considered a good bait by the French fishermen. Occasionally Gloucester vessels have taken cargoes of squid from Cape Breton direct to the Banks and peddled them out to the Frenchmen, but the more general custom has been to sell them at Saint Pierre.

Great quantities of fresh squid are purchased at Newfoundland by American Grand Bank cod fishermen, and numerous outrages have been committed by the natives of that island upon our fishermen who have attempted to catch rather than purchase this bait. In the summer of 1880 the schooners Moro Castle and Victor of Gloucester were thus interfered with, and serious trouble avoided by the yielding of the American captains, who feared to stand for their rights in the face of so much opposition. Captain Naus, of the schooner Moro Castle, stated to the agent of the United States Fish Commission at Gloucester that his vessel had been on the Grand Bank cod fishing, and having exhausted the bait went to Newfoundland to procure a supply of squid. He anchored in Conception Bay, in Job or Devil Cove, on the afternoon of Wednesday, August 4, about a mile from the shore. That afternoon Captain Naus purchased of the natives 18,000 squid, at 60 cents per hundred, paying them $108. The next morning Captain Naus left the vessel in a dory to go in search of more bait, having learned that some could be procured at a neighboring cove. While absent he saw the mainsail of the schooner start, and knowing that something must be wrong, hurried back, and found his vessel surrounded by boats, and that some two or three hundred Newfoundlanders had boarded and taken possession of her. He ordered the intruders to leave the vessel, but they took no notice of him, and, being all alone, his crew, mostly Nova Scotians, having been frightened and taken refuge in the cabin and forecastle, he was without means of enforcing his orders. The natives were very threatening, and the captain feared for his life if he attempted unaided to regain control of the schooner. These men had come on board because some of the crew had been seen jigging for squid, although they had taken only ten or a dozen. The squid were plenty, and it would have been easy to have secured a sufficient supply for bait if the crew had been allowed their rights to free fishing without intimidation. The invaders had broken the anchor from bottom and put the schooner under mainsail and jib, and she was fast drifting towards the rocks. Seeing that there was danger of the vessel being wrecked, the invaders became frightened and hurriedly took their departure, and she was rescued from shipwreck with considerable difficulty.

Mr. Augustus Dower, one of the crew of the schooner Victor, reports that his vessel left Portugal Cove, Newfoundland, at seven o'clock on the morning of August 4, in search of bait. Having secured ice in Northern Bay, the vessel got under way and came to anchor at five o'clock in the afternoon about three-quarters of a mile from the shore in Job's Cove, Conception Bay. Squid were schooling around the vessel in large numbers, and the crew commenced fishing, all hands being busily employed in hauling them in as fast as possible. The natives, perceiving the situation, got out their boats and soon surrounded the vessel, ordering them to take in their lines and desist from fishing. Captain Bowie remonstrated, claiming the right to fish without molestation, but it availed nothing, and the rioters threatened to cut the cable and allow the vessel to go

adrift unless their demand was complied with, using the most violent and threatening language. Yielding to the force of superior numbers, fishing was abandoned, after which one of the natives who had seemed reluctant in joining the mob was brutally beaten by his companions. One of the crew of the Victor reminded the mob of the fisheries articles of the Washington treaty, and of the award of $5,500,000, but they replied that they knew nothing about treaty or money. The scene was a very exciting one, most of the hostile Newfoundlanders roaring at the top of their voices and gesticulating wildly. The mob consisted of about two hundred and fifty men in boats roughly made, averaging about 16 feet in length, a few being provided with one mast and sail, though the greater part were propelled by oars. The next morning the crew of the Victor resumed fishing, when they were again attacked, the natives brandishing their oars and striking at the captain and crew. Two of the crew were struck and slightly injured. Afterwards the mob boarded the vessel and ordered the crew to heave up the anchor. The wind being from the northwest, blowing on a lee shore, the anchor was hove up and the Victor went to Northern Bay, a distance of about 6 miles. The schooner Mattie, Captain Foster, of Beverly, was at the same place for bait, but got under way and left before an attack could be made upon her.

Job's Cove, where this assault occurred, is surrounded by high land, shaped like a quadrant, and as the wind was blowing on shore at the time, the cove affording no shelter, the vessels were in imminent danger of being wrecked if the mob carried out their threat of cutting the cables.

Capt. Charles Martin, of schooner Martha C., reports that while fishing for squid at Low Point, Conception Bay, on Monday and Tuesday, August 2 and 3, having caught a considerable quantity with jigs, a party of Newfoundlanders came on board and endeavored to prevent their fishing. Captain Martin claimed the right to fish under the treaty, and the party departed without molesting him, leaving the crew engaged in fishing. On Sunday, August 29, while engaged in catching a few squid with jigs at Ophall Cove, Trinity Bay, at daylight, a party came off in a boat and ordered them to stop, threatening to drive the vessel out of the harbor if the crew persisted in fishing. The captain told them to try it if they dared, and kept on fishing, but was not further molested.

Along the shores of Cape Ann a small quantity of squid are taken in the floating traps, but little use is made of them, the number secured not being sufficient to render them specially valuable for bait. During the spring of 1881 squid were very abundant in Vineyard Sound. The two Gloucester squid vessels that visited the region secured 350,000 that were taken to Saint Pierre, and several George's-men also procured some for bait.

THE TRADE IN FROZEN HERRING.—A large business has been done during the winter season for the past twenty-five years in the Newfoundland and New Brunswick frozen-herring trade. The Newfoundland branch of this business was inaugurated in the winter of 1854–'55 by a Gloucester fishing vessel that purchased at Newfoundland a partial cargo of frozen herring and sold them for bait to George's cod-fishermen. This new kind of bait was found to be just the thing needed by the fishermen, and a large demand was at once created for frozen herring. Its introduction among the George's-men gave new impetus to the winter cod fishery, and from that day to the present time frozen herring has been almost the only bait used at Gloucester in the winter fisheries. In 1865 a similar business was begun on the coast of New Brunswick, in the vicinity of Saint Andrews and Grand Manan. As trading at New Brunswick was attended with much less expense than in making the longer trips to Newfoundland, that region became the principal trading place of the frozen-herring fleet.

The vessels bound for Newfoundland generally leave Gloucester in November, and take out an assorted cargo suited for trade with the native fishermen from whom the herring are purchased.

In some cases the crews have taken seines for the purpose of themselves capturing the herring. Sometimes the natives have been hired to take the fish with the American seines rather than with their own rude gear. About the middle of January these vessels arrive at Gloucester, and sell the herring for bait, or else proceed to New York or Boston, where there is a demand for these fish as food.

The New Brunswick trade now has its headquarters at Eastport, Me., near the herring grounds. Instead of taking out general cargoes for trade, vessels in this business go from Gloucester to Eastport in ballast or empty, and purchase the herring from the catchers either directly or through an agent who is sent out from Gloucester for this purpose. The business can be carried on only during cold weather, and must be abandoned in March or the early part of April. The cargoes are stowed in bulk in the vessel's hold, and sometimes the cabin is also filled full, large vessels bringing home from 300,000 to 500,000 herring at a time. The crews on the vessels are small, numbering from three to seven men, or just enough to navigate the vessel and care for the cargo. All the men are hired by the month, and have no special share in the venture. In the chapter on the fisheries the frozen-herring business is fully discussed in all its phases, and need not be further mentioned here. It was in this trade at Newfoundland that the Fortune Bay outrages occurred a few winters ago. The business gives employment to from thirty to fifty sail of vessels that might otherwise be unemployed during the winter, and has proved very profitable to those engaged in it. As it is a trade rather than a fishery, the statistics of product and capital are not included in the census report.

During the year 1880 there arrived at Gloucester 19,587,000 frozen herring, valued at about $100,000. Nearly all of these came from the vicinity of Grand Manan, New Brunswick, and Eastport, Me. Of this great number of herring, 11,742,000 were sold at Gloucester to the fishing vessels for bait, and the balance, 7,845,000, were sent to New York, Boston, and Philadelphia to be sold for food.

THE SHORE BOAT FISHERIES.—The shore fishery includes the capture of cod, hake, haddock, mackerel, and herring. The boats are all under five tons burden, most of them simply dories, carrying two or three men each. The number of shore boats in 1879 was 256, the number of men 356, and the catch, 5,076,000 pounds of fish. Abou 125 of these men are engaged in this shore fishery the year round, while the remainder fish only during the winter season, when great schools of cod usually visit the shores of Cape Ann.

From November until May the principal catch of the boats is codfish. During May and until July haddock become more abundant, and from July till the middle of September hake are chiefly taken. By the latter part of September all the shore fishermen are active in preparation for the expected school of herring that come in to spawn. For about a week at the beginning of October there is great bustle in the capture of these herring, but after they have left the coast there is little for the small boats to do but to wait for the coming of the winter cod. The larger boats during this interval go offshore a few miles for pollock that are usually abundant in the latter part of October and first of November. Boats that have good gill-nets, especially those on the north side of the cape, find considerable profit during the summer months in taking mackerel in Ipswich Bay. At Lanesville and Folly Cove haking is a favorite pursuit of the fishermen. In favorable seasons they take from 3,000 to 4,000 quintals of these fish, and make, besides a profit from the fish themselves, an equal profit on the sounds and livers. Hake frequently sell for 60 cents per hundred-weight as they come from the water, while the sounds and livers are alone worth that amount, so that fishermen who have the facilities cure their own fish and make nearly

double wages, as they sell the dried hake for about $1.50 per quintal, and the dried sounds for 60 to 75 cents per pound, the livers being tried out for their oil.

In seasons of the year when alewives, mackerel, or herring are along the shore, the boats supply themselves with bait from their nets, each boat having usually four nets set in the harbors. They visit these about daylight and then start out on their day's fishing, to return in the afternoon in season to market their fish in Gloucester, or to send them to Boston for the next morning's trade. In the winter months the chief bait of the boats is sperling or small herring taken in the rivers, and frozen herring from Grand Manan and Eastport. The grounds visited by the boats are mostly within a short distance of land, and have received various peculiar names, such as Old Man's Pasture, Honey Pink, Saturday Night, and Eleven Fathom Ground. Both hand-lines and trawls are used; most of the dory fishermen prefer the former, although during the haking season all use trawls.

The shore fisheries from Gloucester were of considerable importance about 1832, when 799 men were employed in it. The catch, 63,112 quintals of cod, was valued at $157,780, and a Government bounty of $25,172 was received. In 1804, when the bank fisheries were almost abandoned, the shore fisheries employed two hundred sail. Most of this boat-fishing was carried on at Sandy Bay or Rockport, which was then a part of Gloucester, and that place has continued until the present day to be more or less engaged in these fisheries.

The boats in use at the beginning of the century were mostly the Chebacco boats of some 15 tons burden, and carrying four or five men. They had two masts, but no bowsprit. A small cuddy forward afforded sleeping room for the men on their trips, lasting usually four or five days. These boat-fishermen seldom ventured more than 20 or 30 miles from shore. Dory-fishing began about 1825, and is still carried on off Cape Ann more or less throughout the year. In early years fish were very abundant in the harbor and all about Gloucester, so that in the haddock season in the spring there was no difficulty in securing a boat-load in a short time. Since 1866 haddock have been more abundant offshore, and their capture has been by large vessels.

Codfish, hake, and pollock have been the principal catch of the shore-boats, and some good day's work have been made. Two men at Folly Cove took 3,900 pounds of codfish in one day in the winter of 1877–'78. The method of fishing since 1855 has been mostly by trawls, though hand-lines are used at some seasons of the year.

THE BOAT-FISHERY FOR HERRING.—There is no extensive fishery with gill-nets in the vicinity of Gloucester except for a few weeks in the fall of the year, when the herring visit these shores to spawn. Many of the shore-boats are supplied with nets for the capture of bait, setting them in various parts of the outer harbor, and taking each day enough alewives or herring for the day's fishing. Occasionally schools of mackerel visit the harbor, when the bait-nets capture a considerable number. On the north side of the cape the shore-boats take more mackerel in this way than the harbor-boats, but in neither case is it an important fishery. The nets in use are about four hundred in number, and are generally 20 fathoms long by 3 fathoms deep, with 1¾ to 2¾ inch mesh, the average mesh being 2¼ inches.

During the latter part of September and the early part of October herring are usually very plenty along the shores of Cape Ann, and about 10,000 barrels are annually captured by a fleet of about one hundred and fifty boats and vessels equipped with gill-nets.

In the season of 1879 the herring made their appearance on the 20th of September. Through the succeeding week few were taken, but on Sunday, the 28th, they were very abundant, and considerable numbers were captured in the nets. During Wednesday and Thursday of this week the fishermen were busy enough. The weather was mild, water smooth, and everything favorable for a

good catch. All the available boats in Gloucester Harbor were made use of to gather in the harvest that lay at the fishermen's door. Nets were set at night and in the early morning they were found loaded down with fish, being, in many cases, sunk by the weight of the fish, and many nets were lost in this way. Fishermen who were not provided with nets visited the spot and from the fragments got good boat loads. The nets used were the ordinary gill-nets of 2½ and 2¾ inch mesh, 25 fathoms long, anchored at each end. They were sunk about 2 fathoms below the surface of the water. The principal fishing ground was in the vicinity of Norman's Woe, on the western side of the harbor, and extending nearly a mile off from the rocky shore. The nets were set for about three-quarters of a mile in a southeast direction from the shore, and then in a northeast and southwest direction for a half mile. Within this small compass upwards of 20 miles of gill-nets were set during the two principal days of the fishery. On Friday, October 3d, the school of herring had disappeared from Norman's Woe, having moved westward toward Marblehead, where considerable numbers were taken, and within a few days they had left the coast. There were landed in Gloucester during that season, about 10,000 barrels of herring, for which the fishermen were paid from 75 cents to $1.50 per barrel, or an average of $1 a barrel.

THE SHORE VESSEL FISHERIES.—During the winter of 1878–'79 the United States Fish Commission made some successful experiments off Gloucester Harbor with gill-nets for the capture of cod. The nets were from 8 to 10 inch mesh and were found eminently adapted for the winter shore cod fishery. The fishermen were at first not disposed to provide themselves with these nets, but they were afterwards generally used by the Gloucester fleet fishing in Ipswich Bay, and very successful seasons have resulted.

A shore fishery for cod is quite extensively carried on during the winter months in Ipswich Bay, in vessels of from 20 to 40 tons burthen. During some winters large schools of very fine cod visit this bay, especially on the northern side toward Newburyport and Portsmouth, and a large part of the catch is marketed at those ports. The vessels are fitted either with trawls or gill-nets. The principal trawl bait used is frozen herring. Most of the catch is sold fresh, though when more can be realized by drying the fish they are sold to the splitters. A fleet of some sixty sail of Gloucester vessels was engaged in this fishery in the winter of 1879–'80.

After the close of the winter fishing some of these vessels cruise further to the eastward, fishing on Cashe's Banks, off Matinicus, and other eastern grounds, capturing all varieties of ground fish. A part of the fleet fish on Middle Bank for haddock, or cruise off the south of Cape Cod, and off Block Island. In the summer season those vessels that are large enough engage in seining mackerel, while the rest cruise on the haking grounds off the eastern coast. In the early fall pollock become abundant in Boston Bay off Gloucester, and are taken in large quantities.

THE FISHERY WITH FLOATING TRAPS.—Until the year 1874 no attempt had been made in the vicinity of Gloucester to capture fish by the use of traps, pounds, or weirs. In that year Mr. Henry Webb, of Rockport, set a floating trap at Milk Island, on the outside of Cape Ann. The venture proved profitable, so that each year since a trap has been set at that island. This continued to be the only trap in the vicinity until 1879, when four more were set at various points, and a crude stake-weir was built in Gloucester Harbor. The weir and most of the traps met with poor success, the total value of the catch of all the traps being only $3,550. The number of men employed from June to September was twelve, and the value of the traps was about $1,000.

In the season of 1880 fourteen traps were set along the shores of Cape Ann from Manchester to Annisquam, employing forty-three men. The value of the traps and boats used in connection with them was $6,500, and the value of the products was $18,000.

The floating trap in use along the shore is square or rectangular in shape, and is made entirely

of netting. It is open at one end, where it is furnished with two stationary guides that lead obliquely into it from the ends of its sides and up from the bottom. These guides are made of netting, and have an opening between their inner ends. The trap is also furnished with movable wings made of netting that extend outwardly from the trap as leaders. Floats are attached to the upper edge of the trap, the guides, and the wings, so as to buoy the trap when in the sea, and to keep the sides in a vertical position and the bottom of the trap on that of the sea. The wings are not fixed to the bottom at their lower edges, but one of them is bent around or turned inward, and, by a line, is connected with the middle of another line that extends across the mouth of the trap. The other wing serves to direct the fish into the trap, and the bent wing intercepts and turns back any that might escape from it. The guides not only guide fish into the trap, but prevent the escape of those already in it. The trap is held in place in the sea by ropes leading from the upper edge of the trap to anchors. Fixed to the anchors and to the bottom of the trap are elastic stay-lines or connections that allow the bottom of the trap to conform to the surface of the bottom of the sea and hold it down thereon.

In front of the trap is a purse or pocket of netting, open at the top, where it is provided with a series of floats. The pocket communicates with the trap by an opening leading from one to the other at the upper part of the front end of the trap. To haul the trap, its bottom, at its rear end, is lifted off the bottom of the sea high enough to cause the fish to pass into the intercepting pocket. The dimensions of the traps vary; one of the most successful ones set off Gloucester is rectangular in shape, and is 25 fathoms long, 30 fathoms wide, and 5½ fathoms deep, and has a leader 40 fathoms long, reaching to the shore. The peculiar, though simple, construction of the trap, by which it is supported by anchors and brace lines, makes it specially suited for deep water or places where it would be difficult, if not impossible, to employ piles or merely a single line to each anchor. The kinds of fish taken include all the species commonly found on this coast, the most important being mackerel and herring. In the spring of 1880, when mackerel were very abundant inshore, many thousand barrels were taken in the traps near Gloucester. Most of them were tinkers, and too small for salting, so that but a small part of the catch was saved.

THE CLAM INDUSTRY.—The business of digging clams for bait and for food is carried on in the 'Squam River. The flats in this river are daily covered by the tide and afford good feeding ground for the clams. Ninety-two men are engaged in this business from October to May, and twenty men the balance of the year. The grounds are visited by men in their dories who wait for low tide, secure loads of the bivalves and return to shore, when the clams are sent in shell to market or "shucked" and sold for bait after being salted in barrels. Small houses are built upon the shore for the shelter of the diggers while engaged in "shucking." The diggers pay one of their number a certain percentage to act as agent for the sale of the clams. During the year 1879 the yield of clams amounted to 13,978 bushels, valued at $5,200, and the capital invested in dories, outfits, and buildings, was $2,000.

LOBSTER FISHERY.—This business is not extensively prosecuted at Gloucester. In and about the harbor and at Annisquam and Bay View during the year 1879, fifty-three men were engaged in taking lobsters, using for their capture the ordinary lobster pot, in form a half cylinder. The bait used was fish heads, sculpins, and sometimes haddock. The pots were set offshore at various depths varying from 1 to 12 fathoms. The catch was landed by the fishermen and at once sold to buyers who transported most of the lobsters by rail or boat to Boston. The principal season is from April to November. Forty-eight dories, valued at $960, and 1,324 pots, worth $1 each, were used to capture 133,340 lobsters, making 1,778 barrels, of a total value to the fishermen of $6,667.

DISTRIBUTION OF FISHERY PRODUCTS.—There has been for several years a growing tendency

among Gloucester merchants to distribute their products directly to large dealers throughout the country. Prior to 1860 the work of distributing fish taken by Gloucester vessels was very largely done at Boston, but to-day, although Boston handles in transshipment a vast amount of fish, yet but a small part of the Gloucester catch is sent there for distribution. Dealers are directly interested in the capture and cure of the fish, so that it is for their interest to prepare them in good shape and send them to market in the best condition. The curing and packing is done on the wharves where the fish are landed, and as soon as they are ready for shipment they are teamed to the cars or the steamboat landing or carried to the latter place on lighters built specially for this purpose.

Gloucester has good facilities for a wide distribution of the products of the fisheries, being on the line of the Gloucester branch of the Eastern Railroad, which connects with roads to all parts of the country. Besides the railroad communication there is a fleet of nineteen sailing vessels, 1,161 tons burthen, and a steamboat line constantly plying between here and the leading markets. The Cape Ann Advertiser states that the first steamer to sail regularly between Boston and Gloucester was the Mystic, run by the Gloucester Steamboat Company during the years 1860 and 1861, when she was chartered to the Government. At the beginning of the business most of the trade freight was billed to Boston only, and was confined mostly to barrels, halves, quarters, and kits of fish, and fish in 450-pound boxes and bundles. This trade from 1870 to 1873 warranted the running of a daily steamer carrying freight and passengers until late in the fall, when three trips were made per week during the winter. Business in 1875–'76 warranted building a new steamer making daily trips throughout the year. The steamers touch at East Boston and land their west-bound freight, connecting with all the fast freight lines over the Boston and Albany road, and then proceed to their berth at Central Wharf, where a connection is made with the Metropolitan Steamship Company with freight for New York and other points, and with the Philadelphia and Baltimore lines and all the inside lines to the South. Bills of lading are signed in Gloucester by all routes, rail or steamer, through to any point in the United States, and rates given, so that the business of transportation is now on such a footing that the Gloucester merchants have no trouble in doing business with connecting lines out of Boston. The trade has changed somewhat of late years, and fish is now packed for the market in all kinds of ways and size of packages, a large portion of the goods going West.

Fresh fish intended for market either in New York or the West are sent by rail rather than by steamboat. The halibut companies have for a number of years chartered cars for their sole use; these are loaded with fish and taken to Boston in season to connect with night trains for the New York and other great markets.

For the handling and transporting of fish in Gloucester there are employed sixty horses and a large number of low wagons called jiggers. In 1845, before the introduction of the railroad or steamboat lines, fish were shipped in sailing vessels. There was then little need for hauling fish, only two horses being thus employed. In 1850 there were not over half a dozen used for this purpose, but in 1880 the number had increased to sixty, valued, with wagons, at about $15,000.

FISH BOXES AND BARRELS.—Fish are shipped from Gloucester to all parts of the United States, to the West Indies, and to various parts of Europe. Brine-salted fish are packed in barrels, the size and material of which are regulated by the laws of the State. Dry fish are generally packed in boxes containing 400 to 450 pounds each, though a large part of this product is now made into prepared or boneless fish, and shipped in smaller boxes containing from 5 to 200 pounds. Fresh fish packed in boxes with ice are sent to all parts of the country, even as far west as California; such boxes usually containing 450 pounds of fish. These barrels and boxes are brought to Gloucester by rail and vessel from Maine, New Hampshire, Vermont, various towns in Massachu-

setts, and from the British Provinces. It is estimated that in the year 1880 there were consumed by Gloucester packers 150,000 barrels and 400,000 boxes, of a total value of $175,000. Most of the barrels are made in Maine and shipped to Gloucester in a condition ready for use. The boxes are brought here in the form of shooks and are nailed together by the packers, or at two factories in Gloucester, where some score of men are constantly employed in putting the pieces together and printing brands on the box-ends by the use of printing presses. Most of the boxes are made of spruce wood, which is stronger than pine and free from any unpleasant taste.

In the early history of the business fish were roughly handled, the dried fish being tied up in bundles of 1 or 2 quintals each, for shipment to Boston, where most of the distributing was done. Few fish are at present sent from Gloucester without being packed in boxes, and these few are preserved from damage by a wrapping of tea-matting. Dried fish intended for exportation to the West Indies are closely packed in what are called drums. These are barrels made usually of soft spruce wood, and are of five sizes, containing from 2 to 8 quintals of fish. The staves and heads are made in Maine, and put together in Gloucester.

FOREIGN TRADE.—Gloucester, next to Boston, has the largest amount of foreign commerce of any sea-port in Massachusetts. Its salt trade and exports of fish bid fair to increase from year to year. During the year 1879, 70 American and 31 foreign vessels arrived from foreign ports with cargoes of salt, fish, lumber, wood, potatoes, and other merchandise. Eighteen vessels were cleared with cargoes of fish, namely, 8 for Guadaloupe, 5 for Martinique, 2 for Barbadoes, and 1 each for Porto Rico, Surinam, and Trinidad. Twenty-two hundred vessels, not including fishing vessels, were boarded and inspected during the year by the customs officers of the port.

Prior to 1860 there were in Gloucester several mercantile houses running fleets of barks, brigs, and schooners to the East Indies, South America, West Indies, and other countries. The commercial interests of the place from 1790 to 1860 were mainly directed to Surinam, in Dutch Guinea. The imports were principally sugar, molasses, and cocoa, and aggregated in some years about $400,000, while the exports amounted to about $200,000. This business has been transferred to Boston, and now but a comparatively small quantity of the products destined for foreign markets are shipped direct from this port.

In 1878 an effort was made to re-establish the export trade of fish from Gloucester to the West Indies, and from March, 1878, to the close of 1879, 24 vessels took out cargoes. Seven of these sailed in 1878, and 19 in 1879, 15 of them clearing at the Gloucester custom-house and 11 at other ports. The cargoes taken by these vessels in 1878 included 1,234 casks, 867 boxes, and 625 drums, containing 2,821 quintals of cod, 1,702 quintals of haddock, 1,210 quintals of hake, 88 quintals of cusk, and 207 quintals of pollock; 514 barrels of mackerel, and 918 barrels of herring; making a total of 6,021 quintals of dried fish, and 1,432 barrels of pickled fish. Besides dry and pickled fish they took 275 pounds of butter, 8,000 feet of lumber, 155 bags of guano, 44 kits of cod tongues and sounds, 5 barrels of dried apples, 9,197 pounds of smoked halibut, and 2 cases of copper paint.

In 1879 the cargoes of the 19 vessels were 3,853 casks, 1,551 boxes, and 709 drums, containing 15,847 quintals of cod, 2,203 quintals of haddock, 1,174 quintals of hake, and 25 quintals of pollock; 1,130 barrels of mackerel, and 282 barrels of herring; making a total of 19,249 quintals of dried fish, and 1,412 barrels of pickled fish; also 5,086 boxes of smoked herring, 80 barrels of salmon, 100 barrels of bread, 180 barrels of potatoes, 1,750 pounds of butter, 84,724 feet of lumber, 15 casks, 48 bags of guano, 183 barrels of apples, 11 barrels of turnips, 40,000 shingles, 10 barrels of onions, 7 cords of wood, 640 bricks, 1 hogshead of tinware, and 1 chamber set.

The whole amount of dried and pickled fish shipped in the above vessels from March 28, 1878,

to November 18, 1879, was 25,270 quintals of the former and 2,934 barrels of the latter, having a total value of about $100,000.

The amount of cash, exclusive of that paid for freights, charters, and commissions, brought into Gloucester from abroad by these vessels during the above period was $95,112, which, with freights of $8,000 more, makes a total of $103,912. Of this amount nearly $12,000 was paid out in Gloucester for labor and other incidental expenses. For the preparation of the fish ten men were constantly employed, and a building was specially fitted for the artificial drying of the cured fish and the manufacture of drums and casks.

In 1876 there sprung up a foreign trade in pickled herring. The first cargo of these fish ever shipped to a foreign port from Gloucester was sent to Gottenburg in the spring of 1876, and within about twelve months was followed by ten other cargoes. The business has been continued with some success. Vessels have sailed during the past four or five years with cargoes of herring on Gloucester account from Newfoundland, bound for Sweden and other European countries.

ICE FOR PRESERVING FISH.—In the Gloucester fisheries there are annually consumed 25,000 tons of ice, valued in 1880 at $100,000. The greater part of this ice is used on board the vessels to preserve the fish fresh for market. George's-men take on an average 6 tons of ice per trip, using it for the preservation of bait and for fresh halibut. The fresh halibut fleet average 16 tons per trip, though in the summer season as high as 40 tons are often taken from Gloucester and consumed on a single trip, lasting three or four weeks. During the year 1879, Gloucester vessels made 1,132 trips to George's and 375 fresh-halibut trips, consuming about 14,000 tons of ice, while fresh-mackerel, haddock, and shore vessels used a large amount. A great quantity was also used in the shipment of about 15,000,000 pounds of fresh fish by rail to all parts of the country, going as far west as the Pacific coast.

Gloucester vessels began to carry ice about the year 1842, prior to which time halibut were brought to market largely in well-smacks. About 1845, ice-houses were built in the holds of the vessels, and the fish, as soon as caught, were dressed and preserved fresh for some days, or even weeks. Since about 1859 the fish have been shipped largely from Gloucester packed in boxes with ice, each box holding from 400 to 500 pounds of fish. The ice is usually cut from the ponds about Gloucester and stored in large houses erected for the purpose. During unfavorable seasons, as that of 1880, the supply is brought from distant places. The price varies from year to year, in 1879 the fishermen paid $2.50, while in 1880, owing to the warm winter, they were obliged to pay $4 per ton. There are two ice companies, in one of which the fishing firms are largely interested. Until 1878 one company controlled the entire business, but the demand for ice has so increased that two companies, with an invested capital of $50,000 in buildings, fixtures, horses, and wagons, find abundant profit. Forty men and about fifty horses are constantly employed in hauling ice in wagons to the wharves, where it is received by the crews of the vessels and stowed in ice-pens constructed in the vessel's hold.

SALT FOR FISH-CURING.—The fisheries of Gloucester consume an enormous quantity of salt. During the year ended December 31, 1879, 43,102,164 pounds, valued to the fishermen at $125,450, were withdrawn from the custom-house in this district for the curing of fish. In the early period of the fisheries much of the salt needed was brought from Spain and the West Indies by the fishing vessels that took their catch direct from the banks to those countries and exchanged it for salt. At the present day numerous ships, barks, and large schooners bring cargoes direct to Gloucester from Liverpool, Cadiz, and Trapani. It is imported by two firms which have extensive warehouses in Gloucester, and who sold it to the fishermen at an average of $1.63 per hogshead in 1879. The average price in Gloucester for the past eighteen years has been about $2.75 a hogs-

head. Cadiz salt is more extensively used than either of the other varieties. Trapani salt is generally used by cod fishermen bound on long trips, while Liverpool salt is used in pickling mackerel and herring.

The quantity of salt taken by fishing vessels varies very much, and is determined by the kind of fishery and the length of the intended trips. Grand Bank cod fishermen absent from home from two to four months or more average 210 hogsheads, though some of the largest vessels take as high as 300 hogsheads, or about 80 tons, of salt on a single voyage, while the shore cod fishermen may take either a few bushels or none at all, their fish being cured on the wharves. Cod fishermen carry their salt in bulk, but the mackerel catchers take it in barrels which are afterwards used for packing the fish. The quantity of salt required for curing various kinds of fish is discussed in the chapter on methods of curing.

Salt withdrawn from warehouses to be used in the curing of fish is free of duty, this drawback in a measure taking the place of the bounty formerly allowed to fishing vessels. Reference to the chapter on marine salt will show the amount consumed by the various fishing ports and the amount of duty saved during a period of years. Two concerns and twenty-six men are constantly employed in handling salt in Gloucester. The invested capital in buildings for storage is $16,000, and the cash capital for carrying on the business is $25,000.

For many years prior to 1861 there were very few direct importations of salt into Gloucester, but since that date many ship-loads have arrived from foreign ports. In 1870, 45,000 hogsheads of salt were imported in 7 brigs and 10 barks. In 1875 the importations were 108,486 hogsheads in 2 ships, 12 barks, 12 brigs, and 16 three-masted schooners. Of these 42 vessels, 34 were under the American, 5 under the English, and 3 under the Austrian flag. The amount used in curing fish in the year 1875 was 106,245 hogsheads.

The wholesale price of salt in Gloucester each year since 1860 has been an average of about $2.75 per hogshead of 560 pounds. The prices, per hogshead each year, were as follows:

Year.	Price.	Year.	Price.	Year.	Price.	Year.	Price.	Year.	Price.	Year.	Price.	Year.	Price.
1860	$2 00	1863	$2 25	1866	$4 25	1869	$2 87	1872	$2 25	1875	2 00	1878	$1 62
1861	2 00	1864	3 62	1867	4 00	1870	2 87	1873	2 12	1876	1 75	1879	1 63
1862	2 00	1865	6 50	1868	3 12	1871	2 37	1874	2 25	1877	1 62	1880	1 75

Up to 1873 salt withdrawn for curing fish on board of vessels licensed for the fisheries was free of duty, but that used on shore for curing fish was subject to a duty of 8 cents per 100 pounds. Since 1873 all salt withdrawn for curing fish has been duty free. The amount used yearly in Gloucester for this purpose during the past eight years, and the wholesale value of the same has been as follows:

Year ended June 30—	Pounds.	Value.	Year ended June 30—	Pounds.	Value.
1873	38, 874, 776	$147, 390	1877	58, 544, 962	$170, 400
1874	48, 944, 728	196, 650	1878	44, 504, 477	138, 750
1875	50, 558, 751	180, 560	1879	38, 098, 454	110, 864
1876	56, 707, 427	177, 210	1880	43, 567, 922	135, 000

PROVISIONS USED BY THE FLEET.—The annual consumption of agricultural products by the Gloucester fishing fleet is very large and includes a great variety of articles, as may well be supposed when we consider that nearly 4,500 men must be fed during the greater part of the year. The value of provisions consumed on the vessels during the year 1879 is estimated at $310,000,

and included the following items: Rice, 25,920 pounds; flour, 6,912 barrels; sugar, 128,640 pounds; molasses, 29,376 gallons; beef, 4,104 barrels; pork, 864 barrels; pork shoulders, 1,512 barrels; lard, 13,072 pounds; butter, 210,248 pounds; beans, 1,720 bushels; peas, 864 bushels; dried apples, 64,800 pounds; potatoes, 35,826 bushels; onions, 2,592 bushels; beets, 1,296 bushels; turnips, 1,728 bushels; cabbages, &c., $12,960 worth; vinegar, 2,592 gallons; fresh beef, 86,400 pounds. It is estimated that 1,262,888 pounds of cotton were used in sails and fishing-lines on the Gloucester fleet in 1879.

THE GLOUCESTER FISHERIES, 1870 AND 1871.—The United States census report gave the following items concerning the Gloucester fisheries for the year ending June 30, 1870:

The whole number of industrial pursuits was 160, of which number 48 were engaged in the fishing business; capital invested, $2,357,700; number of men employed, 4,629; amount of wages paid, $1,410,923; number hogsheads of salt used, 54,890; value of salt used, $158,246; number of barrels, 109,032; value of barrels, $110,004; value of bait, $236,011; number of quintals codfish, 189,033; value of codfish, $1,243,776; number of barrels mackerel, 85,834; value of mackerel, $1,186,009; number of barrels oil, 3,113; value of oil, $78,457; value of other fish, $330,128; total value of fish products, $2,838,370.

The report of the town clerk gives the following concerning the fishing business of Gloucester for the year ending December 31, 1870:

The whole number of schooners and boats fitted for fishing was 471. The value of the products of the fisheries was $3,613,105, estimated as follows, from custom-house returns and fish inspector's report: 210,000 quintals codfish, valued at $1,260,000; 129,595¼ barrels mackerel, $1,814,330; 12,000 barrels herring, $72,000; 6,560,000 pounds fresh fish, $262,400; 26,000 quintals other fish, $78,000; 120,000 gallons oil, $90,000; 18,000 barrels shell fish, $18,000; miscellaneous, $18,375; total, $3,613,105."

For the year ending December 31, 1871, the town clerk gives the following statistics:

"The whole number of schooners and boats fitted for fishing was 465. The value of the products of the fisheries was $2,918,022, estimated as follows, as compiled from the custom-house returns, fish inspector's reports, and other sources: 303,055 quintals codfish, valued at $1,363,747; 33,250 quintals other fish, at $66,500; 7,836,500 pounds fresh fish, $225,095; 160,000 gallons oil, $96,000; 107,008 barrels mackerel, $1,070,080; 15,000 barrels herring, $52,000; 18,000 barrels shell fish, $18,000; miscellaneous, $26,600; total, $2,918,022."

THE FISHERIES IN 1872.—The Gloucester Telegraph gives the following figures of the fishing industry of the town for the year ended November 15, 1872:

"In the herring fishery 18 vessels made trips to Newfoundland, 24 to Grand Menan (5 making two and 5 making three trips each) and 2 to Bay of Islands. One man was lost overboard. During the previous year 59 vessels made herring trips, and 2 vessels were lost.

"The winter haddock fishery was but partially successful, owing to unfavorable weather in February and March. One vessel was lost.

"The Bank fishery (exclusive of George's) employed 101 vessels (against 81 the previous year) and 339 fares were landed, an increase of one-third over the previous year. Four vessels and 49 lives were lost. Last year the loss was 4 vessels and 24 lives.

"The George's fishery employed 182 vessels, and the receipts were 800 fares, an increase of 48 over the previous year. One vessel and 11 lives were lost against 10 vessels and 97 lives in 1871.

"The Bank and George's fisheries were uniformly successful.

"The Greenland fishery employed 6 vessels (two more than the previous year) all of which were successful and free from disaster.

"The mackerel fishery employed some 40 or 50 vessels in the spring fishery at the South, about 100 vessels in the offshore summer fishery, and 60 vessels (an unusually small fleet), in the Bay Saint Lawrence.

"Seven vessels were lost in the pohagen and other offshore fisheries in the summer and fall months."

THE FISHERIES IN 1873.—The Gloucester Telegraph of November 19, 1873, gives the fishing record for that year as follows:

"The fishing season will be brought to a close with the arrival of the Bay Saint Lawrence fleet, of which but 12 vessels remain to arrive. The season has been a disastrous one in losses of life and property, though but for the unusual losses it would have been a moderately profitable one. So far as the fishermen themselves are concerned, whose lives have been spared, the business has yielded good returns, the catch having been large and the prices fair, and the loss has fallen on the capital invested in the business, most of the establishments coming out with a small range of profits, if not with absolute loss.

"The Newfoundland fresh herring fishery last winter employed 18 Gloucester vessels, nearly all of which marketed their catch abroad, some 1,500 barrels only being disposed of here in baiting the Bank fleets. The schooner Thorwaldsen, with a crew of 7 men, was lost in this business.

"The Grand Manan fresh herring business gave employment to 38 vessels, 5 of which made two trips each, and 1 making three trips, during the season. The schooner Franklin A. was lost on the return trip from New York, after having disposed of her herring fare in that market.

"Six Gloucester vessels engaged in the Bay of Islands salt-herring fishery. The shore fishery for cod was actively pursued during the winter months with average success, a portion of the Gloucester fleet, however, rendezvousing at Portsmouth, N. H., where they found a ready market for their catch.

"The Grand and Western Bank fishery employed one hundred and fifty Gloucester vessels during the year ending November 15, 1873, and six vessels belonging elsewhere landed fares here. Quite a number of the Gloucester fleet continued in this branch of the fisheries throughout the year. The fleet was at its minimum during the quarter embracing the months of November, December, and January, when the whole number of fares received was 62 in the three months; and at its maximum at the close of spring, during the summer, and opening of fall, the number of fares received being 74 in May, 41 in June, 62 in July, 61 in August, and 46 in September. The fleet was successful throughout the season, the Western Bank yielding good fares of halibut, which commanded high prices, and the catch of codfish on Grand Bank being unusually large and the fish of superior quality. The number of bank fares landed during the year was 463 against 339 the previous year.

"The George's fishery was followed during the year to a greater or less extent by one hundred and seventy-five vessels, being at its height in May, in which month 169 fares were received. The total fares received for the year ending November 15, were 779 against about 800 the previous year. The catch was good, and prices ruled well.

"In the mackerel fishery, the southern fleet in the spring was of usual size, embracing fifty-four vessels, and fairly successful, marketing their earlier catch in New York at good prices. The summer fishery off the shores of Maine, New Hampshire, and Massachusetts was of respectable size, and mostly engaged in the seining of mackerel, with a very good average success, although a few vessels did not pay expenses. Eighty-six vessels engaged in this business.

"The Bay Saint Lawrence fleet was unusually large, consisting of one hundred and eighty-five vessels, against sixty last year. The catch was good, and the business would have proved quite successful but for the disastrous gale in August, by which so many vessels were wrecked or temporarily disabled in the height of the fishing season, materially reducing the receipts. Of the one hundred and eighty-five Gloucester vessels engaged in this fishery, ten were wrecked and are total losses, and three remain ashore at the Magdalen Islands, but are not abandoned. Twenty-six vessels made two bay trips each during the season, and the whole number of fares received at Gloucester this season will be 198 against 65 last year.

"The Greenland fishery employed four vessels, meeting with only moderate success. The Iceland fishery employed one vessel, which failed to secure a fare."

THE PRODUCTS OF GLOUCESTER FISHERIES IN 1875.—Prepared from actual returns obtained by Mr. George H. Proctor, of the Cape Ann Advertiser:

Products.	Amount.	Value.	Products.	Amount.	Value.
Bank codfish ..... quintals..	177,473	$998,628	Mackerel—Continued.		
George's codfish ..... do ...	185,758	1,021,669	No. 3 ..... barrels..	21,763	$174,104
George's halibut ..... pounds..	2,462,364	172,365	No. 4 ..... do....	4,039⅜	24,205
Bank halibut ..... do....	7,248,413	507,389	Herring ..... do....	3,175	13,494
Hake ..... quintals..	4,257	12,774	Pickled codfish ..... do....	163	1,097
Cusk ..... do....	2,349	7,047	Swordfish ..... do....	40¼	
Pollock ..... do....	9,417	32,964	Trout ..... do....	410⅜	4,042
Herring ..... barrels..	38,292	153,168	Fins and napes ..... do...	75¾	
Shore-fish:			Salmon ..... do....	21⅞	2,282
Fresh	.....	89,738	Tongues and sounds ..... do....	205	
Cured	.....	135,697	Shell-fish	.....	10,000
Oil	.....	8,945	Other fish	.....	8,000
Mackerel:			Fish oil, other than shore	.....	100,000
No. 1 ..... barrels..	18,172⅝	327,112	Total value	.....	3,989,500
No. 2 ..... do....	7,065½	184,780			

The items of shore, fresh, and cured fish and oil in the above statement include the following:

Products.	Amount.	Value.	Products.	Amount.	Value.
Fresh fish:			Cured fish—Continued.		
Codfish ..... pounds..	1,476,755	.....	Hake ..... quintals..	8,434	.....
Haddock ..... do....	816,348	.....	Pollock ..... do....	7,372	.....
Pollock ..... do....	280,983	.....	Haddock ..... do....	1,512	.....
Hake ..... do....	195,256	.....	Cusk ..... do....	724	.....
Cusk ..... do....	40,048	.....	Fish roes ..... barrels..	143	.....
Swordfish ..... do....	14,581	.....	Hake sounds ..... pounds..	5,276	.....
Mackerel ..... numbers..	246,607	.....	Tongues and sounds ..... barrels..	345	.....
Flounders ..... do....	16,646	.....	Porgy slivers ..... do....	273	.....
Lobsters ..... barrels..	1,675	.....	Oil:		
Perch ..... do....	15	.....	Dogfish oil ..... gallons..	11,040	.....
Fresh livers	.....	$9,875	Medicine oil ..... do....	3,640	.....
Cured fish:			Porgy oil ..... do....	1,240	.....
Codfish ..... quintals..	12,712	.....	Hake oil ..... do....	720	.....

THE FISHERIES IN 1877.—From the Cape Ann Advertiser, of January 4, 1878, we have the following review of the fisheries for the year 1877: The number of fishing arrivals in the herring, cod, halibut, and mackerel fisheries, exclusive of the boat and shore fishermen, have averaged over 50 per week, the aggregate for the year being 2,680, as follows: Newfoundland, 28; Grand Manan, 37; Grand, Western, and La Have Banks, 556; George's, 1,281; shore mackerel trips, 692;

Bay Saint Lawrence, 86. The herring fleet met with their usual success, and the cod and halibut fisheries have been fairly profitable. The Bank and George's fleets have landed over 28,000 tons of green fish, or enough to load a train of cars 50 miles in length. Prices have been well maintained throughout the year, and most of the stock has been closed out."

The products for 1877, as given in the Fisherman's Own Book, exclusive of shore-fish and oil, were 23,755,000 pounds George's codfish, 16,865,000 pounds Bank codfish, 14,319,000 pounds Bank halibut, 1,814,000 pounds George's halibut, 850,000 pounds flitched Bank halibut, 100,000 pounds Greenland halibut, 49,044 barrels mackerel, 28,500 barrels herring. Eighty-six Gloucester vessels fished for mackerel in the Bay of Saint Lawrence this year.

THE FISHERIES IN 1878.—The Advertiser of January 3, 1879, says:

"There were 2,180 arrivals during the year, averaging half a dozen a day, from the more important fishing grounds. The arrivals do not include the boat and dory fishermen, the short trips off shore in the winter cod and haddock fisheries, while only a part of the shore mackerel arrivals in summer are reported. The number of Bank trips was 503, George's 1,234, Grand Manan, Bay of Fundy, and Eastport (herring), 30; Newfoundland and Magdalen Islands, 18; Greenland halibut fishery, 2; Southern and Eastern mackerel trips, 280; Bay of Saint Lawrence mackerel trips, 113."

The products for 1878, as given in the Fisherman's Own Book, exclusive of shore-fish and oil, were 24,158,000 pounds George's codfish, 12,202,500 pounds Bank codfish, 10,914,500 pounds Bank halibut, 524,100 pounds George's halibut, 120,000 pounds Greenland flitched halibut, 55,742 barrels mackerel, 27,000 barrels herring. This was the year when the herring fleet was driven away from the shores of Newfoundland. One hundred and twenty-five fares, about 30,000 barrels, sea-packed mackerel, were received from the Bay of Saint Lawrence.

THE FISHERIES IN 1879.—The Advertiser of December 24, 1879, gives the following review for that year:

"The fishing fleet of Gloucester the present year has numbered 429 vessels, of which 338 are owned here, and 91 belong in other places, but have made this their headquarters for the whole or a part of the active fishing season. We have had during the year a fleet of 104 Gloucester schooners constantly employed in the George's fishery, many of them making over a dozen trips each, and 48 other vessels have followed the branch a part of the season, making one or more trips, the 152 vessels making over 1,000 trips, and landing at this port 23,144,000 pounds of codfish and 995,500 pounds of fresh halibut. Eighty-two Gloucester vessels have been employed all the year in the Bank fishery, some making one or two trips cod fishing and quite a number following the halibut fishery and making five or ten trips each during the season. Thirty-two other Gloucester vessels and 11 belonging elsewhere have made one or more bank trips during the season, giving us a total Bank fleet of 125 schooners, making over 500 trips, and landing at the Gloucester wharves 13,247,000 pounds of codfish and 11,717,400 pounds of halibut. The shore cod fishery was active for a part of the season, and employed 47 Gloucester vessels and 47 belonging elsewhere, making a total fleet of 94 vessels, which made nearly 200 trips, and landed here 3,742,000 pounds of codfish. Concerning the rest of the fishing fleet, it is difficult to give accurate statistics. Most of the southern mackerel fleet and a portion of the offshore fleet followed the market fishery, selling their catch fresh in New York and Boston. Many of the vessels salting their catch sold them from the pickle, without inspection, so that they go to the credit of other fish markets. The mackerel inspection of Glocester is estimated at 47,085 barrels of shores and 7,125 barrels of bays, making a total of 54,210 barrels. The Bay of Saint Lawrence fleet numbered about 25 vessels. About 100 Gloucester vessels and 30 belonging elsewhere made this their headquarters in the shore mackerel fishery for

a greater or less part of the season. The number of arrivals reported at this port in the shore mackerel industry for the season was about 250. Three vessels engaged in the Greenland fishery, bringing home about half a million pounds of flitched halibut. Eight vessels followed the squid fishery, making two trips each, one off the Southern coast and one to Newfoundland, meeting with indifferent success. Over a score of vessels were employed in the Eastport, Grand Manan, and Bay of Fundy herring fishery, and half a score made herring trips to Newfoundland. Leaving out of account the receipts of mackerel and herring, and the item of fish-oil, we cannot be far out of the way in estimating that, including the catch of boat and dory fishermen, the average weekly receipts of fish at this port for the current year has been fully 1,000,000 pounds.

"This is a large showing for a single fishing port, because, as a rule, the business is only carried on elsewhere as one element of a varied industry. Gloucester gives her sole energy to this productive enterprise, practically speaking, and would be unfortunate indeed if she did not reap commensurate results, placing her at the head of the list of fish-producing communities. The returns are not excessive for the amount of capital and talent and labor and risk involved; and while in some cases vessels have been fortunate in securing large fares, moderate success from constant and patient delving has been the rule, and it is only through extensive operations that large results have been secured. The catch has found a ready sale all through the year, and, with an almost bare market, the outlook for the fishing industry in 1880 is a most encouraging one."

THE FISHERIES IN 1880.—The following review for the year 1880 appears in the Advertiser of January 14, 1881:

"The Gloucester fishing fleet for 1880 numbered 441 vessels, of which 334 belonged to this port, 11 in Rockport, 81 to other New England ports, and 15 to the British provinces. Some of the outside vessels visited Gloucester only once or twice, to avail themselves of the advantages of our market in disposing of their Bank, herring, or shore catch, but a very respectable portion of the number made Gloucester their headquarters during the greater part of the fishing season, or throughout the year.

"We find by reference to our files that 163 vessels from this port were engaged in the George's fishery at some time during the year, a part of which made a few George's trips during the height of the season, engaging in other branches of the fisheries subsequently. One hundred and seven vessels, however, followed the George's fishery exclusively, many of them making 14 trips or more during the year. Twenty made trips to George's and the bay; 20 made George's and mackereling trips; 5 were in the George's and Grand Manan fisheries; 4 engaged in the George's and shore cod-fisheries; 3 went to George's, the Banks and mackereling; 2 to George's, mackereling and Grand Manan; 1 to George's and squidding; and 1 to George's, the Banks, and shore fishing.

"The 163 vessels engaged at different times in this branch of the fisheries employed about 1,800 men, and made during the year 1,430 trips, landing 27,000,511 pounds of codfish, and 1,125,450 pounds of halibut, an increase over the previous year of 10½ per cent.

"The number of vessels engaged in the Bank cod and halibut fisheries during the year was 133, of which number 90, employing about 1,200 men, followed the Bank fisheries throughout the year. Twelve were engaged in Bank fishing and mackereling; 4 in the Bank and herring fisheries; 1 in the Bank herring and mackerel fisheries; 1 in the Bank and shore cod-fisheries; 1 went to the Banks and Greenland, and 24 to the Banks, George's, &c., as above stated. But few of these vessels made the long trip, occupying all the season, as was formerly the practice, finding better returns in shorter trips and quicker handling of fares. The halibut fleet made from ten to a dozen trips each, and being considerably smaller than for the previous year made good stocks on a much smaller aggregate catch. The total Bank fleet included in our figures made 249 trips for codfish,

and 261 for halibut, making a total catch of 20,000,247 pounds of the former, and 7,000,940 pounds of the latter. This shows an increase over the previous year of about 7,000,000 pounds in the Bank codfish catch, and a decrease of about 4,000,000 pounds in the catch of Bank halibut.

"The mackereling industry employed 175 vessels, and about 2,500 men; the number of vessels engaging in no other fishing branch for the year, was 90. Fifteen were employed in mackereling and the shore fishery; 27 in mackereling and the herring fishery; 5 in mackereling, the herring, and shore fisheries; and 38 in the mackerel, George's, and Bank fisheries, &c., as indicated above. The Block Island mackereling fleet comprized 15 vessels, the Southern fleet 34, and the Bay Saint Lawrence fleet 15, all of which were also successfully engaged in the offshore mackerel fishery. Most of the Southern fleet disposed of their catch, in large proportion fresh, in the Philadelphia, New York, and Boston markets; the Bay Saint Lawrence trips were failures; the Block Island catch was smaller than in 1879; but the shore catch was larger than for many years, and proved profitable. The total catch is estimated at 129,620 barrels.

"The shore cod fishery was less profitable than in previous years, the schools of fish failing to appear in their inshore haunts. The fleet numbered 56 vessels, of which about one-half were also engaged during a part of the year in other branches of the fisheries. The number of fares landed was 96, aggregating 1,000,720 pounds, or about one-half the quantity reported in 1879.

"The herring fisheries employed 50 vessels, most of which were also engaged in other fisheries, as already indicated. The number of trips made was 79, and the catch about 30,000 barrels, or twice the quantity received in 1879.

"There were also half a dozen vessels engaged in squiding, a winter fleet of large vessels in the fresh cod and haddock fishery, and a respectable fleet of small craft following the market cod and haddock fishery all the season, whose catch, together with that of the dory fishermen, if we were able to present the figures, would swell the Gloucester product to very considerable figures, and substantiate her claim to the first rank in the list of food-producing communities on this side of the Atlantic."

THE GLOUCESTER FISHERIES IN 1881.—The following review for 1881, though not properly belonging to the census report, is given here to show the increase in the industry since 1879. It appeared in the Cape Ann Advertiser of January 6, 1882:

"The Gloucester fishing fleet for 1881 numbered 437 vessels, or 4 less than for the previous year. The Gloucester vessels numbered 343; 17 belonging elsewhere fished from Gloucester the greater part of the season, and 77 others made one or more trips here during the year. The George's fleet, pursuing that fishery all the season, was considerably smaller than in 1880—62 against 107—but 163 vessels, the precise number as for the previous year, were engaged at some time during the year in the George's fishery. Twenty-six vessels confined their operations to the Western Bank fishery, 10 were engaged exclusively in the Grand Bank cod fishery, 25 made Bank halibuting trips only, and 29 were employed only on shore and Bay of Fundy cod fishing trips. One hundred and eight vessels, however, made more or less Western Bank trips during the year, 24 Grand Bank cod fishing trips, 32 Bank halibuting trips, 40 were engaged in the shore cod fishery, and 48 visited the Bay of Fundy. The summer mackerel fleet numbered 149 vessels, 81 of which confined their operations for the year to this department. The Grand Manan fleet numbered 45 vessels. The other fishing grounds visited by the Gloucester fleet were Brown's Bank, Cape Shore, Greenland, Newfoundland, La Have Bank, Cape North, Banquereau, Seal Island grounds, Cape Sable, &c.

"The table below shows the fish receipts at this port in the leading departments of the industry for the past three years, the La Have and Brown's Bank catch being credited to the George's

fishery, the Bay of Fundy catch to the shore fishery, and the figures in the Bank fishery including Grand and Western Banks, Banquereau, the Cape Shore, and other distant fisheries:

Products.	1881.	1880.	1879.
Bank codfish ..... pounds..	20, 955, 280	20, 247, 000	13, 247, 000
George's codfish..... do....	22, 510, 000	27, 511, 000	23, 144, 000
Shore codfish..... do....	3, 245, 300	1, 721, 000	3, 742, 000
Total codfish ..... do....	46, 710, 580	49, 479, 000	40, 133, 000
Bank halibut..... do....	7, 178, 800	7, 940, 000	11, 717, 400
George's halibut..... do....	1, 087, 400	1, 125, 450	995, 500
Fletched halibut ..... do....	25, 000	.....	.....
Greenland halibut..... do....	428, 290	.....	500, 000
Total halibut ..... do....	8, 719, 490	9, 065, 450	13, 212, 900
Total cod and halibut..... do....	55, 430, 070	58, 544, 450	53, 245, 900
Mackerel ..... barrels..	*163, 851	*129, 620	†48, 643
Frozen herring..... number..	13, 318, 000	9, 000, 000	6, 000, 000

* Sea-packed. † Inspected.

"For the closing five months of 1881, the shore fleet landed at this port 983,500 pounds hake, 586,000 pounds pollock, 324,000 pounds haddock, and 40,000 pounds cusk; total shore fish otherwise than cod, 1,933,000 pounds; shore herring catch, 8,632 barrels.

"The fish receipts at this port from Maine and the Provinces during the last four months of the year were as follows: 9,370 quintals hake, 8,030 quintals codfish, 2,905 quintals haddock, 25 barrels herring; 32 barrels fish-oil; 5,500 boxes smoked herring."

LOSSES OF LIFE AND PROPERTY.—The Gloucester fisheries have been prosecuted only at the risk of life and property. Each year has its dark record of disasters, and many are the sad hearts in Gloucester who mourn husband, father, or brother lost on the fishing banks. The George's fishery has been the most disastrous of any single fishery. In a single gale in February, 1879, 13 vessels were lost with 143 men, leaving 50 widows and 115 children to watch in vain for their return. The years 1862, 1871, 1873, 1875, 1876, and 1879 have very dark records. The help'ess ones left behind are assisted by the generous contributions of warm hearts all over the land. A charitable organization exists in Gloucester known as the Fishermen's Widows and Orphans Aid Society, which annually distributes moneys contributed by the fishermen, who give ¼ of 1 per cent. of their gross earnings for this purpose.

The total losses in the Gloucester fisheries during the period from 1830 to 1881, as recorded in the Fishermen's Own Book, published at Gloucester, has been 2,249 lives and 419 vessels. These vessels were valued at $1,810,710, and were insured for $1,355,418. The yearly record of losses is as follows:

Year.	Vessels.	Tonnage.	Value.	Insurance.	Lives.	Year.	Vessels.	Tonnage.	Value.	Insurance.	Lives.
1830.....	3	.....	$5, 600	$3, 100	7	1841.....	2	.....	$2, 725	$150	8
1831.....	.....	.....	.....	.....	.....	1842.....	3	.....	2, 000	150	.....
1832.....	1	.....	1, 000	.....	.....	1843.....	3	.....	6, 000	2, 000	10
1833.....	1	.....	1, 000	.....	.....	1844.....	3	.....	4, 800	1, 500	7
1834.....	1	.....	1, 500	.....	4	1845.....	4	.....	4, 500	2, 350	8
1835.....	.....	.....	.....	.....	.....	1846.....	3	.....	4, 900	3, 600	15
1836.....	.....	.....	1, 000	.....	.....	1847.....	3	.....	6, 200	4, 450	.....
1837.....	5	.....	10, 100	4, 300	21	1848.....	.....	.....	.....	.....	.....
1838.....	4	.....	7, 100	3, 000	4	1849.....	2	.....	3, 500	2, 200	10
1839.....	2	.....	3, 800	3, 150	4	1850.....	4	.....	12, 500	10, 300	31
1840	2	.....	3, 800	1, 400	6	1851.....	9	.....	25, 300	21, 800	32

Yearly record of losses—Continued.

Year.	Vessels.	Tonnage.	Value.	Insurance.	Lives.	Year.	Vessels.	Tonnage.	Value.	Insurance.	Lives.
1852	13	.....	$41,200	$37,100	40	1868	4	282.27	$35,000	$28,150	39
1853	3	.....	10,000	8,800	.....	1869	16	858.81	83,450	54,887	65
1854	4	.....	14,600	12,650	26	1870	13	788.15	75,200	59,907	97
1855	7	.....	20,900	16,100	21	1871	20	1,035.93	90,560	78,253	140
1856	6	.....	14,400	11,475	2	1872	12	576.68	55,400	49,121	63
1857	5	.....	11,500	7,750	9	1873	31	1,624.55	118,700	100,918	174
1858	7	.....	18,700	8,537	42	1874	10	633.17	49,100	44,975	68
1859	6	.....	21,900	16,475	36	1875	16	1,050.91	96,000	81,326	123
1860	7	.....	26,350	20,494	74	1876	27	1,075.46	150,000	116,222	212
1861	15	.....	54,250	43,900	44	1877	8	722.33	45,000	22,000	39
1862	19	.....	66,500	53,225	102	1878	13	907.57	64,794	49,967	56
1863	10	.....	40,700	8,300	6	1879	29	1,893.36	111,056	90,582	249
1864	13	.....	98,900	59,625	84	1880	7	300.44	21,000	15,972	52
1865	8	504.93	40,300	32,400	11	1881	8	511.51	31,000	20,493	56
1866	15	1,055.00	114,250	82,095	26	Total	419	.....	1,810,710	1,355,418	2,249
1867	11	844.57	82,675	59,069	66						

61. THE FISHERIES OF MANCHESTER.

MANCHESTER.—This town joins Gloucester on the east and Beverly on the west. It is 23 miles northeast from Boston, on the line of the Eastern Railroad. It has a good and safe harbor for vessels not over 120 tons burden. The population of the town in 1840 was 1,355, at which date the place was engaged in the cod and mackerel fisheries, having a fleet of eleven sail, measuring about 650 tons. In 1880 the number of inhabitants was 1,640. The fisheries have steadily declined; in 1879 not a single fishing vessel belonged here. While the fishing industry has decreased, the place has grown in wealth as a favorite sea-side resort, and many beautiful cottages and hotels dot the shores.

At the entrance of the harbor there are set during the summer months several floating traps for the capture of mackerel and other fish. These are owned and worked by Gloucester fishermen. The number of these traps in 1880 was five, valued at $2,000, and the number of men employed was sixteen. The production amounted to $2,300 worth of fish, some of which was sold to fishing vessels for bait. There has been much opposition to the use of these traps, the summer boarders claiming that they are a nuisance because of refuse fish washed ashore. The result of this opposition has provoked considerable discussion in the State legislature; but as nothing could be proved against the traps, they continue to be used.

The only branch of fishery engaged in by Manchester fishermen is for the capture of lobsters, and this only to a very limited extent. The number of men employed is 12; number of dories 11, valued at $220; number of lobster-pots, 425, valued at $425; and the number of lobsters taken, 8,250, or 110 barrels, valued at $412. The lobsters are peddled around town, being sold mostly to summer boarders. Seaweed that is driven upon the beaches is sold by the town authorities to farmers, who use it for fertilizing purposes.

D.—THE DISTRICT OF SALEM AND BEVERLY.

62. REVIEW OF THE DISTRICT.

PRESENT CONDITION OF THE FISHERIES.—In the customs district of Salem are included the fisheries of Beverly and Salem. The former place at one time had a large fleet of vessels in the Bank cod fishery, but the fleet is now much reduced in numbers. Salem was in former years an important fishing station, but it has now become an important manufacturing and commercial city. The number of vessels belonging in this district is thirty-six, valued, with their outfit and apparatus, at $105,139. The total capital invested in the fisheries is $209,784, and the value of the products is $117,444. The number of persons employed in fishing or preparing fishery products is three hundred and twenty.

STATISTICAL SUMMATION FOR 1879.—The following statement gives in detail the extent of the fishing interests of Salem district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	208	Capital in vessels and boats	$106,300
Number of boat-fishermen	49	Capital in nets and traps	3,484
Number of curers, packers, fitters, &c	63	Other fixed and circulating capital	a100,000
Total	320	Total	209,784

a Cash capital, $20,000; wharves, shorehouses, and fixtures, $80,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	20	1,090.63	$41,125	$7,075	$25,815	$74,015	In vessel fisheries	7	$84
Idle	14	650.68	20,700			20,700	Purse-seines:		
In oyster fishery	1	130.00	5,000		100	5,100	In vessel fisheries	3	1,500
In squid fishery	1	82.25	1,000	100	400	1,500	Total	10	1,584
Total	36	1,903.56	67,825	7,175	26,315	101,315	*Traps.*		
Boats.							Weirs, &c	2	600
In vessel fisheries	91		2,240			2,240	Lobster and eel pots	1,300	1,300
In shore fisheries	29		805	690	1,250	2,745	Total	1,302	1,900
Total	120		3,045	690	1,250	4,985			

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$117,444
Fresh fish.				
Cod	491,500			7,373
Cunners	6,000			30
Cusk	800			6
Eels	1,000			50
Flounders	3,000			45
Haddock	148,700			1,978
Hake	26,000			156
Mackerel	20,000			266

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Fresh fish—Continued.				
Pollock	3,000			$12
Smelts	500			13
Mixed fish	130,000			650
Total	830,500			10,579
Dry fish.				
Cod	4,144,000	1,450,400		52,214
Pickled fish.				
Mackerel	433,800	289,200		8,314
Swordfish	3,500	2,000		65
Mixed fish	6,000	4,000		100
Total	443,300	295,200		8,479
Shell fish.				
Lobsters	422,250			15,482
Oysters				a26,000
Total	422,250			41,842
Miscellaneous.				
Squid			325 barrels	1,950
Fish oil			6,475 gallons	2,590
Seaweed			150 tons	150
Total				4,690

a Enhancement on southern oysters.

63. THE FISHERIES OF BEVERLY AND SALEM.

BEVERLY.—Beverly, situated 18 miles east from Boston, has a fine rock-bound harbor with 15 feet of water at low tide. In the early history of the State it was known as the home port of a large portion of the New England Grand Bank fleet of cod-fishermen. At one time ship-building was carried on to a considerable extent at this place, large, square-rigged vessels, as well as fishing schooners, being launched from this port. With the exception of a few small yachts no vessels have been built here for many years, and only one of 20 tons during the year 1879. Concerning the reduction in the number of mackerel vessels and bankers sent from this port of late, Mr. Crittenden writes:

"Beverly sends no mackerel catchers this year, 1879; she sends ten bankers, each of which makes but one trip a year. It is not long since there were seventy bankers sailing from here, each one of which made two trips a year. There is some small boat fishing carried on."

The crews of the fishing vessels at one time fished on shares, receiving five-eighths of the proceeds and the vessel three-eighths, the expenses of the vessel being first paid. Of late years, however, and at the present time, there is no uniform rule as to how the crew shall be paid.

The hand-line and trawl are both in use. In the case of hand-line fishing salt clams are used for bait. For a 1,200 quintal fare of codfish 45 barrels of clams are taken, costing from $5 to $5.50 per barrel. For use in trawl-fishing, only a few barrels of clam bait are taken and a few tons of ice in which to preserve the fresh bait. When a vessel is provided in this manner she proceeds to Newfoundland, where a supply of fresh herring is procured at a cost of $1.50 to $2 per barrel. A full supply of ice is also laid in at this time, costing $2 a ton. Squid, which, between July 10 and August 1, sell for 20 to 75 cents a hundred or $5 a barrel, are also bought for bait. Cod roe, worth only $2 to $2.50 a barrel, is never saved. Tongues and sounds were formerly saved, when

the men fished on shares, they then being naturally willing and anxious to save them, but as the men are not at present so much personally interested in the voyage, some receiving stated wages, not many are saved. The livers are preserved in large vats until the vessel is within a short distance of home, when, the oil having been drawn off, they are thrown overboard. If the livers are fresh and but lately caught, they are brought into port and subjected to a steaming process. The average yield of oil is one-half gallon to a quintal of fish. When the fishing is carried on by means of trawls, each boat is provided with trawls armed with from 1,000 to 2,000 hooks, the average being about 1,200.

The present price of cod varies but little from that of forty years ago, when it was $2.75 to $3.50 per quintal. During 1879 the price was $3.25 to $3.50 per quintal. Forty years ago the business was profitable, while at present, with higher prices, it hardly pays expenses, and the trips often result in a loss on account of the present rate of wages and the cost of outfit, which are proportionately larger than is the advanced price of cod.

The record for 1879 shows that the active fishing fleet consisted of fifteen sail, aggregating 897.12 tons register, engaged in the cod fishery, ten of which went to the Grand Banks. One of the Bankers made two trips and another was lost on her second trip. No lives were lost during the year. One of the fleet made a trip to Banquereau.

On account of the poor encouragement which the fishermen have received in late years, five fishing vessels remained idle throughout the year 1879, while five others, with an aggregate tonnage of 601.97, were engaged for a part of the year only in coasting. These make up a total of twenty-five vessels of 1,499.09 tons.

The schooner D. A. Wilson made only one trip in 1879 to the Grand Banks, during which she took 1,700 quintals of fish and thereby cleared $1,000. For the past forty years or more, during which time trawl-fishing has come into general use, there has been no marked change either one way or the other in the abundance of cod. In trawling, five or six dories, with two men to a dory, are used. In hand-lining only one man goes in a dory, and eight to fourteen dories are used by a single vessel. Cod are usually taken in from 30 to 40 fathoms of water; in 5 to 20 fathoms only, on the Virgin Rocks.

SALEM.—Twenty years ago this port had a fleet of vessels engaged in fishing, and twenty-five sail went to George's and Grand Banks for cod. From 1860 to 1868 ten vessels engaged in the mackerel catch, besides numerous vessels which were engaged in the near-home shore fishing. A number of vessels were yearly built for fishing, and quite a large foreign demand was supplied from this port. The custom-house records of the early fishery business of this place are very imperfect and broken. Our principal information comes from the old dealers, but from them we can get no reliable statistics. At the present time the fishing industry is almost abandoned. The wharves along Derby street, once crowded with business connected with the fisheries, are now covered with lumber and coal, or else lie idle, wearing a deserted appearance. One wholesale firm alone remains. Only ten vessels have been built here in the past ten years, and none during the past two, in which time no fish have been exported.

During 1879 ten fishing licenses were granted to four vessels over and six under 20 tons each, the aggregate tonnage being 274.47. Of this number four were used only for fishing parties; one was engaged in the squid fishery off Newfoundland, supplying the fishermen with fresh bait; two went to the Gulf of Saint Lawrence for mackerel, one of which caught only 96 barrels throughout the entire season, the trip resulting in a loss; and three vessels fished near home.

The lobster fishery is followed by thirty men, using fifteen boats. They use 1,000 lobster pots and fish all the year from boats, weather permitting. The pots are all set single in and about the

ledges of the harbor and from 5 to 10 miles outside. Most of the catch is secured in April, May, September, and October; only a few are taken in warm weather. The catch of late years shows a general decrease, especially in the size of the lobsters. Small lobsters are reported plentiful, and are taken regardless of the State law referring to their length. Each boat, on an average, fishes with sixty pots, and makes a daily average catch of 150 lobsters during the season. The winter fishing averages 75 lobsters a day for each boat. The total catch in 1879 was 250,000. Most of the early catch is sold in Boston, while later in the season it is boiled in the old-fashioned kettle, and the greater part of it sold in the neighboring towns.

Concerning the oyster trade of Salem and vicinity, Mr. Ingersoll, in his census report on that industry, says:

"The oyster business here, the next place north of Boston where there is any original trade, seems quite out of proportion to the importance of the town. The reason is found in the fact that a large surrounding region derives its supplies from this point, as well as the town itself, which appears to be highly educated in the eating of all kinds of shellfish. Two schooners, the T. A. Newcomb, 130 tons, and the Lizzie Smith, 118 tons, are engaged in the trade. They cost $22,000, but now are worth only about $5,000 each. In the summer they go on mackereling voyages, but in the winter devote their whole time to bringing oysters from Virginia. Ten years ago 25,000 bushels sufficed for the demand, and a portion of these came from New York Bay; in 1875 three vessels were employed, and Salem called for 45,000 bushels, all from the Chesapeake. At present, however, the total annual importation by sailing craft does not exceed 40,000 bushels, with about 5,000 bushels by steamer from Norfolk, in winter, added. About 500 bushels of fancy stock from New York are also sold. A large portion of these oysters are sold at the wharf; another large portion goes into the storehouse; a third part are opened; and the remainder (8,000 to 9,000 bushels) are laid down in Collin's Bay, near Beverly Bar, where they are dry at each ebb-tide. No opened oysters are taken from Norfolk or Baltimore. The result is as follows:

	Amount.	Price.	Total cost.
	Bushels.		
Oysters imported in vessels	40,000	$0 36	$14,400
Oysters imported via Boston steamer	5,000	57	2,850
Oysters (fancy stock)	500	1 00	500
Totals	45,500	.....	17,750

"Selling price of Virginia oysters, imported at wharf, 40 cents; selling price of bedded oysters, in summer, 90 cents (common), $1.20 (selected); selling price of opened oysters (common), $1 per gallon; selling price of opened oysters (selected), $1.20 per gallon; selling price of opened oysters (in winter), 75 cents per gallon; annual amount of business, $40,000.

"The firms engaged employ forty-three men from November 1 to May 1; the rest of the year about twenty men. This represents about one hundred persons supported by the business, since many of the men are unmarried. The weekly salaries will average $12, and shuckers are paid 20 cents for each solid gallon.

"The old shells are disposed of to the gas company of the city at one-half cent a bushel, the purchaser paying for the carting. This does not take all of the 1,500 or so bushels a week accumulating, which are used by the proprietors to fill in water-lots, which they buy for the purpose of thus converting into land. To sell their shells is more profitable, however.

"The leading firm in Salem, Messrs. D. B. & J. Newcomb, boasts an economic method of transferring the cargo from the vessel to the shuckers' broad tables, ranged around the interior walls of their shucking-house down on the wharf. This building is two-storied, and is flush with the side of the wharf, so that the vessel moors alongside. A door in the end of the loft opens upon a rail-

less platform or balcony 6 feet square. Here two men stand to receive the loaded tubs of oysters as fast as they are hoisted (by horse-power) out of the vessel's hold. When a tub comes within reach they seize it, overturn it into a wheelbarrow, made of one-third of a strong cask, mounted on a wheelbarrow frame, and one man sends it down while the other goes and empties the barrow, returning in time to help when the tub comes up again. The ordinary method is for two men to receive the tub upon the first floor, carry it away, lift it up, and overturn it upon the table, while two others hand back an empty tub and repeat the operation. This requires four men and much lifting. The Newcombs, however, dispense with two men and all the laborious lifting, by receiving their oysters on the upper floor and dumping them from a wheelbarrow down shutes that lead to different portions of the shucking-table, or to the 'cool room,' where they can store 8,000 bushels at a time, if desired."

Statistical recapitulation of the oyster business of Salem and vicinity.

Number of wholesale dealers		3
Number of schooners engaged		2
Value of same		$10,000
Number of men hired by dealers		25
Semi-annual earnings of same		$2,500
Number of restaurant servants		20
Annual earnings of same		$12,000
Total number of families supported		25
Annual sales of—		
II. Chesapeake "plants"	bushels..	40,000
Southern, by steamer	bushels..	5,000
Value of same		$40,000
III. Fancy stock	bushels..	500
Value of same		$750
Total value of oysters sold annually		$40,750

E.—THE DISTRICT OF MARBLEHEAD.

64. REVIEW OF THE DISTRICT.

PRESENT CONDITION OF THE FISHERIES.—Marblehead is well known as one of the most important fishing ports in the early history of Massachusetts. Its inhabitants are now chiefly dependent on manufactures. In this district are included the fisheries of Marblehead, Swampscott, Nahant, and Lynn. The fish industry of these places now employs five hundred and thirty-seven persons; the capital invested is $207,706, and the value of the product is $230,942.

STATISTICAL SUMMATION FOR 1879.—The following statement gives in detail the extent of the fishing interests of Marblehead district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	314	Capital in vessels and boats	$150,390
Number of boat-fishermen	193	Capital in nets and traps	12,316
Number of curers, packers, fitters, &c	30	Other fixed and circulating capital	45,000
Total	537	Total	a207,706

a Cash capital, $15,000; wharves, shorehouses, and fixtures, $30,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.
Vessels.						
In food-fish fisheries:						
Active	39	1,057.52	$61,825	$12,060	39,560	$113,445
Idle	13	470.68	15,300	.....	.....	15,300
In lobster fishery	1	14.12	1,000	10	160	1,170
Total	53	1,542.32	78,125	12,070	39,720	129,915
Boats.						
In vessel fisheries	166	.....	5,770	.....	.....	5,770
In shore fisheries	153	.....	5,980	3,300	5,425	14,705
Total	319	.....	11,750	3,300	5,425	20,475

Nets and traps.	No.	Value.
Nets.		
Gill-nets:		
In vessel fisheries	38	$456
In boat fisheries	100	1,200
Purse-seines:		
In vessel fisheries	15	8,400
Total	153	10,056
Traps.		
Lobster and eel pots	2,260	2,260

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total	.....	.....	.....	$230,942
Fresh fish.				
Alewives	30,000	.....	.....	160
Cod	5,048,946	.....	.....	75,734
Cunners	15,000	.....	.....	75
Cusk	1,000	.....	.....	7
Eels	6,000	.....	.....	300
Flounders	1,000	.....	.....	15
Haddock	673,279	.....	.....	8,955
Hake	32,000	.....	.....	192
Herring	35,000	.....	.....	175
Mackerel	2,381,400	.....	.....	31,673
Pollock	25,000	.....	.....	100
Swordfish	17,000	.....	.....	510
Tautog	300	.....	.....	10
Mixed fish	226,000	.....	.....	1,130
Total	8,491,925	.....	.....	119,036
Dry fish.				
Cod	5,930,235	2,372,094	.....	85,395
Cusk	26,356	13,178	.....	356
Haddock	173,400	65,891	.....	1,318
Hake	203,400	132,062	.....	2,113
Pollock	192,800	79,069	.....	1,344
Total	6,616,191	2,662,294	.....	90,526
Pickled fish.				
Herring	40,000	32,000	.....	480
Mackerel	81,000	54,000	.....	1,552
Swordfish	7,000	4,000	.....	130
Mixed fish	7,500	5,000	.....	125
Total	135,500	95,000	.....	2,287
Shell fish.				
Lobsters	325,500	.....	.....	11,935
Miscellaneous.				
Fish oil	.....	.....	7,510 gallons	4,283
Fish spawn	.....	.....	100 barrels	325
Fish sounds (dried)	.....	2,500	.....	2,250
Seaweed	.....	.....	300 tons	300
Total	.....	2,500	.....	7,158

65. THE FISHERIES OF MARBLEHEAD, SWAMPSCOTT, NAHANT, AND LYNN.

MARBLEHEAD.—From 1846 to the present time the fishery industry of Marblehead shows a steady decline. The system of giving bounties to fishing vessels, continued until 1867, failed to revive the interest formerly taken in this industry. This may be seen by an examination of the following table, giving the number of vessels and amount of bounty paid during the last few years of the existence of the bounty system:

Year—	Number of vessels.	Amount paid.
1862	61	$14,378 20
1863	52	11,595 95
1864	43	10,129 26
1865	43	9,336 06
1866	25	5,457 39
1867	20	4,927 37
Total		55,824 23

The bounty was at the rate of $4 a ton on the measurement of the vessel up to 90 tons, ceasing in 1866, since which time no bounty has been paid, the amount paid in 1867 being for fish caught in 1866.

In 1879 only one vessel was sent to the Grand Banks from this port. Seventeen vessels of small tonnage engaged in the home-shore fishery with ten sail idle, or occasionally engaged for sailing parties. A total of twenty-eight sail of 807.36 aggregate tonnage represents the fishing fleet of this once celebrated port. The fishing business of Marblehead has always been mostly cod, but few have engaged in the mackerel catch, and none to make a special business of it during the past twenty years. The old-established custom of the Grand Bankers was fishing on shares; the vessel receiving three-eighths, the captain, mate, and crew five-eighths; all bills for bait, stores, provisions, &c., being first paid. By the oldest living masters we are told that Marblehead vessels never fished in the Gulf of Saint Lawrence, nor for the past twenty years in any waters of the Provinces. In the prosperous days of the past a large number of vessels were built here, but, with the exception of a few yachts, none have been built for several years.

The appended statements show the extremely reduced condition of the fleet of vessels fishing on the Banks. Mr. Crittenden writes:

"Marblehead sends but one Banker this year (1879), fitted by George Knight. Less than forty years ago Marblehead sent seventy-five Bankers. There is considerable small-boat fishing. There are no large vessels engaged in the mackerel fishery."

Mr. Martin, of Marblehead, wrote to Professor Baird in 1879:

"Our fleet of vessels which several years since numbered from eighty to one hundred sail (engaged in the fisheries at the Grand Banks of Newfoundland) has been reduced to one vessel of about 80 tons burden."

It is sufficient to say of the fishery industry from 1877 to 1879 that there was nothing done, except by the shore boatmen. The larger vessels were tied to the wharf and the owners offered the use of them to the Gloucester men on condition that the latter pay the insurance, preferring that their vessels should be in use and taken care of than that they should lie idle at the wharf, depreciating in value every day.

The eighteen vessels which were engaged in fishing in the year 1879 were, with one exception, schooners ranging from 5 to 70 tons burden, with an average of 20 tons. They were all owned in Marblehead. The largest, the Oceana, 70.94 tons burden, was the only one engaged in the cod

fishery; the remainder were all shore fishing vessels, three of them, the Alabama, E. G. Williams, and Eliza, combining the mackerel fishery with shore fishing, and another, the Zeppie, the lobster fishery. The total capital dependent on the fisheries of Marblehead in 1879 was not more than $50,000, and the number of persons employed was one hundred and fifty. The product was valued at about $48,000.

Under date of February 20, 1882, Mr. Simeon Dodge, collector of customs at Marblehead, writes:

"The fishing business in this place increased from the year 1800 to 1846, and then gradually decreased until the present time. The loss of so many lives and vessels, the introduction of the shoe business, and, finally, the repeal of the bounty act, has reduced our fishing fleet to its present proportions. We now have in this district forty-three vessels engaged in the Bank and inshore fisheries, aggregating 1,164 tons."

Marblehead is one of the quaintest as well as one of the oldest towns in New England. It was once extensively engaged in the fisheries, but the people have of late years turned their attention to manufactures, and have allowed the fisheries to decline, until now there are but a very few vessels where formerly there was a fleet of a hundred or more sail. The people have become known as a sterling race, full of patriotism, and have always contributed their quota in time of national peril. About 1,000 Marbleheaders took active part in the Revolution, more than half of whom perished and left behind 600 widows and 1,000 fatherless children, in a population numbering less than 4,000. The famous frigate Constitution was chiefly manned during the war of 1812 by men from this town, and many privateers were sent out from here. At the close of that war nearly five hundred Marblehead men were held in England as prisoners of war.

SWAMPSCOTT.—This beautiful seaside town, situated 13 miles northeast of Boston, from its nearness to the fishing grounds and market, has long been and continues to be the home of a large number of fishermen. It has not, however, such a desirable harbor as have many neighboring ports in which the fishing industry is now almost entirely abandoned. The harbor, being open to the sea on the southeast, is quite exposed. The vessels do not anchor, but lie at moorings which are very heavy, weighing about 10 tons, and supplied with heavy chains. The risks in this sort of a harbor are so great that the vessels are never insured. No vessels, however, have been lost in ten years, except four, which were blown ashore in 1876.

Bordering the harbor are four sandy beaches, named Phillips, Whale, Blarney's, and King's. These are separated by ledges of rocks, the outcropping of the rocky bluffs, and are covered with fine residences. The fishermen own and occupy many of these houses, and for years may have been seen starting out morning after morning to engage in their daily labor, and they often, fishing within sight of home, return the same evening with from 8,000 to 12,000 pounds of fish. The two last-named beaches are the ones mostly used by the fishermen, who upon their arrival home make their vessels fast to heavy moorings from a quarter to a half mile from shore, and land their fish in dories, from which they are weighed off, loaded in wagons, and carried to Boston. This is done more or less at all seasons, but chiefly during the winter. At other times vessels go direct to Boston or other ports and sell their fish.

From 1830 to 1840 most of the fishing was carried on from the dories belonging to eight or ten small pinkey vessels. As the business prospered, larger and better vessels were built, until there was a fleet of 40 to 50 sail of handsome yacht-built schooners. Of late years, the fishing fleet has somewhat decreased. At present it numbers twenty-one sail of 682.48 aggregate tonnage, manned by one hundred and eighty-six American-born fishermen.

During 1878, fish were very plenty off this shore. Some vessels report taking as high as 16,000

pounds a day, codfish forming the largest part of the catch. For the past two seasons fish have been scarce on the old grounds. Vessels have been compelled on that account to go to the eastward and southward, and are away generally from four to six days on a trip. These trips have not been attended with the success of former years. During the summer season most of the vessels engage in the mackerel catch off the New England shore, supplying the Boston market with fresh fish. The small boat or dory fishermen, on account of being obliged to go out further, are introducing the lapstreak boat; this is usually schooner-rigged.

Most of the vessels are built at Salisbury, Mass., and measure from 50 to 60 tons, and often cost $10,000. They carry a crew of ten men, all, without exception, of American birth. The crew, including the captain, have an equal share in the proceeds. All expenses are charged to the gross stock, and one-fifth of the proceeds goes to the owners. The captain and some of the crew usually own a share in the vessel. The running expenses of a vessel are estimated by Capt. King Harding to be about $1,000 a year. To pay the crew for their time the vessel should stock $10,000. This is a fair stock. In 1877 and 1878 the average stock was below this amount. In 1876 and the ten previous years it exceeded it, in some years the "high-line" reaching $20,000.

The cod fishery is prosecuted from the middle of October until May, the mackerel fishery the remainder of the time. On an average, reckoning for twenty years past, the proceeds of the two have been about equal. For ten years previous to 1876, the mackerel interest predominated. In 1877 prices were poor. "The Nova Scotia imports have a ruinous effect."

But few lobsters are caught; thirteen men fishing with five hundred and twenty traps through part of the season. Their catch is consumed at and near home, a few being sent to Boston. At one time fishing vessels were built at this port, but none have been built here for the past fifteen years.

The fisheries of this place, in 1879, employed 320 men. The capital invested was about $50,000. The value of the product was about $140,000, and included 10,807 barrels of mackerel, over 5,000,000 pounds of cod, haddock, and cusk, 40,000 lobsters, and about 5,500 gallons of fish oil. Beside the 21 vessels, aggregating 682.48 tons, there were 21 lapstreak sail-boats and 80 dories used in the fisheries in that year.

LYNN.—The city of Lynn is largely interested in the manufacture of boots and shoes and other articles, and pays little attention to the fisheries. Four small vessels took out fishing licenses in 1879, but none of them followed the business. One was sold and the three others remained idle, except when engaged by pleasure parties for fishing. The only fishing done from Lynn during 1879 was by ten men fishing from dories near shore during part of the year and supplying the summer houses of Chelsea Beach with cunners, eels, and ground fish. At Flax Pond Brook in West Lynn about 100 barrels of alewives were taken during the year with dip-nets. About 50 barrels of alewives were caught by Lynn fishermen in the river in the adjacent town of Saugus.

F.—THE DISTRICT OF BOSTON.

66. REVIEW OF THE FISHING INTEREST OF BOSTON DISTRICT.

PRESENT CONDITION OF THE FISHERIES.—The fisheries in the district of Boston, which includes towns as far as Cohasset on the south shore of Massachusetts Bay, employ 92 sail of vessels and 472 boats, besides a large number of nets and other apparatus. Of the vessels, 73 are engaged in the capture of food-fish, one fishes exclusively for lobsters, four follow the menhaden

fishery, three the oyster fishery or carrying trade, and six the whale fishery. The tonnage of the fleet is 5,422.25 tons. In the shore fisheries for cod, haddock, herring, and other fish there are employed 188 boats and 426 men.

Boston, the principal place in the district, has a very large trade in fish, being one of the most important markets in New England and the center of the trade in imported fish. A large capital is invested here in buildings and wharves used in the fishery industry, and great quantities of fresh and cured fish are annually distributed from here, as will be seen from the paragraphs on Boston. The capital invested in the district is $3,218,949, and the value of the products, the catch of fishermen of this district, is $1,026,360. The number of persons employed is 2,653.

STATISTICAL SUMMATION FOR 1879.—The following statements show in detail the extent of the fishing interests of Boston district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	997	Capital in vessels and boats	$376,805
Number of boat-fishermen	426	Capital in nets and traps	38,944
Number of curers, packers, fitters, &c	1,024	Other fixed and circulating capital	a2,803,200
Number of factory hands	206	Total	3,218,949
Total	2,653		

a Cash capital, $1,190,000; wharves, shorehouses, and fixtures, $1,388,200; factory buildings and apparatus, $225,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total Value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	73	3,430.04	$114,050	$14,015	$80,175	$209,140	In vessel fisheries	72	$954
Idle	5	462.30	14,500			14,500	In boat fisheries	200	2,400
In lobster fishery	1	5.77	50	10	160	220	Purse-seines:		
In menhaden fishery	4	292.75	31,500	300	1,200	33,000	In vessel fisheries	49	26,800
In oyster fishery	3	303.85	9,000		300	9,300	Total	321	30,154
In whale fishery	6	920.04	34,000		a36,000	70,000	*Traps.*		
Total	92	5,422.25	204,000	14,325	117,835	336,160	Weirs, &c	1	500
Boats.							Lobster and eel pots	8,290	8,290
In vessel fisheries	284		15,140			15,140	Total	8,291	8,790
In shore fisheries	188		16,575	3,430	5,500	25,505			
Total	472		31,715	3,430	5,500	40,645			

a Includes gear.

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$1,026,360
Fresh fish.				
Alewives	192,800			1,328
Cod	5,482,825			82,242
Cunners	100,000			500
Cusk	313,804			2,193
Eels	5,000			250

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Fresh fish—Continued.				
Flounders	45,000			$675
Haddock	8,459,217			112,508
Hake	783,260			4,700
Halibut	260,000			9,100
Herring	1,163,150			5,816
Mackerel	2,206,421			29,345
Menhaden	221,400			332
Pollock	626,611			2,506
Shad	128			6
Smelts	6,000			150
Swordfish	15,750			472
Mixed fish	829,000			4,145
Total	20,709,866			256,268
Dry fish.				
Cod	1,462,500	585,000		21,060
Cusk	6,500	3,250		88
Haddock	42,700	10,250		325
Hake	280,000	126,000		2,016
Pollock	47,500	19,500		332
Total	1,839,200	750,000		a 104,000 23,821
Pickled fish.				
Alewives	31,250	25,000		500
Bluefish	5,362	3,300		82
Cod	61,000	30,500		762
Herring	877,656	702,125		10,532
Mackerel	6,569,700	4,379,800		125,919
Swordfish	38,500	22,000		715
Mixed fish	15,000	10,000		250
Halibut fins	7,875	6,300		252
Tongues and sounds	50,000	40,000		1,500
Total	7,656,343	5,219,025		140,512
Canned fish. b				
Clam chowder		36,000	36,000 cans	7,500
Fish balls		264,000	264,000 cans	38,500
Fish chowder		36,000	36,000 cans	7,500
Smelts		38,400	38,400 cans	4,800
Total		374,400	374,400 cans	58,300
Shell fish.				
Lobsters	1,390,800			50,996
Oysters			15,400 bushels	c 325,025 15,000
Clams, for food			34,940 bushels	17,470
Total				409,091
Miscellaneous.				
Fish oil			20,000 gallons	8,000
Fish guano			1,000 tons	6,000
Fish spawn			300 barrels	975
Fish sounds (dried)		2,200		1,980
Irish moss		45,000		1,575
Seaweed			400 tons	400
Products of whale-fishery—sperm oil			10,270 gallons	15,438
Total				34,368

a Enhancement on dried fish prepared as "boneless" in Boston, but accounted for elsewhere.
b Exclusive of salt mackerel canned in Boston.
c Enhancement on southern oysters.

67. BOSTON AND ITS FISHERY INDUSTRIES.

GENERAL DESCRIPTION OF THE CITY AND ITS FISHING BUSINESS.—Boston is the largest city in New England in regard to commerce as well as in population. It also has the finest harbor of New England, and its shipping business, together with its foreign and domestic trade, is very extensive. It is a great railroad center, being the terminus of all the principal lines in New England. It has several historical landmarks, as the Old State House, Old South Church, Faneuil Hall, Bunker Hill, and Dorchester Heights. It was settled in 1631, and was called Shawmut by the Indians. The settlers called it Trimountain, because of its three hills. It received its present name as a token of respect to the Rev. John Cotton, a minister of Boston in England, and afterwards minister of the first church here. The population in 1790 was 18,038; in 1870, 250,526; and in 1880 it had increased to 362,839, making it the fifth city in the country in respect to population.

From the early colonial days to the present time, Boston, although never having a large fishing fleet in comparison with Gloucester, Marblehead, and other New England ports, has been recognized in the fish trade as a central receiving and distributing port for all points, both domestic and foreign. Many vessels from the other New England fishing ports, as well as from the Provinces, bring their catch direct from the fishing grounds to this port for a market, or, returning to their home port to land and cure, their cargoes are finally brought here.

According to Sabine (Report on American Fisheries, 1852), Boston had vessels fishing on the Newfoundland Banks as early as 1645. The first exportation of fish from Boston was in 1633. The adventure was to one of the southern colonies, and Governor Winthrop appears to have been interested in it. The vessel, which was laden with furs as well as the products of the sea, was wrecked on the outward passage when near the capes of Virginia.

The fishing business, which has undergone many changes within the past generation, may at present be divided into two distinct classes, the fresh and the salt or cured fish trades, of nearly equal capital. The latter branch is no larger than it was ten or twenty years ago, and has not advanced with the country and other industries. The fresh-fish trade has steadily increased, the total business showing that as much fish are caught and consumed at the present time as in the past, when the foreign and domestic shipments of salt fish were much greater.

The fishing fleet belonging to Boston in 1879 numbered 76 vessels, aggregating 4,467.87 tons, and valued at $165,300, exclusive of their gear and outfit. The total value of the fleet, including the value of gear and outfit, such as boats, nets, seines, salt, ice, and provisions, was $312,974, and the total number of men in the crews was 868. Of the total fleet, 5 vessels, measuring 462.30 tons and valued at $14,500, were idle throughout the year; 60 vessels, measuring 2,780.41 tons, were employed in the food-fish fisheries; 1 small vessel, of 5.77 tons burden, engaged exclusively in the lobster fishery; 4 steamers, measuring 292.75 tons, followed the menhaden fishery; and 6 vessels, of 926.64 tons burden, were employed in the sperm-whale fishery.

The sixty vessels engaged in catching food-fish made trips lasting only a few days, fishing near home, and usually returning with fares of fresh fish. About one-third of these vessels followed the mackerel fishery from April till November, bringing their fares in fresh or curing them on board.

No Boston vessels are engaged in the George's or Grand and Western Banks salt-cod fisheries, but the supply of fish from these banks for the Boston market comes from other New England ports and from the Provinces. The whaling vessels in 1879 landed 18,270 gallons of sperm oil, valued at $15,438. In addition to the fleet of fishing vessels, there were one hundred and nineteen sail-boats and row-boats, valued, with their outfits, at about $20,000, that fished in and about Boston Harbor. These boats gave employment to three hundred and thirty-five men. Their catch included all

the food species of shore fish, lobsters, and clams. During the latter part of September and the first of October they take large numbers of shore-herring, and in the winter, quantities of haddock. In 1879 forty-five of the larger size boats took 1,990,062 herring in number, and 3,250,000 pounds of other fish.

Comparing Boston as a fish market with its importance as a fish-producing center, we find that the aggregate value of fish and fish products annually received and distributed by the fish dealers is over $5,000,000, exclusive of $700,000 worth of oysters, while the value of the catch by the fishermen and fishing vessels of Boston is about $1,000,000. The total capital invested in the various branches of the fishing industry in Boston and the neighboring towns included in the same customs district is $3,218,949. This amount includes $1,388,200, the value of wharves, storehouses, and fixtures; $225,000, the value of factories for the preparation of canned and boneless fish; and $1,190,000 additional cash capital. If to the total capital as above be added the investment in related industries, such as the net business, the oil-clothing business, and isinglass factories, the aggregate capital dependent on the fishing industry would reach a much larger figure.

The total number of men directly employed in the fishing industries is about 2,500, to which number may be added several hundred who are engaged in the manufacture of nets, barrels, boxes, and other articles used in the fisheries.

THE TRADE IN DRY AND PICKLED FISH.—Previous to the year 1815 not a single firm in Boston was engaged exclusively in the sale of dry and pickled fish, this business all being carried on by the wholesale grocers, who bought the cured fish direct from the vessels and disposed of them mostly to the New England trade. The first wholesale fish store in Boston for the purchase and sale of dry and pickled fish was opened on Long wharf in 1815 by Mr. Ebenezer Nickerson, and for fifteen years he was the only exclusive salt-fish dealer. In 1830, two other firms engaged in this branch of the fishing industry, and as it steadily grew in importance other firms started, until at the present time there are sixteen wholesale dealers in dry and pickled fish. Of the extent of the business in those early days we have no record, except the custom-house record of exports and the meager report of the State inspector. The fishermen themselves, with very few exceptions, to the present day, keep no account of their business, even from one trip to another. An exceptional good year's business is remembered and handed down as a tradition from year to year. Through the enterprise of the late Mr. Franklin Snow (a dealer for over twenty-five years), the Boston Fish Bureau was organized in 1875. It is an association of the salt-fish dealers for a bureau of information and statistics. Since its organization the records are more complete than ever before. We are indebted to it for tables of the receipts from foreign and domestic ports for the past few years.

In the early history of the business it was not only confined mainly to New England trade, but to the crude article. The dry fish were tied up in bundles, with or without mats or other covering, and pickled fish were packed in barrels and smaller cooperage packages. At the present time fish are taken from the vessels into the large packing and manufacturing establishments, where they are sorted and rapidly transformed into packages of "boneless," "minced fish," "fish-balls," and various other specialties. They are put up in boxes of all sizes from 1 to 500 pounds, or are packed in tin cases of different sizes, neatly labeled and boxed, and, with the larger packages of whole, half, quarter barrels and kits, are loaded into cars at the door to be shipped to all parts of the country. This improvement over the old manner of doing business has resulted in a much wider field and increased trade, and Boston-packed preparations of fish are now found in nearly all the grocery stores from the Atlantic to the Pacific. New England caught fish are noticed in the daily market reports of San Francisco and Oregon as much as at home, and command a

higher price than the catch of the Pacific. Not the least among the desirable results secured by the improved methods of packing is the clean and attractive appearance of the packages as compared with the former loose mode of shipping.

Boneless fish is dry cod, hake, cusk, or haddock, from which the skin and bones have been removed. The stripped fish is then cut up into small or large pieces, and packed in various-sized boxes. Simple as this process is, and always in use since fish have been used for food, it has been protected by patents issued in 1868 and 1869, causing an endless amount of trouble among the manufacturers, a royalty fee being charged.

During the past five years this mode of placing fish on the market shows a large annual increase. Boneless fish is packed mostly in small wooden boxes of convenient sizes, holding from 5 to 40 pounds, though a small amount is put up in paper boxes of 3 to 5 pounds each. This excellent article has become very popular with all classes. Codfish commands the highest price, while cusk, haddock, and hake follow as to value. During the year 1879 the aggregate amount of fish of all kinds cut up as boneless amounted to 6,502,050 pounds. The loss or shrinkage in weight is from 20 to 28 per cent. on cod and cusk, and about 30 per cent. on hake, which leaves the aggregate net amount of prepared fish 5,201,640 pounds. The industry gives employment to one hundred and fifty men during the active season, or an average of eighty men during the entire year.

In the infancy of the business the waste was more than a dead loss, being an incumbrance and additional expense for removal, and was gladly given away to any one who would remove it. As soon as its fertilizing qualities became known a demand sprang up, and from 50 cents to $1 a ton was paid for it. The price advanced from time to time, as the demand increased, until, in 1879, $6 a ton was paid for fish skins and bones for the manufacture of guano and fish-glue.

The sixteen firms at present engaged in handling dry and pickled fish and oil occupy the whole or part of nineteen wharves in East Boston and the city proper. The amount of capital invested in this branch of the fishing business, including the value of the wharves, is about $1,500,000, and the number of hands employed is three hundred and seventy-nine. During 1879 the amount of dry fish received in Boston was 201,963 quintals of cod, haddock, hake, pollock, and cusk, about one-sixth of which came from the Provinces, and the balance from fishing ports in Maine and Massachusetts. The receipts in 1880 were 221,103 quintals of the same varieties of fish, and in 1881 the amount was increased to 244,967 quintals.

The same firms that deal in dry and pickled fish also sell smoked herring and bloaters, that are received from Eastport and other parts of Maine and the Provinces. The total receipts of these fish in 1879 were 460,349 boxes of herring and 23,077 boxes of bloaters. In 1880 the amount was 443,597 boxes of herring and 20,603 boxes of bloaters. The receipts in 1881 reached 612,412 boxes of herring and 30,429 boxes of bloaters.

The trade in pickled fish is extensive, and includes mackerel, herring, alewives, salmon, salmon-trout, and shad, received from New England fishing ports and from the Provinces. About half of the total receipts of mackerel are from the Provinces, as is also the case with the receipts of herring, while alewives, salmon, salmon-trout, and shad come chiefly from the Provinces. The total amount of pickled fish received by Boston dealers in 1879 included 167,444 barrels of mackerel, 56,844 barrels of herring, 6,522 barrels of alewives, 6,013 barrels of salmon, 1,437 barrels of salmon-trout, and 3,042 barrels of shad. In 1880 the amount received included 196,493 barrels of mackerel, 55,802 barrels of herring, 7,033 barrels of alewives, 2,892 barrels of salmon, 698 barrels of salmon-trout, and 1,975 barrels of shad. Of the total receipts of mackerel in 1879, 15,275 barrels were taken by Boston vessels, 34,138 barrels were landed in Boston by mackerel vessels belonging to other New

England ports, 33,818 barrels came by freight to Boston from domestic ports, and 84,213 barrels from the Provinces.

The total quantities of dry, pickled, and smoked fish received by the Boston fish dealers during the years 1876 to 1881 is shown in the following table, compiled from the annual reports of the Boston Fish Bureau. None of these fish, with the exception of part of the mackerel, are taken by Boston vessels, but are received from other fishing ports of New England, or from the Provinces, by steamer, rail, or coasting vessels, and are sold in Boston or distributed over the country, either in the same condition as received, or otherwise prepared for use. The total value of these fish received in 1879 is estimated at $3,842,043. The Boston mackerel fleet includes vessels owned in Boston, and also several belonging to Cape Cod and other places, but that pack their catch in Boston.

The following table shows the receipts of pickled, smoked, and dry fish, by Boston fish dealers, from 1876 to 1881:

Kinds.	1876.			1877.			1878.		
	Domestic receipts.	Foreign receipts.	Total.	Domestic receipts.	Foreign receipts.	Total.	Domestic receipts.	Foreign receipts.	Total.
Pickled fish.									
Mackerel ..... barrels..	82,935	43,612	162,031	35,529	86,356	142,344	31,881	78,689	143,028
Mackerel, Boston fleet ..... do....	36,384	.....		20,450	.....		32,458	.....	
Herring ..... do....	17,609	76,251	93,860	19,851	58,097	77,948	22,810	42,300	65,110
Alewives ..... do....	910	6,263	7,173	2,026	1,252	3,878	4,014	3,117	7,131
Salmon ..... do....	.....	2,720	2,720	.....	5,686	5,686	.....	3,906	3,906
Trout ..... do....	.....	159	159	.....	834	834	.....	203	203
Shad ..... do....	11	541	552	.....	893	893	.....	1,192	1,192
Smoked fish.									
Herring ..... boxes..	266,906	65,180	332,086	282,062	180,931	462,993	214,715	171,508	386,223
Bloaters ..... do....	10,824	.....	10,824	18,495	.....	18,495	17,629	.....	17,629
Dry fish.									
Cod ..... quintals..	111,690	7,818	119,508	126,140	20,509	146,649	174,624	9,034	183,658
Hake ..... do....	16,504	1,118	17,622	30,149	14,723	44,872	45,700	10,973	56,673
Haddock ..... do ...	3,021	1,240	4,261	4,916	6,309	11,225	9,683	1,680	11,363
Pollock ..... do....	1,288	2,267	3,555	4,241	3,363	7,604	2,601	2,247	4,848
Cusk ..... do....	2,471	.....	2,471	2,291	330	2,621	2,917	.....	2,917
Boneless fish ..... boxes..	7,029	.....	7,029	7,138	.....	7,138	3,015	.....	3,015

Kinds.	1879.			1880.			1881.		
	Domestic receipts.	Foreign receipts.	Total.	Domestic receipts.	Foreign receipts.	Total.	Domestic receipts.	Foreign receipts.	Total.
Pickled fish.									
Mackerel ..... barrels..	33,818	84,213	167,444	30,761	105,730	196,493	73,053	61,850	204,929
Mackerel, Boston fleet ..... do....	49,413	.....		54,002	.....		69,669	.....	
Herring ..... do .	26,146	30,698	56,844	26,492	29,310	55,802	12,420	44,906	56,998
Alewives ..... do....	795	5,727	6,522	1,351	5,682	7,033	2,184	8,104	10,288
Salmon ..... do....	145	5,868	6,013	560	2,332	2,892	980	1,997	2,977
Trout ..... do....	.....	1,437	1,437	.....	698	698	.....	1,147	1,147
Shad ..... do....	.....	3,042	3,042	.....	1,975	1,975	.....	1,152	1,152
Smoked fish.									
Herring ..... boxes..	291,473	168,876	460,349	262,482	118,115	443,597	337,830	274,582	612,412
Bloaters ..... do....	23,077	.....	23,077	20,603	.....	20,603	29,619	810	30,429
Dry fish.									
Cod ..... quintals..	128,912	21,989	150,901	124,338	30,151	163,489	125,450	56,852	182,302
Hake ..... do...	27,069	6,610	33,679	32,222	8,810	41,032	41,021	7,901	48,922
Haddock ..... do.	9,155	922	10,077	9,172	976	10,148	5,792	1,631	7,423
Pollock ..... do....	1,598	3,437	5,035	1,523	2,762	4,285	1,773	3,020	4,793
Cusk ..... do....	2,059	212	2,271	1,362	187	1,549	1,469	38	1,507
Boneless fish ..... boxes..	5,915	.....	5,915	9,646	54	9,700	14,293	316	14,606

THE FRESH-FISH BUSINESS.—From the first settlement of Boston until the year 1835 the fresh-fish business was carried on only as a retail trade. Ice was not then used, so that in the summer season but limited quantities of fish could be sold, and then only to the near towns. During the winter, fresh fish were teamed inland as far as Albany and Montreal. The catch came from Massachusetts Bay and was supplied by the small fishing vessels from this and neighboring ports. During cold weather it was brought in a frozen condition by teams from Cape Ann and other ports. The oyster business was of small importance, and was carried on from two hulks covered in and used for storage below and stores above. The oysters came mostly from Cape Cod, never from south of New York, and were not sold during the months of July and August.

As the demand for fresh fish increased, better facilities were needed to handle the catch. The first wholesale fresh-fish store was opened on Long Wharf in 1835, by Holbrook, Smith & Co. Their business in fresh fish was mostly during the winter and spring months, and through the warm weather their trade was confined to pickled, dry, or smoked fish. In 1838 this firm removed to Commercial Wharf, being the first fresh-fish firm on that wharf, which, at the present time, is the headquarters of the trade. There are now thirty-five firms on and near Commercial Wharf engaged in the wholesale fresh-fish business, and five retail dealers holding stalls in Faneuil Hall Market, receive large quantities of fish, especially fresh-water and rare species, from first hands. The capital employed in this trade, including the value of wharves and buildings, is about $1,000,000, and the number of hands employed is two hundred and seventy-five.

The total value of fresh fish received in Boston from all sources during the year 1879 was valued at $1,761,259, and included the following species:

Species.	Quantities.	Species.	Quantities.
Alewives ..... pounds..	1,308,234	Salmon ..... pounds..	1,351,995
Bluefish ..... do....	1,010,735	Salmon trout ..... do....	7,500
Brook-trout ..... do....	6,900	Scup ..... do....	17,500
Cod ..... do....	11,013,015	Shad ..... number..	257,097
Cunners ..... dozen..	38,000	Sheepshead ..... pounds..	4,850
Cusk ..... pounds..	950,747	Smelts ..... do...	096,101
Eels ..... do....	258,664	Spanish mackerel ..... do...	15,865
Flounders ..... do....	289,105	Striped bass and seabass ..... do....	118,951
Haddock ..... do....	17,447,962	Sturgeon ..... do....	4,000
Hake ..... do....	1,658,176	Swordfish ..... do....	863,154
Halibut ..... do....	3,650,285	Tautog ..... do....	38,887
Herring ..... number..	11,709,968	Whitefish ..... do....	23,004
Lake pike ..... pounds..	6,250	Yellow perch ..... do....	10,500
Mackerel ..... number..	11,724,943	Crabs, soft ..... dozen..	5,000
Pickerel ..... pounds..	144,075	Scallops ..... gallons..	2,000
Plaice ..... do....	26,712	Shrimp ..... do....	200
Pollock ..... do....	1,300,115	Terrapin ..... number.	2,000
Red snappers ..... do....	12,200		

About one hundred Boston vessels and large boats, and an equal number belonging to other New England ports, landed fares of fresh fish in Boston during 1879. The Boston vessels landed 1,599 fares or 15,558,000 pounds of cod, haddock, hake, cusk, flounders, and swordfish; 30 fares or 1,749,693 fresh mackerel in number, and 120 fares or 1,998,062 herring in number. The fleet belonging elsewhere landed 1,171 fares or 17,531,174 pounds of cod, haddock, swordfish, and other ground fish; 220 fares or 9,975,250 fresh mackerel in number; 18 fares or 548,892 pounds of fresh halibut, and 30 fares or 1,935,270 shore herring in number. Besides the above quantities of fresh fish landed by fishing vessels, there was a large amount received by rail, steamers, and sailing vessels, including 500,000 pounds cod, haddock, and other ground fish, 3,110,393 pounds of halibut,

1,351,995 pounds of salmon, and 232,229 pounds of fresh-water fish; also 7,866,636 frozen herring in number received from the Provinces.

The Boston vessels are manned by men of all nationalities, but those of Irish birth or descent appear to be the largest element in the market fishery. The men generally fish on shares, the owners of the vessel being entitled to one-fifth of the gross receipts, and the men dividing equally, after the cost of stores, tackle, bait, ice, and some other incidentals is deducted. The cook has an equal share with the fishermen. The vessel owners find boats and dories.

Codfish and nearly all species of ground fish are taken on trawls armed with from 500 to 1,500 hooks each, according to the depth at which they are to be used. The main line or ground line of the trawl averages about an inch in circumference, and is coiled in a tub or half-barrel, with the hooks arranged around the edge. From one to four tubs of trawl are carried by each dory, which may be manned by one or two fishermen. Having previously baited their hooks, the men row away from the vessel and set their trawls around her at a convenient distance, usually within hail. In shallow water the trawls are constantly underrun; the fisherman hauls in the fish caught and rebaits the hooks; but in deep water the trawls are generally visited and run only two or three times a day, owing to the great depth of water and the hard labor required to take care of so great a number of hooks and length of line. Codfish are taken in the spring by the market-boats in Ipswich Bay and on the Middle Bank, and by the Gloucester vessels on La Have and Brown's Banks, and after February 1 on George's Banks. During the summer and early fall the larger part of the supply comes from the South Channel and Middle Bank and all along the back of Cape Cod, and from November 1 to January 1 all the way from Swampscott to Ipswich Bay, wherever a ledge fit for the spawning fish presents itself. The total amount of fresh codfish received during 1879 was 11,013,915 pounds.

The amount of fresh haddock received during 1879 was 17,447,962 pounds, by far the largest amount of any single species. It is a favorite fish and is preferred by many to cod or other species of ground fish. It seems hardly possible that not many years ago this fish was thought of little or no value; none were cured, and only occasionally would a person use them fresh. The fisherman on George's Banks or elsewhere, fishing for cod, on being so unfortunate as to find only a haddock on his line, with a growl and a kick would send it back into the sea. Now these fish are sought after on George's Banks as well as on other cod-fishing grounds. They are taken in the same manner as cod on trawl or hand lines, and usually bring about the same price as cod.

Hake and cusk are found in deep water on muddy bottom, around the ledges and banks frequented by cod, and are taken by the same gear, bait, and equipments.

Halibut stands third in the aggregate number of pounds of fresh fish received, but leading all other single species in the value of the catch. They are taken for the fresh fish market on the borders of nearly all the banks. Many were formerly taken in shallow water, and some were gaffed as they followed those hooked to the surface, but the larger portion are now caught in from 100 to 250 and even 300 fathoms, on the edges of the banks. It is still related that when the first schooners fished on George's they did not anchor, but drifted across the shallows, taking several with the gaff for every one hooked, and a similar experience was met by the first vessel sent to Greenland, her crew having gaffed nearly 500 halibut in one day.

Swordfish are taken off the New England coast in considerable quantities, and during the year 1879 there were 863,154 pounds marketed in Boston. They are brought to market mostly by New Bedford and eastern vessels, and are captured with spears or lances.

Salmon are sent to this market from April to August, the earliest coming from the Kennebec and Penobscot, and the latest from the Labrador coast via Quebec and Montreal or the Inter-

colonial Railway. They are packed in large wooden boxes holding from 200 to 300 pounds, and during the last part of the season are frozen in large numbers for preservation until the next season's catch is obtained. Nearly all are taken by gill-nets, as the Canadian law forbids the capture of salmon in weirs and pounds, although the law is far from being strictly complied with. The amount usually received here is large, often in excess of the demand, at prices that are not remunerative to the shippers.

Bluefish, once almost unknown in this market, are sent here in large numbers. Their first appearance in Boston Bay in this century was in the year 1837, when the fishermen, finding themselves forced to fish in dories among the rocks for mackerel, "scow-banking" as it was called, discovered that the blue-fish invasion had drawn the mackerel to the shelter of the rocks and ledges. This fish is taken by hand-lines from Ipswich Bay to Sandy Hook, but principally in weirs on both sides of Cape Cod and along the coast of Rhode Island and Connecticut. Like the salmon it is preserved by being frozen, and can be procured the year round.

Bass are not a plentiful fish in this region, but some are shipped here from New Market, N. H., from either shore of Cape Cod, and from points south. They were formerly taken in great abundance along the shores of the old Plymouth colony and Cape Cod, principally by means of small seines, thrown from boats and hauled ashore.

Shad are supplied to the Boston market from almost every river and shore from the Potomac to the Saint Lawrence, some of the finest coming from the Bay of Fundy and Saint John River.

Flounders are caught by the smallest boats of the market-fishermen. They are little valued, and are chiefly sold to the poorer and foreign class; but the aggregate catch is quite large.

Eels are mainly supplied from various parts of Boston Harbor, and are chiefly taken in pots baited with broken clams, or chopped-up fish heads. When ascending the rivers and small streams in the fall, or leaving them in the early spring, large quantities are sometimes taken by obstructing the flow of water, and placing in the center of the stream a strong barrel pierced with auger holes, into which the eels creep, but out of which, curiously enough, they seem unwilling to stir. The barrels have been so filled at times as to suffocate a large part of the catch before morning. Very large and fat eels are sent here in winter from certain towns in Maine, as well as from various other points, but the eel is not valued as in Europe, and the market is easily overstocked.

Smelts are brought from Maine, Nova Scotia, and New Brunswick, where, during the winter months, they are seined under the ice in large quantities. The Massachusetts law forbids the seining of them, and but a small part of the market supply is of home catch. Over half a million pounds of eastern smelts come to this market yearly, and retail from 3 to 6 cents a pound. They often sell, in quantities, from 1 to 1½ cents per pound, and afford a cheap food-fish to the poorer classes, though these frozen smelts seldom retain the peculiar and delicate flavor of the recently caught fish. During the past winter, for the first time, quite a large amount were canned, being cooked in butter. They met with a ready sale, and a large business will probably be done in that line hereafter.

Previous to 1817 mackerel were caught with hook and line when under sail, or, as it was called, "drailing." Vessels usually carried twelve men, six being stationed on each side, and each man tended a pole from which three lines with hooks were suspended. The pole was made fast to the side of the vessel. This way of fishing always required a good breeze, and if the breeze died away no fish could be caught, although the vessel might be surrounded with them. In 1817, according to Rev. Elisha Kellogg, of Harpswell, Me., Captain Pote, of Freeport, Me., observed that the hake fishermen, by throwing the refuse overboard, called the mackerel around. From this hint he began chopping up mackerel with a hatchet and throwing it over to attract the fish to the side of the

vessel. The watch on deck at night chopped the bait, but only the captain threw it, and with so much economy that an iron spoon was used for that purpose. Captain Pote was very successful, and, keeping his method a secret for a long time, other fishermen said he had made a bargain with the evil one. From that time it is claimed that the practice of throwing bait and using the hand-line began. Mackerel are now taken by the market fishermen and American fleet almost exclusively with the purse-seine in deep water, and many are brought fresh to market from as far south as Cape Henry in the spring, and later in the season from off the New England coast, and as far north and east as Halifax in July and August. They are caught in weirs and gill-nets off Cape Cod early in the spring and late in the fall, and by the hand-line of the shore-fisherman among the ledges all along the Massachusetts coast. During the past season they have varied in size, and ranged in value from 25 cents to $25 per hundred. During the year 1879 there were received in Boston 11,724,943 fresh mackerel in number.

Herring are principally sold fresh in winter, when the supply comes from the shores and islands of Eastern Maine and New Brunswick, where vessels fish all winter. The fall catch off the home coast in October and November freely supplies the market at that season, but the herring is not then highly valued as a fresh-fish food.

Alewives are sent here to a small extent in spring from the small rivers and inlets of this State, Rhode Island, and Connecticut, but most of them go to the smoke-house or are pickled for the West India trade.

Turtle and terrapin are not largely sold in this market. The former comes from the West Indies and South America, and the latter from Virginia, both of them chiefly via New York.

Tautog are caught in weirs and also with the hand-line, and are chiefly taken around Cape Cod. They are highly esteemed, but seem to be much less numerous than a generation ago.

Plaice are mostly caught off Cape Cod with the hand-line, with small but stout hooks.

Spanish mackerel are taken from the south shore of Cape Cod to New Jersey, but are counted a southern fish, and most of the 16,000 pounds annually received in Boston are taken along the southern coast.

Sturgeon, so largely handled in the Philadelphia and New York markets, are not much sought after here; but a few thousand pounds have been sold here for the past three years.

Red snappers are ordered by a few dealers from New York. More are seen in this market now than formerly, from 5,000 to 10,000 pounds a year being sold.

Sheepshead are even less called for than the red snapper, and are only occasionally received from the New York dealers.

Scup are taken principally along the south coast of Massachusetts, Rhode Island, and Connecticut. They are no longer as plentiful or as large as formerly, and during the past season have been smaller and scarcer than for many years.

Striped bass is another excellent fish. Once large and plenty, they are now small and scarce in the rivers of New England, and thus far the Canadian fish are seldom sent to the Boston market. Less than the amount once annually taken at a single one of the many estuaries frequented by these fish, appeared in the Boston market last year.

Salmon trout are received from Maine and the Dominion, and are sold here annually to the amount of 4 or 5 tons. The trout business is crippled by the harshness of protection laws, which refuse the dealers the privilege of importation during our close season, at which time the trout of more northern waters are in their best condition.

Sea perch, or cunners, were taken in much larger quantities a few years ago than at present; 38,000 dozen were sold in Boston during 1879. The market could dispose of many times this

amount if they were taken, but for some unexplained cause the supply has largely decreased during the past few years.

A few pompano, bonito, shrimps, soft-shell crabs, English prawns, and other species prized by epicures, are found in this market, but the aggregate quantity is small. The bulk of the fresh-fish business is in ground fish, salmon, halibut, lobsters, and clams. Salmon, shad, bluefish, mackerel, and any species that are taken only at certain seasons of the year, can be had at any time in the frozen state. During the season when they are plenty they are spread out in huge refrigerators, charged with ice and salt, and frozen solid. They are then piled like billets of wood in other large refrigerators, where a temperature of about 10° above zero is maintained. They are taken from the refrigerators as wanted, being found frozen solid even during the warmest weather. The demand for frozen fish is not large, and only one firm pays much attention to freezing them. Dealers claim that the demand for fish that are out of season is too small to justify a great expenditure of time or money in freezing them.

Soon after being landed, fresh fish are packed in boxes holding an average weight of 425 pounds, with from 40 to 50 pounds of crushed ice packed with them. They are also packed in old flour barrels, holding from 200 to 225 pounds of fish, with 20 to 25 pounds of ice, the barrels being covered with tea-chest matting or sacking. They are then shipped to any part of the country, Chicago and Saint Louis being the practical western limit of destination. Dealers state that one-half of the total amount is consumed in New England, one-fifth in New York City and State, while Philadelphia, Baltimore, and Washington, with the Middle and Western States, consume the remaining three-tenths. New England orders are mostly shipped in barrels, while the large boxes are sent to the leading cities.

THE TRADE IN CANNED FISH.—During the past few years an extensive business has grown up in canned fish. Fish-balls, chowders, and uncooked mackerel packed in tin have found a ready market, and large quantities have been packed in Boston. No lobsters or clams are canned in Massachusetts, but that industry is centered on the coast of Maine, especially in the vicinity of Penobscot Bay. It is estimated that some 2,112,000 1-pound cans of lobsters were packed on that coast in 1879. Large as this amount appears, it is a fact that in years past an equal quantity has been packed at individual ports, but owing to the present scarcity of lobsters several of the large companies controlled by Boston and Portland capital are now obliged to open establishments in Nova Scotia, Cape Breton, and other parts of the Provinces.

During the year 1879, Boston firms packed in their factories in Boston and elsewhere, and distributed from Boston, 9,649 cases or 463,152 cans of lobsters, valued at $57,894; 8,400 cases or 403,200 cans of salt mackerel, valued at $33,600; 20,000 cases or 240,000 cans of fresh mackerel, valued at $90,000; 800 cases or 38,400 cans of smelts, valued at $4,800; 1,500 cases or 36,000 cans of fish-chowder, valued at $7,500; 11,000 cases or 264,000 cans of fish-balls, valued at $38,500; and 1,500 cases or 36,000 cans of clam-chowder, valued at $7,500. A large proportion of the products of the canneries controlled by Boston capital is distributed direct from the Eastern factories and does not appear in this report.

The duty on tin cans from the Provincial factories is so heavy as to practically shut them out of this market. A large part of the product of these factories passes through the United States in bond to the European markets. The products of the canneries are distributed all over the country, but principally west and south. There is also a large European trade in canned lobsters and a moderate demand for other fish productions in tin.

Of the various specialties, fish-balls is the only one that is protected by a patent, a Boston fish packer and dealer having obtained a patent for that article in March, 1878. They are com-

posed of nearly equal parts of choice codfish and potatoes. The fish are uncooked or parboiled, and the potatoes are washed, boiled, and pared, with the greatest attention to quality, cleanliness, and perfect cookery. The ingredients are then chopped as fine as possible by machinery, and at the same time are intimately mixed. The mixture is then put up in cans of 1, 2, or 3 pounds each, and subjected to a steam bath. They are then hermetically sealed, and are warranted to keep in any climate.

Canned salt mackerel is an old article in a new dress, being ordinary uncooked pickled mackerel with the heads and tails cut off and packed in 5-pound tin cans, one dozen cans in a case. They were introduced in 1879, and the packages being of convenient size for family use and handsomely labeled, have been quite favorably received. In 1879 there were 20,000 dozen cans, of 5 pounds each, packed in the Boston canneries.

The canning of smelts was begun late in the fall of 1879. They are thoroughly cooked in butter and packed in 1-pound cans, five dozen cans in a case. It is probable that large quantities of smelts will hereafter be preserved in tin.

A large export demand is promised for the various fish preparations in tin, and some large orders have already been filled for Europe, Australia, and the West Indies. Much improvement is constantly being made in the methods and styles of packing and labeling, and good satisfaction has been given, so that a constantly increasing demand is created, especially throughout the mining regions of this country and on the Pacific slope.

The canning industry in Boston employs seventy men, fifty-six women, and a capital of $40,000. The value of the products distributed from Boston in 1879, including those brought here from eastern canneries, was valued at $239,794.

THE LOBSTER AND CLAM INDUSTRIES.—The lobster industry of Boston is important, though not as extensive as when lobsters were more abundant. Over-fishing is said to have largely diminished the number annually taken, and stringent laws are needed to save this fish from extermination. They are received from Maine and from ports along the northern and southern shores of Massachusetts. In 1880, 2,425,125 lobsters were received in Boston, of which number 798,571 came from Maine, 300,000 from Cape Ann and vicinity, 360,954 from the south shore and Cape Cod, 50,000 from Nahant, 319,200 from Hull, and the remainder from Boston Harbor and its immediate vicinity. They are taken with the ordinary lobster pot, and are sold to the boiling establishments, where they are boiled in sea-water in large zinc-lined wooden tanks. They are then peddled in wheelbarrows throughout the city or shipped in barrels covered with tea-matting to various parts of the country, Chicago being the practical limit of distribution. Upwards of $60,000 is invested in this industry in Boston, and about one hundred men are employed.

Ninety men in and about Boston Harbor, with from forty to sixty dories, are employed during the greater part of the year in taking the soft or sand-clam, and as many more men follow the business occasionally. These clams are abundant on nearly all the flats and bottom-lands of Boston Bay. Large quantities are also received from Cape Cod, the south shore towns, Saugus River, and other points east. In all, some 75,000 bushels or 24,000 barrels of clams, costing on an average, including freight, $2 a barrel, are annually received in Boston. The outfit for a clam-digger consists of a dory, clam-rake, oars, rubber boots, and buckets, and costs about $15 for the boat and $7.50 for the other articles. Two men generally use a single boat, so that the individual investment is about $15 each.

The towns about Boston usually charge a license fee of $2 a year for the privilege of taking clams. The clams are in some cases bought up by small operators, who team them into the city,

though the diggers sometimes bring them to the city and sell them to the dealers from their boats at the wharves. Quahaugs are not generally taken, and but few sea-clams, razor-fish, or mussels. The supply of these bivalves and of scallops comes in small quantities from Cape Cod, no great amount being required to meet the demand.

THE TRADE IN OYSTERS.—The following extracts are from Mr. Ingersoll's census report on the oyster industry:

"1. HISTORY OF THE BUSINESS. When the natural beds in the Charles and Mystic Rivers gave out, Boston derived its oysters from the natural beds at Wellfleet and in Buzzard's Bay, but mainly from the first named. When, in turn, these became exterminated, toward the close of the last century, Boston dealers began to bring ship-loads of oysters from the shores of Buzzard's and Narragansett Bays, directly to the city in winter, and in the spring bedded at Wellfleet supplies for the ensuing summer and autumn. This has been explained in the account of Cape Cod, preceding this. These cargoes were taken up in the early fall, and sent in sloops and schooners to Boston. There the schooners were dismantled and tied up, or else the cargoes were transferred to hulks (old mastless vessels) and covered with so thick a layer of seaweed that no frost could get at them. These hulks were towed up into the docks close to Faneuil Hall, the recollection of which is preserved in the name of Dock Square, and there the oysters were sold to retail dealers, peddlers, and other customers, either in the shell or opened. Another favorite place for the oyster-vessels to lie was about where the Boston and Maine railway station now stands, in Haymarket square. At that time a canal, well remembered by old citizens, ran through from the Charles River to the City Wharf, following what is now Blackstone street. Another wharf for oyster-boats occupied the present site of the New England Hotel. Prices then ranged higher than now in some respects and lower in others. A bushel in the shell (at wholesale), or a gallon opened, cost $2; this was 'in liquor,' the 'solid' gallon being a recent invention. In the restaurants they charged ninepence (12½ cents) for a 'stew,' and fourpence (6¼ cents) for a 'dozen' of fourteen; or you could buy a better quality for 7 cents.

"There was a queer custom in vogue in those days, half a century ago. Besides the hawking about the streets, which has survived, a few men used to 'bag' them. Taking a bag of the bivalves on their backs, they would go in the evening to a house where there was a lively family, or, perhaps, where a company of friends had assembled. A carpet would be spread in the middle of the parlor on which the damp bag would be set, when the peddler would open the top, shuck an oyster, and pass it upon the half-shell to his nearest customer; then another for the next, and so on. Some lively scenes must have been enacted around that busy bagman, as his knife crunched rapidly through the brittle shells, and the succulent morsels disappeared down fair throats.

"Meanwhile more and more oysters were being brought every winter from Long Island Sound, Newark Bay, New Jersey, and southern waters, mainly in Cape Cod vessels, as I have shown, but somewhat, also, in Boston's own craft, for in those days there were more mackerel-fishermen hailing from the city than there now are.

"When oysters first began to be brought to Boston from Virginia, I could not ascertain with precision. The patriarch of the business, Mr. Atwood, of the firm of Atwood & Bacon, says that when he began dealing in Water street in 1826, oysters were being brought regularly from Chesapeake Bay in small quantities. He thinks the first cargo arrived about 1824. Mr. J. Y. Baker assures me that in 1830, 20,000 bushels from all quarters sufficed for Boston. About 1840 Gould estimated that 100,000 bushels would cover the consumption of all Massachusetts. Business rapidly increased, however, as the subjoined figures of the importations of oysters in cargoes from

Virginia, by Atwood & Bacon alone, will show. Besides these there were eight or ten other dealers in the city. Atwood & Bacon received—

Year.	Amount.	Year.	Amount.
	Bushels.		*Bushels.*
1846	32,575	1853	123,097
1850	90,354	1855	105,752
1851	90,587	1857	83,000

"These were by their own nine vessels alone; they had occasional cargoes otherwise. The largest lot (1853) cost them $41,853, which gives an idea of values. Freight in those days was 17 cents.

"At present very few oysters, indeed, are bedded in the vicinity of Boston, while of propagation there is none whatever. The grounds in the harbor were never very excellent, and became less so as the city increased in size. The encroachments of the building and filling in along the water-front overran the old limits of the bedding-grounds, and even the ancient natural beds. Where the Boston and Maine railway's car-house stands, a leading dealer not many years ago laid down 42,000 bushels in a single season. It was known as White Island at that time. The South Boston flats are being graded up into streets, and the Charles, Mystic, and Malden rivers, Bird Island, and other places were long ago abandoned, because the wharves or the sewerage of the city has destroyed their usefulness to the oysterman. Instead of bedding in his own harbor, therefore, the Boston dealer, as a rule, now rents ground in Buzzard's or Narragansett Bay, and lays down there (the principal grounds being about the mouth of Providence River) the Virginia oysters he proposes to use for his summer and autumn trade, or else he has abandoned the practice altogether. The process of bedding will be dwelt upon in the chapter upon the Rhode Island fisheries.

"The coming on of the war of secession found the Boston oyster trade in its most flourishing condition. More cargo-oysters were brought then than ever since; prices were high and profits large. The shipping interests fostered by it were large, too, for the competition of railways and steamers had hardly made itself felt. Most of the large dealers ran lines of vessels of their own, as well as chartering additional assistance in the spring. In the demand for fast sailers which the oyster business created, is found the origin of that celebrated model of sailing vessel that made America famous on the seas—the clipper ship. The first of these were made by Samuel Hall, a noted ship-builder, at his yard in East Boston, and were named Despatch, Montezuma, Telegraph, and Express. They were from 90 to 126 tons, old measurement, and carried an average cargo of 2,500 bushels of oysters. Six months in the year these clippers were devoted to bringing oysters from Virginia. There were 35 or 40 of these "sail" running, and in the summer they would go fishing. The freight tariff on oysters was then 20 cents, and during the war it went as high as 25 cents a bushel.

"The war interfered sadly with the business of oystering. Often the military operations did not admit of the cultivating and raking of the beds in Virginia and Maryland, or of the schooners from northern ports going where they wished to buy. A period of higher costs and shortened sales was in store for the dealers, and they have not yet quite recovered the prosperity of 1860. The greatest period of depression was 1874–'75, when the business was almost a failure. I think none of the dealers 'suspended,' however.

"In the course of this business, as long ago as the traditions of the trade go back, a few bushels were now and then laid down in various parts of the harbor to keep them from spoiling. But this

was not at first a regular and systematic thing. The bedding-grounds were usually in the Charles, Mystic, Malden, and Pines Rivers, often above the bridges, or on the Winthrop shore. Later all the dealers bedded on the South Boston flats, which are now being wholly filled up by the New York and New England Railway. There was a large, oval, bare space here, occupied by all the dealers in the city, who had it regularly divided. Mr. J. H. Wiley's father's portion was at the extreme end, and was bounded by eel-grass. He experimented by putting oysters over, upon, and among the eel-grass, and found that they did far better than those on the open flat, which had been occupied for a long time, and ebbed dry. Mr. Wiley supposed that the reason was, that it was new ground, from which fresh and plenteous nourishment was to be derived. The grass afforded so much protection, also, that many oysters used to survive the winter.

"At present (1879–'80) the only vessels, so far as I could learn, registered in Boston and engaged in the oyster-carrying trade, are the following schooners, all the property of a single firm:

Name.	Tons.	Name.	Tons.
William H. West	68	J. M. Ball	87
Eddy Pierce	90	Neponset	74
Alice	89	Longwood	66
Barty Pierce	95	Leona	100

"2. PRESENT CONDITION OF THE OYSTER BUSINESS.—Another great change from ancient methods of conducting the business has been caused by the introduction of opened oysters from Norfolk. These are received twice a week (Tuesdays and Fridays) by steamer direct from Norfolk, and on other days, to a less extent, by steamer from Norfolk to New York, and thence by railway. In the neighborhood of 250,000 gallons were thus handled in Boston during the winter of 1879–'80, for they come only between September and April. They are shipped in barrels and kegs. The effect of this innovation has been very marked upon the trade; whether for good or ill there are two opposite opinions, the general verdict being that this feature works against the best interests of the trade. In their favor, it is said, in general, that they can be sold cheaper than any other oysters, and hence are accessible to the poorer class of people; that they are as good as the cargo-oysters, and that in the increased number sold is compensation for the diminished percentage of profit. I will quote some opinions expressed to me in this direction:

"The Boston Oyster Company considered the innovation of Norfolk opened oysters not unfavorable to business generally, although hurtful to the cargo-trade. Although higher profits were received five or six years ago, three times as many gallons are sold now as then, and hence dealers can afford to take less. Selling more cheaply a grade of goods equal to the old stock opened here, they give better satisfaction and sell more. There is less risk, also, than with cargoes, in which they had relinquished large dealings. They washed all their oysters from Norfolk carefully, and had heard no complaint of ill-health resulting from eating them.

"The Chesapeake Oyster Company deal almost wholly in opened oysters, and believe in the Norfolk trade, for the same reason as given in the report of the 'Boston' company, and say that, with their refrigerator barrels, they have no trouble with warm-weather losses. One of the advantages of this new business is, that a man can begin it with small means, since the stock may be procured in quantities as small, or large, as desired.

"R. R. Higgins thought the oysters opened in Norfolk as good by the time they got here as those of the same grade opened here out of cargoes. He used them largely, and had opened a branch house in Norfolk in order to compete with Norfolk shippers on their own ground. By sending to his customers full packages, he avoided the complaints against the Virginia shippers,

that they sent 'scant' barrels, pretending to allow for a 'swell' of the contents, which does not occur.

"This, I believe, completes the list of those who would not be glad to see the Norfolk opened oysters disappear from the market. Indeed, so strong is the prejudice, that an effort was made about two years ago to induce the legislature to forbid their importation into the State; but this failed it being opposed not only by certain consumers and carriers, but by two or three of the wholesale dealers themselves. In opposition to them it is asserted that their quality is poor; that they are unhealthy; that the losses attending them are greater than with cargoes, and that they unduly cheapen all superior grades of stock. Two grades are brought to Boston, but for one of the 'selected' come ten barrels of the 'common,' the cheapest and poorest oysters brought to the Norfolk market. The alleged injuriousness of them is said to arise from their too great age when they arrive. It is almost impossible, any way it is arranged, to get the stock from Norfolk to Boston's customers in less than a week. If they are put upon the steamer in Norfolk immediately upon being opened, come speedily, and the weather remains cold, little fault will be found. It is rare, however, that this favorable conjunction of circumstances occurs, and a large percentage of almost every cargo is thrown away. One firm dumped overboard 300 gallons out of a single shipment recently. Under such circumstances the wholesaler will save all he can, including now and then some he ought to throw away; and the same thing will occur in the shop of the retailer, so that frequently the consumer gets oysters not fit to eat. Rumors of sickness and death resulting are common enough, but I failed to trace any to a trustworthy origin in truth. They are often dirty, and are washed again and again, until the aroma and delectable flavor are all gone from their lacerated and rinsed remains. They are only fit to be cooked in a method calculated to disguise their insipidity, by the time Vermont, Maine, or Canada get them for dinner.

"Nor does it appear that a large increase of sales has followed the introduction of this new stock. Trade has changed rather than amplified, while prices have been reduced in a marked manner throughout the whole list. If, now, the wholesale dealer clears 5 cents a gallon on Virginia oysters, in shell or out, he thinks himself doing well. Most of the business is done on a much smaller margin. Considerable profit, however, is made on the 'superior grade' of Norfolk stock; but only a little of this is brought on. Worse than this, however, for Boston merchants, is the fact that Norfolk cuts out much of their regular custom. A man anywhere can buy 5 or 10 gallons and have them sent to him just (or very nearly) as cheap as the wholesaler who gets his thousand gallons. The natural result is, that many retailers and large consumers, like the hotels, do send direct to Virginia. With the cargo method this is out of the question. All consumers near Boston or other importing cities must go there for supplies. Take it all in all, Boston thoroughly deplores the innovation, but comforts herself with the conviction that already she sees signs of general dissatisfaction, and looks forward to a speedy abandonment of the new for the old method.

"A large variety of oysters are to be found on sale in Boston from widely different points. Those from the shore of Connecticut used to be highly esteemed, but they have gone out of the Boston market. The 'Cape' and 'Providence' oysters are better of late, and the expense of bringing them on is much less than from Connecticut. About five years ago the very choicest brand eaten came from Wareham, at the northern extremity of Buzzard's Bay. Now these are poor, and better ones come from Cotuit, on the 'heel' of Cape Cod, and the best of all (in my judgment) are from the Sandwich shore, particularly Monument River. The size, fine appearance, and saltness of the 'Cape' or 'native' oysters recommend them for 'bench' stock, to be eaten raw. You see

advertised also the Blue-point, Saddle-rock, Stamford, and Norwalk oysters, more familiar to New Yorkers; but they are kept for a special, small custom, as 'fancy.'

"3. EXTENT OF THE OYSTER TRADE.—It is not easy to get at the exact number of persons in Boston who derive their daily support from the oyster business. The hired help of the wholesale dealers amounts to about 125 persons the year round, with the addition of about 250 more who are engaged with greater or less steadiness to 'shuck' during the colder half of the year. The majority of these persons are married; and I believe that, including the dealers themselves, to multiply by four in each case would fairly estimate the number of souls represented—that is, the mouths fed. There are, then, in this wholesale trade, deriving their whole support, about 500 persons; deriving one-half their support, about 1,000 persons.

"It is asserted that there are about 1,000 retail shops, fish markets, hotels, and restaurants in the city where oysters form a regular part of the sales. I was unable to verify this, but am inclined to believe it rather under than over the actual number. It would be a low estimate to say, that an average of one family of 5 persons in each case is supported by the molluscan share of the business, which would add 5,000 persons to the 750 in the wholesale department, and give a total of 5,750 persons in Boston estimated to derive their living chiefly out of the oyster and clam. Most of the wholesalers run restaurants and lunch-counters. The wages paid vary with the kind of employment and the employer, all the way from $4 to $25 per week. The lowest rates are paid to the girls in the restaurant-kitchens, who get from $3 to $5 per week and their board, and to the waiters in the restaurants, who receive about $8 a week and board. The men who pack, attend to shipments and delivery of orders, who aid in bedding, and do the heavy work of the establishment, will average from $12 to $15 a week. The large addition employed between September and May are 'openers' or 'shuckers,' who are paid by the solid gallon, and work only when there are oysters to be opened. They are, as a rule, a rough, ignorant class of men. In summer they do ordinary laboring jobs, like working on the streets and carrying hods. Their pay has been a shilling (17 cents) a gallon for some years, but last season (1878–'79) 18 and occasionally 20 cents was paid; and in consequence of a strike on their part it is expected that 20 cents will be the ruling price in 1879–'80. It is rare that they earn more than $10 a week, and often not half that. The largest day's work at opening oysters that I could learn of was performed several years ago by a man in Atwood & Bacon's employ, who opened 45 gallons between 7.30 a. m. and 10.30 p. m.; but this was 'liquor' measurement, and he got only 10 cents a gallon for it. Most of the openers are married and have large families.

"Subsidiary to the oyster business in Boston is the disposal of the empty shells. These are used somewhat for filling in, particularly along the Atlantic avenue wharves, and are largely consumed by the gaslight companies to be burned into lime for purifying their gas. In addition to this there are two pulverizing establishments in East Boston that take large quantities. The shells are gathered for them by carters and boys of every grade, at odd times, from the saloons, the proprietors of which are glad to get rid of them, and taken to the factories, a few barrels at a time. The factories pay 8 cents a barrel, and often men are thus able to profitably employ their leisure. The shells are put into a crusher and then through bolts, and are thus ground into small fragments, from which the dust is sifted. The machinery employed is precisely that used for crushing bones, &c. There is a strong prejudice against the presence of any oyster-shell in the manufactured fertilizer, strange to say, and the broken shell finds a market only as food for poultry in place of fine gravel. The price is one-quarter of a cent a pound, and a barrel will weigh about 275 pounds. About 500 barrels, valued at $375, are sold annually by these factories to the henneries near Boston,

and an occasional barrel of the finer grade is sold to the bird stores, to be used in 'sanding' the floors of cages."

Statistical recapitulation of the oyster trade of Boston.

Number of wholesale dealers and shippers		10
Number of vessels engaged		8
Value of same		$20,000
Number of men hired by dealers—		
Annually	125	
Semi-annually	250	
		375
Annual earnings of same	$85,000	
Semi-annual earnings of same	35,000	
		$120,000
Number of sailors employed (three months)		40
Earnings of same		$2,500
Number of restaurant servants		1,000
Annual earnings of same		$500,000
Total number of families chiefly supported		1,500
Annual wholesales of—		
I. Native oysters (Cape Cod) ... bushels		15,400
Selling value of same		$15,000
II. Chesapeake "plants" ... bushels		*457,500
Selling value of same		$340,000
III. Fancy stock ... bushels		60,000
Selling value of same		$100,000
IV. Baltimore and Norfolk "open stock" ... gallons		350,000
Selling value of same		$250,000
Total wholesale value of oysters sold annually		$705,000

EXPORTS OF FISH PRODUCTS.—In the earlier history of the fishing industry the foreign demand was looked upon as of great importance. That it shows a decrease may be accounted for from a number of causes, among which is the fact that a constantly growing domestic demand, with a light catch during the past few years, has much of the time left the market bare for export. The home market calls for an entirely different and more profitable method of curing, that requires less labor and expense than curing for a foreign trade. Dry fish, for home trade, have an additional weight, being only lightly dried or pickle-cured, and bring as good prices as those that are hard-dried and carefully prepared for export.

The lack of steam transportation between Boston and the West Indies has at times diverted trade from this port to other markets, both domestic and foreign, where there are regular lines of steamers. For this reason a large part of our exports, being cleared from New York, does not appear on our home clearances. During the year 1879 there were about $75,000 worth of pickled fish and about $175,000 worth of dry fish exported from Boston via New York, and this amount added to the Boston clearances, $404,358, gives $654,358 as the aggregate value of Boston exports for that year. The value of fish exports direct from Boston was $781,621 in 1875, $788,196 in 1876, $619,325 in 1877, and $555,548 in 1878. During the five years from 1875 to 1879, inclusive, the total value of fish exported through the Boston custom-house was $3,149,050, of which $2,945,379 worth was of domestic production and $203,671 worth the production of the British Provinces or other countries.

The value of each year's exportation, and the countries to which fish have been exported, are shown in the following statements compiled at the Boston custom-house:

* Of these, 140,000 gallons are sold annually under the name of Providence stock.

Value of exports of domestic fish from Boston during each year from 1875 to 1879.

A.—DRIED OR SMOKED FISH.

Countries.	1875.	1876.	1877.	1878.	1879.
England	.....	$50	$862	$960	.....
French West Indies	$29,333	25,701	62,470	59,031	$15,480
British West Indies	1,418	10,330	10,200	24,849	4,131
British Possessions in Africa	2,512	1,980	4,050	5,754	2,638
Hayti	254,280	203,648	155,959	128,140	110,234
Dutch West Indies and Dutch Guiana	62,231	83,483	52,432	23,672	35,821
British Guiana	1,558	4,745	4,063	8,069	814
Azores, Madeira, &c	682	3,825	6,490	6,494	4,279
Cuba	8,257	2,957	2,880	3,533	6,587
Brazil	.....	.....	.....	654	.....
Nova Scotia, &c	5,868	86,421	12,388	38,355	31,860
French Possessions in Africa	120	75	48	1,096	.....
British Possessions in Australasia	.....	.....	.....	523	.....
San Domingo	6,300	3,069	2,470	1,113	.....
Danish West Indies	.....	508	6,272	7,044	71
Porto Rico	6,159	1,824	7,085	2,028	132
Newfoundland and Labrador	.....	350	96	1,730	.....
United States of Colombia	.....	69	164	147	.....
Sweden and Norway	.....	1,110	.....	743	.....
Liberia	.....	.....	1,639	207	.....
Portuguese Possessions in Africa	.....	.....	90	189	79
French Guiana	.....	.....	.....	7,103	28,626
Total	378,727	430,145	329,676	323,894	240,602

B.—PICKLED FISH.

Countries.	1875.	1876.	1877.	1878.	1879.
England	$1,619	$3,047	$2,808	$1,160	$5,999
French West Indies	7,833	8,198	17,660	14,491	5,498
British West Indies	3,424	10,636	12,440	10,879	5,791
British Possessions in Africa	1,653	468	86	2,556	918
Hayti	119,166	104,014	88,079	53,894	51,164
Dutch West Indies and Dutch Guiana	7,643	9,680	5,972	2,894	4,783
British Guiana	1,019	4,155	8,091	5,505	4,546
Azores, Madeira, &c	21	38	141	142	.....
Cuba	1,213	.....	.....	237	1,008
Brazil	30	.....	.....	.....	.....
Chili	30	.....	.....	.....	.....
Nova Scotia, &c	22,485	11,395	10,695	7,437	497
French Possessions in Africa	.....	.....	.....	343	.....
British Possessions in Australasia	1,618	4,112	2,150	8,065	715
San Domingo	8,635	4,196	2,782	1,250	.....
Danish West Indies	426	563	2,108	4,271	145
Porto Rico	4,150	472	2,017	1,837	469
Newfoundland and Labrador	125	.....	.....	1,932	.....
Belgium	.....	60	.....	.....	.....
Sweden and Norway	.....	8,814	7,912	5,122	.....
Liberia	.....	.....	788	715	269
Portuguese Possessions in Africa	.....	.....	.....	340	.....
French Guiana	.....	.....	.....	698	2,510
British Honduras	.....	.....	.....	.....	40
Total	181,090	164,788	164,629	123,708	84,301

Value of exports of domestic fish from Boston during each year from 1875 to 1879—Continued.

C.—Other Cured Fish.

Countries.	1875.	1876.	1877.	1878.	1879.
England	$126,522	$133,011	$73,207	$74,479	$35,566
French West Indies	86	105	1,030	504	242
British West Indies	718	1,003	113	90	475
British Possessions in Africa	1,543	240	2,072	1,962	343
Hayti	181	.....	315	.....	79
Dutch West Indies and Dutch Guiana	2,110	492	401	.....	48
British Guiana	355	651	60	232	224
Azores, Madeira, &c	91	104	161	1,000	.....
Chili	200	.....	330	520	.....
Nova Scotia, &c	2,029	114	350	1,536	489
French Possessions in Africa	105	.....	562	.....	.....
British Possessions in Australasia	7,090	6,441	11,573	13,591	11,700
San Domingo	227	.....	268	.....	.....
Danish West Indies	174	436	236	125	48
Miquelon, Langley, &c	95	172	.....	161	.....
Hawaiian Islands	54	.....	.....	.....	2,180
Newfoundland and Labrador	.....	220	.....	.....	.....
Belgium	.....	130	.....	.....	.....
United States of Colombia	.....	195	80	.....	.....
British East Indies	.....	.....	453	.....	.....
Cuba	.....	519	.....	108	52
French Guiana	.....	.....	.....	.....	.....
Total	141,589	144,733	91,211	94,308	51,446

D.—Fresh Fish.

Countries.	1875.	1876.	1877.	1878.	1879.
British Guiana	.....	.....	$340	.....	$42

Value of exports of foreign fish from Boston during each year from 1875 to 1879.

A.—Pickled Herring.

Countries.	1875.	1876.	1877.	1878.	1879.
Hayti	$1,989	.....	.....	.....	.....
Nova Scotia, &c	5,982	$150	.....	$48	.....
British Possessions in Australasia	978	.....	.....	.....	.....
Sweden and Norway	.....	4,954	$9,088	.....	.....
Total	8,949	5,104	9,088	48	.....

B.—Pickled Mackerel.

Countries.	1875.	1876.	1877.	1878.	1879.
French West Indies	$162	.....	.....	.....	.....
British West Indies	.....	$3,700	.....	$408	.....
Hayti	815	.....	.....	.....	.....
Nova Scotia, &c	4,300	.....	$75	434	$400
Porto Rico	.....	.....	.....	700	.....
Total	5,277	3,700	75	1,542	400

Value of exports of foreign fish from Boston during each year from 1875 to 1879—Continued.

C.—OTHER FISH, FREE OF DUTY, NOT ELSEWHERE SPECIFIED.

Countries.	1875.	1876.	1877.	1878.	1879.
England	$44,490	$29,390	$12,855	$4,372	$4,840
French West Indies	3,999	1,699	5,409	3,268	100
British West Indies	683	2,692	.....	.....	.....
Azores, Madeira, &c	.....	.....	.....	.....	500
Cuba	.....	.....	.....	.....	18,692
Nova Scotia, &c	.....	5,945	5,462	794	.....
British Possessions in Australasia	461	.....	80	3,554	1,537
Hawaiian Islands	.....	.....	.....	.....	616
Newfoundland and Labrador	76	.....	500	.....	.....
Scotland	.....	.....	.....	.....	1,022
Total	49,709	39,726	24,306	11,988	27,307

D.—OTHER FISH, SUBJECT TO DUTY, NOT ELSEWHERE SPECIFIED.

Countries.	1875.	1876.	1877.	1878.	1879.
England	$11,124	.....	.....	.....	.....
Hayti	.....	.....	.....	.....	$170
British Possessions in Australasia	5,158	.....	.....	.....	.....
Total	16,282	.....	.....	.....	170

IMPORTS OF FISH PRODUCTS.—The importation of fishery products from the British Provinces is an important element in the fish business of Boston. From statistics compiled at the Boston custom-house we find that the total value of fish and fish oils received in Boston from Canada and Newfoundland during the 10 years from 1870 to 1879, inclusive, was $9,362,754, which includes pickled mackerel $4,239,992, herring $1,351,193, fresh fish $307,955, other fish $2,840,417, and fish oils $623,197. The following tabulated statements show these imports in detail for each of the above years:

Value of fish imported into Boston from Dominion of Canada and Newfoundland during the years 1870 to 1877.

DOMINION OF CANADA.

Year.	Herring.		Mackerel.		Fresh fish.		Other fish.		Total.	
	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.
1870	$136,304	$36,537 50	$154,563	$30,175 74	$19,136	Free ...	$256,301	$14,840 41	$636,438	$125,682 37
Prince Edward Island	10,701	3,374 50	43,957	8,263 00	None.	..do.....	15,386	2,491 22		
1870 (total)	147,005	39,912 00	198,520	38,438 74	19,136	..do.....	271,777	47,331 63	.....	.....
1871	80,434	21,011 50	223,889	66,248 50	20,145	..do.....	108,402	20,997 76	438,870	108,857 76
1872	58,300	17,845 50	248,067	86,023 00	41,544	..do.....	248,934	61,218 18	596,935	165,086 68
1873	104,834	2,621 00	713,116	30,101 00	27,428	..do.....	245,706	8,861 00	1,091,084	41,583 00
1874	130,118	.....	455,977	.....	29,332	..do.....	415,821	.....	1,031,248	.....
1875	155,561	.....	489,680	.....	28,142	..do.....	246,796	.....	920,179	.....
1876	114,484	.....	297,836	.....	20,005	..do.....	132,258	.....	570,583	.....
1877	77,854	.....	723,527	.....	10,621	..do.....	214,142	.....	1,035,144	.....
Total	868,680	81,990 00	3,950,612	220,811 24	217,353	.....	1,883,836	138,408 57	6,320,481	441,209 81

Value of fish imported into Boston from Dominion of Canada and Newfoundland during the years 1870 *to* 1877—Continued.

NEWFOUNDLAND.

Year.	Herring.		Mackerel.		Fresh fish.		Other fish.		Total.	
	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.
1870	$20, 865	$5, 781	$101	$24	$1, 230	Free	$93, 228	$15, 004 04	$115, 424	$20, 809 04
1871	19, 439	5, 156	8, 844	2, 335	None.	..do	50, 656	8, 672 87	78, 939	16, 163 87
1872	12, 178	4, 095	869	258	718	..do	66, 528	10, 680 81	80, 293	15, 033 81
1873	18, 377	5, 922	26	9	4, 840	..do	61, 750	11, 528 00	84, 993	17, 459 00
1874	24, 749	270	None.		2, 861	..do	90, 807	757 00	118, 417	1, 027 00
1875	44, 468		14, 213		39, 681	..do	62, 211		160, 573	
1876	55, 392		None.		7, 874	..do	20, 517		83, 783	
1877	57, 753		8			..do	39, 208		96, 969	
Total	253, 221	21, 224	24, 061	2, 626	57, 204		484, 905	46, 642 72	819, 391	70, 492 72

Total value of fish imported into Boston from Dominion of Canada and Newfoundland from 1870 *to* 1877.

Provinces.	Herring.		Mackerel.		Fresh fish.		Other fish.		Total.	
	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.
Dominion of Canada	$868, 680	$81, 990	$3, 350, 612	$220, 811 24	$217, 353	Free	$1, 883, 836	$138, 408 57	$6, 320, 481	$441, 209 81
Newfoundland	253, 221	21, 224	24, 061	2, 626 00	57, 204	..do	484, 905	46, 642 72	819, 391	70, 492 72
Total	1, 121, 901	103, 214	3, 374, 673	223, 437 24	274, 557		2, 368, 741	185, 051 29	7, 139, 872	511, 702 53

Quantity and value of fish oils imported into Boston from Dominion of Canada and Newfoundland during the years 1870 *to* 1877.

Year.	From Dominion of Canada.			From Newfoundland.		
	Gallons.	Value.	Duty.	Gallons.	Value.	Duty.
1870	38, 786	$20, 700	$5, 169 70	54, 751	$30, 192	$8, 713 15
1871	44, 594	20, 101	4, 201 00	92, 061	52, 036	13, 553 40
1872	96, 220	42, 126	8, 460 15	81, 705	38, 817	7, 763 40
1873	68, 955	34, 052	312 00	47, 883	32, 335	6, 429 00
1874	74, 721	44, 254		56, 366	37, 660	1, 787 00
1875	96, 846	49, 332	212 00	13, 449	10, 265	
1876	69, 076	37, 340		8, 556	9, 471	
1877	135, 101	67, 141		8, 940	6, 327	
	624, 308	315, 046	18, 464 85	364, 611	217, 103	38, 245 95

Total quantity and value of fish oils imported into Boston from Dominion of Canada and Newfoundland from 1870 *to* 1877.

Provinces.	Gallons.	Value.	Duty.
Dominion of Canada	624, 308	$315, 046	$18, 464 85
Newfoundland	364, 611	217, 103	38, 245 95
Total	988, 919	532, 149	56, 710 80

Total importations of fish and fish oils into Boston from Dominion of Canada and Newfoundland from 1870 *to* 1877.

Products.	Gallons.	Value.	Duty.
Fish		$7, 139, 872 00	$511, 702 53
Fish oils	988, 919	532, 149 00	56, 710 80
Total	988, 919	7, 672, 021 00	568, 413 33

Quantity and value of fish imported into Boston from Dominion of Canada and Newfoundland during the years 1878 *and* 1879.

DOMINION OF CANADA.

Year.	Herring.		Mackerel.		Fresh fish.		Other fish.	Total.
	Barrels.	*Value.*	*Barrels.*	*Value.*	*Pounds.*	*Value.*	*Value.*	*Value.*
1878	28,667	$96,826	75,628	$524,637	507,950	$17,718	$167,896	$807,077
1879	30,325	94,800	77,338	339,729	257,640	11,165	253,618	699,312
Total	58,992	191,626	152,966	864,366	765,590	28,883	421,514	1,506,389

NEWFOUNDLAND.

1878	6,657	$25,590	2	$6	$644,000	$4,146	$24,500	$54,242
1879	5,066	12,076	195	947	90,000	369	25,662	39,054
Total	11,723	37,666	197	953	734,000	4,515	50,162	93,296

Quantity and value of fish oils imported into Boston from Dominion of Canada and Newfoundland during the years 1878 *and* 1879.

Year.	Dominion of Canada.		Newfoundland.		Total.	
	Gallons.	*Value.*	*Gallons.*	*Value.*	*Gallons.*	*Value.*
1878	66,581	$23,180	2,500	$512	69,081	$23,692
1879	148,511	52,623	35,969	14,733	184,480	67,356
Total	215,092	75,803	38,469	15,245	253,561	91,048

ICE AND SALT USED IN THE FISHERIES.—Ice is now considered as necessary as bait or other indispensable articles in the outfit of the market fishing vessel. Large quantities of ice are also used by the receivers of fresh fish. It is delivered at the wharf to vessels or stores in large blocks. When wanted for packing fish, it is cut up and shoveled into a crusher, where it is broken into small pieces, and is then freely used in packing fish in boxes for transportation to all parts of the country. Previous to 1845 it was seldom if ever taken to sea by the fishermen. Vessels in that year began taking ice on halibut trips, returning with the fish on ice. Although fish thus preserved were in good condition, they found a slow sale. Dealers said, "They have been on ice and that has spoiled them." Notwithstanding this prejudice, the use of ice became general, and, with the growth of the fish business, has shown a steady increase, so that vessels now use more or less at all seasons of the year. The amount taken on a trip depends on the state of the weather, the size of the vessel, and the probable length of the trip. In winter 1 or 2 tons, and in warm weather from 5 to 10 tons, are average quantities. The price is very changeable, an open or very cold winter permitting the harvesting of a short or full supply. During 1879 the price from January 1 to May 1 was $3.50 a ton, and from May 1 to January 1, 1880, $3 a ton. The winter of 1879–'80 being mild, but a very small crop of ice was secured in Massachusetts, and the supply came chiefly from Maine. The price advanced, April 1, 1880, from $3 to $4, and on May 1 was $5 a ton. The fresh-fish stores and vessels of Boston are supplied by the Union Ice Company, that employs thirty men and has a capital of $60,000.

According to the statement of James Emery, jr., and Charles W. Hallstram, of the Union Ice Company, the following quantities of ice were used in the Boston fisheries in each month of 1879:

Month.	Vessels.	Stores.	Total.	
	Pounds.	*Pounds.*	*Pounds.*	*Value.*
January	4,000	50,000	54,000	.....
February	8,000	.....	8,000	.....
March	86,000	394,000	480,000	.....
April	108,000	372,000	480,000	.....
May	857,370	1,374,717	2,232,087	.....
June	843,400	1,449,770	2,293,170	.....
July	1,293,434	1,558,320	2,851,754	.....
August	1,488,700	1,637,587	3,126,287	.....
September	1,555,600	1,990,387	3,545,987	.....
October	1,229,000	1,533,000	2,762,000	.....
November	236,000	701,000	937,000	.....
December	128,000	555,000	683,000	.....
Total	7,837,504	11,015,781	19,453,285	$32,410

Fishing vessels from many of the New England ports take more or less salt in bond from Boston. The Grand Bank cod-fishing vessels generally use Trapani salt; for mackerel, salt from Cadiz and Liverpool is preferred; while for herring Liverpool salt is mostly used. It is sold by the hogshead, holding 8 bushels, or 560 pounds, of salt. During 1879 prices rated very low; Cadiz salt sold at $1.25, Trapani at $1.35 to $1.40, and Liverpool 80 cents to $1.20 per hogshead. The present season of 1880 it has advanced considerably, and prices through the spring were as follows: Cadiz $1.50 to 1.65, Trapani $1.69 to $1.75, and Liverpool $1.20 per hogshead. Since the removal of a bounty on codfish in 1866, Congress has permitted the fishermen to use what salt is necessary for the cure of their fish free of duty. They do not seem to appreciate or consider it much of a grant to them as long as they have to pay what they think are excessive weighing fees; or, as they say, "the duty is yet on, only in another form." In 1799 Congress passed a law charging 50 cents for weighing 100 bushels of 56 pounds each. In 1816 this fee was increased to 75 cents, the Government weighing each bushel and paying for the labor. The tax or weighing fee was only on bonded salt. The fishermen receiving a bounty and paying a duty had no weighing fees to pay. This old law is said to have remained dormant for over fifty years, and was brought from its retreat by the officers of the Boston custom-house some years ago. The tax was collected at this port, and no other, for some time, until a protest was made which brought forth a general Treasury order to enforce it at all ports. As the law granting fishermen salt duty free provides for their payment of the *actual* weighing expenses, they seem to think the present tax of 7½ cents a hogshead unjust, excessive, and not the true intent of the law. For a vessel handling 500 hogsheads of salt this tax amounts to $37.50 as fees for a weigher who weighs only 10 or 20 hogsheads as an average, and all the labor-hire is paid by the vessel. Much complaint is heard at all ports in which the fisheries are carried on.*

The amount of salt withdrawn from the Boston custom-house in 1879 for use in the fisheries was 20,413,200 pounds, or 36,452 hogsheads, having a market value of $54,678. There are five firms in Boston, with a capital of $75,000 and employing fifty men, engaged in the importation of salt and supplying the fish trade as a part of their business.

*In the spring of 1882 Congress modified the customs laws, so that this unjust tax is now removed.

The quantities of salt withdrawn in bond from the Boston custom-house, from 1872 to 1880, for use in the fisheries, and the invoice value of the same, or the cost at the foreign port of lading, were as follows:

Year.	Pounds.	Invoice value.
1872	12,592,600	$11,824
1873	14,082,400	12,583
1874	16,663,600	15,084
1875	13,547,300	12,248
1876	14,824,700	14,415
1877	16,898,450	17,179
1878	19,065,040	16,313
1879	20,413,200	19,406
Total	128,147,050	119,052

INDUSTRIES RELATED TO THE FISHERIES.—The manufacture of isinglass from fish sounds is an important branch of business in connection with the fishing industry. The sounds are received from the various fishing ports and also from foreign countries. They are soaked and ground up into pulp, and the mass is then rolled into long thin sheets of excellent isinglass or glue, that is used for refining beer and for various other purposes. There are several isinglass factories in Boston, and two or three in other parts of the State, controlled by Boston capital.

During the past few years more attention has each year been given to the fertilizing qualities contained in the large amount of fish waste and scrap that was formerly constantly thrown away. Three of the fertilizer factories in and around Boston use fish products, and these factories make a specialty of this line, utilizing all the scrap and waste from the numerous boneless-fish factories, menhaden chum, and the large amount of refuse from the market fishermen, such as fish-heads and all kinds of unmarketable fish, for which the fishermen receive quite a sum. In fact, everything connected with the fish that was formerly thrown away is now utilized at the fertilizer factories.

The process of manufacture is simple, and varies but little in any of the factories. Fish scrap, bone phosphate, and sulphuric acid are the principal ingredients used by all the factories. The use of this fertilizing material has shown such favorable results that the demand is consequently on the increase. Dealers give the following as the distribution from the New England factories during 1879: New York, 40,000 tons; North Carolina, 20,000 tons; South Carolina, 20,000 tons; Virginia, 45,000 tons; Georgia, 45,000 tons; New England, 10,000 tons. Maryland and New Jersey take a less amount, and the newer States of the West as yet care for but little, if any, fertilizing compounds. A large amount is also exported to the West Indies. During 1879 the total amount of fertilizers manufactured in the three Boston factories was 14,000 tons, valued at from $25 to $35 per ton. The proportional part of the business belonging to the credit of the fishing industry is about $100,000 capital, ninety men, and $140,000 as the value of the product.

Of the large number of barrels, drums, boxes, and smaller packages required in the fishing business, Maine furnishes nearly all the barrels, one-fourth of the drums, and most of the large boxes used in packing fresh and dry fish. The boxes arrive in shooks, all ready to be put together as required. Kits, half and quarter barrels, for this market are mostly made at Townsend, Mass., where there are five factories and numerous small dealers. There is also one factory at each of the following towns in New Hampshire: Hollis, Brookline, Merrimack, and Milford. One-fourth of the products of the Massachusetts and New Hampshire factories are used by dealers in Boston, and the remainder in the Gloucester, New York, Philadelphia, and the Western Lake fisheries. The boneless-fish trade demand for boxes, holding from 5 to 40 pounds, is supplied from Middle-

borough and other small inland towns. Boston has five small shops that manufactured 18,000 drums and 10,000 barrels during 1879. These shops employed seventeen men, a capital of $10,000, and the value of the production was $23,000.

The towns of Hollis, Brookline, Merrimack, and Milford, N. H., produced 300,000 half and quarter barrels and kits; 75,000 of which were used in Boston. The capital invested at these places aggregates $50,000, and the value of the products is $75,000. The number of men employed is one hundred.

At Townsend, Mass., five factories, with numerous small dealers, employed one hundred and fifty men, with an active capital and machinery valued at $100,000. They produced 400,000 packages, worth $100,000. One hundred thousand of these packages were kits, holding from 10 to 20 pounds each; of which Boston dealers used one-third; Gloucester, New York, and Philadelphia one-third; the lake fisheries and cities of the West one-third. Messrs. B. & A. D. Fessenden, the largest manufacturers at Townsend, also have a factory at Sandusky, Ohio, where they made 100,000 quarter and half barrels during 1879, for the fish trade of the Great Lakes.

The number of boneless-fish boxes made in New England towns during 1879 was 400,000, valued at about $40,000. The capital employed in their manufacture was $20,000, and the number of men was twenty-five.

The total amount of capital employed in New Hampshire and Massachusetts in the manufacture of packages, chiefly for the Boston fish trade, is $180,000, and the number of men in the factories is two hundred and ninety-two. The number of packages produced in 1879 was about 1,128,000, valued at $238,000.

There are four establishments in Boston and Cambridge engaged in the manufacture of oil clothing and hats, used in various branches of business. The proportional part for fishermen's use gives average steady employment to one hundred persons the entire year, over three hundred being engaged at times during the year. The goods manufactured are mostly sold along the Atlantic coast north of the Potomac, though a small portion of them goes to the lake or river fishermen of the Middle and Western States. The goods manufactured are of excellent quality and design, and number over a score of varieties of suits, with as many grades and styles of head gear. The capital in this branch of business is about $42,000, and the number of hands employed is one hundred. The value of the products used in the fisheries is about $109,000.

The numerous ship-chandlery and hardware stores supply the fishing vessels to a limited extent with all that is required, but most of the outfit used on the fleet is furnished by the only exclusive fishing supply store of Messrs. Nickerson & Baxter. The sales of fish lines and hooks by this single firm during 1879 will give some idea of the extent of the fishing interest. Among their sales were the following items: 7,148 dozen tarred cotton fish lines, weighing 88,053 pounds, used for trawl and hand line fishing; 300 dozen imported hemp lines, of 4,500 pounds' weight, used in cod fishing; 908,767 pounds of white cotton hand lines, used for gauging; 25,000 gross of imported Scotch hooks; 50,000 gross of American manufactured hooks, mostly used for ground fishing. A large trade was formerly done in mackerel hooks, but at present the catch being mostly by seines, only a limited amount are used, so that of hooks for this fishing only 40,000 attached to metal jigs were sold. The aggregate sales of lines and hooks by this one firm was 1,001,320 pounds of fish line and 7,840,000 fish-hooks. We have noticed only the two leading specialties of the many numerous articles found in a supply store, in order to show something of the amount of the fishing industry. If we add to the above the amount sold by the numerous small dealers and ship chandlers, the aggregate would be much more. There is invested in this

business about $75,000 capital, and about twenty-five men are employed. The total value of sales of fishing supplies amounts to about $200,000.

The manufacture of nets and seines is an important industry, entirely dependent on the fisheries for its support. For many years Boston has done a large business in those articles, and at present has $300,000 invested in factories that give employment to seventy-one men and two hundred and four women. The value of nets and seines made by these factories in 1879 was $275,000. The first net factory in Boston was started in 1842, and until 1866 the work was done by hand. At the latter date machines were imported, and now most of the knitting is done by them.

68. MEDFORD, BRAINTREE, AND QUINCY.

MEDFORD.—Medford is a suburban town of Boston, on the Mystic River. Its history shows that it was once the seat of a quite profitable river fishery. Ten men now follow the business of taking alewives in the Mystic River at a point 6 miles from its outlet into Boston Harbor. The catch is small, because of the restrictions of the State law, which prohibits the use of seines or gill-nets. In 1879 the total catch was 600 barrels of alewives, worth about $1,200, sold to market fishermen of Boston for bait.

BRAINTREE AND QUINCY.—The towns of Braintree and Quincy, situated a few miles south of Boston, are not now concerned in the fisheries, though in past years they attained to considerable importance as fishing ports. An excellent review of the fishing interests of these old towns in past years is given in W. S. Pattee's History of Old Braintree and Quincy. From this work we learn that the town took action concerning its fisheries as early as 1755, and persons who engaged in the cod fishery were exempted from poll tax. In 1836 the business amounted to about $30,000, and employed ten vessels, that caught 6,200 quintals of cod, valued at about $18,000, and 1,750 barrels of mackerel, worth $12,242. About one hundred persons were employed in the industry. About the year 1840 two or three whaling vessels were owned here.

69. FISHING TOWNS FROM WEYMOUTH TO COHASSET.

WEYMOUTH.—The fishing industry of Weymouth is represented by one isinglass factory and one factory for making fertilizers. The former, in 1879, produced 70,000 pounds of isinglass, valued at $122,500. It employs forty men, and has a capital of $125,000. The latter factory employs a large number of men, and has a capital of some $300,000. About one-fourth of the material used in making the fertilizers is fish products, received from various parts of the coast. Six thousand tons of fertilizers, worth $180,000, were made in 1879. In former years this town had an alewife fishery; and in 1639 the General Court granted liberty to the town "to build a weare where it may not preiudice any mans p'priety."

HULL.—Hull is a little village situated in Boston Bay, at the extreme northern end of Plymouth County; it is 8 miles by water from Boston, and is almost entirely surrounded by water, being connected with the mainland of Nantasket by a very narrow causeway. For nearly 250 years the fishing business has been followed here to a greater or less extent. At the present time the only fishery receiving any attention is the lobster catch. There are 33 men engaged in this business; they own 33 boats, and set 3,240 pots about the ledges of Hull and Boston Bay. These pots are set in trawls, each containing 25 of them. A few men, usually not more than half a dozen, follow the business through the winter. April, May, September, and October are the best months in which to prosecute this fishery. During June, July, and August the catch is not only lighter but the quality of the lobsters caught is poorer, the fish at that season being, as the fishermen say,

soft lobsters. The State law, as to size, is said to be well observed; yet the catch yearly shows a decrease in size and number. The practice of wedging the claws of the lobsters is not followed here. The larger portion of the catch is sent to the Boston market. Occasionally large lobsters are taken in Boston Harbor. One weighing 16, and another weighing 21 pounds, were noticed among the catch of last year. A few small vessels are engaged in the shore herring fishery in October.

HINGHAM.—Hingham, situated 12 miles southeast from Boston, was in past years known as a fishing port of considerable importance. To this place at one time belonged a large number of vessels engaged in the mackerel fishery. As railroads and other industries of recent date sprang up, the fishery interest decreased from year to year. The harbor has been allowed to become obstructed, and the wharves to decay; and, by degrees, the port at last has ceased to be recognized as a fishing place of any importance. Three vessels received fishing licenses during 1879; two of them having been sold, one sail alone remains to represent the fishery industry of Hingham.*

COHASSET.—Cohasset, situated 20 miles southeast from Boston, with a fine harbor, at one time had a good fishing fleet, as is seen by the records of the custom-house. Formerly, numerous firms were engaged in the fisheries, but at the present time the port is noted more for its attractions as a seaside resort than for anything else. The fishing industry is now represented by only two firms, both of which are engaged in the mackerel fishery. They have been in the business for over fifty years, and in 1879 fitted out only six vessels. A few dories and small boats fish near the shore for cod and lobsters. A number of vessels formerly went from this place annually to the Grand Banks for cod; none have been since 1845, in which year three were sent. Ten men are engaged in gathering Irish moss. Five hundred barrels of it were produced in 1879. Twenty men are occupied in catching lobsters and shore fish. Marine products secured in 1879 were worth $34,339, and included 4,783 barrels of shore mackerel, 217 barrels of Bay of Saint Lawrence mackerel, 175,000 pounds of shore fish, 60,000 lobsters, and 500 barrels of Irish moss. The fishing fleet included eight vessels, aggregating 521.51 tons, ten dories, and ten lapstreak boats. The number of persons employed was one hundred and nineteen, more than half of whom were Portuguese.

G.—THE DISTRICT OF PLYMOUTH.

70. GENERAL REVIEW OF THE DISTRICT.

PRESENT EXTENT OF THE FISHERIES.—The fisheries in Plymouth district, which includes the towns of Scituate, Duxbury, Kingston, and Plymouth, are not nearly as important at the present time as in past years, when a large fleet of cod and mackerel fishermen sailed from these ports. An annexed tabulated statement shows the extent of the cod fisheries from 1815 to 1879. We find that in 1853 there were eighty-nine vessels of 25,595.86 tons in this fishery, and that they brought home 56,313 quintals of cod and 22,223 gallons of oil. In 1879 the product of the fleet was 12,500 quintals of cod and 3,465 gallons of oil.

The business of gathering Irish moss is largely carried on at Scituate. This business was begun here in 1853, and Scituate has now grown to be the headquarters in New England for that article. Shore fisheries for cod, mackerel, and other species are carried on to a small extent. A

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* In the summer of 1881 the schooner Exchange, the last of the once large Hingham mackerel fleet, was sold to Cape Cod.

considerable quantity of lobsters and clams are also taken along the shores and from the flats in the harbors.

The total capital invested in the fisheries of the district is $133,096, and the value of the products is $138,443. The number of persons employed is six hundred and eighty-six.

STATISTICAL SUMMATION FOR 1879.—The following statements give in detail the extent of the fishing interests of Plymouth district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	228	Capital in vessels and boats	$93,700
Number of boat-fishermen	414	Capital in nets and traps	7,396
Number of curers, packers, fitters, &c	44	Other fixed and circulating capital	a 32,000
Total	686	Total	133,096

a Cash capital, $18,000; wharves, shorehouses, and fixtures, $14,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	25	1,129.67	$33,750	$9,250	$33,450	$76,450	In vessel fisheries	8	$96
Idle	1	54.58	600			600	Purse-seines:		
Total	26	1,184.25	34,350	9,250	33,450	77,050	In vessel fisheries	5	2,800
Boats.							Total	13	2,896
In vessel fisheries	121		8,100			8,100	*Traps.*		
In shore fisheries	241		8,320	2,130	3,100	13,550	Lobster and eel pots	4,500	4,500
Total	362		11,420	2,130	3,100	16,650			

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value prepared.
Grand total				$138,443
Fresh fish.				
Cod	945,000			14,175
Cunners	15,000			75
Cusk	1,000			7
Flounders	2,000			30
Haddock	273,000			3,631
Hake	36,000			216
Mackerel	440,000			5,852
Pollock	5,000			20
Mixed fish	450,000			2,250
Total	2,167,000			26,256
Dry fish.				
Cod	4,326,095	1,730,438		62,296
Cusk	3,778	1,889		51
Haddock	40,000	15,557		311
Hake	51,860	23,336		373
Pollock	16,260	6,668		113
Total	4,438,893	1,777,888		63 144

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value prepared.
Pickled fish.				
Swordfish	7,000	4,000		$130
Mixed fish	6,000	4,000		100
Total	13,000	8,000		230
Shell fish.				
Lobsters	721,050			26,438
Clams, for food			10,000 bushels	5,000
Total	721,050			31,438
Miscellaneous.				
Fish oil			6,464 gallons	2,585
Fish sounds (dried)		350		315
Irish moss		405,000		14,175
Seaweed			300 tons	300
Total				17,375

THE COD FISHERY FROM 1815 TO 1879.—The following tabulated statement, compiled from the custom-house records, shows the extent of the cod fisheries of Plymouth customs district for the years 1815 to 1879:

Year.	No. of vessels.	Bounty.	Quintals of cod.	Gallons of oil.	Year.	No. of vessels.	Bounty.	Quintals of cod.	Gallons of oil.
1815	39	$7,854 48	19,560		1848	69	$19,123 31	50,974	19,802
1816	56	12,295 45	28,150		1849	63	17,726 83	48,683	19,742
1817	67	15,014 76	33,580		1850	65	18,011 05	51,665	23,259
1818	71	15,991 36	35,560		1851	71	19,443 18	51,970	19,742
1819	85	20,475 07	42,530		1852	67	20,261 86	49,371	21,155
1820	60	14,894 91	30,000		1853	89	25,595 86	56,313	22,223
1821	53	12,403 15	26,500		1854	69	19,325 50	41,424	13,169
1822	61	14,302 00	30,000		1855	73	19,778 84	36,070	13,736
1823	65	15,256 70	32,500		1856	62	16,012 38	37,968	15,216
1824	62	14,327 03	31,000		1857	67	16,917 50	37,587	16,735
1825	61	13,450 15	30,000		1858	64	16,287 04	32,544	18,192
1826	48	9,534 14	24,000		1859	64	16,377 36	33,353	17,896
1827	59	12,521 53	29,907		1860	63	16,072 43	36,049	17,513
1828	81	17,929 20	48,219		1861	61	15,683 02	32,379	19,642
1829	68	15,490 91	35,270		1862	58	15,340 48	34,842	19,678
1830	71	15,105 86	33,218		1863	58	15,548 04	37,964	19,342
1831	75	17,352 00	43,705		1864	62	17,074 55	41,706	22,358
1832	67	15,371 18	37,578		1865	54	10,956 89	42,590	24,593
1833	69	17,382 80	48,199		1866	52	10,836 99	39,639	25,165
1834	73	19,165 73	54,555		1867*			38,100	22,800
1835	76	20,286 30	56,903		1868			37,700	18,490
1836	89	24,386 50	57,965		1869			30,700	18,553
1837	87	23,852 69	44,776		1870			35,300	18,679
1838	86	23,067 49	51,776		1871			32,000	16,789
1839	94	27,027 96	62,763		1872			25,700	14,270
1840	73	19,262 76	39,601		1873			28,900	13,608
1841	60	15,625 70	34,753		1874			9,512	3,307
1842	52	13,582 19	32,300		1875			11,480	2,898
1843	72	18,415 15	48,200		1876			14,342	4,441
1844	87	23,975 40	54,150		1877			13,310	8,818
1845	77	21,774 85	50,142		1878			12,902	3,591
1846	64	18,123 03	40,526		1879			12,500	3,465
1847	57	14,858 91	40,669	20,495					

* Not any bounty since 1866.

EXPORTS OF FISH FROM 1803 to 1879.—The following tabulated statements compiled from the custom-house records show the importance of the export trade in dry and pickled fish from the customs district of Plymouth, for the years 1803 to 1878:

A.—*Exports from* 1803 *to* 1819.

Quarter ending—	Value per quintal.	Value per barrel.	To British West Indies.		To French West Indies.		To Spanish European ports.		To Portugal.	To Spanish West Indies.	To Madeira.	To Azores.	To French European ports.	To Swedish West Indies.	To Gibraltar.	To Leghorn.
			Qtls.	*Bbls.*	*Qtls.*	*Bbls.*	*Qtls.*	*Bbls.*	*Qtls.*	*Qtls.*	*Qtls.*	*Qtls.*	*Qtls.*	*Qtls.*	*Qtls.*	*Qtls.*
June 30, 1803	$4 00	$4 00	80	229	4,050	203	5,515		90							
September 30, 1803	4 00		1,164						1,500	3,037						
December 31, 1803	4 25	6 00					3,170	89		770						
March 31, 1804	4 00	4 00					2,785	121		6,702						
June 30, 1804	4 33	4 00			4,007	183	8,058									
September 30, 1804	4 25	4 25			3,581	78	1,459		640							
December 31, 1804	4 00				5,242		8,450									
March 31, 1805	4 00	4 25	882		5,700	146	1,525				1,150					
June 30, 1805	4 25	4 00			5,382	50	7,050		295							
September 30, 1805	4 00	4 00			2,379	10						400				
December 31, 1805	4 25				8,494		27,268		25			1,020				
March 31, 1806	4 00				7,145		1,553									
June 30, 1806	4 00	6 00	849	2	6,538	2	4,370									
September 30, 1806	4 50	7 00			3,095	4	1,310						1,800			
December 31, 1806	4 25	14 00			5,159		15,840	20	25		821					
March 31, 1807	4 50				3,584		5,000		30				1,250			
June 30, 1807	4 25				1,950		1,460									
September 30, 1807	4 25	25 00			2,084		2,082	20								
December 31, 1807	3 50				5,176		3,420				622					
March 31, 1809	1 50				170					807	423			6,748		
June 30, 1809	2 50						1,950			1,900				10,563		
September 30, 1809	2 00	4 00	8,332			35	500		220					1,056		
December 31, 1809	2 50						10,290			700				400		
March 31, 1810	2 00						2,850			564				1,020		
June 30, 1810	2 00	5 00	3,560	7										2,965		
September 30, 1810	3 00	5 00	3,207			39										
December 31, 1810	3 50		3,495						2,100	347				1,144		
March 31, 1811	4 00	15 00			3,550	80								2,240		
June 30, 1811	4 00									1,070				3,510		
September 30, 1811	3 00									2,070						
December 31, 1811	3 00		1,070							1,176				1,236		
March 31, 1812	3 50									5,482						
June 30, 1812	3 00								800					2,850		
June 30, 1815	4 00				620											
September 30, 1815	4 25				1,350											
December 31, 1815	4 50				1,460		2,200									
June 30, 1816	4 00				1,961											
September 30, 1816	3 50				2,913											
December 31, 1816	3 00				4,611				1,950							
March 31, 1817	2 50				2,990											
June 30, 1817	3 00				4,278											
September 30, 1817	3 00				1,959											
December 31, 1817	4 00						1,675								4,500	
March 31, 1818	3 00				10,080											
June 30, 1818	4 00				2,580											
September 30, 1818	3 50				2,862											
December 31, 1818	3 50				1,200					90					2,112	
March 31, 1819	3 50				1,100											
June 30, 1819	4 00				2,200											2,000
September 30, 1819	4 00															2,200
December 31, 1819	4 00				1,238											

B.—*Exports from 1820 to 1878.*

Quarter ending—	Value per quintal.	Value per barrel.	To French West Indies.		To Spanish West Indies.		To Gibraltar.	To Hayti.	To Danish West Indies.	To Nova Scotia.
			Quintals.	*Barrels.*	*Quintals.*	*Barrels.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*
March 31, 1820	$4 00	$5 00	2,500		100	191	1,308			
June 30, 1820	4 00		1,880							
September 30, 1820	3 00	5 00	1,465	335						
December 31, 1820	3 00		740							
March 31, 1821	2 50	3 50	2,240	222						
June 30, 1821	3 00	4 00	1,091	50						
September 30, 1821	3 00	3 00	1,063	115						
December 31, 1821	3 00	3 50	1,607	164						
March 31, 1822	3 00		930							
June 30, 1822	3 50	4 00	1,030	60						
December 31, 1822	3 00	4 00	1,754	100						
March 31, 1823	2 75	4 50	2,548	60						
June 30, 1823	3 00	4 00	1,888	288						
September 30, 1823	3 00	4 00	684	127						
December 31, 1823	2 50	4 00	258	116				260		
March 31, 1824	3 00	4 00	2,157	215						
June 30, 1824	3 25	4 25	2,397	215						
September 30, 1824	3 25	3 75	1,402	180						
December 31, 1824	2 50	4 50	2,330	155						
June 30, 1825	2 75	4 00	2,742	200						
September 30, 1825	2 50	3 50	767	52						
December 31, 1825	2 50	3 00	2,937	248						
March 31, 1826	2 75	3 00	1,678	138						
June 30, 1826	2 50	2 50	1,278	50						
September 30, 1826	2 50	2 50	2,019	50						
December 31, 1826	2 50	2 75	1,205	121						
March 31, 1827	3 00	4 50	2,708	55						
June 30, 1827	4 00	4 00	1,362	50						
September 30, 1827	3 00	3 50	845	80						
December 31, 1827	3 00	4 25	1,835	128						
March 31, 1828	3 50	4 75	2,684	228						
June 30, 1828	3 25	5 25	2,364	198						
September 30, 1828	2 75	3 50	2,818	205						
December 31, 1828	3 00	4 00	5,181	427						
March 31, 1829	2 75	4 50	1,011	102						
June 30, 1829	2 75	4 25	4,873	260						
September 30, 1829	2 50	3 50	3,860	258						
December 31, 1829	2 50	3 50	3,843	302						
March 31, 1830	2 25	3 50	2,093	116			2,550			
June 30, 1830	2 50	3 25	3,136	204						
September 30, 1830	2 75	3 00	2,553	234						
December 31, 1830	2 75	3 25	2,292	234						
March 31, 1831	3 50	3 75	2,495	304						
June 30, 1831	3 25	3 50	4,542	442						
September 30, 1831	3 25	3 50	1,863	259						
December 31, 1831	3 00	3 00	847	278						
December 31, 1832	3 00	2 75	712	185						
March 31, 1833	3 00	3 50	252	75						
September 30, 1833	2 75	3 00	744	163						
March 31, 1835	3 00	4 50	700	50						
June 30, 1835	3 00	7 00	514	20						
September 30, 1835	3 25	4 50	850	125						
December 31, 1839	3 00		868							
June 30, 1840	2 50	3 00	761	85						
June 30, 1841	2 75		471							
March 31, 1842	2 50		1,514							
June 30, 1842	2 25		789							
December 31, 1842	2 25		624	50					2,978	
June 30, 1876	5 00									1,626
June 30, 1877	4 00									1,500
December 31, 1878*	2 50							258		

* None exported in 1879.

71. THE FISHERIES OF SCITUATE AND DUXBURY.

SCITUATE.—Scituate, a small village, situated 26 miles southeast from Boston, at one time had a fishing fleet, of which nothing now remains larger than the small sail-boats used in gathering moss, taking lobsters, and shore-fishing. Mr. H. G. Reed, an old citizen, reports that prior to 1840 some forty sail were engaged in the mackerel fishery, but that fishery has gradually dwindled to nothing. A number of reasons are given for the entire abandonment of this industry, the principal one being an open and shallow harbor, where there is but 9 feet of water at high tide. The Government has in contemplation the building of a breakwater and the dredging of the harbor, which it much needs, in order that it may be of some use as a harbor of refuge or for commercial purposes. This the inhabitants most earnestly hope will be done. At present the small amount of fishing is done by 23 men, having 20 small sail-boats engaged in near-shore fishing. Eighteen men, with 1,200 lobster-pots and 18 dories, are engaged in taking lobsters. The fish and lobsters taken are used for home consumption, and for supplying the surrounding towns. Clams were plentiful several years since, but are now about exhausted by fishermen from the islands in the vicinity. Lobsters at one time were large and plenty, but from over-fishing they have decreased in quantity and size.

Irish moss (*Chondrus crispus*) is now the leading marine production. This is found in greater or less abundance all along the Massachusetts coast, but more abundantly about the rocks of Scituate. Prior to 1835 the small amount of that article used in this country was imported from Europe, selling from $1 to $2 a pound. In that year the late Dr. J. V. C. Smith, post physician from 1826 to 1849, and late mayor of Boston, being stationed at Rainsford Island, a few miles away, made it generally known that the moss which was so plenty was the same article that was being imported and sold at such a high price. From that time we date the commencement of this industry. Mr. Augustus Cole, of Scituate, was the first person to pay much attention to it at this place. Starting in 1853, he and his son, Charles A. Cole, have followed the business to the present time, having seen its steady growth from its infancy. We are indebted to the latter gentleman for much valuable information. With the increase of the business has followed a steady decrease in price, which in 1835 was $1 a pound. In 1853 it was only 25 cents, and gradually fell to 10 cents, at which price it remained for a number of years; the past ten years, ending with 1879, 3 to 3½ cents a pound has been paid for the crop. The average annual yield is 5,000 barrels of 90 pounds each. The past season 4,500 barrels, or 405,000 pounds, has been gathered and disposed of. The crop is always considered a sure one, and is never overworked or exhausted, since a clean glean of one year is followed the next year with the usual bountiful supply. The season of gathering begins from the 1st to the 10th of June, and lasts until about the 1st of September. During this time 120 men, with women and children, aggregating 300 hundred persons, are employed in gathering it. A barrel a day is considered an average day's work for a man.

The moss is gathered from the rocks, to which it grows to the tide level, at low water, by hand. As the tide rises, all hands take to the fleet, consisting of one hundred dories and fifty small sail-boats, using hands and a small rake, 7 inches wide, with 14 steel teeth 4½ inches long. The handle of this rake is 3 feet long. As the tide rises higher, a larger rake, 12 to 13 inches wide, with 20 to 22 steel teeth 6 inches long, and a handle 16 to 20 feet long, is used. These rakes are made only at this place, and cost $4 each. They last for about one season. With these few and crude tools the moss is torn from the rocks, thrown into the boats, and taken to the beach, where, a gravelly bed having been prepared, it is spread to the depth of 2 inches. At this time it is of a dark green color. If the weather is fair, the moss remains on the beach 24 hours; after which it

is raked up, and taken up the beach to be washed in tubs, when its color changes from dark green to red. It is once more spread out for 24 hours. The washing, spreading, and drying operations are repeated 7 times, and each time the moss loses more or less of its color, until at last it is bleached to nearly a white or straw color. Fresh water injures it, and plenty of sunshine and fair weather is necessary for a proper cure. Should the weather indicate rain, the moss is hastily raked into heaps and covered until fair weather. After curing, it is sold to dealers, packed in barrels, and shipped to the leading markets of Boston, New York, and Philadelphia, a small amount being sent to Chicago and Saint Louis. The beaches, from which the moss is mostly gathered, are named First, Second, and Third Cliff, Jericho light-house, and Sand Hill. Irish moss is used for numerous purposes; the first quality being taken by grocers and druggists for food purposes. It is also largely used for sizing. The second and inferior quality meets with a ready sale to brewers as a clarifying substance.

The fisheries of Scituate in 1879 employed 8 vessels, aggregating 70.02 tons, 170 sail boats and dories, and 1,200 lobster-traps. The total capital invested in vessels, boats, shore property and apparatus, was $21,520. The value of the marine products was $39,575, and included 1,310,000 pounds of cod, 120,000 lobsters, and 4,500 barrels of Irish moss. The number of persons employed on the vessels was 39, and on shore or in boat fisheries, 333; making a total of 372, of which number 335 were Irish, and the rest Americans.

DUXBURY.—The fisheries of Duxbury have decreased year by year since 1835. During 1879 four sail, aggregating 157.27 tons, engaged in the near home cod and mackerel fisheries. In May of the previous year a pond, by the order of the town, was stocked with herring. The result will be known about May, 1881.

Clams have always been plenty here. Formerly quite a large amount was sent from here to Boston. During 1879 thirty men followed the business for the greater part of the year, the yield being 5,000 bushels. These were sold in the neighboring towns.

The shell-fish industry, according to Mr. Goodspeed, is quite an item. Its average annual return is about $5,000. The earnings of the hands have been decreasing for five or six years, whereby the men became disheartened. A fleet of ten vessels was engaged in this industry in 1860, and, adds Mr. Goodspeed, "the prospect is that there will only be two next season" (1880). He thinks that the trawls set for ground fish, and the seines and nets for mackerel, are destroying the fisheries rapidly. He also states that the fishermen about Massachusetts Bay regard the reciprocity treaty as a very heavy burden. From the same source, we learn that the lobster fishery of 1879 was pursued by six men in open boats; each of which, on an average, stocked $300. The business is said to have declined one-half in the last five years.

A fertilizer factory was started in Duxbury in the fall of 1879 under the name of the Standard Fertilizer Company. The same company has had a factory at Bristol, Maine, since 1874. The Duxbury factory is run by a ninety horse-power engine and employs sixty men. The fertilizing compound is manufactured largely from fish products. During the fall of 1879 and the winter of 1879–'80, 1,000 tons of fish waste, the refuse skins and bones of the "boneless fish" factories, with 400 tons of menhaden chum were used. Any and all kinds of refuse fish and old bones are in demand here. Sharks, skates, and all the various fish heretofore considered worse than useless now find a ready sale, and are quietly turned to good account.

The proportional parts of the compost are about one-third each of fish-waste, phosphate, and sulphuric acid. The fish-waste is one-third menhaden chum and two-thirds fish scraps. The process of manufacture is as follows: The chum and scraps are placed in a large mixing box holding 1,500 pounds, and a revolving shaft, to which numerous spokes or paddles are attached,

keeps the mixture in motion; at the same time from 25 to 30 per cent. of sulphuric acid is added by means of a feed-pipe from a tank near by. After a thorough mixture the phosphate is added, when it is once more thoroughly mixed and then taken to the drying-room, where it remains three weeks. It is then placed in a steam dryer, and after a thorough drying the entire mixture is pulverized in the Holmes & Blanchard disintegrator. It is then packed in strong burlaps or sacks of 200 pounds each, or in barrels of 250 pounds. The demand is mainly from New England and the Southern States, the supply for the former being put up in barrels and for the latter in sacks. As the valuable qualities of these fertilizers are becoming more generally known the demand is constantly growing. During the short time this factory has been in operation it has produced 5,000 tons of various fertilizers sold under the trade names of the Standard Fertilizer, Superphosphate, and Food for Plants. Exclusive of the fertilizer factory the amount of capital invested in the fisheries of this place in 1879 was $27,580. The number of persons employed was eighty-two. The products of the fisheries were valued at about $16,000, and included 440,000 pounds of fresh mackerel, 280,000 pounds of cod, 5,000 bushels of clams, and 4,800 pounds of lobsters.

72. PLYMOUTH AND ITS FISHERIES.

PAST AND PRESENT IMPORTANCE OF THE FISHERIES.—This old historic town, with all its other honors, may well claim to have been the birthplace of the fishing industry of New England. From the landing of the Puritans, December 22, 1620, to the present time, for two hundred and sixty years, the business has been carried on to a greater or less extent. From the records of the Massachusetts Historical Society we find petitions to the General Court in 1671 for a fishing privilege to the Plymouth Colony. There is no record of the number of licenses granted to vessels until 1793, in which year 97 vessels, mostly from 30 to 60 tons, a few 80 to 100 tons, and one each 111 and 114 tons, were granted licenses for cod fishing. The first record of a bounty being paid on fish is in 1803, when 84 vessels reported a catch of 42,000 quintals, receiving $19,987.62 bounty; in 1804, 74 vessels, 37,000 quintals cod, bounty paid $18,063.62; from that date until 1815 the record is lost. From 1815 until 1867, during which time the bounty was paid, the yearly catch, number of vessels, and amount of bounty paid will be found in the review of this district. Separate licenses were granted for mackerel and cod until 1867, since which time it has been under one general fishing license, without any bounty. A large export trade was carried on for years; we find in 1805 for the three months ending December 31, 36,167 quintals of cod were exported; in 1804, same time, 23,645 quintals of cod, mostly sent to the Spanish ports on the Mediterranean. The yearly exports and value from 1803 to 1879 are given in the review of the district.

The town of Plymouth has probably more fresh-water ponds and small lakes than any other town in the State. They are said to number 365, and nearly all of them are well stocked with fresh-water fish, such as bass, red and white perch, pickerel, eels, &c. The largest of these ponds are named Herring Pond, Long Pond, Halfway Pond, White Island, Great South, Boot, and Billington Sea. They are from 1 to 3 miles long and one-half to three-quarters of a mile wide, some of them very deep, Long Pond having been sounded 120 feet. Not any fish are taken from these ponds for commercial purposes, except through the ice during the winter. The last mentioned, Billington Sea, is one and a quarter miles long and one-half to three-quarters of a mile wide. It is recorded that one of the Puritans, discovering it, and thinking he had found a sea, gave it the present name. The outlet from this lake forms a small stream called the Town Brook, which is about one mile long from the lake to its mouth in the center of the village, where it empties into the ocean. Alewives, eels, and other salt-water fish formerly went up this small stream into the

lake in immense numbers, until the erection of numerous factories has completely barred their progress with dams, as well as poisoned the water somewhat by the free use of large quantities of vitriol.

The fishing privilege of this brook is yearly leased by the authorities for a nominal sum, the lessee being obliged to place 10,000 alewives in the headwaters each spring, usually about May 1. The brook has no fishways, and the fish are carried in tanks past the dams. The lessee has the sole right to take fish from the brook, though the privilege is not worth much, only about 100 barrels of alewives being the annual catch. Eels were formerly so plenty as to do much damage to the dams, which had to be sheathed with tin, in many cases. The small, iron turbine water-wheels have often been choked and stopped by eels, and large quantities were caught in traps, until the passage of a law in 1877 preventing their catch, except by spearing, or in pots made of withes.

But little can be said of the fishing industry at the present time. In company with most of the old fishing towns of Massachusetts, with the advent of railroads came numerous new industries, the cordage, shoe, thread, nail, print, and other factories, drawing yearly from those engaged in the fisheries, so that the number of fishing vessels shows a yearly decrease, until against seventy vessels from this town in 1839, we find but thirteen in 1879.

Lobsters are taken in considerable numbers, but the catch of late years shows a decrease in numbers and size. They are taken near shore, not over 1½ miles out, from Cut River on the north to Sandwich on the south. One-half of the catch is marketed at home, supplying the near towns, and one-half sold to smacks from Boston, New York, and New Haven. Not much attention is paid to the law as to size. About all the lobsters found in the traps are saved, those under size being sold to the smacks from out of the State, and only those of the legal length are landed or sent to Boston.

Clams were the chief support of the Puritans during their first winter here, and probably prevented the starving of the infant colony. The daily prayer of the devout Brewster was that they might "suck of the abundance of the seas, and of the treasures hid in the sands." The supply continues good, and clam-digging gives employment at the present time to thirty men during half of the year.

Boneless fish is cut to a small extent, 250,000 pounds the past year. A small amount of fish is exported via Boston and New York, but not any direct from here since 1878. A small amount of cooperage, half and quarter barrels and kits, to the amount of $15,000 worth was manufactured during 1879; one-fourth of this cooperage went to New York and Philadelphia, the rest to Boston and near home towns.

It is an interesting historic fact that to the fisheries of the old Plymouth colony we owe the birth of the free-school system of Massachusetts, the Colony Court in 1663 making the following proposition:

"It is proposed by the court unto the several townships in this jurisdiction, as a thing that they ought to take into serious consideration, that some course may be taken in every town, that there may be a schoolmaster set up to train children to reading and writing."

In 1670 "the court did freely give and grant all such profits as might or should accrue annually to the colony, for fishing with nets or seines, at Cape Cod, for mackerel, bass, or herring, to be improved for and towards a *free school*, in some town of this jurisdiction, for the training up of youth in literature for the good and benefit of posterity, provided a beginning be made within one year after said grant."

The school was at once established at Plymouth, and until 1677 was supported from the proceeds of the Cape fishery. From 1677 until the union of Massachusetts with Plymouth Colony, in 1692, the proceeds of the fishery revenue were divided among several towns, to be used for the same object; since 1692 the fisheries have been free.*

In 1879 the fisheries of Plymouth employed one hundred and eighty-two men, and a capital of about $62,000. The value of the various fishery products was about $53,000. These products included 9,128 quintals of dry cod, 357,500 lobsters, 5,000 bushels of clams, and 4,564 gallons of fish oil. The fishing fleet consisted of ten vessels, aggregating 649.57 tons, one idle vessel, 54.58 tons, and fifty-five boats in the shore fisheries.

H.—THE DISTRICT OF BARNSTABLE.

73. REVIEW OF THE FISHERIES OF CAPE COD.

CAPE COD AND ITS FISHERIES.—The county of Barnstable, which comprises the customs district of the same name, includes all of Cape Cod from Sandwich to Provincetown and Wood's Holl. This cape has a coast line nearly 150 miles in extent, with few good harbors, and most of these are difficult to enter. The harbor at Provincetown, however, is an excellent one, easy of entrance, and well sheltered, and is much frequented by coasting and fishing vessels.

Most of the towns on Cape Cod are more or less interested in the boat fisheries, though the vessel fisheries are confined to the leading ports, of which Provincetown is the most important. The entire fleet of vessels numbers 196 sail, of 12,489.19 tons. Of this number 171 vessels, of 10,355.68 tons, are employed in the capture of cod, mackerel, or other food-fish; 2 vessels, of 123.69 tons, are engaged throughout the season in the oyster-carrying trade; and 20 vessels, of 1,938.92 tons, follow the whale fishery. The fleet of whalers is owned at Provincetown. These vessels are of the smaller class, and cruise exclusively in the Atlantic Ocean. The number owned here during the past 40 years, has ranged from 10 to 53 sail; the latter number was in 1868; in 1850 the fleet was reduced to 10 sail.

The shore fisheries of Cape Cod employ 1,100 boats, 2,262 gill-nets, 32 haul-seines, 44 weirs or pounds, and 3,000 lobster and eel traps. The catch of the shore fishermen includes a great variety of edible fish, besides numerous species used only for manure. Lobster-catching is carried on to some extent, but is not as profitable as in districts farther north. Clams were formerly taken in much larger quantities than at present. The oyster business was once an important element in the fisheries of Cape Cod, but is now comparatively unimportant, except as regards the carrying-trade, which gives employment to mackerel vessels during the winter season. In the winter of 1879–'80 the number of Cape Cod schooners in this business was forty-six, owned at Wellfleet and Provincetown. Ingersoll reports the following facts concerning this fleet:

"This list of forty-six schooners comprises, I think, the whole of the Cape oyster fleet; and there are few vessels engaged outside of these ports. They were noted in the old days, as now, for their

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* The custom-house records for the past one hundred years and over are in a fine state of preservation, and quite complete; are mostly large calf-bound books, such as we do not often see of that early date. For much information from them and otherwise we are indebted to Samuel H. Doten, collector; Charles O. Churchill, deputy collector; George Harlow, and J. R. Atwood, fish merchants.

swiftness in speed and firmness of structure, and were the origin and prototypes of the famous Boston clipper ships. The original cost of these fine vessels was, on the average, about $7,000; now they are not worth over $4,000 each. In summer they go on mackerel-fishing voyages, which occupy a little more than half of the year. In the winter and spring they carry oysters, varying it with frequent coasting trips. Four voyages after oysters annually would probably be a fair average, and not more than a third of the vessels' yearly receipts, as a rule, will be derived from this source. They are commanded by captains of experience, and go back and forth quickly, safely, and profitably. Capt. Jesse Freeman, now one of the leading fish merchants of the village, told me that he had sailed between the Chesapeake and northern ports 316 times before he was forty years old, that is, 158 voyages. His opinion was that no cargo wore upon a vessel less (others say the opposite), and it was usually of much profit to the owners. In the spring, oysters for bedding are brought cheaper than those designed for market in winter. The crew of an oyster vessel usually consists of two (often three) men before the mast, with a cook, mate, and captain. One-third (as a rule), sometimes one-half, of the freight-money goes to the owners, and the remainder to pay the men and furnish food. The wages of a mate in 1879 were $30 a month; of a cook, $25; and of a seaman, $15 to $16. Food for a voyage costs from $40 to $50. In addition to his share, the owners give the captain $15 a month."

The total capital invested in this district in all branches of the fishing industry is $1,355,278, and the value of the product is $1,051,619. The number of persons employed is 4,004.

STATISTICAL SUMMATION FOR 1879.—The following statements give in detail the extent of the fishing interests of Barnstable district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	2,297	Capital in vessels and boats	$960,550
Number of boat-fishermen	1,507	Capital in nets and traps	140,828
Number of curers, packers, fitters, &c	184	Other fixed and circulating capital	a253,900
Number of factory hands	16	Total	1,355,278
Total	4,004		

a Cash capital, $100,000; wharves, shorehouses, and fixtures, $108,000; factory buildings and apparatus, $45,900.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	171	10,355.68	$434,550	$20,985	$230,150	$684,685	In vessel fisheries	484	$5,928
Idle	3	70.90	2,400			2,400	In boat fisheries	2,262	26,930
In oyster fishery	2	123.60	6,000		200	6,200	Purse-seines:		
In whale fishery	20	1,938.92	68,800		*66,350	135,150	In vessel fisheries	82	44,920
Total	196	12,489.19	511,750	20,985	305,700	838,435	Haul-seines:		
Boats.							In boat fisheries	32	6,400
In vessel fisheries	778		33,155			33,155	Total	2,860	84,178
In shore fisheries	1,100		69,650	6,300	13,010	88,960	*Traps.*		
Total	1,878		102,805	6,300	13,010	122,115	Weirs, &c	44	53,650
							Lobster and eel pots	3,000	3,000
							Total	3,044	56,650

* Includes gear.

Detailed statement of the quantities and value of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$1,051,619
Fresh fish.				
Alewives	897,495			4,520
Bass, sea	12,300			738
Bass, striped	124,940			12,494
Bluefish	3,264,014			97,921
Cod	3,225,104			48,376
Cunners	4,000			20
Cusk	3,500			25
Eels	95,903			4,800
Flounders	116,169			1,743
Haddock	738,000			9,815
Hake	52,869			317
Halibut	10,000			350
Herring	541,839			2,709
Mackerel	1,851,225			24,621
Mackerel, Spanish	60			9
Menhaden	275,089			918
Perch	17,498			525
Pollock	16,000			64
Salmon	20			3
Scup	625,230			18,757
Shad	58,857			2,943
Squeteague	32,175			1,126
Sturgeon	2,000			60
Swordfish	21,750			653
Tautog	74,849			2,620
Mixed fish	500,000			2,500
Total	12,560,976			238,627
Dry fish.				
Cod	24,029,940	9,011,079		346,031
Cusk	23,376	11,688		316
Haddock	115,000	43,518		870
Hake	345,600	155,538		2,489
Pollock	265,300	108,795		1,850
Total	24,779,216	9,031,518		351,556
Pickled fish.				
Alewives	232,800	186,250		3,725
Bluefish	14,495	8,920		223
Herring	225,000	180,000		2,700
Mackerel	13,270,500	8,847,000		254,351
Swordfish	52,500	30,000		975
Mixed fish	13,500	9,000		225
Total	13,808,795	9,261,170		262,199
Smoked fish.				
Alewives	20,000	12,000		300
Halibut	54,700	13,675		1,094
Total	74,700	25,675		1,394
Shell fish.				
Lobsters	211,230			7,745
Oysters			3,400 bushels	a 9,750
Clams:				4,375
For food			26,000 bushels	13,000
For bait			6,773 bushels	2,420
Quahaugs and sea-clams			5,250 bushels	2,625
Scallops			1,028 gallons	514
Total				40,429

a Enhancement on southern oysters.

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Miscellaneous.				
Fish oil			52,150 gallons	$21,805
Fish guano			300 tons	2,200
Fish spawn			75 barrels	243
Fish sounds (dried)		2,300		2,000
Marine salt			136 tons	1,290
Seaweed			1,400 tons	1,400
Total				28,938
Products of whale fishery.				
Sperm oil			110,817 gallons	93,640
Whale oil			84,507 gallons	30,447
Whalebone			9,250 pounds	1,389
Total				128,476

The following statement, by Mr. F. B. Goss, collector of customs, shows the extent of the vessel fisheries of the district of Barnstable, for the year ending December 31, 1881:

Where fishing.*	Number of vessels.	Tons.	Products.	Amount.	Value.
Grand Bank	46	4,061.43	Codfish ....cwt..	90,844	$352,203
Gulf Saint Lawrence	12	747.86	Fish oil ....galls..	59,665	21,502
American waters	12	512.16			
American waters	58	4,217.19	Mackerel ....bbls..	62,246	363,616
North Atlantic Ocean	18	1,726.97	Sperm oil ....galls..	57,109	46,141
Whaling grounds, No. 90			Whale oil ....galls..	52,218	20,954
Total	146	11,265.61			804,416

* Within three miles of the Canada shore, none.

RECAPITULATION FOR 1881.

	Vessels.	Tons.
Cod fisheries, Grand Bank	46	4,061.43
Cod fisheries, Gulf Saint Lawrence	12	747.86
Cod fisheries, American waters	12	512.16
Mackerel fisheries, American waters	58	4,217.19
Whale fisheries, North Atlantic Ocean	18	1,726.97
Total	146	11,265.61

74. PROVINCETOWN AND ITS FISHERIES.

GENERAL DESCRIPTION.—Provincetown is the leading fishing port in Barnstable County, as well as one of the most important in the United States. The town is located at the extremity of Cape Cod, and is almost surrounded by water. The western coast line is deeply indented, forming the shore of one of the finest harbors on the Atlantic coast. The houses are built near the water, occupying a section of the town extending along the shore of the harbor for nearly a couple of miles. Between the dwellings and the sea, eastward, lie the great "sand dunes," which form a peculiar feature of this portion of Massachusetts.

In the following account of the present fisheries of Provincetown we shall employ almost exclusively the material furnished by Capt. N. E. Atwood, a retired fisherman of the town, well known for his extended and accurate information on the fisheries, also for his influence on the fishery legislation of the State and his scientific observations upon American fishes and other marine animals.

Nearly every branch of the fisheries peculiar to the northern waters is now or has recently been carried on by the fishermen of Provincetown. Those fisheries which are of sufficient importance to claim attention in this connection are as follows: 1. The offshore cod fishery; 2. The longshore and winter cod fishery; 3. The offshore mackerel fishery; 4. The inshore mackerel fishery with gill-nets; 5. The bluefish fishery with gill-nets; 6. The hake fishery; 7. The lobster fishery; 8. The whale fishery.

THE FISHERY FOR COD.—Supreme in importance is the offshore cod fishery, which has always been carried on at Provincetown with as much zeal as has the mackerel fishery at Wellfleet. Sixty-three vessels engaged in this cod fishery in 1878, each making but one voyage during the season. About four-fifths of the vessels visited the Grand Bank. The majority sailed in the month of May and returned in September or October. Although several vessels did not get full fares of fish, the amount of cod brought in slightly exceeded 75,000 quintals, and of oil a thousand barrels. Four men lost their lives in this fishery during the year. In 1879, with about fifty vessels, the catch amounted to a little less than 68,000 quintals of cod.

Besides the above vessels engaged in the Bank and Gulf of Saint Lawrence cod fishery, a few vessels fish along the coast for cod, selling the fish fresh in Boston, when it is found best to do so; at other times salting them on board and selling them after arriving in some port, either Provincetown, Boston, or Gloucester, as most convenient. The fishermen sell their fish as soon as they can after being salted, as the sooner they sell the more the fish will weigh. They sell them to parties who dry them for market, so that it is not possible to know the number of quintals they get during the season. Besides cod, they catch halibut, haddock, hake, &c. Their fishing is of a varied character, as they sometimes take their fish to market fresh, and sometimes salt them.

Besides the eleven vessels engaged in the New England coast cod fishery, some thirteen small vessels, or boats of less than 20 tons burden, are a part of the time engaged in miscellaneous fisheries with hook, line, and nets for anything they can get, when fish come into the bay. A great part of the time some of them do nothing in the way of fishing, and altogether they make but a small profit.

Cod come into Provincetown Bay and along the coast late in autumn, and remain through the winter and early spring, at which times the fishermen engage in catching them. It is the only fishery carried on in winter, and a considerable number of men are engaged in it. The fishing is carried on from the shore in dories, commencing in December, usually from the middle until the last of that month. The fishery has been carried on at Provincetown many years. The mode of fishing from the beginning was altogether with hand-lines. The trawl-line was not in use here until the winter of 1858, when it was first introduced. Since that time until now the trawl-line fishing has been in general use for cod and haddock.

In 1880 the fishermen commenced their winter cod-fishing about the middle of December, but few were taken. The fishery proved a failure. The fish were sold fresh and sent to Boston, New York, and other markets. About one hundred and forty fishermen were employed. The whole catch during the winter amounted to 496,000 pounds, which, with about 1,000 gallons of oil, was valued at nearly $12,000.

THE MACKEREL FISHERY.—In 1870 and 1871 no mackerel vessels from Provincetown were

sent to the Gulf of Saint Lawrence. All the vessels engaged in this fishery cruised on our own coast. In 1879, also, none of the vessels entered the Gulf. But one firm, the Central Wharf Company, had vessels in the mackerel fishery during that year, and the results were not all that could be desired.

For many years the Provincetown fishermen have been engaged in setting gill-nets in the harbor and bay late in autumn to catch the mackerel as the last schools are passing off the coast on their way to their winter quarters. November is the best month, and it is then that most of them are caught. In some years they have been taken in large quantities as late as the middle of December. They will not bite at the hook, neither do they school, and the seine and hook fishermen cannot catch them. In some falls they come in, school after school, for several weeks. When one school is passing we may have two, three, or more nights' good fishing, after which we may have to wait a week or two weeks or longer before another school will come along. In this way some falls our fishermen do a good business for the time they are engaged, while in other falls the mackerel pass Cape Cod wide out from the coast, and do not come into the bay in any quantity. Only a few straggling specimens are caught. The fishermen using nets do not get enough to pay for the wear and tear and loss of nets.

When this fishery commences many of the fishermen are at home, after having made their voyages to the Grand Bank or elsewhere. Many of them have a few mackerel nets and engage in the fishery. A large number of men are employed while these fish are passing. The following statement shows the number of men employed and value of the fish caught annually for four years:

Year.	Men.	Gross stock.
1874	153	$13,870
1875	127	21,950
1876	188	7,700
1877	184	1,840

In 1878 very few caught; not more than there were the year before. We have no account of the number caught. It will be seen by the foregoing figures that in some falls, like 1877 and 1878, the catch is merely nothing, while in others it proves to be a profitable business for a few weeks while the mackerel are passing.

About one hundred and eighty men were engaged in this fishery last fall (1879), and those having a good stock of nets made a good catch, while others having but few nets did the best they could at that time, as there was no other fishery that would pay them anything.

In the fall of 1879 a large quantity of mackerel was taken in nets for a short time. The most of them were small. They were shipped to Boston, New York, and Philadelphia, and sold fresh at an average price of about 3 cents apiece. Besides the smaller ones a few extra large ones were caught. The most of them were salted and sold at $30 per barrel. The total stock amounted to not less than $22,000.

In the fall of 1880 the fishery was engaged in by about one hundred and fifty men, but it proved a failure. The total stock was not more than $7,500.

FISHERIES FOR BLUEFISH AND HAKE.—The bluefish gill-net fishery has never been carried on very extensively at Provincetown. About thirty-five men, with twelve nets each, engage in it during summer. About $4,000 worth of fish are taken annually.

In the fall of 1880, and in some previous years, forty or fifty men who were engaged in the Bank cod-fishery commenced, after their return, a fishery for hake. They employed dories, and

fished at a short distance from land. In 1880 they secured about 1,000 quintals of fish and 600 pounds of sounds, the total value of which was a little less than $2,000.

THE LOBSTER FISHERY.—Lobsters some ten years ago were abundant, and during the summer a large number of fishermen engaged in this fishery. It was a good and profitable employment for our fishermen from the middle of June to September. They have since become very scarce, so that the fishery will not pay, and only a few old men that have nothing better to do engage in it. In 1880 eight men were employed and averaged only about $60, making a gross stock of $480.

THE WHALE FISHERY.—Of the early whale voyages made from Provincetown there is no record. From the best information we can get we are led to believe that many years ago there were vessels fitted out from this place that made voyages to the Gulf of Saint Lawrence and coast of Labrador and thence northward for right whale. We have been informed that some vessels belonging here made voyages for sperm whale; if so, we have no record of the number of vessels so engaged, the length of their voyages, their cruising grounds, or the quantity of oil taken.

In 1820 five schooners sailed from this port to engage in the sperm-whale fishery. They went directly to the Azores and made their cruising ground near those islands, and thence to the northwest. They all arrived home in the autumn; the result of their voyages proved better than vessels that were engaged in the cod fisheries that season, so that in 1821 the whaling fleet was increased to twelve vessels. All of them went direct to the Azores and cruised in the vicinity of those islands in spring and early part of the summer, after which they went out northwest of the islands some 100 to 200 miles and made that their cruising ground the rest of the season. They met with fair success and all returned home in the fall. The following year (1822) the whaling fleet was increased to eighteen vessels. All went to the Azores, making their cruising ground the same as the year before. Most of their voyages proved a failure, owing to the small quantity of oil brought in and the low price of sperm oil. Nearly all of the vessels were withdrawn from the business to be employed in the cod fisheries. In the spring of 1823 the brig Ardent, Captain Soper, sailed from here on a whaling voyage to the Azores. On her passage home in the fall she was wrecked. The crew were fourteen in number, and many of them died of hunger and exposure. The survivors, after living on the wreck 26 days, were taken off by the British ship Lord Sidmouth on her passage from New York to England. Captain Soper and three of his crew returned home via England.

After this the sperm-whale voyages were generally discontinued from this port for a number of years, though occasionally one or two vessels made short voyages. In the spring of 1830 two schooners sailed from this port; schooner Fair Lady, Captain Atkins, and schooner Vesta, Captain Holmes, made voyages to the Azores for sperm whales. They cruised in the vicinity of the islands through the season, and returning home in the fall, the Fair Lady with 300 barrels and Vester with 160 barrels sperm oil. In the spring of 1833 the brig Imogene (Smalley, master) sailed from this port for the Indian Ocean. She returned in December, 1834, after an unsuccessful voyage. The above-named vessel sailed again in April, 1835 (Atkins, master), to cruise in the Atlantic; she returned home in the fall after a successful voyage. The following year (1836) the Imogene and schooner Louisa sailed from this port on a whaling voyage. These two vessels made another voyage in 1837, after which the Louisa was withdrawn. The Imogene continued in the business the two following years, 1838 and 1839. After her return home in the fall she was wrecked in Provincetown Harbor in December, 1839. In all her Atlantic whaling voyages she was successful. In the spring of 1840 three brigs sailed from this port—Franklin, Captain Soper; Fairy, Captain Genn; and Phenix, Captain Small. They all returned in the fall with a large catch of sperm oil. The Phenix when four months and eighteen days from home was all full having taken 700 barrels

of sperm oil. The success of the vessels was an inducement for others to engage in the sperm-whale fishery, so that a few years after we sent out a large number of vessels.

In 1855 the whaling fleet had increased to fifty-four vessels engaged in the Atlantic sperm-whale fishery. We have had but two vessels from this port who have made voyages in the Pacific for whales. Schooner Mary E. Nason, Capt. Harvey Sparks, sailed in the summer of 1868 and returned in 1871. Schooner Gage H. Phillips, Capt. John J. Cook, made her voyage after the Mary E. Nason. Neither of these voyages proved a success, and the Pacific whaling has been abandoned. Of late years the whaling fleet has been less in number. In 1879 twenty vessels belonging here were engaged in the Atlantic whale fishery. In 1880 the whaling fleet numbered twenty sail that cruised in the Atlantic for sperm and other whales. The fleet in 1881 numbered eighteen vessels that took 57,109 gallons of sperm oil, worth $46,141, and 52,218 gallons of whale oil, valued at $20,954.

Early in March, 1880, there came into Provincetown Bay and harbor immense quantities of herring and shrimps. They were followed by a great number of finback whales, which were here most of the time in greater or less numbers until about the middle of May, when they all left. During the time they were here many of them were killed with bomb lances. They sank when killed and remained at the bottom some two or three days. They then came up to the top of the water, and as they were liable to come up in the night or during rugged weather, when the whalemen were not there to take them, many of them drifted out to sea and were lost. Thirty-eight were brought in and landed at Jonathan Cook's oil works on Long Point. The blubber was taken off and the oil extracted from it in the above-named factory. Two others brought in were sold to parties who took one of them to Boston and the other to New York, where they were exhibited, making forty whales in all saved. Early in June immense quantities of sand eels (*Ammodytes*) came in our harbor and bay and remained here several days. About the 10th of June there appeared plenty of whales, feeding on the sand eels. They were again attacked by our men, when a number of them were killed in a few days, of which ten were saved and landed at the oil works. Probably as many more that were not killed outright received their death wounds and went out of the bay and soon after died and were lost. The forty-eight whales delivered at the oil works yielded 950 barrels of oil, sold at an average price of 40 cents per gallon.

When the first whales were killed it was supposed the whalebone in their mouths was worthless. It was not saved. Subsequently some was saved and sold at 15 cents per pound. The average quantity of bone in each whale is about 250 pounds. No whales have come in of late. Our men are still anxiously looking for another school, hoping they will come again and give them another benefit.

In the spring of 1881 the whales came into the bay again, but not in so large numbers. Fifteen were killed, which furnished 300 barrels of oil.

THE PROVINCETOWN FISHERIES, 1860 TO 1870.—In regard to the condition of the fisheries at the opening of this decade, we cannot do better than to quote a few sentences from Freeman, who, in his History of Cape Cod, written in 1862, says:

"In 1860 Provincetown might be pronounced beyond contradiction one of the most enterprising and flourishing towns in the country. The fisheries now, as ever, command much attention, and employ a great number of men and a very large amount of capital. These fisheries, it may be said, train a large number of the most experienced and intrepid mariners in the world.

"As the abolition of the bounty on salt caused the decline of that branch of domestic manufacture, so the often threatened abolition of the fishing bounties may yet cause the decline and even general abandonment of this branch of industry."

In 1862, from some cause or other, the number of vessels in the cod fishery dropped to about seventy-six, while the aggregate of the catch was approximately 65,000 quintals. Five years later the fleet had again increased, the number of vessels employed being ninety-one. The crews aggregated the very large number of nine hundred and eighty-eight men. In regard to the size of the fleet Captain Atwood remarks:

"The list of cod-fishing vessels sailing from this port in 1867 to the Grand Bank and Gulf of Saint Lawrence was the largest that has been sent out *in any one year* either before or since."

Seventy-eight thousand five hundred quintals of cod were brought in, in salting which about 14,000 hogsheads of salt had been used. The bait used in the cod fishery at this period was entirely of clams, salted. The amount used in 1867 was about 4,098 barrels. Oil to the amount of 1,583 barrels was produced on board.

The vessels engaged in the cod fishery also brought in a considerable amount of halibut. In 1867 the quantity of this species taken by the fleet was 15,156 quintals, or nearly one-fifth the catch of cod. In 1868 five of the vessels carried out ice, with the intent to preserve the halibut and bring them into market fresh; but the experiment, from some cause or other, proved a failure. Each made several trips during the season.

Between 1867 and 1869 the fleet suffered a decrease of nine vessels, the number employed in the latter year being eighty-two, with a tonnage of 5,409 tons, and carrying eight hundred and ninety-four fishermen. They went both to the Grand Bank of Newfoundland and to the Gulf of Saint Lawrence, as in former years, seventy-one visiting the former and eleven the latter grounds. Although the number of vessels was less than in 1867, the cod-fishing was considerably better, and the catch exceeded that of the two previous years, the amount being about 80,457 quintals. Halibut, however, appear to have been quite scarce, or else the fishermen were discouraged by the unsuccessful efforts of the preceding year in bringing them fresh to market, for the catch was only 7,653 quintals, or less than one-tenth the amount of cod. About 1,283 barrels of crude cod oil were brought in. In catching and curing the fish 3,262 barrels of bait and 13,321 hogsheads of salt were expended. The only loss of life this year was from the schooner John Tyler, from which, while riding at anchor on the bank in a gale, the captain and three of the crew were washed overboard and drowned. The Gloucester Telegraph for January 19, 1870, contains the following item bearing on the cod fishery:

"The cost of outfits in the spring was high, so that the fishermen on the average will make small pay, and will find that this fishing the last season has not been a paying business. About half the fish are still on hand."

According to the Provincetown Advocate the mackerel fishery in 1869 employed seventy vessels and about eight hundred and forty men.

The following paragraph, from the Provincetown Advocate, gives some insight into the condition of the town and the character of the people at the close of this decade:

"Provincetown is rich in fishing vessels as well as in coasters. About three thousand men are engaged. They are all plucky, resolute sailors, of good morals and considerable education. Intemperance does not seem to have crept into Provincetown as into some other of our coast villages. Even when the fishermen return in the fall there is but little drunkenness. One-third of the town's population of 6,000 are Portuguese, and these make remarkably good sailors. A large number of the fishermen who ship in Provincetown vessels are from other parts of the cape, but are generally Americans or Portuguese."

75. TRURO AND WELLFLEET.

THE FISHERIES OF TRURO AND SOUTH TRURO.—Truro Township occupies a portion of Cape Cod lying between Wellfleet and Provincetown, extending about 10 miles north and south. The width of the cape at this part varies from about 1 mile to 3 miles. Pamet harbor, situated in the southeastern section of the town, is the only inlet from the waters of the bay, if we exclude the one partially forming the boundary between this town and Provincetown. In former years it furnished a safe and commodious haven for vessels, but at present it is choked with sand and rendered useless.

The town contains three small villages, namely, North Truro, Truro, and South Truro. North Truro is a compact village, removed a considerable distance from the other two, and its fisheries, therefore, will be considered separately.

Truro is a somewhat scattered village lying on the north side of Pamet harbor. It does not seem to be largely dependent upon the fisheries. Ten men are engaged in spring and fall in setting mackerel gill-nets. The spring season opens about the 1st of June and lasts a month; the fall fishing begins about the middle of November and also lasts a month. Each man uses about ten nets, which are made from old menhaden nets and are of but little value.

In spring and in fall five men engage in trawling codfish on the ocean side of the cape. They own two trawls, each about 250 fathoms long, and worth $6. When the men catch more fish than they themselves can consume, they sell the surplus fresh in the village or send it salted to Boston.

Every spring and fall cod fishing with hook and line is carried on in the bay. In the fall of 1878 twenty-five men were employed in this fishery; in the spring of 1879, twenty men. In 1879 two men were engaged in setting lobster pots. They owned 10 pots, which they set both on the ocean side of the cape and in the bay. They caught about $100 worth of lobsters, the majority of which they sold in the neighborhood. A few were sold to a Provincetown smack which visited Truro at irregular intervals. Very few bluefish nets are now in use in Truro. No other branches of the fisheries are pursued.

Time has wrought many changes in the condition of Truro and of its fisheries. The fine fleet which anchored in Pamet harbor has been scattered, and the industry which raised the town to importance and brought wealth to many families has dwindled into insignificance.

THE FISHERIES OF NORTH TRURO.—North Truro, or Pond Village, as it is commonly called, is situated in the northwestern part of Truro Township, on Cape Cod Bay. The principal portion of the village is built upon the northern bank of a small fresh-water pond, and on a cross-road at its eastern extremity. The pond formerly formed a small harbor, communicating with the waters of the bay, but was closed by a dike at the time of the construction of the railway. On the low beach, outside this dike, stand the storehouses of the fishermen, about 15 in number.

The principal fisheries engaged in by the fishermen of North Truro are for bluefish, cod, mackerel, menhaden, and lobsters. A few clams are dug, and three or four men occupy themselves in manufacturing dogfish oil. The bluefish gill-net fishery is the leading pursuit. About fifteen men are engaged in it, each employing ten or twelve nets. Fishing is prosecuted from the 1st of July until the middle of October. During the season of 1879 about 40,000 pounds of fish were caught. They are invariably packed in ice and sent by rail to Boston or New York, consigned to agents, to whom a commission of 5 per cent. is paid.

Codfishing with trawls is carried on in winter on the ocean side of the cape, and with hook and line in spring and fall in the bay. In winter only three or four men are engaged in trawling, for it is an arduous and dangerous employment, yielding scanty and uncertain profits. They ven-

ture forth only on those days when the sea is calm. The codfish which are taken are salted and sold in the village.

In the cod fishery carried on in spring and fall twelve or fifteen men participate. The spring season opens about the 15th of April and lasts two months. In fall, fishing begins about the middle of October and is continued for about a month. In the spring of 1879—an unfavorable season—the average daily catch of each fisherman was about 10 fish, while 50 was about the average number in the fall of 1878. All cod taken in this fishery are salted, and usually sold in the village at a price seldom varying widely from $3 per quintal.

The spring mackerel fishery, engaged in by nine men, begins early in May, and continues for one month. In fall, twenty-two men fish for mackerel during a month or six weeks, beginning at any date between the 20th of October and the 10th of November. Somewhat less than 150 nets are employed in spring, but in fall about 300. In the spring of 1879 each fisherman captured from 120 to 600 fish, while in the preceding year not more than 700 were taken by each man during both seasons. The mackerel are packed in ice and sent principally to New York.

Four or five menhaden nets are owned in the village, but have not been used for three or four years. They were formerly employed in capturing bait for Gloucester vessels.

There are only two fishermen at North Truro who make a business of lobster-fishing, each of whom owns about 50 pots. One fishes from April to September, the other from May to the middle of July. The lobsters are sold both in Boston and New York and are usually shipped by rail, but sometimes in smacks which come from Provincetown at irregular intervals. In 1879 about 7 cents apiece was received for them; in 1878, 8 cents.

The four men engaged in extracting dogfish oil produce about 350 or 400 gallons annually as the result of their combined industry. The oil is sold in Provincetown.

At the time of the greatest prosperity of the village, about thirty years ago, there were twelve or fourteen vessels hailing from North Truro. They were all cod vessels, and made regular trips to the banks. Each crew consisted of four men, who shipped on shares, and a number of boys. In winter the vessels were laid up in Pamet harbor in Truro. With the decline of the business they were sold one by one, and joined the fleets of Wellfleet and Provincetown. The Volante and the Alterato (?) were among the last that hailed from North Truro.

When the vessel fishery declined, the inshore grounds were still well supplied with fish, and the waters adjacent to North Truro swarmed with boats of all descriptions. It was not unusual, according to Mr. Harvey Collins, looking from the beach, to see three hundred or four hundred boats filled with men and boys busily engaged with hook and line. Many of these boats belonged at North Truro, but perhaps the larger proportion came from Provincetown and Truro. With the advent of bluefish and the introduction of gill-nets the hook-and-line fishing gradually decreased, until it assumed its present limited proportions.

Prior to ten years ago many New London smacks came to North Truro and the vicinity to fish for lobsters. In those days the "hoop-pot" was in general use. The North Truro fishermen usually fished from boats with one or two pots, but the New London men attached buoys to their pots and set a great many in all directions. The new pots are much more destructive than were the old ones, but nevertheless lobsters were so much more abundant when the latter were in use that many more were taken in a season than now. Fifteen or twenty years ago it was not unusual to sell a boat-load of lobsters for 1 cent apiece.

About thirty years ago a breakwater was built on the outer bar, opposite the village. It was triangular in section and ballasted below with rocks. Unfortunately, however, it lasted only two or three years, being speedily destroyed by ship-worms.

THE GENERAL FISHERIES OF WELLFLEET.—Wellfleet, the second fishing town in importance in Barnstable County, is situated about half way between the "elbow" and extremity of Cape Cod. The village stands upon high ground at the head of a beautiful and commodious harbor, which opens toward the south, and is protected on the east by a number of islands, on the most southerly of which stands Billingsgate light. The wharves, which are three in number, are well built and in a good state of preservation.

The fisheries engaged in are: 1. The offshore mackerel fishery. 2. The oyster fishery. 3. The weir fishery. 4. The clam fishery. 5. The mackerel fishery with gill-nets. 6. The alewife fishery. The offshore cod fishery has been engaged in at different times, but has been abandoned after a short trial on account of the poor facilities which Wellfleet offers, and the lateness of the return of the fleet from the winter oyster fishery.

In 1879, the fleet of Wellfleet fishing-vessels comprised thirty schooners, one of them a three-masted vessel; the extremes of tonnage being, respectively, 37.12 and 151.65 tons. The average crew is fourteen men. In 1879 all of these vessels were engaged in mackerel catching from May to November, and, with one exception, all used purse-seines. They followed the mackerel from Cape Hatteras northward, fishing at the latter part of the season off Mount Desert, Maine. One schooner, the smallest of the fleet, used hand-lines, and fished on Nantucket Shoals during that year. From November to May the vessels are employed in carrying oysters from Virginia to Boston market. Five-sixths, or perhaps even a larger proportion, of the fleet are employed in this manner in the winter. A few enter the merchant-service at the close of the mackerel fishery, and many of those engaged in the oyster trade make two or three trips to Jamaica and other West Indian ports during the winter.

Five weirs are located within the limits of Wellfleet Township, but one of them is owned in Eastham, and will be mentioned below under that town. Of the four remaining weirs, three are erected near each other, off Horse Island, at the southeastern part of the harbor, and the fourth almost exactly on the boundary between Wellfleet and Eastham. They are all "flat" weirs, constructed of poles and laths.

From 100 to 150 gill-nets are set in spring and in fall for mackerel. They are owned by ten or fifteen men, the average number owned by any one man being ten. These nets are not allowed to drift, but are anchored at one extremity.

The Wellfleet Herring River has its source in a chain of lakes at the north of the village, and opens into the harbor at its extreme northwestern section. This river, formerly the property of a citizen, was given to the town on condition that it should be kept in good order. It is leased annually to the two highest bidders. Fishing is carried on only on Mondays, Wednesdays, and Fridays, according to a law made in 1773.

The hard clam or quahaug fishery gives employment to five men during a large part of the year. They do not spend their whole time, however, in this fishery. Most of the raking is done on the west side of the bay, where the water is not more than 8 feet deep at ebb-tide.

In 1879, 16,947 barrels of mackerel were inspected in Wellfleet. During the same year about 500,000 pounds of fish were sent to market from the weirs. The Herring River produces about 25,000 fish annually. About 1,800 bushels of quahaugs have been taken annually for a number of years. The mackerel are marketed in Philadelphia, New York, and Boston.

Most of the salt consumed in the fisheries at Wellfleet is from Cadiz and Trapani, but a small amount comes from Syracuse and Liverpool.

The cost of the forty-five vessels owned in Wellfleet in 1879 was estimated at $275,000. A

number are entirely unemployed, however, and the value of all has depreciated. About $54,000 are invested in seines, boats, &c.

The "lay" most commonly used is the "seiners' half-line." According to this system, one-sixth of the total value of the fish caught is paid for the seine; and after this amount and the inspection fees have been subtracted the remainder is divided equally between the vessel-owners and the crew.

Fishing vessels in general are insured by the Wellfleet Marine Insurance Company at three-quarters of 1 per cent. on their full value, or a large fraction of it. Vessels fishing on the banks are insured at 3 per cent. All vessels are insured by the month.

THE ALEWIFE AND BLACKFISH FISHERIES AT WELLFLEET.—In order to enable some of the alewives to reach the ponds which were their natural spawning-grounds, "fish were allowed to be taken in Herring Brook only on Mondays, Wednesdays, and Fridays, except for codfish bait. 1773."* This regulation is still in force, and fish are taken from the brook on those days only.

The blackfish (*Globiocephalus intermedius*), which until within a few years has been quite abundant in Cape Cod Bay at certain seasons of the year, furnishes a valuable oil, which has been a source of a considerable revenue to the people of Wellfleet and other Cape towns. In 1620 the Pilgrims landing at Wellfleet are said to have discovered the Indians engaged in cutting up a *grampus*. In all probability this was not a true grampus, but simply a blackfish.

In a description of Wellfleet by Levi Whitman, in the Collections of the Massachusetts Historical Society, for the year 1794, the blackfish fishery is alluded to in the following language:

"It would be curious indeed to a countryman who lives at a distance from the sea to be acquainted with the method of killing blackfish. Their size is from 4 to 5 tons weight, when full grown. When they come within our harbors boats surround them. They are as easily driven to the shore as cattle or sheep are driven on the land. The tide leaves them, and they are easily killed. They are a fish of the whale kind, and will average a barrel of oil each. I have seen nearly four hundred at one time lying dead on the shore. It is not, however, very often of late that these fish come into our harbor."

While I was in Wellfleet Mr. Elisha Atwood very kindly gave me some interesting facts regarding the history of the whale fisheries here. He informed me that seventy-five or eighty years ago, there were four captains, each, with his vessel, employing fourteen hands, hailing from Wellfleet. They went to Labrador for right-whale, Mount Desert and vicinity for humpback-whale, and the West Indies for sperm-whale. There were watchers on the shore who signaled to the whalemen the appearance of a whale in the bay. These men would then go out after it and tow it inshore to the islands, where the oil was tried out. There is no whaling from Wellfleet now. Fifty-five years ago the whale-oil trying on Griffin's Island and Bound Brook Island came to an end. Just prior to this sixteen persons were employed. Ten or twelve years ago the last vessel was fitted out for the West Indies, but proved a failure.

In 1874 a company was organized under the name of the North American Oil Company, for the purpose of trying out blackfish blubber. Its capital, invested in a building, steam-boiler, tanks, kettles, boats, &c., amounts to $2,400. In 1875 the number of barrels of oil extracted was 300; in 1876, 100 barrels. During the years 1877, 1878, and 1879 no blackfish appeared on the coast, and the company was obliged to suspend operations. This company has also carried on a small business in splitting and preparing menhaden for bait.

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* History of Eastham, Wellfleet, and Orleans, by Enoch Pratt, p. 126.

PRESENT CONDITION OF THE OYSTER TRADE OF WELLFLEET.—Ingersoll, in his report on the oyster business, says:

"It is probable that this season (1879-'80) the sum of the freights paid to Wellfleet and Provincetown schooners on oyster cargoes alone will exceed $75,000, and the losses and casualties will be few. The competition of the steamers between Norfolk and Boston, of the railroads, and particularly the recent custom of opening so many oysters in Virginia, has been severely hurtful, however, to the oyster-schooner interests.

"I may add an odd note of interest to naturalists. At Wellfleet are found many marine invertebrates not known elsewhere north of Virginia, which the naturalists of the United States Fish Commission say were probably introduced with imported oysters.

Number of planters, wholesale dealers, and shippers		3
Number of vessels engaged (including those owned at Provincetown)		46
Present value of same		$185,000
Number of sailors employed (three months)		250
Earnings of same		$15,000
Total earnings of vessels		$75,000
Annual sales of—		
I. Native oysters	bushels	600
Value of same		$500
II. Chesapeake "plants"	bushels	6,000
Value of same		$5,000
Total value of oysters sold annually		$5,500

"GROWTH OF THE OYSTER TRADE OF WELLFLEET.—Realizing that their natural resources in oysters had disappeared, and that any attempt to preserve the beds by a system of propagation was unsuccessful, the people of the coast of Massachusetts Bay turned their attention many years ago to replacing their oysters by importations from more favored regions, which should be kept in good condition during the warmer half of the year by being laid down in the shore-water, and so held in readiness for the autumn trade. This operation was called 'planting,' but it is a misuse of the word, and the other popular phrases, 'laying down,' or 'bedding,' express the fact more truthfully. It is not oyster culture at all, but only a device of trade to get fresh oysters and increase their size and flavor, which adds proportionate profit in selling. It is neither intended nor desired that they shall spawn.

"Just when this practice began on Cape Cod—for Wellfleet, whence had come the latest and best of the native oysters, naturally became the headquarters of the trade—is uncertain; no doubt it was some time before the opening of the present century. There is a gentleman now living in the village of Wellfleet, Mr. Jesse D. Hawes, who is 84 years old. He cannot remember when they did not bring some oysters every fall from New York Bay, to use at home and sell in Boston.

"It is surmised that when the native beds became exhausted, the inhabitants got into the habit of going to Buzzard's and Narragansett Bays, then to the Connecticut shore, and finally to New York, and laying down more and more yearly in Wellfleet Harbor, until finally a considerable business grew. Egg Harbor, New Jersey, was also a ground much frequented a little later by oystermen.

"By the year 1820, I am informed by Mr. Frederick W. True, who made inquiries for me on this subject, 12,000 to 14,000 bushels were brought to Wellfleet yearly, and ten or twelve shops were opened by Wellfleet men for their disposal in Boston and Portland. This accounts for the striking fact that there is hardly an oyster dealer on the New England coast, north of Cape Cod, who is not a native of Wellfleet, and a certain small circle of old names seems to inclose the whole

trade. Besides the citizens, however, many strangers came in and procured the privilege of bedding down imported oysters to fatten on the flats of this hospitable harbor. In 1841, Mr. Gould, the conchologist, wrote that the whole trade at Wellfleet then employed thirty vessels of about 40 tons each, and the services of about one hundred and twenty men for three months of the year, This yielded to the town a revenue of about $8,000 annually.

"The process of 'bedding down' was as follows: Each proprietor of a space upon the flats chartered the services of a vessel, in the latter part of the winter, to go to some specified oyster ground and purchase a certain number of bushels, for which he gave the captain money. The vessel was chartered at a round sum for the trip, or else was paid at a rate varying from 15 to 20 cents a bushel freight on the cargo. When the vessel arrived home she anchored in the distant channel, and the oysters were unloaded into dories, fifty bushels to a dory. The dories then proceeded to the grounds, which had been already divided into rectangles a few rods square, by rows of stakes, and deposited a load of fifty bushels in each rectangle or 'square.' In order that the oysters might be distributed as evenly as possible over the bottom, the dory was rowed to the center of a square, and anchored at both ends. The dorymen then threw out the oysters with shovels into all parts of the square. This was done when the water was high over the beds. When the tide was out the oysters were redistributed with forks or 'spreading machines.' The similarity of this proceedure to the seeding of a field is obvious, and sufficiently explains the phrase 'oyster-planting.' It afforded occupation to a distinct class of men, who did it by contract, the ordinary price being about 10 cents a bushel for placing them upon the beds. The season for bedding began in February, as soon as there was a surety of no further danger of hard freezing, and continued until April, the ground chosen being the hard surface of the flats in the western portion of the bay, where the beds would be left dry about two hours at each low tide. The oysters had very little fresh water near them, and their growth was variable, seeming to depend on the weather, but in what way, or just how it affected them, I could not learn. In a favorable season they grew very rapidly, in respect to both shell and meat, so that the 100 bushels put down in April would fill 300 bushel measures when taken up in October. The percentage of loss was always considerable, however, probably never less than one-quarter, and now and then amounting to the whole bed. Drifting sand, sudden frosts when the beds were exposed, disease, and active enemies were the causes that operated against complete success. I could not obtain satisfactory information concerning prices during the first quarter or half of the present century, and am inclined to believe they did not differ much from the present rates, except that selling rates were uniformly higher, and far more profit was realized than is now possible. Dr. Gould, describing the winter work in his Invertebrates of Massachusetts, states that in the autumn the oysters are taken up, selected, brought to market, and sold at wholesale for $1 per bushel, the cost of planting, attending, taking up, &c., amounting to 20 cents per bushel. Thus a profit of 30 cents on a bushel, or about 40 per cent. on the cost, is realized; and the town of Wellfleet thereby realizes an income of about $8,000 annually.

"It was asserted by citizens of Wellfleet, both to me and to Mr. True, that not until 1845 were any oysters brought to Wellfleet from Virginia, and that the cause of their importation then was the high price asked for 'seed,' as the oysters purchased in the Somerset River, in Connecticut, and in New York, for bedding, were erroneously termed. William Dill is credited with being the first captain engaged in the Chesapeake trade. I think, however, that there is an error here, for Gould mentions in his book that in 1840, 40,000 bushels were brought to Wellfleet annually from Virginia, at a cost of $20,000. Nevertheless, it was not until about 1845 or 1850 that the business began to confine itself to Virginia oysters and a large business to be done. At its height, about

1850, it is probable that more than 100,000 bushels a year were laid down in the harbor; some say 150,000. One consignment alone of 80,000 bushels was remembered by Mr. S. R. Higgins, who kindly gave me the many facts noted above. The favorite ground was at the mouth of Herring River.

"This great business gave employment to many men and vessels, and was eagerly welcomed by the Wellfleet people. Responsible men were accustomed to meet the incoming vessels and take contracts to bed the oysters. The ordinary price was 9 cents a bushel. They hired help at day's wages, and often made a good profit. Fifty men would thus often be busy at once.

"During the summer partly, but chiefly in the fall, these great deposits, which would perish during the cold winter, but were now well grown, were raked up and sent to the warehouses in Boston, Portland, and minor ports, in freight vessels and in packets. Usually the oysters were owned and bedded by dealers, who used them in their regular trade, but some were owned by speculators, who took them to market or sold them to dealers as they lay upon the beds, the purchaser taking all risks. The measure used for oysters in those days was a half-barrel holding a bushel, called a 'bushel-barrel.'

"The war of the rebellion, however, interfered somewhat with the oyster trade, and it began to decline, so far as Wellfleet was concerned. Then the various dealers in northern ports, having learned something, began to bed near home in their own harbors, and so saved freightage. Finally the steamers from Norfolk and the railways entered into so serious a competition, that fully ten years ago Wellfleet Bay was wholly deserted by the oystermen, as a bedding-ground, though her vessels still continue to carry cargoes in winter from Virginia to Boston, Portland, Salem, Portsmouth, and the Providence River, to supply the active trade and fill the new beds, which the dealers at these various ports had learned could be established at home.

"The reader thus discovers how important a part Wellfleet has played in the history of the oyster-trade of New England. A hundred thousand bushels of the bivalves once grew fat along her water-front, and thousands of dollars were dispensed to the citizens in the industry they created. Now, a little experimental propagation, of the value of a few hundred dollars, and about 6,000 bushels of bedded oysters from Virginia, worth perhaps $5,000 when sold, form the total active business. The oyster fleet, however, remains, though greatly diminished and carrying its cargoes to Boston, Portland, and elsewhere, instead of bringing them to be laid down in the home harbor. It will be long before Wellfleet and its neighbor, Provincetown, lose the prestige of old custom as oyster-carriers."

76. FISHING TOWNS FROM EASTHAM TO DENNIS.

EASTHAM.—Eastham Township occupies the entire section of Cape Cod between the towns of Wellfleet and Orleans, a territory about 6 miles in extent, north and south. The Cape at this part is uniformly about 3 miles wide. The township contains the post-offices Eastham and North Eastham, but only a small number of houses are grouped about them, the majority being scattered irregularly along the principal roads. The principal kinds of apparatus in use here are weirs, gill-nets, and seines. Six weirs—one of them a deep-water weir, the others shoal-water weirs—are located in the bay, within the limits of the town. An additional shoal-water weir, located at Billingsgate Island, near the light, is owned in Eastham. Each of these weirs is tended by about four men. The catch consists almost exclusively of bluefish, sea-herring, and, in some years, menhaden. The main dependence, however, is placed upon the bluefish, and the profit accruing is almost entirely from this species. The first weir used on the north shore of Cape Cod was erected in North Eastham.

About eleven men are engaged in seining bluefish with purse-seines during the summer months, and these, together with six or seven who do not use seines, set gill-nets also for bluefish. The seiners own eight or ten little vessels about 30 feet long, and about one-half the number carry their fish to market, while the others send theirs by rail. Each boat carries one seine. Six or seven of the men who use gill-nets for bluefish employ others also for mackerel. Probably 170 bluefish gill-nets and 100 mackerel nets are owned in Eastham.

ORLEANS AND SOUTH ORLEANS.—Orleans is situated near Town Cove, the head of an inlet, which, after many windings, opens on the ocean side of the cape. About one hundred and twenty men make their living by fishing. Of these, twenty are engaged in weir, net, and line fishing in the vicinity of the village, and the remainder ship on fishing vessels in other places, mostly in Provincetown. As many as five mackerel vessels are owned almost entirely in Orleans, and have captains and crews who belong in the town. These vessels fit out and sell their fish in Boston and Provincetown. A considerable proportion of the men who are engaged in the offshore fishery in summer remain at home in winter and carry on a clam fishery in Town Cove. Both soft clams and quahaugs are gathered. Twelve or fifteen men are engaged in tending the weirs, of which there are three. They are all erected on the flats extending from the shore of the bay, and are not more than a mile apart.

Fifty gill-nets are set by four men for mackerel in May, also in October and November. In the fall of 1878 and the spring of 1879 very few mackerel were taken, but in the spring of 1878 each man engaged made from $30 to $75. In the fall ten or fifteen men fish for cod with hook and line, for their own consumption. In the fall of 1878 each caught an amount equal to 500 pounds when dried, but this is unusual.

South Orleans is a small and somewhat scattered village, situated directly south of, and about 2 miles distant from Orleans proper. In 1879 quite an extensive clam fishery was being carried on here, which gave steady employment to twelve men. Some 1,200 barrels of soft clams and quahaugs are taken here during the season, and sent to Boston and New York. About the year 1876, 1,000 bushels of oysters were planted in Pleasant Bay, South Orleans, by a Boston merchant. They were speedily buried by the sand, however, and the enterprise proved a failure.

At East Orleans six men, with three cat-rigged boats, fish with hand-lines for cod and pollock between May and November, and in winter three men trawl for cod. The fishing is carried on just outside the mouth of Town Cove. One man engages in a lobster fishery. He owns 40 pots, and in 1879 took 35 lobsters daily from May to October. About four or five years ago eleven men were engaged in this fishery, but they considered it unprofitable and left it.

BREWSTER.—The villages of East Brewster, Brewster, and West Brewster occupy the stretch of coast between East Dennis and Orleans, on the north side of Cape Cod, about seven miles in extent. There is no harbor here, but a vast flat, exposed at low water, extends in many places at least a mile from the shore. The principal fishery now engaged in at Brewster is the weir fishery. There are five weirs in operation within the limits of the township. They are all "flat" weirs, constructed of laths and poles. Their average value is from $400 to $500. Each weir is "tended" by four or five men. There is but little regularity in the amount of catch, but perhaps the average catch in each of these weirs is 50,000 pounds of fish. In fall about twenty men are engaged in cod fishing from boats for six weeks or two months. They make about $25 each for the season. Some of the codfish are salted and sent to Boston, and the remainder sold fresh in the neighborhood.

An alewife brook, located at West Brewster, produces from 50 to 100 barrels of alewives annually, which are distributed to citizens of the town at a nominal price. Each person is entitled

to one eighth of a barrel. If more than enough to supply the wants of the town are taken, the surplus is sold to outside parties.

PRESENT CONDITION OF THE FISHERIES OF CHATHAM.—The town of Chatham occupies the most southeasterly portion or what is commonly called the "elbow" of Cape Cod. Its territory is deeply indented on all sides by arms of the sea, and in reality forms a short and broad peninsula, the greatest length of which is about five miles. The township contains the villages of Chatham, North, South, and West Chatham, and Chatham Port. All of these villages are removed a considerable distance from the line of railway, and are connected with it by a stage route.

Chatham, the most important village of the town, occupies the southeastern section. The larger proportion of the dwellings are situated nearly a mile from the harbor and wharves. The fishing business of the place has greatly declined within twenty or twenty-five years. A number of years ago the sea broke through and destroyed the best harbor, leaving only the one to the westward of Monomoy flats, known as Stage Harbor. This harbor, although of fair size, is shallow in most parts, and has a very narrow channel, and a troublesome bar at the mouth.

The principal fisheries at present engaged in are the George's Bank cod fishery, the boat cod fishery, the offshore mackerel fishery with seines, the mackerel fishery with gill-nets, the Monomoy weir fishery, the lobster fishery, and the clam fishery.

The offshore cod fishery is carried on by a firm who have their establishment on Harding's Beach. In 1879 five vessels, with crews of about eleven men each, were employed in cod fishing on Nantucket shoals from about the 20th of April to the middle of August. Hand-lines are used altogether. They were accustomed to come in on Saturday, and having obtained a supply of bait from the flats, to depart again on the following Tuesday. During a part of the time, however, the vessels made trips of two weeks' duration, and carried the fish caught into Gloucester. In 1879 they averaged 600 quintals of codfish each, of which perhaps one-sixth was sold in Gloucester.

The boat cod fishery off Monomoy gives employment to about one hundred and fifty men, the majority of whom belong in the village of Chatham. They use small cat-rigged boats about 20 feet long. Sometimes two men go in one boat and sometimes but one, the number of boats in use being about one hundred. The men who go alone are usually old and experienced fishermen, and hence the catch of these boats is always more than half the catch of those which carry two men. In 1879 the boats averaged from 40 to 150 quintals of cod. The larger portion of the fish are sold to little vessels called "pickpockets," in which they are carried to Hartford, New Haven, Providence, and other Rhode Island and Connecticut ports.

After the cod-fishing season is over, about the 1st of September, the five fishing schooners are employed in seining mackerel off the coast of Maine. They fit out for the first trip at Chatham, but after that at the port where the mackerel are sold; it may be at Portland, or any other of the eastern ports. A small proportion of the fish are sold fresh in Boston. After the mackereling season is over the men engaged carry on the clam fishery to some extent.

Between 150 and 200 mackerel gill-nets are owned in Chatham, and are usually set during the month of May. They are owned by twelve or fifteen men. All the fishermen except one sell the mackerel caught to peddlers, the man forming the exception marketing his fish in Boston. For three years very few mackerel have been taken.

In 1879 ten deep-water weirs, all large except three, were set on the flats on the western side of Monomoy Island. These weirs are first placed in position about the middle of April, and are removed at the latter part of May or the 1st of June. Each employs about twelve men, two cooks, and a book-keeper. The principal fish taken are mackerel, shad, sea-herring, menhaden, and codfish. The mackerel are sold chiefly in Boston, but a few also go to New York. The men-

haden and herring are sold to Gloucester fishing schooners for bait. The fish are transported to Boston by the way of Dennis Port. Five or six little schooners carry them from Chatham to Dennis Port.

About twenty men in Chatham and about the same number making their summer quarters at Monomoy set pots for the capture of lobsters, from the beginning of June to November. Each fisherman owns from 40 to 80 pots. The lobsters are sold in Boston and are carried thither in smacks.

The winter clam fishery is carried on by fishermen who do not make sufficient money during the summer to support their families, by old men who are unable to join in offshore fishing, and by boys. Altogether about one hundred and fifty persons are employed. They begin in November and rake on every fair day until April. The sea clams are either sent directly to Provincetown fresh, or are salted and sold to the grocers of the village, who advance money on the same and hold them until spring, when they bring good prices. In 1879 about 700 barrels were raked and barrelled.

Five or six bluefish and bass seines are owned in Chatham. They are shot from the beach, sometimes on the ocean side and sometimes in the harbor. Five men are required to manage each seine. The season begins in May and lasts until October. In 1879 the catch was 12,000 pounds of bluefish and 3,000 pounds of bass. The fish are iced in boxes and sent to New York.

The fisheries of North Chatham and Chatham Port are not important. A number of boats from North Chatham join the cod fishing fleet, and twenty men are engaged in digging clams in Ryder's Cove in winter.

West Chatham is not situated near the water and is only indirectly interested in the fisheries.

HARWICH.—The town of Harwich lies between Dennis and Chatham. Its only coast line is on the south, being shut in on the north by Brewster. It contains the villages of Harwich, North, East, South, and West Harwich, and Harwich Port. The last named is the only important fishing-village in the town. West Harwich, in regard to fishing interests, can scarcely be considered as a separate village. It is separated from Dennis Port only by an imaginary line and the interests of the two are identical; they will therefore be treated together under "Dennis Port."

Harwich Port, like many of the Cape Cod villages, is built mainly upon one long street running parallel to the coast line. From this street others make off at right angles leading to the wharves. About 200 men are engaged in the fisheries. In 1879 about 40 men shipped at Portsmouth, 125 manned the vessels sailing from the villages, and from 30 to 40 were employed at the wharves in preparing the fish for market. Nearly the entire remainder of the male population of Harwich Port, in many cases with their families, are engaged in the merchant service and are scattered all over the earth. There are two sail-lofts in Harwich Port, which together would furnish about enough employment for one man during the whole year. The sails made here are principally for the cat-rig boats of Chatham. A boat factory, established over twenty years ago, gives rather scanty employment to two men. During the winter of 1878 two cat-rig boats, worth about $300 each, were made for some Chatham fishermen.

The only fisheries carried on at Harwich Port are the mackerel and the weir fisheries and incidentally the cod fishery. The mackerel fishery is carried on by two firms at two wharves a few hundred yards apart. Each firm in 1879 owned six schooners, carrying crews of fourteen or fifteen men each. In that year one vessel fished in the Gulf of Saint Lawrence, but the others mostly on the Maine coast.

The fishing season opens about the 1st of April and closes about the 10th of November, after which time the vessels are hauled up for the winter. The trips average about three weeks each.

The amount of capital invested in vessels is about $40,000; in apparatus, $20,000; and in buildings and wharves, $2,500. One of the firms sends half of the mackerel taken to Philadelphia and half to New York. The other firms send one-sixth to Philadelphia and the remainder to New York and Boston. The vessels are insured for periods of six or seven months, in Provincetown, Wellfleet, and other places. Two of the vessels belonging to one of the firms make one trip in the spring to Nantucket Shoals for codfish. In the spring of 1879 the catch was 600 quintals.

A weir has been in use at Harwich Port for thirteen years. It is a double weir, having two leaders, pounds, and bowls. It is placed in position about the 20th of April, and is taken up in the latter part of May. Its original cost was $3,000.

South Harwich is located about 4 miles west of Chatham, and has within its limits the wharves and buildings of two firms carrying on the fishing business. Four cod vessels and four mackerel vessels are owned here. The cod vessels carry from nine to twelve men each. Two of these vessels go to the Banks, and make but one trip; the others go to Nantucket Shoals. About 4,000 quintals have been brought in by these four vessels annually for a number of years. The fish are sold to small vessels, which carry them to Rhode Island and Connecticut ports. The four mackerel vessels are employed from the 1st of April to the last of October. They go south in spring, and follow the fish to and along the coast of Maine. They make trips from two to six weeks in length. Each vessel carries from fifteen to twenty men. From 800 to 1,000 barrels of mackerel are sometimes brought from the Monomoy weirs, and are packed here. Ten or twelve men are employed for about one-third of the year at the wharf in salting and preparing the mackerel for market. During the remainder of the year they either remain at their homes, or, if opportunity is offered, ship on coasting vessels. The wharves at this place are exposed to rough weather in winter, and are often damaged by ice.

Two small weirs are owned in South Harwich. One is situated at a short distance to the west of the wharves, and the other a similar distance to the east of them. They are constructed of netting, and have only a single leader and pound. They are not placed at so great a distance from land as the Monomoy weirs, because the water is deeper.

The condition of the fisheries of Harwich at the opening of the present century is shown in the following note from the Collections of the Massachusetts Historical Society:* "Fifteen or twenty vessels, averaging 40 tons each, and about half of them owned in the precinct, are employed in the shore fishery on the coast. Four vessels of 100 tons each, which go to the Banks of Newfoundland and the Straits of Belle Isle, sail also from this place and obtain their men here. The whole number of men and boys engaged in the cod fishery is about two hundred, but several sail from Chatham, Bass River, and the North Precinct."

During the first quarter of the century the business does not seem to have increased very much. It is recorded by Freeman, in his History of Cape Cod, that in 1837—

"There were here about twenty vessels engaged in the cod and mackerel fisheries; the aggregate tonnage about 1,300 tons. The result of their voyage was 10,000 quintals of codfish, worth about $30,000, and 500 barrels of mackerel, worth about $3,000. The amount of salt used in the business was 9,000 bushels; the number of hands employed 200, and the capital invested $60,000."

During the second quarter the fisheries increased very rapidly. The number of vessels twice doubled. In 1862 eighty or one hundred vessels were employed in the cod and mackerel fisheries, and several wharves and packing establishments were connected with the business. For the

*Note on the South Precinct of Harwich, in the County of Barnstable. September, 1802. <Coll. Mass. Hist. Soc., VII, 1st series, p. 141.

eleven years from 1868 to 1878 inclusive, the number of fishing licenses issued for vessels over 20 tons belonging in Harwich was as follows:

1868	35	1874	31
1869	33	1875	27
1870	33	1876	24
1871	36	1877	20
1872	28	1878	20
1873	30		

DENNIS.—The village of Dennis, or North Dennis, as it is often called, is located in the northeastern portion of Dennis Township, and is distant from Yarmouth about three miles by air-line. Between Dennis and Yarmouth is an extensive salt marsh, through which flows a creek known as the "Chase Gardner Creek."

With the exception of a small and uncertain cod fishery carried on for a short time in spring and fall with boats, the pound fishery of the Nobscusset Fish Weir Company is the only fishery prosecuted at Dennis. This company own a shoal-water weir, situated near Chase Gardner Creek, for the management of which they employ four men, and from which in 1879 36,600 pounds of fish were shipped.

Dennis Port is situated in the southeastern part of the town and about a mile from the shore. Its streets are continuous with those of West Harwich, and the two villages are separated only by an imaginary line, and, except in matters of town government, are practically one village. At present there are four firms carrying on the fishing business; three are connected with the trade in fresh fish, and two with the offshore cod and mackerel fisheries. These firms carry on their business at two wharves, known as the east and the west wharves. Twelve schooners are owned here, six of which are employed in the cod fishery and six in the mackerel fishery. Each vessel carries about sixteen men.

The cod fishery begins in April and lasts until August, and about seven trips are made in this time. In 1879 five of the vessels employed hand-lines and one used about 12,000 hooks of trawl. In 1879 3,100 quintals of codfish were taken by the six vessels. The fish are salted, and part are sent to Boston market and part sold to peddlers, who carry them in small vessels to Rhode Island and Connecticut ports. Seven such vessels are owned in Dennis Port and employ about fifteen men. They are the same that bring fresh fish from the Chatham weirs in spring.

The mackerel fishery was carried on in 1879 with six vessels, each with an average crew of fifteen. Two of the cod vessels are also employed in this fishery at the close of the cod-fishing season. All use seines. The total catch of all the vessels in 1879 was 6,125 barrels. In addition, about 3,000 barrels are brought from the weirs at Monomoy and packed here. These fish are prepared for market by about two hundred men. Two-thirds of them are iced and shipped to New York and Boston fresh, and the remainder are salted and barreled. This work occupies about six weeks. When it is over the men go into other branches of the fishery. The boats which have brought the fish from Monomoy take in cargoes of 10 or 12 barrels of mackerel and a quantity of codfish, varying from 25 to 200 quintals, and peddle them at various ports in Rhode Island and Connecticut. Some of the men employed in preparing the mackerel for market, when that employment comes to an end, go into the bluefish fishery, swelling the number in that fishery to about sixty. The mackerel fishery is carried on in spring also by two men, who employ twelve mackerel-nets. In 1879 about sixty men, employing twenty boats and little vessels, were engaged in line-fishing for bluefish and for tautog, scup, and other species. The fishery lasts until the middle or last of October, when the boats are hauled up. Four of the boats also each set twelve

bluefish gill-nets. About 150,000 pounds of bluefish and one-third as many pounds of tautog, scup, &c., are annually caught. Together with the other fish brought from the Monomoy weirs, there are usually 75 or 100 barrels of shad and a number of salmon.

During the winter, that is from November to April, about one hundred and twenty men belonging in Dennis Port and an equal number from the neighboring villages are engaged in a clam fishery. They go out to the beds singly in dories. In the winter of 1878 about 2,000 barrels of clams were gathered. Twenty men are employed to open them. They are shipped fresh to Provincetown, Gloucester, Boston, and other ports, to be used for bait. In 1877 and 1878 about three-fourths of the whole number were shipped to Boston. The total capital invested in this business is about $8,000.

The amount of capital invested in vessels is about $35,000; in seines and other gear, about $10,000; in wharves and store-houses, about $8,000; in mackerel and bluefish gill-nets, $2,500; in boats and little vessels for the line-fishery, $8,000; in dories and other apparatus for the clam-fishing, $8,000. The total amount invested in all branches of the fisheries is about $100,000.

West Dennis is situated in the southwestern part of the town, on Bass River, a considerable stream, which has its source in a small pond on the northern side of the Cape and is swelled by the inflowing of the tide. Some five or six boats are employed in the bluefish line-fishery off the mouth of the river. About 150 barrels of bluefish are annually shipped. A number of gill-nets are also employed for the capture of bluefish. In 1879 about 1,700 bluefish were taken in them. The majority of the fish are shipped through Mr. George Loring, of South Yarmouth.

A small number of alewives are annually taken in an artificial brook cut between one of the ponds in West Dennis and the salt water. About 10,000 alewives are taken.

At South Village, a small hamlet about a mile south of West Dennis, there are four men who together own and employ eighteen bluefish gill-nets. In 1879 about 20,000 pounds of fish were caught, of which 2,000 was salted, and the rest shipped to market fresh.

A clam-fishery, similar to that carried on at Dennis Port, is engaged in here every winter by about fifteen or twenty men. They secure from 100 to 150 bushels of clams each during the season.

77. THE FISHERIES OF YARMOUTH AND BARNSTABLE.

YARMOUTH.—Yarmouth is a quiet little village, for the most part built upon one street and continuous with the village of Barnstable. Yarmouth and Yarmouth Port are essentially the same village, being separated by an arbitrary line. At one time this was the seat of a considerable cod and mackerel fishery. Before the Revolutionary war there were said to be thirty-four fishing vessels in the town of Yarmouth, a large share of them probably belonging on the north shore; in 1789 there were thirty-two, and in 1790 there were thirty. These were probably small vessels of 15 or 20 tons engaged in the shore cod fishery. Captain James B. Crocker, of Yarmouth Port, went into the fishing business about 1854. At that time there were about eight fishing vessels. Relics of the old fleet were there in the schooners Wave and Leo, each about 60 tons old or 40 tons new measurement, shallow and poor sailers, valued at $700 or $800 each. For a time subsequent to this the mackerel fishery was prosecuted quite vigorously with a larger class of vessels, and there were ten or eleven of these when the fishery was at its height, about 1857 or 1858. Among these were the Kentucky, the Anna L., the Thatcher Taylor, the Karenhappuck, the Fillmore, the Olive Branch, the Hockanom, the Everett, and the Premium. The last of these vessels left Yarmouth about 1860. This was the Kentucky, which was then sold at Provincetown.

Mackerel packing, according to Captain Matthews, was begun at Yarmouth about 1831. At

times when mackerel were scarce and there were few vessels that went cod-fishing, there were usually two in this business. They do not appear to have gone to the Grand Bank, but chiefly to Quereau and Cape Sables (as the fishermen call it). Captain Matthews is of the opinion that the mackerel fishery was carried on there with considerable energy from 1838 to 1840. Yarmouth does not appear to have been devoted to any considerable extent to the fishery beyond supplying capital. From 1854 to 1860, according to Captain Crocker, most of the fishermen and skippers came from Orleans and Harwich, and it was found difficult to hire men to ship in the Yarmouth vessels because of the hard work in getting vessels into the harbor and getting the fish ashore. The fishery was finally given up because only shallow vessels could get into the harbor, and these were not suitable to be used to advantage in the winter for mackereling or other purposes. In 1879 twenty or thirty Yarmouth men were engaged in fishing, shipping from Harwich, Provincetown, and other ports. One fishing skipper belongs here.

Hitherto in Yarmouth as in Barnstable, three or four men have engaged in cod fishing in spring on the bar at the mouth of Barnstable harbor, and have helped to make up the amount of 20,000 pounds of fish usually taken on that bar. This year, however, the fishery was a failure.

Capt. Benjamin Lovell, half owner of the weir at Sandy Neck (see Barnstable), has a sweep-seine, worth perhaps $100, which he uses for the capture of various kinds of fish. He also sets twelve or fifteen lobster pots. This fishery has been carried on for many years, but from 1876 until the present year it scarcely supplied local demand. This year, however, Captain Lovell has caught at least 2,500 lobsters.

The Yarmouth Fish Company, Daniel B. Crocker, treasurer, has a capital of $2,500, and there are 249 shares and 54 owners. They own a weir, which was put down in 1859. In 1878 about 150 barrels of fish were shipped; in 1879, about 100 barrels, and in 1880 the same. There is no harbor except in a shoal creek flowing through the marshes between the village and the bay. Here it is said that 12 or 15 vessels were formerly laid up in winter, but it seems almost incredible that they could have been brought up to the wharves. The wharves and the fish stores are dilapidated and essentially useless.

South Yarmouth comprises 3 small villages—South Yarmouth proper, Georgetown, and lower village. South Yarmouth itself, situate 1 mile from the mouth of Bass River, is the largest place, but contains few fishermen, and is not dependent on the fishing. Georgetown is a small hamlet of about 10 fishermen's houses, and is dependent upon the fresh fishery. It is about 1 mile above South Yarmouth, on Bass River; the lower village is but a short distance below South Yarmouth, and does not depend on the fishery. In all these villages together there are probably forty men who make a living during nine months of the year by fishing with hook and line in small cat-rig boats, off the mouth of Bass River. Twenty men, including about ten of the forty men mentioned above, make a partial living by eel fishing. It is estimated that they average 1,000 pounds of eels apiece annually, which would make an aggregate of 20,000 pounds. Some thirty men are employed in line fishing off the mouth of Bass River. They use small cat-rigged boats, worth from $100 to $300.

In spring codfish are caught, and later in the season bluefish, scup, and flatfish. In 1879 about 60,000 pounds of bluefish and 30,000 or 40,000 of scup and flatfish were taken by the fishermen. The larger proportion are shipped by two firms having a capital of about $3,000. Four sweep-seines are owned in South Yarmouth, and are used for the capture of herring off the mouth of Bass River. A number of gill-nets are used annually by five men for the same purpose.

The privilege of the alewife fishery in Bass River is held jointly by the towns of Dennis and Yarmouth. The fishery is leased annually to private individuals for about $700. The alewives

are caught with sweep-seines in a pond at the head of the river. Fishing is allowed on four days only of each week. In 1879, 140,500 alewives were taken. Each citizen of Dennis and Yarmouth has the privilege of buying 400 alewives at 40 cents per hundred. About 75 barrels of white perch are also caught annually in the river. Each citizen of the two towns may buy a peck of them for 85 cents. A few smelts, tom-cod, and flatfish are also caught in the river.

BARNSTABLE.—The village of Barnstable is built mainly upon one long street running parallel to and about a half mile distant from the south shore of Barnstable Harbor. It contains the court-house and custom-house for the county and the residences of many wealthy citizens. It cannot at the present day be classed with fishing villages, properly speaking, although until 1860 several fishing vessels were owned here and sailed from this port. The village is now, seemingly, principally supported by the capital which the retired captains of whaling and merchant vessels who make their residence here have brought with them. The wharves, which, in large measure, are in decay, are located at some distance from the mouths of two creeks in an extensive salt marsh. The sand has washed in, almost filling the creeks and making it difficult for even small boats to go in and out.

The only vessel at present owned in Barnstable is the Pontiac, a schooner of about 15 tons. She is employed by her owners, Messrs. James & George Smith, in a variety of fisheries. In spring and fall she has been used in setting mackerel nets, and in summer in lobster fishing in Buzzard's Bay or in bluefish fishing with nets on the outside of the cape.

A weir belonging to Capt. Benjamin Lovell, of Yarmouth, and a partner, is located in a cove near Sandy Neck light-house, on the north side of Barnstable Harbor. It has not proved very successful. During the present year (1880) no fish have been shipped for want of ice.

A cod and pollock fishery has been carried on by four or five men for a number of years from March to June at the edge of the bar which closes the mouth of the harbor. This fishery has been quite successful, yielding about 15,000 pounds of cod, and 5,000 pounds of pollock annually, until the present year, when it proved an almost absolute failure.

Since 1878 two men have done a considerable business in catching and shipping eels. In the year 1878 they shipped about 5,400 pounds, and in 1879 about 5,800 pounds. The fishing begins about the middle of May, and lasts until the middle of September.

For three or four years a fisherman belonging in Barnstable, with the aid of a partner from Yarmouth, has set a few lobster-pots in the harbor. In 1879 eight pots were set during July, and 200 or 300 lobsters taken. In 1880 twelve or fourteen pots were set, but the catch was about the same as that of the previous year.

Scallops are abundant along the shores of the harbor, and in 1876 a party of men from Hyannis established themselves here for the purpose of gathering them. In 1877 the price of scallops declined very greatly, forcing these men to abandon their enterprise. The fishery was continued, however, by two men of Barnstable. In the winter of 1877–'78 the latter shipped 40 half-barrels of "eyes," and during the winter of 1878–'79 only 6 half-barrels. They were sent to Boston and New York.

A shoal-water weir was built on the shore of the bay, west of Beach Point, in 1870, for the purpose of catching bass and bluefish. It was not successful and was abandoned in 1876. In the spring of the latter year a deep-water weir was erected off Beach Point; 20 or 30 barrels of mackerel were taken in it, but it was soon broken down by the waves, and has not been replaced.

Several fishing vessels were owned in Barnstable prior to 1860 by N. & W. Scudder and one other firm. Among the last employed here were the Emma C. Latham and the Flying Fish.

Hyannis is a flourishing village situated in the southern part of Barnstable Township. Its

prosperity, however, is due, perhaps, more to the fact that it contains the residences of many wealthy retired captains, than that a portion of its citizens are fishermen. The wharf, at which the fishing business is carried on, is distant more than a mile from the village, and is owned by the railroad company, that also use it and have connected it by rail with the main part of their road.

In 1879 the fisheries at this place gave employment to about one hundred men. The principal branches engaged in are the offshore cod and mackerel fisheries, the boat line-fishery, and the bluefish fishery with gill-nets. The cod and mackerel fisheries are carried on by a single firm, which owns three schooners. Each of these vessels carries about twelve men. In 1879 only one crew was composed of Hyannis men, the others living at Chatham and Harwich. In spring and summer the vessels are employed in the cod fishery, going about 25 miles from Hyannis, off Monomoy. In 1879 the three vessels brought in 600 quintals of codfish. In fall the mackerel fishing takes place. One vessel was stranded in the August storm of 1879, and hence only two went mackereling that season. The vessels are withdrawn in winter and the fishing is not carried on.

The boat line-fishery employs about forty men, twenty-five of whom belong in Hyannis; the others come from West Yarmouth and other places. About one-half of the boats carry two men, and the remainder one man. They are all cat-rigged, and are worth from $25 to $300 each. The first fish taken in spring is the flounder, then follow scup and bluefish, tautog and sea-bass, and in fall the flounder again. About 1,000 barrels of fresh fish are shipped to market annually, of which the larger proportion are bluefish and scup. Four firms are engaged in shipping the fish, but one has a much larger business than the other, and ships, perhaps, two-thirds of the whole quantity. The fishermen do not like to trust a distant and fluctuating market for their compensation, and therefore sell the fish they catch directly to the shippers; the latter then reselling to Boston and New York dealers.

The bluefish fishery is carried on by four men, who together own about twenty-five gill-nets. They also employ four other men to assist them in setting the nets. The fishing begins about the 15th of May and lasts until October. In 1879 some 12,000 pounds of bluefish were taken, and $1,200 was stocked. The fish are usually sent to New York. A net weir was erected at the west of the village in the spring of 1879, for the purpose of capturing menhaden. Only 50 barrels of menhaden were taken, however, and the enterprise failed. The weir was taken up in June. About 300 barrels of scallops are taken every winter in Hyannis Bay, by a varying number of men. They are usually shipped to New York by rail.

Messrs. Hall & Thatcher, of Hyannis, have planted a few hundred bushels of oysters annually for six years in Mill Creek, east of Hyannis. At one time they planted 600 bushels. In 1879 none were planted, and all were taken up, except about 100 bushels. Seed is obtained from Long Island Sound and Buzzard's Bay. The above firm has shipped a few oysters annually to Boston, selling them to the hotels at $6 per barrel in the shell.

Twenty-five or thirty years ago about thirty vessels sailed from the west bay of Hyannis. There were six bankers; the rest were mackerelmen. The crews came from Hyannis and vicinity. In the East Bay, or Lewis Bay, as it is called, there were two wharves, from each of which twenty vessels were sent out, mostly for mackerel. They went in the spring to Virginia and followed the fish up to the Bay Chaleur. In the winter season they were laid up. They were from 50 to 100 tons burden, old measurement. Among the last to go out were the Blue Rock, Faithful, Red Rover, Voltaire, Splendid, Enchantress, Euphrates, William King, Shade, Adrian, Potomac, Eunice Cobb, and John C. Calhoun. All these vessels were owned in Hyannis.

During the past five years every firm formed for carrying on the salt-fish trade has failed in a few months. The men concerned have been scattered, and it is very difficult to obtain information in regard to the cod and mackerel fisheries during and prior to this period.

Bluefish were first caught by the Hyannis fishermen about forty-five years ago. Twenty years ago they were still plenty, but the difficulty then was that the markets were not good. The fish were commonly sold to smacks for 1 cent per pound. It was customary at that time to salt the bluefish.

The villages of Osterville, Marston's Mills, and Cotuit are situated in the southwestern part of Barnstable Township. Marston's Mills is located at the head, Osterville on the eastern side, and Cotuit on the western side, of a deep inlet or bay, the waters of which find their way about three miles inland. The most important fishery carried on at this point is the oyster fishery. In Cotuit and the neighboring villages there are twelve firms which have capital invested in this fishery. They employ forty or fifty men. About 2,000 bushels of oysters are annually brought from several places in Buzzard's Bay, Long Island Sound, and on the Jersey coast, and Norwalk, Conn., and planted here. The available ground is now almost entirely taken up. The removal of the oysters for market begins about the middle of September, but the height of the season is from the middle of October to the first of April. About $3,000 are now invested in "seed," that is, in oysters which are to remain undisturbed for one or two years, that they may grow and fatten. The apparatus owned by the twelve companies, including scows, rakes, &c., is worth about $1,200.

In addition to the men engaged in the oyster fishery, there are from twenty to twenty-five men at Cotuit who earn a living in other branches. They own and employ about fifteen cat-rigged boats. In winter they occasionally fish for cod on the Horse Shoe shoal, which is 15 or 18 miles distant from Cotuit. Only 30 or 40 quintals are usually obtained during the season. In April hand-line fishing for tautog, scup, bass, and bluefish is begun, and is continued until fall. Twenty-five gill-nets are set annually, from May to August inclusive. Six boats are employed in this fishery. Four drag-seines are also owned in Cotuit, and are used for the capture of bluefish. In 1877 twenty-five lobster pots were in use. The total catch in 1877 was as follows: Cod, 10,000 pounds; haddock, 2,000 pounds; bluefish, 30,000 pounds; scup, 2,575 pounds; sea bass, 2,000 pounds; tautog, 1,600 pounds; striped bass, 1,500 pounds; flounders, 6,000 pounds; eels, 1,000 pounds; menhaden, 1,200 barrels; and 500 lobsters in number.

Both soft clams (*Mya arenaria*) and quahaugs are to be found in the harbor, but no considerable fishery for them is carried on.

In 1878 the fishing was very poor. The fishermen did not average $50 during the whole season. Purse-seines were formerly used at Cotuit for the capture of menhaden.

Centreville is a small village situated about four miles west of Hyannis. The fisheries are carried on by ten men. Each man owns three gill-nets, which are used for the capture of bluefish. Two sweep-seines are also in use here. A menhaden purse-seine, used in spring to secure fish to be sold for bait, is owned here. A weir, worth about $500, was erected in March, 1879. About twenty years ago an artificial alewife brook was cut in a marsh near the village, into the narrow drains of which the fish naturally came. A company was formed under the name of the Nine Mile Fishing Company. In 1877 the brook paid 60 per cent. on the original capital of $1,000. In 1878, 320 barrels of alewives were taken out, a larger amount than usual. The fishing is carried on for two months, usually from the 1st of April to the 1st of June. The alewives are salted or smoked and consumed in the village, or sold in Hyannis, or sold fresh to the fishermen fishing on Nantucket Shoals.

78. THE FISHERIES OF SANDWICH AND FALMOUTH.

SANDWICH.—The village of Sandwich, although situated very near the water, is not and has never been, to any considerable extent, dependent upon the fisheries. There are three men who

earn their living partially by fishing. They do not ship any fish, but sell their catch in the village. They own two small bluefish gill-nets and a sweep-seine worth about $100, which is used in spring for the capture of mackerel. In fall and spring these men catch a few cod and mackerel with hook and line in the bay.

The Sandwich alewife-river, which forms a part of Monument River, yields annually from 400 to 1,000 barrels of alewives. The river belongs to the town, and each citizen of Sandwich Township is entitled to one barrel of alewives on payment of the trifling sum of from 35 to 70 cents, which serves as compensation for the men who catch the fish. The villages of West Sandwich and North Sandwich are inland, and do not participate in the fisheries. In the course of its history Sandwich has had three whaling vessels, the last of which was sold to Sag Harbor in 1864.

Cohasset Narrows is situated in the town of Sandwich, and is at the extreme northern end of Buzzard's Bay. The fishing at this end of the bay is followed only by sportsmen and by others who thereby furnish fish for home consumption. The State law prohibits the setting of any weirs or pounds from Bird Island light on the south to the extreme northern end of the bay. The Narrows is now receiving special attention, it being at the southern end of the proposed canal soon to be cut through from Cape Cod Bay on the north, the two bays being only 6 miles apart. A few years ago clams were plentiful at this point, but probably from having been overworked are now nearly exhausted. The amount taken from the flats of Buttermilk Bay during the season of 1879 was 800 bushels. During the next season 400 bushels were taken and were sold by peddlers to the inhabitants of the neighboring towns.

The villages of Pocasset, Monument, and Buzzard's Bay form a part of the town of Sandwich, and are situated on the eastern shore of Buzzard's Bay, near its head. The oyster fishery is the only fishery which engages the attention of the citizens to any considerable extent.

THE OYSTER INDUSTRY OF SANDWICH.—The following account of the oyster interests of Sandwich is from the report by Mr. Ingersoll:

"The Cohasset River divides the town of Wareham from the adjacent township of Sandwich, its neighbor on the south and east. Flowing into Buzzard's Bay from this Sandwich side are several rivers, and the shore is indented with numerous inlets and shallow ponds. Nearly all of these inlets were found by the earliest colonists occupied by beds of natural oysters, and most of these beds are still living and supplying seed for cultivation. That the Indians used the oysters extensively is shown, not only by tradition and analogy, but by abundant traces of former feasts in the shape of shell-heaps. Some account of the oysters of this region more recently, is accessible in a letter from Dr. J. B. Forsyth, written in 1840, to Dr. A. A. Gould, and printed in the first edition of the latter's Invertebrates of Massachusetts. Dr. Forsyth says that the aged men of the vicinity assured him that oysters had never been brought there from abroad up to that time (1840); that they grew so abundantly everywhere along the Sandwich shores 'that at low water you could at almost any point procure a bucketfull of them from the rocks.' Dr. Forsyth also mentions Wareham as an oyster locality. There was then a statute prohibiting a man from taking more than two bushels at one time for his own use, and forbidding their being carried out of town. 'The oysters,' says the writer, 'are generally collected by a few men, who bring them to the village and dispose of them at 50 cents a bushel for their trouble; and by selling half a bushel or a bushel to an individual the spirit of the statute is not violated. This may be repeated every day, until the desired supply is laid in. When placed in the cellar and fed from time to time with a little meal and water, they will sometimes keep good for months.'

"Buzzard's Bay is the new name for the railway station on the Old Colony line, known to all the people about there as Cohasset Narrows, because it is upon the narrowest part of the neck of

the peninsula of Cape Cod. The river flowing down past Buzzard's Bay station is the Monument, a clear, broad stream, up and down which the tide rushes with great force. 'Wild' native oysters inhabited this stream, but had been pretty nearly exhausted by constant raking, when the attention of the town authorities of Sandwich was called to the matter a few years ago. They caused a survey of this and the various other oyster waters of the township, and divided them off into 'grants' of different sizes, according to the character of the bottom, but none less than about an acre and a half in extent. These grants could be taken by any citizen of the town, under certain conditions, upon the payment of $2.50. If not improved within a year they reverted to the town. Each grant, as soon as taken, and no matter what the value of the stock upon it, was taxed at a valuation of $50.

"The people were quick to take advantage of these legal permits, and it was not long before nearly all space of value was appropriated, and wild speculation began; but it is only within the last three or four years that much business has been done, or systematic efforts at transplanting and stocking have been introduced. There are now about fifty owners on Monument River, Cohasset River, and in Little Bay, and a careful estimate of money invested gives $30,000 as the probable value of grants, stock on hand (November, 1879), and appurtenances. Many of the grants are as yet very slightly stocked with oysters.

"The Monument River oysters were famous in olden times for their superior quality and size. 'They opened well,' the oystermen said; that is, there was a large proportion of meat to the shell, which was thin, brittle, and much scalloped. The first idea was simply to hold, as proprietors, the seed which were caught upon the grants from the natural bed at the mouth of the river; and, to facilitate this catching, more or less dead shells have been thrown down. But the more enterprising planters have laid down great deposits of seed oysters, purchased chiefly in Wareham, and these are just now beginning to produce their legitimate returns, having grown to a marketable size. Some fresh seed is put down every year, but in addition to this, it is expected that large accessions will be made by spawn caught from the natural bed and from the spawning of the planted oysters. Since 1874, however, very little spawn has been caught. In that year a vast quantity appeared, but arrangements were not made to avail themselves of it.

"The amount of seed placed upon a grant varies with the pocket and theory of the owner, from 100 to 500 bushels on an acre; perhaps 200 bushels would be an average of actual planting. The seed from one to two years old is used and preferred. It is generally planted in the spring, when it can be bought for from 30 to 35 cents a bushel; but it is thought much better to plant it in the fall, although then from 60 to 80 cents is asked for the seed. It costs about 10 cents a bushel to throw down. The best bottom (found everywhere here) is hard sand, a little soft on top. The average depth of water on the beds is 3 feet; but some stock is planted where it is exposed or just covered at ebb-tide, the objection to this being the danger of damage from drifting ice, for the mere resting of the ice on the oysters is not usually harmful, provided they lie flat on the sand. The calculated cost of beginning business along this river now would be about as follows:

Present cost of good ground (1 grant)	$40
Seeding, 300 bushels at 50 cents	150
Sail-boat and row-boat	55
Beach, shanty, and furniture	40
Rake, tongs, shovels, and tools	10
Incidentals	65
Total	360

"One who is really going into the matter hopefully must expect about this outlay before he considers his grant in condition to yield. If he puts down shells for the spawn to catch upon, as he probably will, it will cost him about 10 cents a bushel.

"Formerly Virginia oysters were planted and bedded here, but did not do well. The prices received for these oysters, which are all picked over and shipped to Boston in good shape, vary from $3.50 to $6 a barrel. In 1878, the exports from the Buzzard's Bay station by rail were 138 barrels. Up to November 1, 1879, 240 barrels were sent, making 300 barrels a probable total for that year. Besides this, in 1879, much opening was done by the oystermen to supply the neighborhood market, and about 1,000 gallons of opened oysters were carried by express companies, in small packages.

"Another oyster locality in the town of Sandwich is Red Brook Harbor, 6 miles south of Monument River. The railway station is Pocasset, on the Wood's Holl branch of the Old Colony line. This harbor is an indentation of Buzzard's Bay, about 1½ miles long by one-third of a mile wide, and it is separated from the outer bay by an island. A branch of the harbor, also, runs up to a landing known as Barlowtown. The name Red Brook Harbor is derived from a little stream which flows into it, the bottom of which is tinged with iron-rust; but this brook does not freshen the water to any considerable extent. The bottom of the main part of the harbor is hard sand, and the water is nowhere more than 8 feet deep at low tide. In some portions rocks and eel-grass exist.

"On the southern shore of this harbor, about a mile from its head, exists a living bed of natural oysters, some 7 acres in extent, under protection of the town for public benefit. The oysters growing upon it are reported to be large, but not of extraordinary size, scalloped and roundish, differing in no respect from aged oysters grown after transplanting to another part of the bay. Excepting this natural bed, the whole harbor has been surveyed and divided into grants; all those good for anything have been taken up, and must now be bought at an advanced price, if any one desires to possess them. The largest owner is a Boston firm, reputed to have 75 acres, but beside it are a score of other proprietors, inhabitants of the shores. It is safe to say that $3,500 would buy out all the home interests in the whole tract, and $15,000 cover the total investment up to January 1, 1880. There is a spirit of progress here, however, which will lead to a great increase in the value of the property within the next few years. During 1878, for example, there were shipped from Pocasset station only 85 barrels; in 1879, 500 barrels.

"I spent some hours on these grounds with Mr. Edward Robinson, who exerted himself to make my visit instructive. He thought that one-half of the whole water-area was suitable for oyster cultivation, and all of this is now appropriated, though only a portion has yet been stocked. The seed is mainly derived from the native bed in the harbor and from the shores where the native spawn has 'set,' and is planted in the spring and fall. The only outside seed brought in thus far is 300 bushels from the Weeweantit River, across the bay; and 1,000 bushels from Somerset. The latter did not seem to do well. A long, sandy point runs out into the harbor here, which ebbs dry at low tide. This does not come into any grant, therefore, and hence is public ground for the gathering of seed. I saw upon the pebbly beach, in places, how abundantly this was to be had. Young oysters, at this season, from the size of a dime to that of a dollar, were strewed between tide-marks so thickly that you could hardly avoid stepping upon them, and they would survive the winter well in this exposure. These are gathered by everybody who wishes and placed upon their grants. In addition to this, many thousands of bushels of old shells have been laid down, the proper time to do this work being early in July, in order to have their surfaces clear and ready to

catch the spawn which begins to appear about that time. In 1876 when there was the last good quantity of spawn emitted, the shells had been put down in May, and by July were so slimy that the spawn did not set upon them. They learned wisdom by that, but no good year for spawn has occurred since. The seed is planted in varying quantity, but Mr. Robinson said he should put it down shoulder to shoulder, so as to pave the whole bottom, if he had enough. I saw tracts where the growing oysters lay so thick as to conceal the sand, and you could gather a bushel from a square yard of bottom. The natives consider the seed here better than that at Monument River, for it is rounder and less distorted. When the oysters are three to four years old, and ready for market, Mr. Robinson takes them up and lays them upon a wooden floor near his packing shanty, in water almost wholly fresh, which takes away the very saline flavor, fills them up in size, and makes them plump and hard. It is known as the 'fattening' process, after which they are ready for shipment. Bought from the boats, a dollar a bushel is paid for these oysters, but the freight to Boston and the barreling make them cost about $1.30 a bushel to the dealer.

"Here, as at Monument River, fishing is habitually done through the ice in winter. The method is to cut a large hole and use tongs. The oystermen do not complain of it as especially cold or unpleasant work. In order to keep the oysters from freezing, they dip the bag which they intend to put them in when caught, in water, and hold it upright until it freezes stiff. It thus stands conveniently open, like a barrel, and no wind can blow through its sides to the detriment of the contents."

FALMOUTH.—The town of Falmouth is situated in the southwestern extremity of Barnstable County, and occupies a territory about 10 miles square. It contains the villages of Waquoit, East Falmouth, Hatchville, North Falmouth, West Falmouth, Falmouth, and Wood's Holl. The southern coast line of the town is broken by many inlets, creeks, and shallow bays, through which large schools of alewives pass to their spawning grounds in the ponds above. At Wood's Holl there are two harbors suitable for vessels, and there are also two or three of considerable size in Buzzard's Bay, within the limits of the town, but they are of inferior character.

Waquoit, the most easterly village of the town, is situated at the head of a large and shallow bay or fiord. The only branches of the fisheries engaged in here to any considerable extent are the weir fishery, the herring fishery, and the eel fishery. The Waquoit weir, which, according to Mr. Thomas Phinney, is one of the oldest on Vineyard Sound, is owned by a stock company of nine persons. It is tended by five men, who, for their compensation receive one half of the fish caught. The weir is placed in position annually about the 1st of April, and is removed when the bluefish make their appearance, early in June. The larger proportion of fish taken in this weir are of the two kinds, menhaden and alewives. During the spring of 1880, about 350 barrels of menhaden and 140,000 alewives were taken, together with about 12 barrels of scup and 3 barrels of shad. The menhaden and alewives were sold to Gloucester fishing vessels for bait. These vessels lie off Falmouth and receive the fish fresh from the weir. The usual price obtained is from 75 cents to $1 per hundred. In 1879, 100 barrels of menhaden were taken. The weir is constructed entirely of netting, and, including boats and other necessary apparatus, cost about $1,000. It costs annually $200 to keep it in repair.

About sixteen years ago an artificial alewife-river was opened. The catch of alewives was small at first, but increased until eight or nine years ago, when the maximum quantity, about 180 barrels, was taken. In 1878 the amount decreased to 140 barrels. In 1879 and 1880 the catch was very small, amounting to only 7,000 or 8,000 fish. This sudden diminution was due, perhaps, to the fact that cranberry patches have been formed in the swamps bordering on the brook, which are flooded annually, destroying the ordinary flow of the brook. Alewives are first taken

in May. The stock of the company is divided into fifty shares. One of the stockholders bought the privilege of exclusive fishing in 1880, paying at the rate of 40 cents for every hundred alewives taken.

The eel fishery gives employment every winter to about one hundred men, belonging in Waquoit and East Falmouth. A large proportion of eels taken are caught in Waquoit Bay. About 300 barrels are shipped to New York annually.

Quahaugs are plenty in Waquoit Bay, and are gathered and eaten by the villagers, but none are shipped. It is estimated that about 500 bushels of quahaugs are annually consumed by the people of Falmouth town. At Waquoit there is some business done in "seed" oysters. According to Ingersoll, about 2,500 bushels of these oysters are annually raised here.

No considerable fisheries are carried on at East Falmouth except in winter, when about thirty or forty men engage in spearing eels. A few oysters are cultivated here. About 1,000 bushels of seed are annually planted, and about the same amount of oysters sold each year.

Hatchville is 4 or 5 miles distant from the water, and cannot be classed with fishing villages.

North Falmouth is a little village of about fifty families. The population is made up principally of retired captains of whaling and merchant vessels and their families. Many of the people are now farmers. There has never been any fishing business at this point. A few clams are dug and an occasional hook cast for scup or bass. Prior to twenty-five years ago the hills were covered with salt works.

Very little fishing is carried on at the village of Falmouth. A weir has been in successful operation here for about nine years, which gives employment to three or four men. The principal part of the catch in 1879 consisted of alewives and menhaden, about 90,000 fish of each species being taken. Considerable numbers of flounders, tautog, squeteague, and bluefish were also caught and sent to market.

Wood's Holl is a small village of about 530 inhabitants, situated in the extreme southwestern portion of Barnstable County. In addition to the dwellings, it contains several small churches, two or three stores, a meat and a fish market, and several other small shops. The large factory of the Pacific Guano Company is located here.

Of the male inhabitants only seven are regularly engaged in fishing, the remainder being employed in the guano factory, in farming and other minor pursuits. The total number of men employed by the guano company is about one hundred, but a large proportion do not belong in the village, and many reside here only a few weeks or months. There is one ship carpenter in Wood's Holl, but he finds employment in his legitimate business only at long intervals. Of sail-makers, riggers, caulkers, and other like artisans there are none. Four men are employed by Mr. Spindel, during the height of the fishing season, in icing and boxing fish.

The boat fishery is carried on by seven men from April until September, inclusive. As soon as cold weather begins the men cease fishing and betake themselves to other pursuits—piloting vessels to the guano factory, hunting, &c. Only three species of fish are usually taken, namely, scup, tautog, and sea bass. The total catch of each fisherman is about 15 barrels, or about 2,400 pounds. In addition about 6,720 lobsters are annually taken.

Two weirs are employed annually in the southern part of the village, in Buzzard's Bay, and two others further north, in Quamquesset or 'Quisset Harbor. All four are constructed of netting attached to poles, one being arranged after the square model. About twenty men, including those who ice fish, are engaged in the fishery. A great variety of fish is taken, and the proportion of the different species to the total catch varies largely in different years, but the principal kinds are scup, tautog, striped bass, bluefish, and flounders.

I.—THE DISTRICT OF NANTUCKET.

79. GENERAL REVIEW OF THE DISTRICT.

PRESENT EXTENT OF THE FISHERIES.—The county and district of Nantucket comprises the islands of Nantucket, Tuckernuck, Muskeget, and the two Gravelly Islands. The four last mentioned are very small, and lie at the west of Nantucket. The island of Nantucket is about 16 miles long, and has an average width of about 4 miles. It lies low; the highest point, the summit of Macy's hill, is only 91 feet above the sea. Until the year 1873 Nantucket had been, from its settlement in the seventeenth century, the seat of an important whaling business. The whaling fleet here in 1843 numbered eighty-eight sail; in 1850, sixty-two sail; in 1860, twenty-one sail; in 1870, eight sail. In 1873 only one vessel was owned here, but since that time there has been none.

The fishing business in this district now employs four small vessels and two hundred boats, and the entire number of men engaged in fishing or handling the products is two hundred and eighty-five. The capital invested is $27,120, and the value of the products is $29,546.

STATISTICAL SUMMATION FOR 1879.—The following statements give in detail the extent of the fishing interests of Nantucket district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	9	Capital in vessels and boats	$14,520
Number of boat-fishermen	271	Capital in nets and traps	5,100
Number of curers, packers, fitters, &c	5	Other fixed and circulating capital	a7,500
Total	285	Total	27,120

a Cash capital, $5,000; wharves, shorehouses, and fixtures, $2,500.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery:							Gill-nets:		
Active	4	26.10	$1,000	$140	$800	$2,540	In boat fisheries	200	$2,400
Boats.							Haul-seines:		
In vessel fisheries	4		60			60	In boat fisheries	5	1,000
In shore fisheries	200		4,000	2,500	5,420	11,020	Total	205	3,400
Total	204		4,060	2,500	5,420	11,980	*Traps.*		
							Weirs, &c	1	200
							Lobster and eel pots	1,500	1,500
							Total	1,501	1,700

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$29,546
Fresh fish.				
Alewives	1,500			15
Bass, striped	10,720			1,072
Bluefish	394,000			11,820
Cod	20,000			300

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Eels	5,000			$250
Flounders	3,000			45
Haddock	10,000			133
Herring	4,500			22
Pollock	8,000			32
Scup	1,200			30
Swordfish	1,500			45
Mixed fish	150,000			750
Total	009,420			14,520
Dry fish.				
Cod	750,000	300,000		10,800
Haddock	131,580	50,000		1,000
Pollock	102,430	42,000		714
Total	984,010	392,000		12,514
Pickled fish.				
Alewives	8,000	6,400		128
Blue fish	9,750	6,000		150
Mixed fish	8,000	2,000		50
Total	20,750	14,400		328
Smoked fish.				
Bluefish	6,000	2,000		100
Shell fish.				
Lobsters	11,250			412
Clams:				
For food			475 bushels	237
For bait			1,778 bushels	635
Quahaugs and sea clams			400 bushels	200
Total				1,484
Miscellaneous.				
Fish oil			1,500 gallons	600

80. NANTUCKET AND ITS FISHERIES.

THE FISHERIES IN 1879.—The village of Nantucket is situated at the central point of the northern shore of the island, near the mouth of a large harbor which extends in a northeasterly direction for several miles. About two hundred and fifty of the men are fishermen. The village contains churches, several hotels, numerous stores and shops, and two fish-markets. Several of the streets are paved, and a number of the buildings are of brick, so that the place, in a limited area, presents the appearance of a small city. Communication is had with the mainland by boat every day during the summer and three times per week in winter. The boat touches at Martha's Vineyard and at Wood's Holl and New Bedford. There is a small hamlet at Siasconsett, at the southeastern part of the island, and the islands of Tuckernuck and Muskeget are inhabited, at least in summer, by a few fishermen.

The principal fisheries now carried on at Nantucket are for cod, haddock, pollock, bluefish, scup, eels, lobsters, and clams. The fishery for cod, haddock, and pollock usually begins late in September, or at the beginning of October, and lasts until January if the weather permits. It ceases then, but begins anew late in March, and is continued to June. About two hundred men are engaged in it. They go 1 or 2 miles, sometimes even 4 miles, off the south shore in dories. About one-half of the men go alone in their boats, but the remainder go by twos, so that the num-

ber of dories employed does not exceed one hundred and fifty. The majority of the fishermen use hand-lines exclusively, but about forty trawls, each with 200 to 400 hooks, are brought into use, chiefly in winter. About 400 quintals of cod are annually dry-salted, 18,000 or 20,000 pounds sold fresh, and the remainder pickled.

The fishery for bluefish and scup usually begins in June and continues until the latter part of September. Some sixty men are engaged in this fishery, of whom perhaps one-third use gill-nets for bluefish. About 150 gill-nets are employed. Those fishermen who set nets go alone, but those using hand-lines usually go in pairs. The principal fishing grounds are off the south shore of the island. In 1879 about 400,000 pounds of bluefish and 1,200 pounds of scup were caught. The larger proportion of the fish are shipped by two firms to whom the fishermen sell them. About one-half of the whole amount is shipped to Boston, and the remainder goes to New York, Philadelphia, Hartford, Providence, and New Bedford. Between 4,000 and 5,000 pounds of eels are annually taken at Nantucket.

There are four men at Nantucket and six at Tuckernuck who make a business of fishing for lobsters, and in addition ten or eleven others are engaged in it at different times. Each man sets from 30 to 60 or 70 pots. In 1879 the total catch was 11,250 lobsters. The lobsters are kept in live-boxes, and sold to a smack which comes from New York once in about ten days. In 1879 about 250 bushels of sea-clams, 475 bushels of shore-clams, and 150 bushels of quahaugs were gathered. In 1878 a wier worth $100 was set in the harbor, but no fish were taken. In 1879 its shape was altered so that the bowl could be pursed, and it was set farther toward the east. The result was as before, however; no fish were taken, although the weir was placed in a spot where many fish have been caught at other times.

HISTORICAL SKETCH OF NANTUCKET FISHERIES.—The fisheries of Nantucket have altered very much in character since the beginning of the last decade. In 1870 fifteen fishing vessels were owned here, and were engaged in the cod and mackerel fisheries. The business had not been prosperous, however, and in 1869 the question of selling the vessels was raised. At the beginning of 1870, however, there were apparent signs of improvement, and the number of vessels employed remained the same. But it seems to have been only a temporary gain, for in 1871 only five vessels were registered. The next year only three were employed, in 1873 two, and in 1874 none. The next year, however, one vessel was employed in the fisheries, but in 1876 it disappeared from the register, and the same was repeated in 1877 and 1878.

In the fall of 1869 not only did the offshore fishery prove unprofitable, but the inshore cod fishery failed to an alarming extent. Fortunately, however, for the welfare of the people, extensive beds of sea-clams were discovered on the bars and shoals outside the harbor. During the winter of 1869–'70, the fishermen found lucrative employment in gathering these clams and shipping them to Gloucester and other ports for bait. In two days in January, 1870, the steamer took from the island 96 barrels of clam bait, worth $1,000. This business is still carried on, but the clams have grown more and more scarce every year.

In 1871 there were only 70 or 75 bluefish gill-nets in use, but fish were scarce, and many fishermen attributed the cause of that scarcity to the destructive tendency of the nets. It is a fact, however, that although prior to 1870 bluefish were taken in large numbers on the north side of the island, soon after that date they became more and more scarce there, and since then nearly all that have been sent to market have been caught off the south shore. Every year, until recently, a number of barrels of bluefish were pickled.

Scup, which 15 or 20 years ago were abundant in the harbor, and were caught in abundance by the old men and boys off the wharves, are now very scarce, and few find their way to market.

The whale fishery, which has now died out at Nantucket, but which was formerly the chief source of the wealth and prosperity of the town, began in 1690, in boats from the shore. In 1712 the first sperm whale was taken by a vessel accidentally blown a considerable distance from the land, and a new and powerful impetus was given to the business. In 1715, an old record* tells us, six sloops, 38 tons burden, obtained about 600 barrels of oil and 11,000 pounds of bone, worth £1,000. But, if we may believe the statement of Zaccheus Macy, these vessels must have been employed near shore. Macy says:†

"In the year 1718, the inhabitants began to pursue whales on the ocean in small sloops and schooners from 30 to 45 tons."

From the old record cited above we learn the tonnage, and the amount of the fares, and their value, from 1730 to 1785. The summary is as follows:

1730. 25 sail, from 38 to 50 tons, obtained annually about 3,700 barrels, at £7 per ton..		£3,200
1748. 60 sail, from 50 to 75 tons, obtained 11,250 barrels, at £14		19,684
1756. 80 sail, 75 tons, obtained 12,000 barrels, at £18		23,600
N. B.—Lost ten sail, taken by the French, and foundered.		
1770. 120 sail, 75 to 110 tons, obtained 18,000 barrels, at £40		100,000
From 1772 to 1775. 150 sail, from 90 to 180 tons, upon the coast of Guinea, Brazil, and the West Indies, obtained annually 30,000 barrels, which sold in the London market at £44 to £45		167,000
N. B.—2,200 seamen employed in the fishery, and 220 in the London trade.		
Peace of 1783. 7 sail to Brazil, from 100 to 150 tons, obtained	2,100	
5 to the coast of Guinea	600	
7 to the West Indies	560	
	3,260	
At £40 per ton		16,280
N. B.—No duty exacted in London.		
1784. 12 sail to Brazil, obtained	4,000	
5 to the coast of Guinea	400	
11 to the West Indies	1,000	
	5,400	
At £23 to £24		14,500
N. B.—The price fell by the exaction of a duty in London of £18. 30 sterling per ton.		
1785. Now at sea: 8 to Brazil, 2 to the coast of Guinea, 5 to the West Indies.		

The number of vessels engaged in the fishery in 1807, is recorded in the following language:

"The rest (forty-one) of the (forty-six) ships are employed in the whale fishing, viz: Eleven on the coast of Brazil, eleven at the Cape of Good Hope, one on the coast of New Holland, and eighteen in the Pacifick Ocean."‡

The absorbing attention paid by the Nantucket people to the pursuit of whaling, seems to have caused a partial neglect of other branches of the fisheries. The cod and mackerel vessels accumulated incidentally, so to speak, during the prosperity of the whaling business. With the decline of whaling, the people naturally turned their energies to other branches of the fisheries.

Fish seem to have been abundant in the waters about the island. Bluefish were plenty from the first settlement of the island until the year 1764, when, for some reason, they suddenly disap-

*Progress of the Whale Fishery at Nantucket, written in the year 1785, Coll. Mass. Hist. Soc., III, 1st series, 1794, p. 161.

†A short journal of the first settlement of the Island of Nantucket, with some of the most remarkable things that have happened since, to the present time. By Zaccheus Macy, 1792. Coll. Mass. Hist. Soc., III, 1st series, 1794, pp. 157–159.

‡Notes on Nantucket, August 1, 1807, Coll. Mass. Hist. Soc., III, 2d series, pp. 29, 30.

peared. In 1807 fourteen vessels were engaged in the cod fishery, of which one was a brig; seven, schooners; and six, sloops. In a note on the condition of the town, in this same year, it is stated that bass, shad, and alewives were abundant in Maticut Harbor, at the eastern extremity of the island, where the first settlement was located, and that "a fishery *might* be carried on here to great advantage; at present 400 barrels are taken annually." This shows, apparently, that at this period the shore fisheries were but little developed.

The manufacture of salt was attempted early in the century, but the fogs which are prevalent on the island prevented the successful carrying out of this scheme and it was abandoned.

J.—THE DISTRICT OF EDGARTOWN.

81. REVIEW OF THE FISHERIES OF THE DISTRICT.

PRESENT CONDITION OF THE FISHERIES.—Martha's Vineyard, the Elizabeth Islands, and No Man's Land together constitute Dukes County, or the customs district of Edgartown. The Elizabeth Islands form a single township under the name of Gosnold. Martha's Vineyard is divided into five towns, namely, Edgartown, Cottage City, Tisbury, Chilmark, and Gay Head. In the fisheries of this district, with the exception of the whale fishery at Edgartown, no vessels are employed, but the entire industry is confined to the use of boats and traps. In point of value the whale fishery is the most important single fishery, the products in 1879 being valued at $47,414. The total capital invested in the district is $220,695, and the value of the products is $133,797. The number of persons employed is four hundred and thirty-four.

STATISTICAL SUMMATION FOR 1879.—The following statements give in detail the extent of the fishing interests of Edgartown district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	211	Capital in vessels and boats	$175,575
Number of boat-fishermen	213	Capital in nets and traps	9,720
Number of curers, packers, fitters, &c.	10	Other fixed and circulating capital	a35,400
Total	434	Total	220,695

a Cash capital, $20,000; wharves, shorehouses, and fixtures, $15,400.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In whale fishery	7	1,446.82	$48,000	.....	a$80,000	$128,000	Gill-nets:		
Boats.							In boat fisheries	50	$600
In vessel fisheries	18	.....	1,800	.....	.....	1,800	Haul-seines:		
In shore fisheries	165	.....	37,255	$3,195	5,325	45,775	In boat fisheries	6	1,200
Total	183	.....	39,055	3,195	5,325	47,575	Total	56	1,800
							Traps.		
							Weirs	9	4,000
							Lobster and eel-pots	3,920	3,920
							Total	3,929	7,920

a Includes gear.

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$133,707
Fresh fish.				
Alewives	473,121			2,381
Bass, sea	12,000			720
Bass, striped	73,860			7,386
Bluefish	444,840			13,345
Bonito	92,000			2,760
Eels	60,000			3,000
Flounders	35,618			534
Frost-fish	25,000			500
Herring	26,315			132
Mackerel	3,262			43
Menhaden	13,454			57
Perch	12,000			360
Scup	98,827			2,965
Shad	1,612			81
Smelts	13,460			337
Squeteague	24,905			872
Sturgeon	1,000			30
Swordfish	6,000			180
Tautog	5,544			194
Mixed fish	392,000			1,960
Total	1,814,818			37,837
Dry fish.				
Cod	1,065,680	426,272		15,345
Haddock	30,739	11,681		234
Pollock	56,980	23,362		397
Total	1,153,399	461,315		15,976
Pickled fish.				
Mixed fish	6,000	4,000		100
Smoked fish.				
Alewives	96,875	58,125		1,453
Shell fish.				
Lobsters	773,100			28,347
Clams:				
For food			1,000 bushels	500
For bait			3,000 bushels	1,070
Quahaugs and sea-clams			300 bushels	150
Scallops			500 gallons	250
Total				30,317
Products of whale fishery.				
Sperm oil			35,122 gallons	20,078
Whale oil			10,317 gallons	6,363
Whalebone			4,728 pounds	11,063
Ivory			1,000 pounds	310
Total				47,414
Miscellaneous.				
Fish oil			1,500 gallons	600
Seaweed			100 tons	100
Total				700

82. MARTHA'S VINEYARD.

EDGARTOWN.—The village of Edgartown, with 1,303 inhabitants, is situated near the northeastern extremity of the island, at the head of a fine harbor of the same name. It was formerly a whaling port, and has several wharves, which, however, are now but seldom in use. About seventy-

five men are engaged in fishing. The principal fishery is the boat line-fishery. About fifty boats, one-third of them carrying two men, are employed. In spring, from April to the 1st of June, one-half of the boats are employed in the shore cod fishery, and the total catch amounts to about 250,000 pounds of cod. About the 1st of June the blue-fishing begins. All the boats are employed in this fishery for ten or twelve weeks, according to the condition of the weather and the abundance of the fish. A small number of striped bass are also taken by the bluefish fishermen. In November the boats are hauled up, and are not in use again until the latter part of March.

Two gangs of seiners, each composed of four men, are engaged from the 1st of June to the last of September in seining bluefish, bass, and other species. They employ two seine-boats, about 25 feet in length, and own four seines, each 150 fathoms long, and worth $300.

Every winter about 300 barrels of eels are caught, and some 15,000 lobsters are taken annually. Bluefish are usually sent to New York either in ice or in smacks. Soft clams and quahaugs are abundant in the harbor, and are used by the fishermen for bait. The whale fishery, which has been prosecuted at Edgartown for many years, is still carried on. Seven whaling vessels are owned, which, with their outfits, involve a capital of $128,000.

Oak Bluffs, a village in Edgartown, is a well-known camp-meeting ground. There are also several hotels and boarding-houses annually resorted to by thousands of people, who spend much of their time in the summer months in fishing in the neighboring waters.

TISBURY.—Holmes' Hole, or Vineyard Haven, situated at the northeastern part of the town of Tisbury, is not at present extensively engaged in the fisheries, nor dependent upon them. Like Edgartown, the village is largely sustained by the wealth of the many retired captains of merchant and whaling vessels who have made their residence here.

In April and May, and again in October and November, four boats usually go from Holmes' Hole to No Man's Land to fish for cod. The average annual catch of each boat is about 10,000 pounds of cod. The fish are quite small, often weighing only 3 or 4 pounds. A cod weighing 40 pounds is considered very large. Five cat-rigged boats are employed in June, and also during portions of May and July, in the bluefish fishery with hand-lines. The total annual catch of bluefish is about 35,000 pounds. No person at Holmes' Hole makes his whole living by fishing, and even those who have been mentioned as fishing at different seasons let their boats in summer to pleasure parties.

There is an alewife-river near Holmes' Hole belonging to the town of Tisbury, from which about 150,000 alewives are annually taken. One-tenth, formerly one-sixth, of the catch is reserved by the town and sold to pay for the clearing of the river. This share is annually bought by Mr. Crowell. The alewives are chiefly sold to fishing vessels for bait, and are also in part sent to New Bedford.

NORTH SHORE OF MARTHA'S VINEYARD.—The northern shore of Martha's Vineyard, from Lombard's Cove, 5 miles to the westward of the West Chop of Vineyard Haven, to Gay Head, is occupied at irregular intervals by weirs. In 1880 there were two in Lombard's Cove, one three-quarters of a mile and one about 3 miles to the westward, and four in Menemsha Bight, near Gay Head. With the exception of one in Menemsha Bight, which has two leaders and two heart pieces, all are single weirs, having but one leader, heart, and bowl. All, without exception, are constructed of netting and poles. They are usually placed in position every year, about the last of May or the 1st of June, and are removed either before or not later than the 15th day of September. From two to four men are required to tend the weirs. The principal species of fish caught are scup, squeteague, bluefish, striped bass, bonito, tautog, mackerel, menhaden, alewives, sea-herring, and flounders. The larger proportion of the fish are sent to New York in ice,

via Wood's Holl,-and in smacks. The managers of at least two of the pounds are accustomed to carry their fish in their own boats to Wood's Holl, whence they are shipped to market by Mr. Spindel. The menhaden and alewives, however, are usually sold to Gloucester fishing vessels for bait. The weirs vary in value from $200 to $400, but several of them originally cost from $800 to $1,000.

There exists on the western side of Menemsha Bight a hamlet of about 14 small temporary buildings, or shanties, as they are called, known as Lobsterville, in which a number of men, all or nearly all lobster fishermen, live during the summer. Forty boats were employed in the fishery in 1880, of which perhaps one-half carry two men. From each boat about 40 pots are set, and the total number of pots in use is about 1,600. In 1879 only fourteen boats and about 560 lobster pots were in use. Lobsters were much more abundant in 1879 than in 1880. In the former year the catch was 268,800 lobsters; in the latter year, about 200,000 lobsters. The season begins late in April and usually lasts about four months. At Gay Head there is a remnant of the former Indian possessors of the island.

83. NO MAN'S LAND AND ITS FISHERIES.

No Man's Land.—The island known as No Man's Land is situated south of the western extremity of Martha's Vineyard, at a distance of about 4 miles. It is a low, sandy island of very small proportions, and is uninhabited except by fishermen, all but two or three of whom remove to Martha's Vineyard at the end of the fishing seasons in spring and fall. While on the island they live in some 25 small houses, valued at about $100 each. The only fisheries are for cod and lobsters. The cod fishery, which is carried on for a few weeks in spring and fall, was engaged in in 1879 by about forty men, who employed some thirty-five boats. The cod taken during that year amounted to not more than 140,000 pounds when salted and dried. This is a much less quantity than was taken in some preceding years, but is more than has been taken since. There has been a constant diminution. The value of the apparatus employed, including boats, tackle, &c., and the single herring-net carried by each boat amounts to not more than $6,000.

A number of fishermen, varying from twelve to fifteen or twenty, engage in lobster fishing every year. The number of lobsters taken has been decreasing, and in 1881 amounted to not more than 15,000 in the aggregate.

84. THE ELIZABETH ISLES.

Gosnold.—The Elizabeth Isles is a group of sixteen small islands that together constitute the town of Gosnold. They are separated from Cape Cod by a narrow channel, and extend 16 miles toward the southwest, forming the boundary between Buzzard's Bay and Vineyard Sound. The resident population of the group in 1870 was 99. Commencing toward Cape Cod, the islands are called Naushon, 8 miles long and 1½ wide; Pasque, about 2 miles long; Nashawena, 3 miles; and Cuttyhunk, 2½ miles. A narrow channel separates the islands. The island of Cuttyhunk was named Elizabeth Island by Gosnold, but that name is now given to the group. Until 1864 these islands belonged to the town of Chilmark. They are noted for their beauty and climate, and are a favorite summer resort of New Yorkers for boating and fishing purposes. Tarpaulin Cove, on the east shore of Naushon, is a harbor much frequented by wind-bound vessels on their way between Boston and New York. Some Noank fishermen come here in the summer for trap fishing. The product of their industry is included in the statistics for Connecticut.

Cuttyhunk Island is the most southerly of the Elizabeth Isles, and is about 2½ miles long and a mile broad. The land is high. It contains a hamlet of sixteen buildings, including the school-

house, and the buildings of the Cuttyhunk Club. About forty fishermen live here, many of them, however, only in summer. Three or four men fish for tautog with hook and line. The fishing begins in October and continues until snow comes. The total catch is usually about 3,500 or 4,000 pounds. Two small pounds are set at Cuttyhunk. They are usually put in position about the 1st of May (in 1880, on the 26th of April), and are taken up early in August. Four men tend them. The catch consists of scup, bonito, and sea-bass. In 1880, 350 barrels of fish were shipped to market, about one-half the quantity being scup and the remainder bonito. The catch in 1879 was about the same. In addition, in 1880, 10 barrels, and in 1879 60 barrels, of sea-bass were taken.

The majority of the fishermen, about thirty, are engaged in the lobster fishery. In 1880 six little smacks, with two boats each, and twelve other boats were employed. From each of the boats from 40 to 120 pots are set, the total number used being about 2,000. The fishery is carried on during four months. In 1880 the total catch of lobsters was between 200,000 and 240,000. The Cuttyhunk Club also sets about 120 pots. The large lobsters caught in these pots are sold, but the small ones are used by the club for bait.

K.—THE DISTRICT OF NEW BEDFORD.

85. GENERAL REVIEW OF NEW BEDFORD DISTRICT.

THE FISHERIES OF THE DISTRICT.—The New Bedford customs district comprises the towns of Wareham, New Bedford, Westport, and intermediate places on Buzzard's Bay. As will be seen by reference to the remarks on the various towns in this district, there are several kinds of fishing carried on, the most important being the whale fishery, which has had its headquarters in this region for many years. New Bedford is the principal place in the district and owns most of the fishing fleet. There is one small vessel in the district engaged exclusively in the lobster fishery. The fishery for cod, tautog, and other food-fish employs 22 vessels, the menhaden fishery 8, the seal fishery 1, and the whale fishery 128; the total tonnage of the entire fleet is 33,576.67 tons. The shore fisheries employ 210 boats, used in connection with the traps, or in the capture of lobsters and shell fish in various parts of Buzzard's Bay. The total capital invested in all branches of the fisheries and shore industries is $4,329,638, and the value of the various fishery products is $2,053,944. The number of persons employed is 4,287.

STATISTICAL SUMMATION FOR 1879.—The following statements give in detail the extent of the fishing interests of New Bedford district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	3,555	Capital in vessels and boats	$2,611,010
Number of boat-fishermen	385	Capital in nets and traps	23,028
Number of curers, packers, fitters, &c	238	Other fixed and circulating capital	a1,695,600
Number of factory hands	109	Total	4,329,638
Total	4,287		

a Cash capital, $1,260,000; wharves, storehouses, and fixtures, $270,500; factory buildings and apparatus, $165,100.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In food-fish fishery	22	490.13	$21,575	$1,090	$9,700	$32,365	Gill-nets:		
In lobster fishery	1	7.80	100	10	160	270	In boat fisheries	66	$1,640
In menhaden fishery	8	520.46	52,500	575	7,200	60,275	Purse-seines:		
In seal fishery	1	84.65	3,000	.....	5,000	8,000	In vessel fisheries	15	6,500
In whale fishery	128	32,474.13	914,500	.....	a1,539,500	2,454,000	In boat fisheries	2	800
Total	160	33,576.67	991,675	1,675	1,561,560	2,554,910	Haul-seines:		
Boats.							In boat fisheries	9	1,800
In vessel fisheries	449	.....	44,140	.....	.....	44,140	Total	92	10,740
In shore fisheries	210	.....	5,500	2,210	4,250	11,960	*Traps.*		
Total	659	.....	49,640	2,210	4,250	56,100	Weirs, &c	29	11,100
							Lobster and eel-pots	1,188	1,188
							Total	1,217	12,288

a Includes gear.

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total	.....	.....	.....	$2,053,944
Fresh fish.				
Alewives	510,819	.....	.....	4,983
Bass, sea	56,000	.....	.....	3,360
Bass, striped	75,100	.....	.....	7,516
Bluefish	114,350	.....	.....	3,430
Bonito	5,000	.....	.....	150
Butterfish	5,000	.....	.....	150
Cod	95,000	.....	.....	1,425
Eels	199,221	.....	.....	9,961
Flounders	211,663	.....	.....	3,175
Frostfish	42,434	.....	.....	840
Halibut	4,500	.....	.....	158
Herring	7,645	.....	.....	38
Mackerel	393,000	.....	.....	5,227
Menhaden	12,740,084	.....	.....	19,110
Perch	3,476	.....	.....	104
Scup	296,923	.....	.....	8,907
Shad	9,344	.....	.....	467
Smelts	14,046	.....	.....	351
Squeteague	46,230	.....	.....	1,618
Sturgeon	1,500	.....	.....	45
Swordfish	342,800	.....	.....	10,784
Tautog	292,392	.....	.....	10,234
Mixed fish	108,800	.....	.....	544
Total	15,575,387	.....	.....	92,586
Dry fish.				
Cod	1,516,500	606,600	.....	21,838
Pickled fish.				
Alewives	150,000	120,000	.....	2,400
Mixed fish	12,000	8,000	.....	200
Total	162,000	128,000	.....	2,600
Shell fish.				
Lobsters	174,726	.....	.....	6,406
Oysters	.....	.....	16,200 bushels	21,225
Clams:				
For food	.....	.....	5,800 bushels	2,900
Quahaugs and sea-clams	.....	.....	5,100 bushels	2,550
Scallops	.....	.....	4,700 gallons	2,350
Total	.....	.....	.....	35,431

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Products of whale fishery.				
Sperm oil			1,135,260 gallons	a$1,060,694
Whale oil			595,098 gallons	b257,086
Whalebone			242,476 pounds	567,393
Ivory			18,100 pounds	5,611
Ambergris			62¼ pounds	6,225
Total				1,897,009
Miscellaneous.				
Fish oil			2,700 gallons	1,080
Marine salt			210 tons	2,600
Seaweed			800 tons	800
Total				4,480

a Includes $101,400 enhancement in refining. b Includes $25,000 enhancement in refining.

NOTE.—The menhaden caught by New Bedford vessels were sold to oil factories in other States and are credited to this district at their value to the fishermen. Their enhanced value as oil and guano is credited to the States where the factories are located.

86. AGAWAM TO FAIRHAVEN.

AGAWAM STATION.—At Agawam station, in East Wareham, 3 miles inland from the northern end of Buzzard's Bay, is Half-way-pond River. This empties into the Wareham River, and the latter into the bay. Large bodies of alewives annually pass from the bay up these rivers to spawn, a considerable number being taken at East Wareham. The State law determines the time when they may be taken; this period is between April 1 and June 1. The exact time when they may be caught, the price at which they may be sold to citizens, and other regulations are left to a committee of three from each of the towns of Wareham and Plymouth. This committee sells the exclusive privilege of the catch at auction, and $400 to $500 a season is generally realized by the sale. The price which the citizens must pay is fixed by the committee at 16 cents a hundred fish, or 64 cents a barrel; one barrel is allowed to each inhabitant who may desire it. No fish may be sold to any except citizens for the space of two hours after the fish are caught, but after that time they may be sold to any person at such price as can be agreed upon. Provision is made that citizens shall always be able to obtain a limited supply at the price already mentioned, namely, 16 cents a hundred. The bulk of the catch is sold by peddlers through the neighboring towns. At the present time the catch is not more than two-thirds as large as it was a number of years ago. In 1880 the fisheries of this place gave employment to six men for 2 months. The catch was 700 barrels of alewives, worth $1,050.

Mr. Ingersoll gives the following report on the present condition of the oyster industry of Wareham and vicinity:

"About 5 years ago no oyster was better received in the Boston market than that from Wareham; it held the first place. Though it has lost this distinction by 'opening' poorly of late, it is still of fine quality and in demand by the neighborhood markets. Wagon-loads are sent off to Plymouth, Middleborough, and elsewhere, frequently through the winter; and during the season of 1877–'78 the Old Colony Railway carried 780 bushels in shell from the Wareham station, and about 150 gallons of opened stock. From East Wareham (Agawam station) there were shipped, during the winter of 1877–'78, 924 bushels in shell, while partial accounts of the next season (1879–'80) indicate a large increase. By far the larger part of the yield, however, is sold small, as 'seed

oysters' to be planted upon the beds along the eastern shore of Buzzard's Bay and the 'heel' of Cape Cod. This seed is never carried away to be sold, but the purchasers come after it in spring and fall in sloops of about 25 feet keel, locally known as 'yacht-boats'. This seed sells for 30 to 35 cents a bushel in spring, or 60 to 80 cents in fall, and is one and two years old, mixed. Some experiments have been made in bedding Virginia oysters through the summer, but although they lived well enough it was not found profitable. They brought only $4, while the native oysters would fetch $6, a barrel.

"Oyster affairs in Wareham can hardly be called a business. The title to the grants is very uncertain, the impression being that the right to operate upon them exists only through courtesy of the owners of the adjacent uplands, and a vast amount of litigation would probably arise if any one chose to object to the present status. This feeling, and the jealousy of anything smacking of monopoly, has deterred capital from being invested in any considerable degree, although efforts have been made to bring money from New York and Boston to bear upon this industry. At present the poor, ignorant, and shiftless portion of the community, for the most part, have to do with the oysters, and have found it necessary, in order to protect each other from a common thieving propensity, to decree among themselves that no man shall fish after sunset, even upon his own grant. It would be an outside estimate to say that 200 persons live upon the oyster in Wareham, at an investment of $3,000."

MARION.—Marion, formerly known as Sippican, is pleasantly located on the western side of Buzzard's Bay. It has a large and accessible harbor, in which are several islands. From the beaches of these islands, as well as from the shore of the mainland, are gathered clams, quahaugs, scallops, and oysters. At one time a fleet of twenty sail engaged in the whale fishery from this place, but at present the fleet numbers only two vessels, aggregating 175.38 tons, valued, with their outfit, at $12,900. A very small amount of any kind of fishing is carried on at present, and that by fifteen sail-boats, ten row-boats, twenty gill-nets, one purse-seine, and one drag-seine, having a total value of about $2,500. The number of persons employed, including the whaling crews, is fifty-nine.

The catch of the fishing boats consists mainly of menhaden, alewives, and bluefish. The catch of menhaden in 1877 was 2,500 barrels; in 1878, 8,000 barrels; in 1879, none; in 1880, 800 barrels. During 1879 4 shad and 11 striped bass were caught, but none in 1880. The yield of the shore fisheries in 1880 was valued at $3,965, and included 2,000 bushels of quahaugs, 1,300 bushels of soft clams, 500 bushels of scallops, 75 barrels of alewives, 20,000 pounds of bluefish, and 800 barrels of menhaden. In former years numerous vessels were built here, and for 40 years quite extensive salt manufactories were carried on. Neither of these industries has been prosecuted for several years.

The oyster interests of this region are thus reported by Mr. Ingersoll:

"Southwesterly from Wareham the head of Buzzard's Bay contains several oyster localities of varying importance. They are: The Weeweantit River, for a mile or so in the neighborhood of the highway bridge; Wing's Cove, and the Blankinship Cove of Sippican harbor, in the town of Marion.

"In the Weeweantit, natural beds of very good oysters have existed for a long time and a few years ago a large yield was obtained from them every year by Mr. Robinson and others. Latterly, however, the quantity has decreased, and the beds have been raked almost wholly for the sake of seed. There are grants here, but no improvement, as yet, of any consequence.

"In Sippican harbor (the harbor of Marion) it is said that no oysters were known until about the year 1864, when the shore of Ram Island, on the eastern side of the harbor, near the

entrance, was found strewn with young oysters, and the next year it was ascertained that these had lived and were growing. The whole cove rapidly filled, and the oysters at once began to be taken by the inhabitants in large quantities.

"Some gentlemen, in 1875, got permission of the town to plant oysters on the bar at the entrance of the harbor, and brought a large quantity of seed oysters from Somerset, Mass., to lay down there. Taking the hint, the town surveyed a fringe of grants around the whole harbor, which were rapidly secured by the citizens for purposes of culture. The first design was that all owning grants should seed them from abroad, leaving the natural beds in Blankinship Cove and all the channels as public domain. But this was done to a very small extent, the natural beds being raked and dredged, instead, for oysters to be placed upon the grants, until it seemed likely that no mollusks at all would be left upon the beds. Legislative measures, both of State and town, were brought forward for oyster protection, but with little avail, as restrictive measures had small support from public opinion, and now there is little attempt to restrain any one fishing to any extent. It is reported by some, as a consequence, that few oysters are left, while others say that there are as many oysters there now as ever. Meanwhile, those who had planted were not encouraged. The best grants lay in favorable spots, where the oysters had shallow water, a hard bottom, and quick tide, only lacking fresh water. One gentlemen has planted about 12,000 bushels, and has put down 6,000 to 8,000 empty shells, hoping to catch spawn; but since these were put down there has been no year in which the spawn was plenty at Marion. (The last good year for spawn in Wareham was 1877, in Somerset, 1878.) Both of these investments have proved to be losing ones. The oysters brought here from Somerset have grown pretty well in shell, but in meat are lean and watery. Last August those of marketable size produced less than two solid quarts to the bushel. This fall (1879) there has been an improvement, but a bushel does not 'open' more than 3 quarts. These facts are true, as a rule, over the whole extent of the harbor, and in every instance the owners consider that they have lost money on their investment, and that it is probable that no great success can be looked for in raising oysters at Marion, for unexplained reasons. Even when they succeed in getting a fair quantity of oysters, they are not as hard and plump as they ought to be, and will not sell in Boston market at prices which will repay the expense of their cultivation. Among special discouragements may be mentioned the burying of 2,000 bushels in one bed, on the outside of Ram Island Bar, by a single gale during the winter of 1878, and the sudden death of several thousand bushels up the harbor through anchor-frost. As a consequence, a large portion of the oysters which have been planted here from Somerset have been taken up and sent to Providence River, where they have been rebedded with great success. It may be that this will afford an opportunity for business, although planting will not succeed well. The seed can be bought in Somerset and laid down here for about 35 cents a bushel. Two years later it can be sold to Providence dealers for 75 cents. During these same years the natural beds near Ram Island have flourished tolerably well, although the large tracts of shells about the harbor have caught no spawn. They have not opened as much nor of as good quality, however, as formerly; but there are great differences in the oysters of even this limited area. A bed at Ram's Island, on the sand, in 3 to 5 feet of water, 'opened handsome,' while only a few yards away oysters on a muddy bottom were of poor quality and size.

"There have been about $17,000 invested in oyster culture in this town, but I believe the whole matter could be bought now for $10,000. Perhaps 5,000 bushels, all told, have been disposed of annually for the last three or four years at $1 a bushel or gallon."

MATTAPOISETT.—For nearly 125 years this place was a part of Rochester. On May 20, 1857, it was incorporated as a town under the old Indian name of Mattapoisett, which signifies "a place

of rest." In past years, up to a comparatively recent date, the inhabitants were quite largely engaged in ship-building and in the whale fishery, but very little attention is now paid to the fishing industry. Clams are plentiful, but the citizens only dig the few which they require for their home consumption. Fishermen from Fairhaven and New Bedford come here with teams and boats and dig large quantities, which they sell through the surrounding towns and cities. Alewives are taken in the Mattapoisett River, which enters Buzzard's Bay at this place. One weir is located 4 miles up the river, and two more at Rochester, 4 miles further up the river. For the past 10 years the catch has averaged 900 barrels a year. The catch of 1880, the smallest for twenty years, was 500 barrels taken at the lower station, and 200 at the upper. The greater portion of them are sold fresh through the neighboring towns. A local law fixes the price for a limited supply to the citizens of Mattapoisett, Marion, and Rochester, at 25 cents for a hundred fish. At the northeast entrance to the harbor, on Pine Island, are two weirs. These are fished by four men for six months in the year. At the fishing stations of Mattapoisett, Pine Island, and Rochester, in 1880, eleven men were employed for a part of the year. The total capital invested in boats, nets, and other apparatus was $2,130. The catch was valued at $2,275, and included 800 barrels of alewives, 2,000 lobsters, 200 barrels of menhaden, 1,000 squeteague, 8,000 tautog, 9,000 scup, 500 bluefish, and 25 Spanish mackerel.

FAIRHAVEN.—Fairhaven is bounded on the south by Buzzard's Bay, and on the west by Acushnet River. The various ways of spelling this name, found on the old records, are as follows: "Cushuet," "Acushnutt," "Acoosnet," "Acushena," and "Acushuett," or, as in use at the present time, "Acushnet." The bay at this point is nearly 1 mile wide, and is in fact an arm of the sea for the 3 miles from its mouth along the Fairhaven and New Bedford fronts. Above New Bedford it decreases in size to a small stream, no larger than a brook, and takes its rise near the south shores of Long Pond and Aquitticaset Pond, in the town of Middleborough, 10 miles distant. There are several islands in the stream; the largest is named Palmer, and is at the entrance to the harbor. The next to the north are Crow, Pope's, and Fish. This last is united to the long drawbridge connecting Fairhaven with New Bedford. Several other smaller islands, not named, add to the beauty of the river scenery.

The land now occupied by Fairhaven, New Bedford, and Dartmouth was purchased from the Indians in 1652, and was all united in the single town of Dartmouth, the part now called Fairhaven being known to the Indians as "Sconticut." On February 22, 1787, Westport and New Bedford were incorporated as separate towns. The latter embraced the present town of Fairhaven until April 22, 1812, when it was incorporated under its present name. The leading business of this place in past years was the whale fishery. Thirty-seven vessels, with nine hundred and forty-five men, sailed from here in 1837, and in 1858 forty-seven sail were engaged in that industry; in 1860, thirty-nine; in 1870, eight; in 1874, two; in 1876, two; in 1880, none.

Although the bay and river have always been noted as having an abundance and great variety of scale and shell fish, and the flats and near shores for miles have long been known to abound with quahaugs and clams, until lately there appears to have been but little attention paid to them, except in a small way for home use. Within the past twenty years, as the whale fishery has declined, more attention has been paid to the abundance of fish near home. At the present time two vessels, of 116.30 aggregate tonnage, engage in the cod fishery off Block Island, the New England shore, and as far as Banquereau; three small vessels, of 27.89 total tonnage (not registered), fish in the bay near home. At the southern end of the town, known as Sconticut Neck, within late years the business has steadily grown, the catch being made with gill nets, purse and shore seines. The weirs, of which there are fourteen located at the neck, are worth from $400 to $500

each. Each weir has a leader to the shore from 400 to 450 feet long. The average depth of bowl is 18 feet, with a diameter of 50 feet. The entire weir is made of twine and fastened to poles driven into the ground. The weirs are put down about the middle or end of March and are fished until the middle of July, when they are taken up. Some of them are again put down about the middle of August and fished until the 1st of November. Sometimes a few remain until December 1, for the sea-herring; these do not appear with any regularity, generally only once in about every four years. The fishermen pay a land-lease for their weirs of from $5 to $75 a season, according to the location. The catch is marketed fresh at New Bedford, New York, Philadelphia; a small part at Boston and other near cities and towns. The importance of the catch of the following species is indicated by the order in which they are named: Alewives, tautog, scup, squeteague, bluefish, and eels. The alewives bring in a half of the value of the total catch. During the season of 1880 menhaden, squeteague, tautog, and scup have been very plenty; Spanish mackerel and bonito scarce. Mackerel (*Scomber scombrus*) are seldom seen. They seem to know full well that there is no outlet for them at the eastern end of Buzzard's Bay, and therefore keep away. Of the immense schools that pass so near on their annual tour to the northeast, but very few are ever seen in the bay.

Thirty men, with small, unregistered sail-boats, fish from June 1 to November 1 with hand-lines in the river and in the bay near home. Their catch consists chiefly of tautog, eels, and scup, the eels being taken, for the most part, in small box-traps baited with clams.

That Buzzard's Bay abounds in a variety of fish, many of them valuable for food, others for fertilizer, has been shown in the foregoing remarks. We now add a complete list, kindly given us by Mr. D. W. Deane, who has been for twenty-five years in this business, and has for the past thirteen years been setting weirs in this locality. The list will be found of interest, as showing the date of the first catch of each species during the season of 1880:

"March 24, caught the first menhaden, alewife, smelt, tomcod, flatfish; April 1, tautog, skate, perch; April 6, sea-herring, eel; April 14, shad; April 15, striped bass; April 17, scup; April 24, dogfish, mackerel; April 26, rock bass; April 27, sea-robin; April 28, squid; May 8, butterfish, kingfish; May 11, squeteague; May 12, flounder; May 13, bluefish; June 8, stinging ray; June 7, sand shark; June 10, shark; June 25, bonito. On July 10 the weirs were taken up, and put down again August 26, on which day the first seres was taken. This is a gold-colored fish about the size of the scup, a very palatable fish. It is quite common some seasons during August and September. August 30, first Spanish mackerel; September 6, first razor-fish; September 6, first goosefish."

Mr. Deane says that striped mullet are quite abundant some years, but that there were none during the past season. No salmon have been seen this year. In 1879 five small ones were caught, but were returned to the bay, the State law not permitting any to be taken in weirs. Cunners have been plenty; hake and cod scarce. A dozen sheepshead have been taken during the season.

There is an ample opportunity for a large increase in this neighborhood in the fishing industry. The abundance of fish and proximity to all the great fish markets, as well as a large demand from the numerous near inland cities, make this a desirable point, and one which is capable of producing many times the number of fish at present obtained, most of the catch being now taken in from four to six months.

Fish of many kinds have been more abundant the past season than for several years. Their great abundance reduced the prices, which reduction, together with the effect of numerous severe storms and gales in the spring, has lowered the gross stock of the season's work of the weirs to a sum rather below that of 1879. Algæ is gathered from the shores of Sconticut Neck in great abundance at various times of the year. Twenty-five years ago but little attention was given to

it. Only a small amount was gathered, and that without charge, by any one who wished it. As its value became known, and more of it was gathered, a charge at the rate of 5 cents for a single-horse load was made. This was about 1860. In 1865 the charge had increased to 12½ cents a load, and at the present time 25 cents is willingly paid for the same amount. It is used as a fertilizer. Rock-weed and kelp are also used, and sold for $1 a ton. The latter, when mixed with other sea-weed, is worth only 75 cents. All fish not fit for market are saved, and find a ready sale at 30 cents a barrel for fertilizing purposes.

Thirty gill-nets are used by the fishermen at the Point. The catch consists of bluefish, tautog, scup, squeteague, dogfish, and sharks. Two shore-seines and one purse-seine are used for the capture of menhaden. The catch for the past season was 750 barrels, all of which was sold to the farmers at 30 cents a barrel. Clams and quahaugs are plentiful almost the entire distance of the west side of Buzzard's Bay from Cohasset Narrows to Sconticut Neck. Twenty-seven men dig them at various points, some going up the bay a short distance, and others, with teams, driving along the shore and filling their wagons, and selling the contents in the neighboring towns. The catch of lobsters here is small in size and amount. Most of it is used for bait in the capture of tautog, scup, and squeteague.

Fourteen men with ten boats dredge for scallops from the middle of October to the middle of January. Great quantities are found in the Acushuet River, as well as along all the western shore of the bay. A small dredge, holding about a bushel, is used. It is made with an oval-shaped iron frame 3½ feet in length. Wire netting is used in the front part and twine at the back. Small sail-boats, each with two men, fish with from one to twelve of these dredges in tow, sailing with just enough sheet to allow a slow headway. As soon as a dredge is filled, the men "luff up," haul in, empty, and go on. These little boats take from 10 to 75 bushels a day. If the breeze be unfavorable, one man takes the oars while the other tends the dredges.

The total number of persons employed in the Fairhaven fisheries in 1880 was 182. The capital invested in vessels, boats, weirs, and other apparatus was $22,725, and the value of the fishery products was $31,289. The catch of the vessels was 410,000 pounds of fish; of the weirs 375,000 pounds of fish. Twenty boats took 2,100 bushels of scallops, 2,800 bushels of clams, and 3,000 bushels of quahaugs. The other shore-boats, the seines, and gill-nets caught 30,000 lobsters, 200,000 pounds of menhaden, and 215,000 pounds of other fish.

In the Fairhaven Star of December 14, 1880, is the following historical review of the whaling business of that town:

"I will give the readers of your paper an account of the whaling business. I have made a list of the whaling vessels that have been owned and fitted from Fairhaven since the war with England. Peace was proclaimed on the 18th of February, 1815, and the ship Herald and schooner Liberty were fitted on a whaling voyage in the North and South Atlantic in the following July, of 1815; the only whaling vessels belonging to Fairhaven at that date. The next whalers added were schooner President, brig Agenora, ships Stanton, Pindus, Leonidas, and Amazon; these, with the schooner Talemacus, were the whaling fleet of Fairhaven in 1821, being eight in number. From 1821 they increased gradually until 1837, when there were thirty-seven vessels in the business, the tonnage being 11,654 tons. Value of sperm and whale oil imported, $296,958.56; whalebone, valued $25,312.86; total, $322,271.42; men employed, 945; capital invested, $957,000. Population at the above date, 3,649. From 1837 to about 1850 the ships and barks increased to fifty that were fitted and hailed from Fairhaven. Averaging 28 men to each ship would be 1,400 men in the service; the tonnage of the ships, averaging 315 tons, would be 15,750 tons; capital invested, averaging $26,000 to a ship, would be, $1,300,000. The largest number fitted in any year were

twenty-three ships and barks, and one brig in 1838. Allowing 165 feet from after end of spanker boom to end of fly-jib boom, fifty ships in line would be over 1½ miles in length; 7 boats to a ship, would be 350 boats; 2,500 barrels cask each, 125,000 barrels.

"From 1835 to 1850, Fairhaven was a busy, thriving town. Persons not acquainted with the place at that time can have very little idea of the number of people employed in the ship yards, shops on the wharves, and about the village. Over one hundred mechanics and laborers were from their labor at noontime from Union wharf, and probably a larger number were employed on other wharves and in the village. In 1841 sixteen ships and three barks were fitted. In 1845 fourteen whalers arrived, with 15,525 barrels sperm oil, 11,625 barrels whale oil, and 100,300 pounds bone. The price of sperm oil in 1845 was 85 cents; whale oil 31 cents per gallon, and whalebone 33 cents per pound; value of sperm oil, $415,681.87; whale oil, $113,518.12; whalebone, $33,099; value of importations in 1845, $562,298.99.

"There have been some very good voyages both in sperm and whale oil. The most costly ship of the fleet was the ship South Seaman, costing $65,000; several others costing about $50,000 each. The last two owned in Fairhaven were ship General Scott and schooner Ellen Rodman. The ship Herald made twenty-five voyages, probably the largest number of any ship from this port, averaging 1,200 barrels each; total, 30,000 barrels. Ship Amazon made seventeen voyages, obtaining 5,014 barrels sperm oil and 28,980 barrels whale oil; total, 33,994 barrels. Ship William Wirt's largest cargo of sperm oil was 2,900 barrels. Ship South Seaman sent home 70 barrels sperm, 3,560 barrels whale oil, and 21,027 pounds bone. Lost on French Frigate Shoal March 13, 1859.

"In 1765 sloops Industry and Dove were engaged in the whaling business. In 1767 sloops Myriad, Sea Flower, Rover, and Supply were added.

"Before the war of 1812 ships Juno, President, Columbia, Herald (Samuel Borden, agent), Exchange (John Alden, agent), schooner Swan (John Alden, agent), were included in the whaling fleet of Fairhaven. When peace was declared in 1815 only one ship and one schooner fitted for whaling—ship Herald, agent Samuel Borden; schooner Liberty, agent John Alden. * * * Since 1815 one hundred and eight vessels hailing from Fairhaven have engaged in the whaling industry, classified as follows: eighty-eight ships and barks, eight brigs, and twelve schooners."

87. NEW BEDFORD TO WESTPORT.

NEW BEDFORD.—New Bedford is built on high ground, and the cross streets, running east and west, have an easy slope, affording a fine view of the Acushnet River and the harbor with its forest of masts of the whaling vessels. Fairhaven on the east and Buzzard's Bay in the distance on the south, make the view complete. New Bedford is the most important city on Buzzard's Bay, and in proportion to its population of 26,845, it is said to be the richest city in the United States. In 1877 its valuation in real estate was $12,609,200, and in personal property $10,854,900, or a total of $23,464,100.

The home fisheries have never been prosecuted with very great interest, although both scale and shell fish are in great abundance and close at hand. Considerable attention is now paid to supplying New York, Philadelphia, and cities nearer home with fresh fish, clams, quahaugs, and scallops. A small amount of fish is also sent to Boston. The vessels engaged in fishing are of small size, sloop or schooner rigged. They fish in Buzzard's Bay and the Acushnet River near home, where a great variety, similar to that spoken of in the report for Fairhaven, is taken. Scaled fish are caught with hand-lines, eels in box-traps, and scallops with dredges.

The menhaden fishery has been prosecuted from here for a number of years and has brought

in a large profit. Most of the catch was taken off the coast of Maine, where the fishing was carried on through the entire season. The fish have not been seen on their usual summer grounds for the past two years in any large numbers, and neither the early spring nor southern catch has paid expenses. The usual manner of running the steamers is as follows: The owners of the steamer furnish the vessel, engineer, fishing-gear, water and coal for the motive power, and the crew furnish their provisions, wages of cook, and board of fishermen. The captain hires his crew by the month or they go on shares. The owners receive one-half of the catch and the crew the other half. The master also receives an additional commission of from 5 to 7 cents a barrel. Steamers on Long Island Sound usually pay so much a thousand for the fish, 3⅓ barrels of fish to the thousand count. During 1879 the fleet from this port caught 55,700 barrels of menhaden, which were sold at the factories of Long Island Sound and Maine at 25 cents a barrel. During 1880 five of the steamers report a catch of 45,925 barrels of menhaden and 1,800 barrels of mackerel. The former sold at 30 cents a barrel and the latter sold fresh in the Boston market.

Scallops are plenty in the Acushnet River and large quantities are taken with dredges from October through the winter. The business has of late years greatly increased. When the season opens in the fall, about 2 bushels in the shell are required to make 1 gallon of solid meats, which weighs about 7 pounds. Scallops are always sold by the gallon.

Eels are found very plenty in the river and near creeks and bays. They are mostly caught in a box-trap of simple and cheap construction. This is 4 feet long, 10 inches wide, with slatted sides. There is a hole in each end 4 inches square. In the aperture are placed two small wooden slats. The eels slide in with ease, the slats opening as they glide in and immediately closing. The box is weighted with stones and baited with clams.

Thirty small sail-boats of sloop or schooner rig, of less than 5 tons each, and therefore not under license, are used by forty-five fishermen in the near home fishery. They catch their fish chiefly in Buzzard's Bay; it consists of tautog, scup, flounders, and eels, with a small amount of the other large species found in the bay. Many swordfish are caught in their season. The average amount of scallops taken every fall and winter is about 4,000 bushels. No fishing is carried on in midwinter.

The food-fish fishery of New Bedford employs fourteen vessels, aggregating 189.75 tons, and valued, with gear and outfit, at $13,990. In the menhaden fishery there is a fleet of seven steamers and one schooner, aggregating 520.46 tons, and valued, with their gear and outfit, at $69,276. Several vessels which obtained licenses in the general fisheries did not engage in that industry. They were mostly yachts that under those licenses were entitled to certain privileges not otherwise granted. One vessel of 84.65 tons, valued, with outfit, at $13,000, sailed in 1880 for the Antarctic fur-seal fishery.

New Bedford has for many years been the chief whaling port of the United States. The whale fishery was pursued here as early as 1755, and in 1765 four vessels were engaged in it. At the period of the Revolutionary war there were fifty to sixty vessels, but most of them were destroyed. After the war the business revived, but was again prostrated by the war of 1812. It was renewed in 1818, and the number of vessels gradually increased till 1857, when the New Bedford fleet numbered 324 sail, aggregating 110,867 tons. Various causes have led to a decline in this industry, among which were the panic of 1857, the destruction of thirty vessels by Confederate cruisers during the late war, and the loss, in 1871, of twenty-four vessels in the Arctic Ocean. Another and perhaps the chief cause of a decline was the substitution of cotton-seed oil and petroleum for whale oil. The great quantities in which these oils could be obtained made them so cheap that whale-oil dealers could not enter into fair competition for the trade. New Bedford

merchants have persistently continued this fishery and have managed to make it generally successful. The demand for sperm oil and whale oil, as well as for whalebone, will never entirely cease, for there are uses to which these products can be put that cannot be met by other oils or substances. There are in this city several large oil refineries and candle factories, where the oils are refined and the spermaceti made into large cakes for use in the arts or molded into candles. The whalebone is sent to the bone-workers in Boston and New York, where it is made into whips, corset and dress bone, and adapted to many other uses.

The whaling fleet of New Bedford at present numbers 123 vessels, aggregating 31,568.83 tons, valued, with outfits, at $2,414,000, and manned by 3,226 men. The catch of the New Bedford vessels and of the five vessels belonging to other ports in this district in 1879 was valued at $1,897,009, and included 1,135,260 gallons of sperm oil, 595,098 gallons of whale oil, 242,476 pounds of whalebone, 18,100 pounds of ivory, and 62¼ pounds of ambergris. In 1880 the oil aggregated about 1,865,262 gallons, and the bone about 380,364 pounds. The state of this industry in the city of New Bedford at different periods during the past forty years has been as follows:

Year.	Number of vessels.	Tonnage.	Barrels of sperm oil.	Barrels of whale oil.	Pounds of bone.
1840	174	.....	63,465	75,411	.....
1850	249	81,442	39,298	91,627	1,081,500
1853	318	107,512	44,923	118,672	2,835,800
1857	324	110,267	48,108	127,362	1,350,850
1860	291	98,760	43,716	90,450	1,112,600
1865	168	50,403	21,292	51,693	376,450
1870	176	50,213	42,886	49,563	569,861
1875	116	31,691	34,430	25,067	359,073

Exclusive of the whale fishery, the products of the fisheries for 1879 included 61,000 barrels of menhaden, 33,684 lobsters, 1,800 barrels of fresh mackerel, 824,200 pounds of tautog, flounders, and other fish, and 2,500 gallons of scallops, having a total value of about $50,000.

Clark's Point forms the southerly part of the city of New Bedford, the Acushnet River on the east and Clark's Cove on the west. Its length is about 2 miles. On the end of the point are a lighthouse and Government fortifications. Four pounds or traps are fished here. They caught in 1880 125,000 pounds of various species of fish valued at $2,200. The value of the traps is $2,000, and the number of persons employed is eight.

Concerning the oyster business in this vicinity, Mr. Ingersoll reports as follows:

"The Acushnet River, just above New Bedford, has been found wanting in the qualities necessary to make it good planting ground for oysters. The experiment has been tried, but has failed. No cultivation exists there, therefore.

"The principal dealers in the town buy yearly a superior stock of oysters in the Chesapeake Bay, bringing one cargo of 3,500 bushels for bedding, and another cargo for winter use; the schooner Hastings, of nearly 100 tons burthen, is the vessel used at present. These oysters cost 65 cents when laid down, but grow very little on these beds, since there is no fresh water to start them. In addition to this, one firm furnishes oysters from Providence River, Wareham, and elsewhere. The rest of the town, as calculated by them, use about 200 bushels and 100 gallons a week for five months. This makes New Bedford's estimated consumption, annually, about 13,000 bushels. Five men are employed six months as openers, at 17 cents a gallon.

"Just west of New Bedford is a little stream and inlet, known as Westport River. This was the locality of an ancient bed of native oysters, which has now nearly disappeared through too great raking. They are said to be very large and of good quality, but not more than 50 bushels

a year can now be caught throughout the whole 3 miles from the "Point" up to the bridge, which sell at $1.50 to $2 a bushel in New Bedford. There is reputed to be good planting ground near the bridge.

"A few miles west of Westport is the Dartmouth River, where, it is said, an oyster-bed has recently formed, but, as yet, is of little account. The bottom there, however, is regarded as very suitable for planting upon. Fifty bushels a year would cover the whole supply from here."

DARTMOUTH.—This port is situated on the western side and about half-way of the length of Buzzard's Bay. Four vessels of 163.03 aggregate tonnage fish from this port—two of them, on Banquereau and Western Banks for cod, and the other two near home, off Block Island and the New England shore, for cod and swordfish. Eight men are engaged in the lobster catch, setting their pots to the west of Cuttyhunk Island, 12 miles from home. Funnel-pounds (or bass-traps, as the fishermen call them) are set along the shore as follows: Apponagansett Bay, two; near Dumpling light, two; 1 mile west of Dumpling light, two; Mishaum Point, three. These pounds cost from $200 to $400 each, according to size, and are made of twine, with the exception of the end of the funnel, which is of wood. Some large pounds are in use at Dumpling light from April until August. They are owned by Mr. George Snell. By August the season is considered over and the pounds are taken up. The twine is made fast to poles driven into the ground. The poles are replaced each year, and the twine is not good for much after having been used for two or three seasons. The fish caught are alewives, menhaden, flounders, scup, and tautog, proprotionately in the order mentioned, with a few bluefish and shad. A State law forbids the taking of salmon. They are very seldom seen. At Dumpling light only two have been observed during the past five years. Menhaden are sold to the farmers at the rate of 30 cents a barrel for fertilizing purposes. Large quantities of unmarketable fish, such as skates, sharks, dogfish and others are taken and sold to the farmers for the same purpose at the rate of 85 cents a hundred fish, large and small. The livers of the dogfish, however, are removed and saved for their oil. The eatable fresh fish are sold fresh at New Bedford, New York, and Philadelphia, and the cured fish at Boston. The catch, by the pounds, during 1880, has been fully 75 per cent. larger in amount and value than that for 1879. The lobsters taken are shipped to New York.

There are salt works at South Dartmouth which manufacture 12,000 bushels of salt yearly from the water of Buzzard's Bay, which is pumped by windmills to the evaporating works. A much larger amount has been produced in past years. Most of the salt is used for home consumption, selling for 35 cents a bushel.

Dartmouth once owned a number of whaling vessels, but there is now only one vessel in this business. This vessel measures 231.59 tons and is valued, with outfits, at $20,000. The total amount of capital invested in the fisheries of this place in 1879 was $38,668, including the value of 1 whaling vessel, 2 bankers, 2 shore-fishing vessels, 4 shore boats, 9 traps and pounds, 238 lobster pots, and $4,100 in salt works. The products, exclusive of the whale fishery, were worth $20,050 and consisted of 598,600 pounds of fish, 50,000 lobsters, and 12,000 bushels of salt.

WESTPORT POINT AND WESTPORT.—Westport Point, situated on the western side, and near the mouth of Buzzard's Bay, was formerly of some note in connection with the whale fishery, and had a fleet of seventeen vessels engaged in it. Since 1876 that fishery has been abandoned at this place. Previous to the last three years more attention was paid to the near-home fishery than at present. The people here now engage in both fishing and farming. From April 15 to November 1, twenty-eight men, including the minister, fish between Sakonnet Point and Gooseberry Neck. They fish with hand-lines from the deck of small, sloop-rigged sail-boats, 13 to 20 feet long. From

September 15 to November 15 these men are joined by forty others, farm-work then being over for the season. The catch is composed chiefly of tautog, with a small proportion of bluefish, squeteague, rock-bass, striped bass, and others. In 1879 the first tautog was caught on June 21. During that season the largest striped bass captured weighed 60 pounds. For the past few years no salmon, Spanish mackerel or bonito, and but few squeteague, cod or hake—and less frequently still, a haddock—have been taken. Tautog have always been plentiful. Bluefish, striped bass, and menhaden show a decrease in the past 2 years' fishing. Eels are abundant and are caught chiefly at night with torch and spear. Lobsters are not numerous, and but little time is devoted to catching them. The fish are sold at Fall River and New Bedford.

On both sides of the Acoakset River clams are plentiful. Six men were engaged in working the beds during parts of seven months in the year 1879. Seven hundred bushels of clams were that year sent to market, and fully 1,000 bushels were used in home consumption. The abundance of clams has varied since 1870, being sometimes large, at others small. The yield of 1879 was not up to the average.

The fisheries of this place in 1879 gave employment to 71 men, and the amount of capital invested in 26 boats, 100 lobster traps, and other apparatus was $1,350. The value of the catch was $5,654, and included 3,000 pounds of striped bass, 47,900 pounds of tautog, 100 barrels of alewives, 17,200 pounds of eels, 35,500 pounds of assorted fish, 8,000 lobsters, and 1,700 bushels of clams. Most of the catch is sold at New Bedford and Fall River. Mr. David H. Bradley, who has been engaged in the fishing business at this point for twenty years, reports that not as many men are employed, nor as many fish caught, as when he first began business.

The following item from the Barnstable Patriot, June 21, 1859, shows the extent of the fisheries here at that date:

"GREAT FISHING.—Our correspondent at Westport Point writes us that the largest quantity of fish ever taken with the hook in one day at that place was taken on Friday. The fish numbered 1,333, and when dressed weighed 4,000 pounds. Two hundred and thirty-six fish, weighing 1,200 pounds, were also taken from gill-nets on same day, making in all 5,200 pounds. Those taken with the hook average 3 pounds each; those taken with the nets 5 pounds. There were 26 boats out, and the largest number taken by a boat was 122. The boats averaged about 50 fish."

At the western side of the bay from Westport Point, and distant from the point 1 mile by water and 8 by land, is the harbor of Westport. At one time a small fleet of fishing vessels and whalers sailed from here. At present there is no fishing vessel, though one whaler is owned here and fits at New Bedford.

The only attention paid in 1880 to fishing was by two fishermen during the summer. They used 500 fathoms of gill-net. The catch consisted almost wholly of bluefish, which were abundant until the 1st of August. In 1879 the catch of three men amounted to $645.50, and consisted of 16,020 pounds of bluefish, 700 pounds of striped bass, and 50 barrels of menhaden. The boats and nets used were worth $550. In 1880 two men with boats and nets worth $500 caught 17,500 pounds of bluefish, valued at $437.50.

L.—THE DISTRICT OF FALL RIVER.

88. GENERAL REVIEW OF THE DISTRICT.

IMPORTANCE OF THE FISHERIES.—The fisheries in this part of Massachusetts are confined to the capture of menhaden, shad, alewives, and a few other species, and shell-fish. In this district, which includes the neighboring town of Swansea, the fisheries of the Taunton and adjacent rivers, and, for convenience, the shad fishery at Holyoke on the Connecticut River, there is invested a capital of $104,930. The value of the product is $63,903, and the number of persons employed is 280. The oyster fisheries of Taunton River and Cole's River are of considerable importance, and for a few days during the height of the season, give employment to 400 men. About 52,000 bushels of oysters, valued at $23,000, are annually sold from the beds in this district. These are mostly seed oysters, which are sold for transplanting, and have not been considered as an actual product of the fisheries. The amount of native eatable oysters produced is 1,000 bushels, worth $1,200.

STATISTICAL SUMMATION FOR 1879.—The following statements show in detail the extent of the fishing interests of Fall River district:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	101	Capital in vessels and boats	$40,585
Number of boat-fishermen	149	Capital in nets and traps	9,345
Number of curers, packers, fitters, &c	15	Other fixed and circulating capital	a 55,000
Number of factory hands	15	Total	104,930
Total	280		

a Cash capital, $15,000; wharves, shorehouses, and fixtures, $10,000; factory buildings and apparatus, $30,000.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Value of outfit.	Total value.	Nets and traps.	No.	Value.
Vessels.							*Nets.*		
In menhaden fishery	22	410.04	$21,000	$380	$8,000	$29,380	Purse-seines:		
Boats.							In vessel fisheries	11	$5,000
In vessel fisheries	24		2,340			2,340	Haul-seines:		
In shore fisheries	61		2,885	360	5,620	8,865	In boat fisheries	20	4,000
Total	85		5,225	360	5,620	11,205	Total	31	9,000
							Traps.		
							Weirs, &c	6	325
							Lobster and eel pots	20	20
							Total	26	345

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Grand total				$63,903
Fresh fish.				
Alewives	135,000			1,320
Bass, striped	2,580			258
Eels	19,200			960

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value, prepared.
Flounders	8,000			45
Menhaden	12,800,000			19,200
Shad	a83,134			4,157
Mixed fish	10,000			50
Total	13,052,914			25,990
Pickled fish.				
Alewives	550,000	440,000		8,800
Mixed fish	3,000	2,000		50
Total	553,000	442,000		8,850
Smoked fish.				
Alewives	150,000	90,000		2,250
Shell fish.				
Oysters			1,000 bushels	1,200
Clams, for food			3,375 bushels	3,121
Total				4,321
Miscellaneous.				
Scallops			800 gallons	400
Fish oil			50,400 gallons	17,640
Fish guano			1,971 tons	4,450
Total				22,492

a Includes 53,636 pounds taken in the Connecticut River at Holyoke, Mass.

89. THE GENERAL FISHERIES OF FALL RIVER AND NEIGHBORING TOWNS.

FALL RIVER AND VICINITY.—Fall River is on Mount Hope Bay, an arm of Narragansett Bay, at the mouth of Taunton River, 45 miles from Boston. Its population in 1870 was 26,766; in 1880, 48,961. It is extensively engaged in the manufacture of cotton goods, and its factories contain more spindles than those of any other city in the United States. Railroads furnish communication with Boston, Providence, New Bedford, and other points, while daily lines of steamers run to Newport, Providence, and New York. The harbor is large and easy of access, and is deep enough for the largest vessels. The foreign and coastwise trade of Fall River is important. In 1873 thirty-seven vessels, aggregating 554 tons, were employed in the cod and mackerel fisheries, but in 1879 there were none. In former years whaling vessels were sometimes fitted here, but that fishery was abandoned many years ago. From 1840 to 1847 the whaling fleet numbered seven vessels, and from 1848 to 1860 two or more vessels were annually sent out; the last one in 1861.

The only fishery now carried on from here is for the capture of menhaden. In this business there are employed twenty-two vessels, including one steamer, aggregating 410.04 tons, and valued with outfits at $36,720. The catch of these vessels in 1879 was 12,800,000 pounds of menhaden, worth $19,200 in the fresh condition, and was sold to the oil and guano factories in this vicinity.

The shad and alewife fisheries of the Taunton River are carried on by 108 men, who use 29 boats, 15 seines, and 1 weir, worth, with their fixtures, about $7,500. The catch in 1879 was 1,718,000 alewives, equal to about 4,000 barrels, and 6,615 shad weighing 21,498 pounds. The value of these products was $12,090. A portion of the alewives were sold fresh, the rest pickled or smoked. The shad were sold fresh in Boston and other markets.

In Cole's River, in the town of Swansea, 4 miles west of Fall River, at the northern end of Mount Hope Bay, there is a small fishing station. The northern and northwestern ends of Mount

Hope Bay are valuable for their scallop and clam beds, which extend from Kickamuit River on the west to Taunton River on the east, a distance of 5 miles.

From 1875 to 1880 scallops were very plentiful. In 1880, however, grown scallops were quite scarce, while the beds were well supplied with the young shell-fish, thus giving promise of a good supply in the future. Nineteen men are engaged in the business, giving most of their time to catching shell-fish. When these are scarce, the fishermen visit the beds near Greenwich, on the opposite side of the bay. When these beds are yielding abundantly, other fishermen, from the Greenwich side, join in the business. In this industry small cat-rigged boats are used, each of which is equipped with four to eight dredges. The catch is opened at Swansea and forwarded principally to New York. During the summer Rocky Point and other resorts are supplied by these fishermen with clams of the summer yield, and Fall River and the local trade are furnished with clams from the winter digging.

Eels are plenty in Cole's river, and are taken in a conical basket-work trap, 2 feet long. The catch is sent to New York. A few fyke-nets are used in the winter, the catch—flounders—being used at and near home. Clams are worth $1 a bushel in summer, and 70 cents in winter. At the present time as many clams are used in summer as in winter.

The fisheries of Cole's River in 1879 gave employment to 19 men. The capital, invested in 6 small sail-boats, 40 scallop dredges, and 100 dories, amounted to $960. The products were worth $5,332, and consisted of 900 bushels of scallops, 3,375 bushels of clams, 19,200 pounds of eels, and 3,000 pounds of flounders. Besides these products there were about 1,000 bushels of oysters dug in this vicinity, valued at $1,200.

90. THE OYSTER INTERESTS OF TAUNTON RIVER AND VICINITY.

The oyster interests of the Fall River district, as reported by Mr. Ingersoll, are as follows:

"TAUNTON RIVER.—There lies in the Taunton River, at Dighton, a large rock, well known to archæologists, on account of some inscriptions which it bears; these, though untranslated, are supposed to be the work of Norse voyagers who early visited these waters. The foundation for this supposition is very fully and attractively stated in Thoreau's Cape Cod, to which the reader is referred. These earliest comers were pleased to find shell-fish abundant in the region, and the English settlers, three or four centuries later, record their thankfulness on similar grounds. From time immemorial, then, oysters have been natives of this district, and no such mistake as has been made north of Cape Cod could ever be put forward to deny that they are here indigenous.

"It was long ago recognized that the Taunton River was a valuable oyster-property, and legal measures were early adopted looking toward its preservation. The present plan of operations came into effect about thirty years ago, and though differing slightly in the various towns bordering the river, consists, in general, of the leasing of the ground for raking and planting purposes, during a term of years, at a fixed rental. Most of the towns do this under the general law of the State, but Somerset had a special act in her favor, passed by the legislature in 1847.

"The oysters from all parts of Taunton River (the producing extent is about 12 miles long) are known as 'Somersets.' Formerly they were considered extremely good eating, and grew to a large size. Within the last twenty-five years, however, they have assumed a green appearance and lost quality. It is popularly asserted, locally, that this is owing to the influence of the impurities discharged by the copper-works, by the rolling-mills, and by the print-works, which are situated some miles above the oyster beds. But this has been denied, on the ground that not enough of the mineral matter thus thrown into the current could get down there to affect the oysters so seriously, and also on the better ground, that chemical analyses fail to show the presence of any-

thing to account for the greenish stain, which is precisely that so highly esteemed a few years ago in the French oysters of Marennes, and other districts. I was assured that this greenness varied in different parts of the river, and with different seasons, and that if any oysters happened to have grown high up on the bridge-piers, or elsewhere off the bottom, they were not green at all. Just how deleterious to health these green Somerset oysters are, I could not learn satisfactorily. Nobody pretends that their effects are fatal, and some say they are as good as any other inferior oyster. The general opinion, however, is, that eating a dozen raw ones is certain to be followed by violent sickness at the stomach. No doubt prejudice has much to do with it, for there is no food which the imagination would more quickly influence the stomach to reject, than the soft, slippery, and somewhat insipid fresh-water oyster. The same green appearance occurs of late in the oysters of Seekonk River, to be spoken of later on; and in both cases transplanting entirely removes the stain and elevates the quality, which is said to be slowly improving. In consequence of this stain, the eating of Somerset oysters, in their natural state, has been nearly given up, and the whole trade of the river is devoted to the production and sale of seed. Of course no planting of any sort, beyond the occasional transference of 'set' from one part of the river to another, has ever been undertaken.

"The number of young oysters born every fall in Taunton River varies, but there is never a year wholly without them. The season of 1877 was a good one, and about ten years previous, the autumn of 'the great September gale,' saw an extraordinary production, or 'set,' as the appearance of the young oysters is termed here. The rocks and gravel along both shores are covered to a greater or less extent, but in addition to this every owner spreads down great quantities of clean shells every summer, in the hope of catching spawn. Generally, they are successful, and sometimes extremely so. Some experiments have been tried with sunken brush; but though the spawn attached itself well enough, the currents and winds are so strong and uncertain as to drift it all away and lose it to its owner. Perhaps 25,000 or 30,000 bushels of shells are spread in this river annually. The favorites are scallop shells, because they are thin and brittle, so that the young oysters anchored to them are easily broken apart or detached. Scallop shells are somewhat scarce, and 3,000 bushels put down at Assonet in 1878 cost $300. The result, nevertheless, is often very gratifying. Mr. S. R. Higgins told me that from 500 bushels of shells placed near Fall River he took up the following year 3,500 bushels of young oysters. The annual product, in seed, of the different town fronts along the river is given approximately as follows:

	Bushels.		Bushels.		Bushels.
Berkeley	11,000	Somerset	6,000	Assonet	13,000
Dighton	3,000	Freetown	10,000	Fall River	8,000
Total "Somerset seed"					51,000

"Putting an average value of 45 cents a bushel on this (the sales of the Somerset Oyster Company in 1879 netted them 42 cents), gives the sum of $22,950 as the value of the yearly crop of Taunton River seed. Of this, $5,400 is paid as revenue to the towns, and the balance mainly to native assistants in dredging, tonging, and transportation. The river towns may therefore be said to derive about $20,000 as the annual value of their fisheries to them, besides the oysters needed 'for family use.' This money is widely distributed. While the law permits the raking of the river during nine months of the year, it is nevertheless the fact that the main part of the work must be done in a much shorter time. As soon as the weather permits, or about April 1, the proprietors put gangs of men at work, and keep at it until the end of May. The catch is nearly all

contracted for before it is caught, and every owner is straining to fill his orders at the promised time. The water is from 3 to 20 feet deep, and the tonging not very difficult. The tongs used do not work by the twisting of the grain of an oaken pivot, but on a brass swivel-pivot, known as the 'Somerset' tongs. All, however, do not approve of the invention, averring that it wears out the tongs. During the months of April and May about sixty persons are employed in Somerset alone, and in other towns in proportion—perhaps four hundred along the whole river—who, as a rule, live along the bank, and often own the boats they operate; if not owned, one is hired from their employer at 25 cents a day. The catching is all done by the bushel. Now from 10 to 15 cents a bushel is given, according to the scarcity of the mollusks, and a smart man might make $2 a day, though the average will not exceed $1.50. Formerly wages were higher, and perhaps the lowering has induced that constant effort on the part of the catchers to cheat the buyers, through false measures, &c., which is so freely charged against them.

"The ground is cleaned up pretty thoroughly by the time the 1st of June is reached, and in the fall little raking is done, it being considered poor policy. A well-known lessee on the Freetown shore, however, thinking, at the expiration of his lease a few years ago, that he would be unable to renew it, resolved selfishly to dredge his whole land in the autumn, leaving as barren a ground as possible for his successor—a proceeding quite characteristic of the locality. He did so, but succeeded in renewing his lease, and returned to his raking the ensuing spring rather ruefully, expecting to find little or nothing. To his astonishment, he picked off an area that had usually yielded him 6,000 to 7,000 bushels no less than 12,000! Hence he concluded that the thorough scraping had done the bottom good, though where he got the spawn at that late day is a mystery. This small seed, less than a year old and about the size of your thumb-nail, is widely distributed, going to beds on Cape Cod, in Buzzard's Bay, along the southern shore, and in all parts of the Narragansett. It is highly esteemed on account of its hardiness. Wonderful stories are told of the cold and heat, drought and exposure, water too salt and water too fresh, which it has survived and prospered under. There is no difficulty about selling to planters all that can be raised, and the present high prices are due to the rivalry which has been brought about between buyers. The vessels which come to carry it away are small sloops and schooners of 30 or 40 tons, which carry from 300 to 1,000 bushels. None, I think, is sent anywhere by rail. Starfishes nowadays are few in Taunton River; but the borers (*Urosalpinx cinereus*) are growing more and more numerous and troublesome.

"SWANSEA.—After leaving Taunton River, pointing westward, the first point at which oysters of any commercial consequence are met with is in Cole's River, which flows into Mount Hope Bay, almost on the boundary between Massachusetts and Rhode Island. It was known long ago that oysters had inhabited this stream, and also Lee's River, near by, and immense dead shells are occasionally brought to light, but it had almost been forgotten until a few years ago, when there was suddenly discovered near the mouth of the inlet a large bank of living oysters of fine quality. Everybody at once rushed to rake them up, evading or discarding the special law enacted in 1867 for the protection of the oyster-beds in these very rivers.

"The result of this onslaught was, that two or three seasons of it nearly extirpated the colony, and the few to be obtained now are only got by hard effort on the part of a few professional rivermen, who peddle them in the neighborhood or take them to Fall River.

"The extensive banks and tide flats of this river, however, have long abounded in young oysters, which were buried by the digging for clams, which is extensively carried on here, or frozen by the winter weather, so that few, if any, survived, and none to speak of were gathered. Lately a large gravel bank has been thrown up by the changed currents against the pier of the railway

bridge, and the number of infant mollusks attached to the pebbles here became so great as to attract the attention of Providence oystermen, who have created a demand for this seed. It is therefore gathered and sold now; about 1,000 bushels, it is estimated, having been collected during 1879. This is hardy, of good shape, and produces a round and remarkably fine oyster. Some attempts have been made at Cole's River to plant and rear its own oysters, and the town granted areas for this purpose, but they have not been successful thus far. Litigation has resulted in several cases from a clashing of alleged rights, and anchor-frost and starfishes, or drifting sand, have done the rest. I fear it is not a favorable locality for this purpose."

Statistics of oyster interests in Fall River district.

Number of planters (not counted elsewhere)		10
Extent of producing area	acres	13
Number of men employed (a few days in spring)		400
Value of shore property and cultch		$5,000
Number of boats employed		250
Value of same		$5,000
Annual sales of native oysters	bushels	52,000
Value of same		$23,000

PART IV.

THE FISHERIES OF RHODE ISLAND.

By A. HOWARD CLARK.

NOTES ON OYSTER INDUSTRY GATHERED BY ERNEST INGERSOLL; ON GENERAL FISHERIES, BY W. A. WILCOX AND LUDWIG KUMLIEN.

ANALYSIS.

A.—GENERAL REVIEW OF RHODE ISLAND AND ITS FISHERIES:
91. Description of the State and extent of its fisheries.
B.—THE OYSTER INTERESTS OF RHODE ISLAND:
92. Origin and importance of the oyster industry.
93. The planting grounds of Narragansett Bay.
94. Business in Southern, native, and seed oysters.
95. Extent of the oyster business in 1879.
C.—GENERAL FISHERIES OF NEWPORT COUNTY, INCLUDING BLOCK ISLAND:
96. Adamsville, Little Compton, Tiverton, and vicinity.
97. The fisheries of Newport.
98. Block Island and its fisheries.
D.—GENERAL FISHERIES OF BRISTOL, PROVIDENCE, AND KENT COUNTIES:
99. Fishing towns from Bristol to Warwick Neck.
100. The fisheries of Apponaug and East Greenwich.
E.—GENERAL FISHERIES OF WASHINGTON COUNTY:
101. Fisheries from Wickford to Narragansett Pier.
102. Point Judith to Pawcatuck River.

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PART IV.

THE FISHERIES OF RHODE ISLAND.

A.—REVIEW OF RHODE ISLAND AND ITS FISHERIES.

91. DESCRIPTION OF THE STATE AND EXTENT OF ITS FISHERIES.

GENERAL REVIEW.—The State of Rhode Island is about 50 miles long and 35 miles wide Its continental shore-line is only 45 miles, yet, with its numerous bays, 320 miles of shore are. washed by the tide. It is divided into two unequal parts by Narragansett Bay, which extends inland some 30 miles from the ocean. Throughout the State there are fresh-water ponds, and in the southern part some large ponds of salt-water. The bays embraced within the State limits are bountifully supplied with fish; some species are fit for food, others only for the manufacture of manure. The ponds contain abundant shell-fish. The State derives its name from the island called Rhode Island in the middle of Narragansett Bay, and upon which are the towns of Newport and Portsmouth and the village of Bristol Ferry.

It is claimed by geographers that Rhode Island is the Vinland of the Northmen, and that the famous Dighton Rock, on Taunton River, bearing some strange hieroglyphics is a memorial of the visit of Thorfin, in the tenth century. The celebrated stone mill at Newport is by some supposed to be another monument left by very early visitors to these shores.

Into Narragansett Bay empty the Taunton, Providence, and other rivers. The city of Providence, an important manufacturing and commercial center, is on the Providence River, some 15 miles from the bay. Here is an excellent harbor. No fisheries are now carried on at Providence, though when the whale fishery was at its height this place, in common with Warren, Portsmouth, and Newport, had its whaling fleet.

The colonial records of Rhode Island give evidence that the early settlers were engaged in carrying on the fisheries, especially for the capture of shad and shell-fish, and frequently whales were "cast up on the shores, and being cut in pieces were sent far and near as a most palatable present." The Indians were accustomed to use nets made of hemp, and to shoot the bass as they became entangled in the meshes of the net. Sturgeon were taken with harpoons, and were very highly prized for food. In 1731 the authorities passed an act for the encouragement of the cod and whale fisheries, and granted a bounty of 5 shillings a quintal for codfish caught by Rhode Island vessels; 5 shillings a barrel for whale oil, and 1 penny a pound for whalebone. As a result of this encouragement the fisheries increased in importance, and at the period of the Revolutionary war were very profitable to the inhabitants. In 1789 one hundred and one vessels, many of them whalers, were owned at Providence. The war of 1812 caused the decline of the whale fishery; after the war it revived and from 1840 to 1850 a number of whaling vessels were owned at several ports in the State, but the business is now entirely abandoned.

In 1860 the general fisheries of the State yielded 118,611 barrels of menhaden and other fish for manure and oil, worth $27,817; about $25,000 worth of food fish; and $11,692 worth of clams

and other shell-fish. Besides these productions of the waters there were gathered from the shore 34,927 cords of sea-drift, valued at $37,604, and 1,540 tons of salt hay, worth $12,320. The Rhode Island State Census for 1865 gives the following figures to show the products of the fisheries for that year: Fish seined for manure and oil, 154,468 barrels, worth $126,035; fish caught for food, 2,462,360 pounds, $121,094; clams, 31,697 bushels, quahaugs, 9,241 bushels, scallops, 9,653 bushels, oysters, 72,895 bushels, and lobsters 42,900 pounds, having a total value of $118,655; sea-drift, 34,146 cords, $38,083; and salt hay, 2,116 tons, $18,545. The aggregate value of the products of the waters and shores of the State was $422,412.

STATISTICAL SUMMATION OF RHODE ISLAND FISHERIES FOR 1880.—The following statements show the statistics of the Rhode Island fisheries in 1880. The number of persons employed is 2,310, the capital invested is $596,678, and the value of products is $880,915. The menhaden industry employs 608 men, some of whom are also engaged in the capture of food fish; the capital invested is $304,300, and the value of products is $221,748. In the oyster business 650 persons are employed; the capital invested is $110,000, and the value of the products is $356,925.

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	536	Capital in vessels and boats	$296,775
Number of boat-fishermen	1,066	Capital in nets and traps	95,053
Number of curers, packers, fitters, and factory hands	708	Other fixed and circulating capital	a204,850
Total	2,310	Total	596,678

a In menhaden factories, $77,900; in other fishery industries, $126,950.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear and outfit, exclusive of boats and nets.	Total value.	Nets and traps.	No.	Value.
Vessels.						*Nets.*		
In food-fish and lobster fisheries	31	314.10	$20,800	$5,600	$26,400	Gill-nets	70	$3,760
In menhaden fishery	61	2,188.58	171,050	24,600	195,650	Purse-seines	50	20,000
						Haul-seines	52	5,070
Total	92	2,502.77	191,850	30,200	222,050	Total	172	28,830
Boats.						*Traps.*		
In vessel fisheries	150		11,410		11,410	Pounds and weirs	166	56,633
In shore fisheries	584		49,835	13,480	63,315	Fykes	865	7,530
						Lobster and eel pots	2,857	2,060
Total	734		61,245	13,480	74,725	Total	3,888	66,223

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Grand total				$880,915
Fresh fish.				
For food	a10,838,328			184,482
For bait and fertilizer	1,355,000		6,775 barrels	2,432
Total	12,193,328			186,914

a The proportion of different species in this quantity is estimated as follows: Alewives, 140,000 pounds; sea bass, 197,000 pounds; striped bass, 292,000 pounds; blackfish or tautog, 468,000 pounds; bluefish, 738,000 pounds; cod, 652,000 pounds; eels, 272,500 pounds; flounders and flatfish, 352,400 pounds; mackerel, 89,000 pounds; white and yellow perch, 30,000 pounds; salmon, 400 pounds; scup or porgy, 6,691,178 pounds; shad, 48,100 pounds; smelts, 95,000 pounds; squeteague, 326,000 pounds; swordfish, 90,000 pounds; mixed fish, 356,750 pounds.

Detailed statement of the quantities and values of the products—Continued.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Cured fish.				
Dry cod	1,931,800	768,720		$26,270
Pickled alewives	505,000	404,000		6,060
Smoked alewives	2,333,000	1,400,000		7,000
Total	4,769,800	2,572,720		39,330
Shell fish.				
Lobsters	423,250			15,871
Clams	530,000		53,960 bushels	48,564
Scallops	124,600		17,800 gallons	8,900
Oysters	1,305,600		163,200 bushels	b356,925
Total	2,393,050			430,260
Miscellaneous.				
Menhaden, for oil and scrap	68,693,800		270,482 gallons oil; 10,590 tons scrap	221,748
Cod oil			3,250 gallons	1,300
Squeteague sounds		400		163
Irish moss			400 barrels	1,200
Total				224,411

b Includes $131,425 enhancement on 274,300 bushels of southern oysters.

B.—THE OYSTER INTERESTS OF RHODE ISLAND.

EXTRACTS FROM REPORT BY ERNEST INGERSOLL.

92. ORIGIN AND IMPORTANCE OF THE OYSTER INDUSTRY.

LAWS; STATISTICS FOR 1860 AND 1865.—When the people of "The Colony of Rhode Island and the Providence Plantations" felt themselves sure of future stability, they applied to the king, Charles II, to grant them a charter, which he graciously did in the year 1683. This charter was a wonderful document for those days, because of the well-nigh perfect liberty it embraced, and its hospitality to every conscientious belief, whatever the name of the religious banner it rallied under. Among the privileges and liberties it insisted upon was the right of free-fishing in every shape. The relations of the fishermen to the owners of the shores were defined with great minuteness, and were calculated to make all the fish of the sea and all the molluscous denizens of the muddy tide-flats as available as possible to every citizen. Thereafter they were jealously preserved for public benefit. In 1734–'35, for instance, the first session of the assembly at East Greenwich was distinguished by an act for the preservation of oysters, which the thoughtless inhabitants were burning in large quantities for lime; and in October, 1766 an "act for the preservation of oysters" was passed, forbidding them to be taken by drags, or otherwise than by tongs, under a penalty of £10. Parents and masters were held liable for the violation of this law by their children or servants, and the owners of boats engaged in evading it were subject to a double fine. When (and it was not many years ago) the State constitution was adopted, no clause was so scrupulously worded against possible evasion as that which declared that in respect to the rights of fishing and of taking clams, &c., everything should remain precisely as decreed in the old charter.

The oyster-law, therefore, is based upon the principle that between high-water mark and the public highway of the ship-channel the land and water are controlled by the State as public

property, to be administered for the greatest good to the greatest number. Rhode Islanders are extremely tenacious of these shore and water rights, and there has been no little quarreling over some actions of the legislators and decisions of the courts with respect to this subject; but, upon the whole, there has been little alteration of the original law. The general statute, in substantially its present shape, came into force in 1864. Previous to that time the State had let oyster-grounds at $1 rent per acre, and not much business was done.

Five out of the thirty-two towns that compose the State are situated on islands. The bays embraced within the State and the extensive salt ponds near the southern coast abound with shell-fish. To ascertain the extent and value of these fisheries the Rhode Island Society for the Encouragement of Domestic Industry made great exertions, but without success, at the time of the general census of 1860. A statement, nevertheless, exists in the report of 1860 that the oysters of Rhode Island were valued at $382,170, out of a total of about $600,000 for all the fisheries, excluding whales. In 1865 this point was made a special feature, and much fuller information was gathered. "These statistics," says the report of the general assembly's committee, "must, from the nature of the case, depend to some extent upon estimates. For example, the clams on the shores are free to all the inhabitants of the State who choose to dig them. Persons come to the shores from all quarters, and often from distances of several miles, and dig as many clams as they choose to eat or carry home. Nothing is exactly known of the quantities thus removed. The only estimates which could be made were from the opinions of the owners of shore farms."

The following is the table of the product of the shell-fish industry as presented by the committee in 1865:

Towns.	Clams.	Quahaugs.	Scallops.	Oysters.	Total value of all shell-fish.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	
Barrington	962	457	.....	.....	82,313
Bristol	200	.....	.....	.....	200
Warren	1,215	10	.....	.....	1,225
East Greenwich	1,415	339	6,635	13	6,313
Warwick	9,127	2,953	1,627	242	13,949
Jamestown	162	6	.....	.....	98
Little Compton	.....	.....	.....	.....	.....
Middletown	119	.....	.....	.....	232
Newport	(Lobsters.)	.....	.....	.....	2,200
New Shoreham	.....	.....	.....	4,200	1,680
Portsmouth	7,715	145	500	.....	4,331
Tiverton	576	55	.....	.....	468
Cranston	200	.....	.....	.....	200
East Providence	3,405	830	.....	12,100	19,662
Providence City	404	2,966	3	50,450	54,122
Charlestown	200	.....	.....	1,812	1,515
North Kingston	5,740	1,480	870	.....	6,791
South Kingston	257	.....	18	3,070	3,345
Westerly	.....	.....	.....	7	11
Total	31,697	9,241	9,653	71,894	118,655

Although the amounts in the above table ought to have been doubled to represent the truth in each case, on the average, yet they show that when the new law, putting a rent of $10 an acre and organizing the oyster interest under careful control by the State, went into operation, the whole value of the industry was very small, compared with the present. Since the passage of this statute the oyster interest has steadily grown in importance.

Nevertheless, there has always been more or less grumbling on the part of the owners of leases, who pleaded that they are paying an exorbitant rent. The general financial depression of 1873–'76

heightened this discontent, and in the winter of 1878–'79 it came to the surface in a contest before the legislature, which brought up several mooted points. The great bone of contention was the construction put by the commissioners upon who were suitable persons to receive leases. It was notorious that many Boston dealers planted oysters and operated business generally in Narragansett Bay, upon ground leased in the name of some "inhabitant of the State," who might or might not act as their agent at the scene of operations. This practice was deemed by many native fishermen an infringement of law and an injury to them. They, therefore, endeavored to procure the passage of a bill through the legislature making it a misdemeanor for any lessee of oyster-beds to be interested with any person not a resident in the State, with a penalty of $100 and a cancellation of the lease for such "interested" connection. The result of the fight was that the bill failed to become a law.

93. THE PLANTING GROUNDS OF NARRAGANSETT BAY.

EAST SIDE OF THE BAY.—Tradition says that oysters used to grow in Mount Hope Bay proper, below the mouth of the Taunton River; though but little trustworthy testimony could be obtained on this point. Beyond that, on the eastern side, no oyster-beds could be found, ancient or modern, until Newport was reached, where now none are growing or planted (the city deriving all its supplies from Providence), but where, in some of the larger salt-water ponds, they formerly existed in considerable quantities. They were described as a large, round, scalloped oyster, quite different from those anciently found in the pond on Block Island, which were said to be long, slender, and very good. It is probable that a careful survey of ponds and inlets along the eastern bank of the Sakonnet River and around Sakonnet Point would disclose the remains of many extinct beds, and perhaps some living colonies of oysters. The same may be said of Newport Neck and Conanicut Island.

The Kickamuit River is an inlet of Narragansett Bay, at the extreme eastern boundary of the State, which has an entrance only a stone's throw in width, but expands interiorly into a bay about 3 miles long and 1 wide, the narrow upper portion of which is called Palmer's River. The water is shallow, of course, and the bottom of a very varied character. Forty-one acres have been leased, distributed among eight planters. Native oysters grew there of good size and quality, and some are got yet, but the chief value of the ground is for planting; and as yet the experiment is too slight to afford much judgment. There seems good reason to expect success, since it used to be a famous place for "set." The bottom is also said to be full of fresh springs, which is highly to its advantage.

Westward of the Kickamuit River are Warren, Barrington, and Palmer Rivers, joining in an inlet of Providence River. In these three streams is leased a total of 173 acres, distributed among thirteen proprietors, some duplicating Kickamuit, Drownville, Providence, and Boston names. The shell-heaps strewn upon the knolls along all four of these rivers show that the succulent bivalves have lived in their waters since time immemorial. Occasionally the natural oysters are still to be found; and that twenty years ago many remained is shown by the fact that in 1860 an extraordinarily large number of infant oysters "set" on the shores. These native oysters were very large and long and slender. Their shells were not usually very heavy, and they were held in high esteem. At present there are none to be had of marketable size, and there are not enough young ones to be found in these rivers to amount to anything. Nevertheless the Warren and the Barrington are among the best places in Rhode Island, apparently, for oyster culture. The water is wonderfully pure, sparkling, and salt, and flows in and out with a swift tide. The bottom is very hard, as a rule, and in places rocky. This fact makes the oysters there come to have a round

outline, and a firmer, better substance within, though they do not grow so fast as they would lying upon mud.

A score of years ago planting was begun above the road and railway bridges, in Barrington River, and among the first leases taken out was one for the acre or two of "quick-water" between the bridges; but it is only within two or three years that operations have been extended below this part into the main river, where the water is salt, and ranges in depth from 9 to 18 feet, over a hard bottom.

The Virginia oysters bedded here do very well indeed. They are handled mainly by one planter. His plan is to lay 75 bushels on an area 50 feet square, distributing them by shoveling overboard from the large crafts known as "planting-boats." Ten men, the usual number engaged on a single cargo, will thus unload and put upon the beds from 2,000 to 2,500 bushels a day. The Virginia oysters cost, put down, about 35 cents a bushel. On good ground the growth is gratifying, although about one-fourth of the original number put down are expected to perish. The large amount of cultch spread upon this gentleman's territory had thus far yielded him no return of consequence, since he had planted with it only a few natives. On the contrary, another prominent lessee in Warren River gave his whole attention to rearing native oysters, and paid no attention at all to "Chesapeakes." He procures his seed, like all the rest of the dealers, from Somerset, Wareham, Pocasset, &c., but mainly from the Connecticut shore. Formerly he got it much cheaper, but now it costs him from 50 to 70 cents a bushel. The several hundred bushels he put down three years ago lived well, and he now considers them trebled in value. He has adopted the plan of not planting until June. "When the weather gets warm," he says, "the slime rises from the sand and rocks on the bottom of the river and floats away. There remains a clean bottom, and I wait to take advantage of this most favorable condition of things for my young oysters, that will have a hard enough time, under any circumstances, to live through it." Being fortunate enough to have a tract where the swift tide never permits serious freezing, he is able to wait until all his competitors are frozen up, when he can sell his easily accessible stock at a large advance upon the ordinary price, which averages about a dollar a bushel.

Rumstick Point juts out from the southern end of Rumstick Neck, a peninsula dividing the Warren River from the waters of Providence River. It is the site of a dangerous shoal, and the bottom is hard and in places rocky. There is only one owner of ground there, who leases 12 acres, but it is probable that a hundred acres more will be let there during 1880.

PROVIDENCE AND THE WEST SIDE OF THE BAY.—Proceeding now up the eastern shore of Providence River, at Nayat Point (which stands opposite Canimicut, and marks the real mouth of the river on this side), 46 acres are now planted by a Providence firm. The beds are north of the point, on the sandy bottom around Allen's Ledge.

The next point above this is Drownville, where the oyster-bottom is owned by three men, who divide 25 acres. Many other dealers, however, make Drownville their opening and shipping point, among them several Boston firms having large opening-houses and shipping extensively. So many citizens, not less than one hundred and twenty-five, are given employment, therefore, in the winter, that the remark of one was justified: "Drownville would evaporate if it were not for the oysters." The starfishes and periwinkles have been troubling the Drownville planters of late more than elsewhere.

Reaching back into the country north of Drownville, and protected from the outer bay by Bullock's Point, is Bullock's Cove, a shallow estuary, by many regarded as the very best place to plant oysters in the whole State. It is certain that, uniformly, the best oysters now put into the market come from this immediate neighborhood. The only reason assigned is, that the bottom has many

springs in it, supplying constant fresh water. In Bullock's Cove 13 acres are taken up by two men; but the ground at Bullock's Point (239 acres) is held by twelve lessees.

At Sabine's Point, just above, there is only one owner, whose tract of 64 acres lies in a crescent between the light-house and the point. Just north, a single acre is let at Pomham Rocks; and beyond, at Fuller's Rocks, 9 acres are divided among four persons. This brings us to Field's Point, on the western side, the northern limit of oyster-culture, and a scene of considerable operations, 23 acres being under lease to nine persons. South of Field's Point the river widens suddenly, but the channel hugs the opposite (eastern) shore, leaving extensive shallows all along the western shore. Southward from Field's Point to Starvegoat Island (familiarly condensed into Stargut Island) runs a reef which is pretty nearly dry everywhere at lowest tide. This reef was among the earliest tracts taken up by the veteran oysterman, Robert Pettis. When, about 1861, the starfishes were depopulating the beds all over the bay, he alone was so situated that he could get at them at low tide and destroy them, and his good luck was the occasion of great profit to him. At Starvegoat Island the beds now operated are 27 acres in extent.

There were formerly natural oysters growing abundantly all over this part of the river; but the main deposit was just south of Starvegoat Island, in the center of the tract of 160 acres, now known to oystermen as Great Bed. This in old times was the great scene of oyster-raking, and it is more than thirty years since these beds were wholly exhausted. Once in a while then they used to get a few enormous specimens from there, and peddle them about town at 10, 15, and 20 cents each; but even these disappeared long ago. The owners on this bed are no less than twenty-one in number, and at Patuxent 63 acres more are taken up by five men.

At Gaspé Point, 10 acres, and at Canimicut Point, 60 acres, both being in a little salter and deeper water than any of the rest, complete the list of plantations, except 1 acre in Wickford Harbor and another at Westerly.

In former years beds grew naturally clear up to the city of Providence, and oysters were even found in the "Cove," that pretty circle of water near the railway station, the banks of which have been converted into a park. Now, however, any leasing of ground north of Field's and Kettle Points is impracticable and prohibited, because of the large amount of impurities thrown into the water by the city's drainage. The few beds up there—Long Bed, West Bed, Diamond Bed, &c.—have, therefore, now been abandoned, and are not counted, though a few leases have not quite yet expired.

At its January session, in 1878, the Rhode Island General Assembly passed a resolution enjoining the commissioners to visit the Great Salt Pond (also known as Powaget Pond), in Charlestown. It lies on the southern border of the State, and communicates with the open ocean by a narrow inlet, which frequently becomes closed by the shifting of the sand in the autumnal storms. In this pond the spawn of the oyster sets abundantly each year, and grows rapidly until the closing of the breach connecting the pond with the ocean cuts off the daily supply of salt water, which causes the oysters to die in immense quantities. If a permanent connection of this pond with the ocean could be secured, the natural oysters, which are of excellent quality, could be grown with great success, and large quantities of seed-oysters could be obtained for stocking the oyster-beds of Narragansett Bay.

Such was the report of the examining committee, and such is the opinion of the people generally. Accordingly, the legislature appropriated $1,500 to defray the expense of constructing a sort of riprap wall, in such a way that the currents and waves should help to keep the breach open, instead of closing it, and so maintain a constant influx and efflux of sea-water. This work is not

yet completed and tested. If it should succeed, a large new territory will be added to the oyster-grounds of the State.

PAWCATUCK RIVER.—The Pawcatuck River divides the State of Connecticut from Rhode Island, and is subject to tides as far up as Westerly, at least. From a mile below Westerly to its mouth it is inhabited by oysters, though of poor quality, and hence of small commercial importance. These are of two sorts: one kind, the "rock oyster," attaches itself to the rocks along the shores and in the bottom of the stream, and grows singly to a good size; the other, called the "bed oyster," grows in dense clusters, in crowded beds, and is of very small size; it is rarely brought to market, and is considered by the fishermen worthless to transplant on account of the clustered condition. Sufficient painstaking in the matter would, of course, overcome this objection. For some years the oysters of all kinds in this river have been affected by a disease which interferes with their sale, because, whether for good reason or not, they are supposed to be unwholesome. The disease was described to me as producing little "boils" on the body, inside the mantle, as near as I could understand. It appeared first as a greenish spot, then became yellow, and finally turned into a black, rotten pustule. Various causes are assigned, but none are satisfactory. Dry seasons, like the present, seem to augment the disease, which is perhaps a fungoid growth that finally "eats out a hole," as the fishermen say, and it is not essentially different from the "greenness" of Somerset and Seekonk oysters.

A large set occurs regularly in this river, but in some years to a greater extent than in others. Three years ago was said to be an exceedingly productive year. Young oysters were found upon everything all through the river, and upon some rocky points down toward the mouth they were said to have been seen lying on the shore "in windrows a foot deep." This is an exaggeration, no doubt, but gives evidence that there was a vast quantity. This was immediately following a dredging-out of the channel. Nothing of any account was done toward saving them to stock beds anywhere. Pawcatuck River is not considered suitable for oyster-bedding to any extent, unless the ground should first be prepared by paving the mud and killing out the eel-grass. There are many impurities in the water, also, arising from drainage and the waste of many mills, print-works, and other manufactories. In Ward's Pond, on the contrary, a sheet of water affected by the tides, which lies four miles east of Westerly, is found a most excellent place for oysters, wild and cultivated, but the people who inhabit the shores do little themselves and object to attempts on the part of outsiders. This pond contains between one and two hundred acres, and is nearly every where gravelly or sandy on the bottom, with considerable fresh water flowing in. I was told that nowhere in this whole region did oysters grow so fast, and acquire so fine a relish as here, but not having inspected the pond myself I cannot corroborate these glowing reports by personal observations.

The total area of pre-empted oyster-grounds in Rhode Island in 1879 was 962 acres, and it is probable that as much more ground might be found suited to oyster-planting.

94. BUSINESS IN SOUTHERN, NATIVE, AND SEED OYSTERS.

SOUTHERN OYSTERS.—Thus far the bedding and fattening of Virginia oysters, mainly to be sold opened, has been the most profitable branch of the business. Of these oysters about 500,000 bushels are laid down annually, at present. The vessels employed in bringing them are mainly owned on Cape Cod. None, so far as I could learn, hail from Rhode Island ports. The freight is about 15 cents a bushel in the fall and winter, falling to 12 and 10 cents in the spring, when quicker voyages for planting purposes can be made. What part of the Chesapeake Bay furnishes the best

oyster for these waters is a question that has received much attention. One gentleman told me that he had lost the whole of two years' labor by trying to put down cargoes from the Rappahannock. Another planter, equally experienced, said these succeeded well enough if brought here and planted before the weather became at all warm. Oysters from the Saint Mary and Potomac Rivers are troublesome because mixed with many obnoxious mussels, and, besides, they do not grow well, as a rule. Those from Tangier Sound are pretty good, and are largely bought. The general verdict, however, is that the best Virginia oyster for this bay is to be had in the James River. These show the largest growth at the end of the season, developing a hard, flinty shell and white meats; on the contrary, I was told that at New Haven, Conn., the James River oysters cannot be used at all. But many cargoes are planted here, the exact southern home of which is never known.

The laying down of southern oysters must all be done early in the spring. If they would only survive the voyage as late as June, Mr. Bourne thought that month would be the best time to plant them. When I suggested the use of steamers to expedite the transfer, he said it would not help matters, for the jarring of the cargo, caused by the throb of the engine, would kill the mollusks. He did not even allow any wood to be split on his oyster vessels for fear of this species of damage. Of the half a million bushels bedded in Rhode Island yearly, about half are owned in Boston.

During the winter of 1878–'79, the Norfolk-opened oysters were brought to Providence in large quantities, but the experiment was generally considered unsatisfactory, and but few now come.

NATIVE AND SEED OYSTERS.—The fattening of Virginia oysters is only half the business, though perhaps the most profitable part, in Rhode Island. A vast number of "native" oysters are raised in Narragansett Bay, though but a portion of them are born there. There are only a few places in the bay where a "set," as it is called, occurs with any regularity or of any consequence. In the Warren and Barrington Rivers it has not happened for twenty years, and the same is true of the whole eastern shore, except Cole's, Kickamuit, and Seekonk Rivers. Providence River itself never produces young oysters now, nor does any part of the western shore, except Greenwich Bay and the ponds in the extreme southern part of the State, deriving their salt water directly from the Atlantic. The cause of this dearth of spawn and seed, where once every shore was populous with it, can only be ascribed, I think, to the antecedent disappearance, through persistent raking, of all the old native oysters. In Cole's River a heavy "set" occurred three years ago, and from 500 to 1,000 bushels are obtained every year. In the Kickamuit the shores are dotted with infant ostreæ annually, and supply the planted beds there, while old oysters of very good quality are not infrequent. In dredging back and forth throughout the whole extent of Greenwich Bay, the scallop-fishers frequently take up large oysters, evidently "to the manor born," and they are now and then seen on the shore rocks. About 1872 there was a very large "set" here and in Potowomut River, just below. Boats came down from Providence and elsewhere and were filled again and again. But all of the crop left was swept away by starfishes, which were then very abundant, or was buried beneath drifting sand and wrack, and so no establishment of a natural bed there was possible. If these young oysters were not all picked out of Greenwich Bay in the fall, they would live through the winter, even where the ice rested fully upon them at low tide, and would soon repopulate the bay. But now their annual value to any one is insignificant and constantly decreasing.

There remains one river, nevertheless, where, under protection, the oysters are able to reproduce regularly every year. This is the Seekonk, which flows down past Pawtucket and Providence,

with East Providence on its left, and numerous bridges and small shipping to worry its swift tides. The Seekonk has always been a favorite home of the oyster, and year by year the river contributes its quota to the tongers, through a space from the Wicksbury pier to nearly 5 miles above. This is due largely to the fact that the oysters of the Seekonk, like those of the Taunton River, are vividly green. No better reason can be assigned than in the former case, and, like the others, this seed, when transplanted for a few months, entirely loses its verdant tint. Seekonk oysters, therefore, never go to market, but are all caught for the seed. This catching begins November 1, according to law, and must close on May 1. These dates are arranged with the purpose to prevent successful planting, and so protect the fishery; but the planters buy as long as the weather remains "open" and warm. Very little raking is done in this river in the spring. The men are rivermen, who work at this a few weeks in November and December, and the rest of the year do other water-work. The law forbids taking more than 10 bushels in one day to each boat, but if the seed is plentiful this law is very often violated, since there is no officer to watch. Perhaps it is a direct good effect of these regulations that 1878 and 1879 have witnessed the largest yield of Seekonk seed known in a dozen years. The main buyers are Wilcox, Browne, Wall, and Adams, of India Point; but everybody buys a few bushels who can. The catchers have to take what pay is offered them, but competition sometimes produces a good rate, the usual price being 25 cents a bushel. This being public ground, and everybody having a chance at it (many of the heavy owners send spare boats and crews up this river to rake at odd times), it is impossible to come at any close estimate of the amount of seed-oysters taken from the Seekonk during the last year. The truth I believe to be somewhere between five and ten thousand bushels. It is a shapely, hardy seed, opening well, and is in general demand, some planters putting it at the head of the list for its good qualities. One year on its new bed suffices to remove totally the green tinge, and two years to make it marketable.

The remainder of the seed-oysters planted in Narragansett Bay come from the Connecticut shore, East River, Fire Island, and the Great South Bay, Somerset (planted chiefly by those owning privileges in Taunton River), and from various parts of Buzzard's Bay. I often asked which was best, but could never get evidence of much superiority in any one kind. The success of a planting does not depend on the kind of seed put down so much as it does upon a thousand circumstances of weather, water, and bottom. The seed which would do excellently in one cove would behave badly in the next, and *vice versa*, individual preferences being founded upon these varying and unexplained experiences. The seed from the south shore of Long Island used to be cheapest of all, and good; but a Boston demand ran up the price beyond the pockets of Rhode Island planters. In general, it may be said that any seed transplanted to Narragansett Bay develops into a better oyster than it would have come to be if left in its native waters. * * * On Block Island, many years ago, there was an abundance of small oysters living in the pond that occupies so much of the interior of the island. For some reason, however, they were rarely found in a fit condition for food, but would serve to transplant. The oystermen at Clinton, Connecticut, and elsewhere, used to buy them, the price being 25 cents a bushel, delivered at their destination. The shells of these Block Island oysters were so delicate, one planter told me, that it was easy to pinch your thumb and finger through them, and often there would be so much air and fresh water held within their half-vacant shells that they would float when thrown overboard in planting, and drift away. All these oysters long ago disappeared, and no cultivation has been tried to replace them.

95. EXTENT OF THE OYSTER BUSINESS IN 1879.

CAPITAL INVESTED.—The amount of capital invested in this State it is almost impossible to come at. It probably approaches $1,000,000, including perhaps $300,000 or $350,000 worth of seed oysters growing on the beds. One-third or more of this property is owned in Boston, and the necessary money for carrying on operations comes thence, but is represented by men who also do more or less private planting on their own account. Of course this is chiefly in the hands of a dozen or more planters on the list; the forty or fifty others will not average a greater sum than $1,000 each invested in this business, which is chiefly conducted personally, close to their bay-side homes, and without hired help, by selling to home shippers. The expensive warehouses required by some of the wholesale dealers and shippers in the city of Providence count largely in the estimate of capital involved; and the boats used are of a good class.

YIELD AND VALUE OF THE OYSTER BEDS.—The yield of the beds and its value, appears in the following table:

		Bushels.
1879.	Native oysters produced on beds owned in Rhode Island	108,200
	Southern oysters, ditto	274,300
	Native oysters produced on beds owned out of the State	40,000
	Southern oysters, ditto	238,000
	Total Narragansett production	660,500

The total value of this, and some additional annual business, will amount to at least $600,000, at the original wholesale price paid the producer.

PRICES AND WAGES.—The prices at which oysters were sold by wholesale dealers in the city of Providence, during 1879, were the following: Virginias, in shell, selected, $1 to $1.25 per bushel; Virginia plants, common, 90 cents per gallon; Virginia plants, selected, $1.25 per gallon; natives, in shell, $1.25 to $1.50 per bushel; at retail, 25 to 35 cents a quart, of all kinds. Some "fancy" lots, of course, brought higher rates than these prevailing market prices. In "Arnold's" and other restaurants the most palatable oysters possible are laid upon the counter to tempt the appetite. Those from Gaspé Point, purely native grown, are recognized as the very best of all, and sell for 5 cents a piece. They are delicious. So great an industry, of course, gives support to a numerous body of citizens in this district, at least during part of the year. In the summer so little is done that comparatively few are employed, this number, including only the proprietors of beds, the dealers and assistants who are obliged to keep their shops open, and the few men required for catching oysters for the feeble market, for spreading shells and planting seed, and for watching the safety of the beds. Reckoning the proprietors as perhaps 100 in all, the addition of the rest employed the year round would bring the total up to about 250; but this varies considerably from year to year. They are paid by the week, as a rule, wages running from $7 to $14, and averaging about $10. For the colder half of the year, "the season," as it is called, large additional help is needed, both on the water and in the opening houses that are placed close to the shore at various points, or on the wharves in the southern part of Providence city. Taking all the oyster houses together at the head of Narragansett Bay, I find about 350 openers employed. Add this to the 250 counted up as otherwise employed, and I have 600 men as the total. A very large proportion of these men are married; and I believe it would not be unfair, all things considered, to multiply this 600 by 4, which would give us 2,400 persons of all sexes and ages supported chiefly by the oyster industry in the Rhode Island district. I believe this is short of the truth. The sum of the wages paid is somewhere about $125,000 annually.

Statistics of the oyster interests of the State for 1879.

Number of planters		100
Number of lessees in 1879		56
Extent of ground cultivated	acres	962
Value of same (about)		$15,000
Value of shore property (about)		$75,000
Number of boats engaged		100
Value of same with outfit		$20,000
Number of men hired by planters and dealers through the whole year		150
Annual earnings of same		$75,000
Number of men hired half the year		350
Semi-annual earnings of same		$50,000
Number of families supported, exclusive of retail trade (about)		500
Annual sales (1879) of—		
I. Native oysters	bushels	148,200
Value of same		$205,500
II. Chesapeake "plants"	bushels	274,300
Value of same		$200,000
III. Fancy stock	bushels	15,000
Value of same		$20,000
IV. Baltimore and Norfolk "open stock"	gallons	8,650
Value of same		$5,000
Value of oysters raised in Rhode Island, but owned elsewhere		$250,000
Total first value of all oysters produced in Narragansett Bay, annually		$680,500

C.—GENERAL FISHERIES OF NEWPORT COUNTY, INCLUDING BLOCK ISLAND.

96. ADAMSVILLE, LITTLE COMPTON, TIVERTON, AND VICINITY.

ADAMSVILLE.—After leaving Massachusetts, if traveling in a southern direction, the next State bordering on the ocean or its bays, is Rhode Island; and, upon crossing the line between the two States the first fishing place is Adamsville, in Newport County. The fish caught here are chiefly tautog and eels, both of which are found plentifully throughout all seasons of the year, save winter. A small amount of fishing is done by five men a part of the season, farming being their chief employment. The catch by these men in 1880 was 5,000 pounds of tautog and 2,000 pounds of eels, valued at $350.

LITTLE COMPTON.—Sakonnet Point is the spot to which numerous fishermen of Little Compton and the neighboring places come for the purpose of fishing. This point juts out into Sakonnet River, which is an arm of Narragansett Bay. Into this bay flow the Providence, Taunton, and several other rivers and streams. A great variety of fish, including shad, mackerel, bluefish, rock bass, striped bass, tautog, squeteague, Spanish mackerel, alewives, kingfish, butterfish, flounders, flatfish, cod, hake, pollock, sturgeon, and scup are taken in the bay and adjacent waters. The last-mentioned species is usually caught in the greatest quantity. The Spanish mackerel, cod, hake, and pollock are rare visitors. Sturgeon are plentiful, but, like the pollock, are not considered a food fish, being classed with the dogfish, goosefish, shark, skate, and menhaden, which are sold at 25 cents a barrel for fertilizing purposes. The fishing grounds extend

from Church's Point to West Island, a distance of 3½ miles. Shore fishing is carried on south of Church's Point.

For pound-net fishing the shore is divided into twenty-one sets or sections of 65 fathoms. Some of the sets are much better than others. No one can draw for a set unless he has all the gear required for fishing. If one man has nearly all the apparatus he cannot draw, but a second party can go in with him under a firm name. This is to give a poor man a chance. Thus a rich fitter will furnish what is lacking and the poor man will do the fishing. No one can set nearer than 65 fathoms to another. When three draws occur in succession in one bay the one having the middle set is allowed to run his leader out till he gets abreast of the other two, but no further. The fishermen are all Americans. Two-thirds of them leave home by the 15th of June and ship on the menhaden steamers and follow that fishery the season through. Most of them are said to be more intelligent than fishermen generally, and many of them are land owners and quite well to do.

Fishing is generally done on shares, rarely any other way. One-third of the gross amount goes to the fitter and the balance, after deducting board, is distributed among the men.

Before the law required a close time many of the men used to go home on Saturday night and stay over Sunday, but if there were any runs of fish during this time those who staid were the only ones who shared; those who were away got nothing of the Sunday's catch. In one instance all were away from one gang but three men, and they got $100 each for the day's catch.

Traps have been fished here for 30 years or more. On the same place where there are now seven traps there have been as high as eighteen.

In the latter part of March notices are posted up in the town of Tiverton that on a certain day and place the subject of the Sakonnet fisheries will be discussed and the draws for the sets made. If there were more than twenty-one applications the distance would be divided into shorter sets, but there has never yet been over eighteen applications.

It is said that in 1879 the run of scup was very great, and came in larger bodies than ever before known. The theory is that the spring of 1879 was cold and backward, and that for this reason the fish did not appear until 3 weeks later than usual. The first scup come in schools at different times, some days apart, and when they strike the cold water they seem to stop. Other schools follow, and they keep coming till bye and bye the water gets warm and the whole body "strike on" the shore at once. This accounts for the enormous runs of 1879. One trap took as high as 3,000 barrels. Traps were so full that they could not be raised, 1,200 to 1,500 barrels being taken at a time.

One year with another, the scup are not as abundant as formerly, though in 1879 they were more numerous than at any other time during the last fifteen years. Fish seem spasmodic in their movements. The year 1880 compares only with an average year, while 1879 was an unusual one. Many of the fishermen think the great runs of fish sometimes get by before the traps are set.

In 1879 seven traps were set south of Church's Point, and some heart-seines around Fogland Point. The fishing is carried on chiefly by traps that are set for several miles along the river, commencing just north of the point. The net and leader are floated by means of corks strung together. The following are the dimensions of the traps used here: Leader, 100 to 200 fathoms long, of 5-inch mesh; the trap itself is of box shape, 10 fathoms wide, 15 fathoms long, from 4 to 7 fathoms deep, and of 2½-inch mesh. They cost, when new, from $1,000 to $1,200 each. They are put down between April 25 and May 10, and taken up about June 15, during which interval the scup are running along the eastern shore. In lifting a net of this kind three boats, called working boats, pointed at each end and capable of holding forty barrels of fish, enter the mouth of the net; each

of the buoy-lines is raised by the occupants of one boat, the fish retreating to the farther end of the net. The pockets attached at the sides and end are movable, and when filled with fish can be detached and brought singly into harbor. The use of these pockets will readily be understood when it is learned that from a single one 3,000 barrels of fish were landed. The end pocket is mostly used, those at the sides only coming into play after the end one has been filled. In 1879 many of the nets had the three pockets full at once. These traps are set so as to catch the fish when they are traveling eastward, the reverse being the case on the east shore of Rhode Island. In heavy blows fish "hang" to windward; the nets on a lee shore then fail to draw. The Sakonnet traps catch only the spring fish that come in to spawn.

A single fishing gang consists of six men and a cook. Sometimes the gangs double and even treble up, using but one cook. When trap fishing is over most of the men go on the menhaden steamers. In 1879, 7,000 barrels of scup were taken in these traps. The assertion is made that a single trap in one season has taken 6,000 barrels. The catch is sold at from 50 cents to $5 a barrel according to their abundance. About three-sixths of the fish go to New York, two-sixths to Philadelphia, and about one-sixth is taken by local trade. In 1879 the seven traps numbered alphabetically stocked as follows: A, $2,000; B, $1,500; C, $1,200; D, $1,200; E, $1,000; F, $800; G, $500; total, $8,200.

During the season one salmon only and several porpoises were caught. Lobsters are taken from 5 to 10 miles off shore; four men follow this fishery, setting sixty pots. Their catch in 1880 was 12,000 lobsters. The capital invested here in traps, boats, and buildings is about $12,000, and the value of the products in 1880 was $9,040, including 12,000 barrels of scup worth $8,200.

SACHUEST NECK.—The fishing at Sachuest Neck, opposite Little Compton, has been carried on for many years. Capt. Ben. Tollman has fished here for 70 years. He employs six men engaged in fishing with a trap that cost, when new, $1,000. The catch of this trap in 1880 sold for about $350 in the New York market. As an instance of the voracity of squeteague Captain Tollman says he has frequently taken from 40 to 50 and occasionally 100 young menhaden out of the stomach of one fish, and he says that bluefish are equally destructive.

In 1879 the number of squeteague, bluefish, and small menhaden was extremely large. The assertion is also made that fish of all kinds are as abundant as ever, but that one kind will absent itself for a year, whose loss is usually compensated by an immense supply of another species. This alternation, often irregular, conveys the impression that fish are diminishing in numbers. The average price obtained here for scup was 50 cents a barrel.

THE TOWN OF TIVERTON.—The menhaden fishery is the principal one carried on from Tiverton. This fishery employs twelve steamers, owned here, and five schooners, with their large boats, to carry their catch to the factories. In the line fishery for tautog there is emyloyed an old fashioned well-smack of 13.98 tons, with a crew of three men. This vessel in 1880 caught 16,000 pounds of tautog, valued at $800. From 2 to 7 miles below the Tiverton stone bridge, on the eastern shore of Sakonnet River, there are nine heart-pounds fished from the last of April until the last of June. The catch consists of scup, squeteaugue, tautog, alewives, and butterfish.

Nonguit Pond, just in the rear of the pounds, is fished from the last of April until June 1 for alewives, four seines being used in the pond by sixteen men. The alewife catch of 1,200 barrels or 480,000 fish is sold mostly through the interior by peddlers. The fish are smoked, or having been well struck with a salt pickle they are strung on sticks and hung up for a few days until dry. Quite an amount are also sold to the hand-line fishermen for bait.

Twelve men are engaged in working the flats and beaches in this vicinity for clams and quahaugs, and in 1880 dug 960 bushels that were peddled in the surrounding country for $720.

Fyke-nets are fished to a limited extent during the fall and winter. The catch is almost entirely flounders, of little value or amount. On both sides of the river from Tiverton to the point there are forty-three fyke-nets set more or less of the time during the fall. The catch by the heart-pounds is much less than from those used on the south and west side of Newport Island. Pounds and fyke-nets are made from the old, condemned purse-seines of the menhaden fleet. The catch by pounds is marketed at Newport, New York, Providence, and Boston.

The capital invested in the fisheries of Tiverton, exclusive of the menhaden interests, is $3,458. The catch of fish by the pounds, nets, and seines in 1880 is valued at $7,274, and includes 814,000 pounds of the various kinds, the catch of alewives being 240,000 pounds. The menhaden fleet took 800 barrels of mackerel in addition to their other catch.

Mr. D. T. Church, of Tiverton, in a letter dated September 15, 1879, says:

"Most of the fishermen from here go to Sakonnet in the spring and trap there for about a month, then they dry their traps and put them away for the year, and don't take them out until the next spring. The balance are purse fishermen that take menhaden, and that is a large business. I am wrong in saying the balance, for there are some old patriarchs that take fish with a hook and line, but they are a poor class in worldly goods, and they cannot compete with the pounds or weirs; in fact, hook-and-line fishing in this vicinity always was a poor business, and the record proves that all families that depended on making a living by taking fish in this vicinity in this way were always poor, and that was the fact before the weir or pound-nets were set. My father was a hook-and-line fisherman, and he educated his seven sons in that calling, and by industry he made more than a living, but we all left it when we left him and went to taking fish with nets, and I think hook-and-line fishing stands to net fishing as walking stands to railroad traveling. The trouble with hook-and-line fishing is this, that early in the spring the fish don't bite; during the hot weather the small sharks that infest this coast drive them into the eel grass for protection, and it is hard work to catch them while there. In fact it is a poor business, and always was and always will be."

In Nannaquacket Pond, Tiverton Four Corners, four seines, worth $50 each, are used mostly for the capture of herring or alewives. Sixteen men follow this fishery and peddle the fish, which are mostly smoked, at an average of 50 cents per hundred pounds. In the spring they get 3 or 4 cents apiece for the fish, but the price soon runs down to 1 cent or less. Nearly all the people at this place are interested in the menhaden business, either working in the factories or running on the steamers from this vicinity. When large schools of bluefish strike in, some men fish for them for a few days, and two or three men follow the hook-and-line fishing more or less during the summer, peddling their catch about the country.

PORTSMOUTH AND BRISTOL FERRY.—The fishing interests of Portsmouth, opposite Tiverton, are centered in the menhaden industry. One of the largest menhaden oil and guano factories in the United States is located here. A fleet of steamers hailing from Tiverton and Newport annually supply this factory with from 50,000 to 90,000 barrels of menhaden, that are manufactured into scrap and oil. The statistics of the fisheries of this town are included in the summation for the State.

Between April 1 and May 25 two sea-traps, owned at Bristol Ferry, are set, one at Sachuest Beach and the other at the "Wash Bowl," on the west side of Rhode Island. Nineteen men in all are employed. In 1879 the nets were set a little too late, many of the schools of fish having passed by. It is here asserted that squeteague and bluefish are more destructive to the fisheries than are the sea-traps. These fish have increased immensely of late years. After the spring fishing of

1879 no scup appeared until the middle of July, when millions came; these were too small for market. As at other places, the men go menhaden fishing when trap-fishing is over.

In 1879 the trap at Sachuest Beach stocked about $200; the one at the "Wash Bowl" about $1,200. The greater part of the combined catch was shipped to Philadelphia and sold at 50 to 75 cents a barrel.

97. THE FISHERIES OF NEWPORT.

PRESENT CONDITION OF THE FISHERIES OF NEWPORT.—The fishing business of Newport is confined chiefly to fresh fish, and is carried on by ten firms. The catch is mostly during April, May, and June, being principally scup. Later in the season bluefish, mackerel, squeteague, bass, and some other fish are caught. Lobsters are taken at all seasons and of all sizes.

Fifty small cat-rigged boats are used by the local fishermen in the near waters of Narragansett Bay and Long Island Sound, fishing more or less of the time until November, after which the season may be considered over until April. The leading catch by these small boats is lobsters, which are caught in the 1,500 pots set about the islands of the bay and Long Island Sound. Tautog, bluefish, squeteague, bass, and eels, with a less amount of many other species, are included in the catch of the boats. These are taken by hand-lines and nets. The largest part of the fish which are marketed or shipped from here are taken by "heart-pounds and square netted traps." There are twenty-five heart and eight square traps set in this vicinity about Newport, Conanicut, and Prudence Islands. These traps and pounds are located as follows:

Location.	Heart.	Square.
On Newport Island:		
Northeast side on Sakonnet River	4	.....
East side at Sachuest Neck	.....	2
East side Boat-House Point	.....	1
South end Gooseberry Island	.....	1
South end Price's Neck, 1 double	.....	1
Southwest side Brenton's Point	2	2
Southwest side Pine Tree	.....	1
Southwest side Brenton's Cove	3	.....
West side Coddington's Cove to Coggshall Point	8	.....
On Conanicut Island (on both sides)	6	.....
On Prudence Island (on west side)	2	.....
Total	25	8

The square traps are put down the last of April, and usually taken up about the first of June, being anchored in from 4 to 7 fathoms of water, with a leader from the shore from 100 to 150 fathoms long. The heart pounds are put down at the same time, the twine being fastened to small piles driven into the ground, in from 25 to 35 feet of water. A small part of them are fished until October, but most of them only during the spring and early summer. In case the heart-pound is located on rocky bottom, the poles are held in place by cast-iron "feet" weighing 500 pounds each. These are cast for the purpose, are of circular form, with a hole in the center for the water. In working a square trap eight men to each are usually employed. The heart-trap, when used single, has three men. When two or three heart-traps are fished by one firm, being set near one another, a single team of three to five men will tend them. The catch from these thirty-three traps during 1880 amounted to 4,185,300 pounds of eatable fish, five-sixths of which were scup. This amount of fish was distributed as follows: New York received three-sixths; Philadelphia, two-sixths; Providence, the near inland cities and local trade, one-sixth. One-third of the New York and Philadel-

phia shipments were forwarded by steamer from Newport, packed in barrels of about 180 pounds of fish with 30 pounds of ice each, and boxes of 300 pounds of fish with 50 pounds of ice each; and two-thirds by sailing vessel iced in bulk. The money paid the fishermen for the catch in 1880, $33,907.50, is quite an item, yet the chief value of the catch is in giving so large an amount of good food to the laboring classes in the cities, by whom it is mostly used, at a very low cost; the first-cost value being less than *three-fourths of a cent* a pound. To this of course must be added the additional expense of placing the same on the market.

The Newport fleet of fishing vessels includes seven sail, aggregating 100.86 tons, and manned by thirty-two men. The gross stock of these vessels in 1880 was $13,200. The catch comprised 172,000 pounds of cod, 30,000 pounds of swordfish, 130,000 pounds of tautog and other species, and 116,250 pounds of lobsters. The catch of pounds and traps was 3,487,750 pounds of scup, and 697,550 pounds of other fish, and the catch of small boats was 350,000 pounds of fresh fish and 160,000 lobsters, having a total value of $51,757. The number of men employed in these shore fisheries is two hundred and seventeen, and the capital invested is about $40,000. The value of the vessels and their outfit is included in the summation for the State. The lobsters are all sold fresh, mostly in Providence, the near inland cities, and home local trade; very few being sent to New York or Boston.

98. BLOCK ISLAND AND ITS FISHERIES.

DESCRIPTION OF THE ISLAND AND ITS FISHERIES.—Of the many islands along the New England coast, Block Island is one of the most interesting and possesses many features of originality. This island is about 8 miles long, and is of peculiar formation, consisting of a succession of hills and valleys, with over a hundred fresh-water ponds scattered here and there. The hills extend all over the island, at some places reaching to the water's edge, forming high bluffs, and at other places retreating inland, thus leaving the water's edge bordered with small beaches. Some of the hills are quite high; Beacon hill, the highest, has about 300 feet elevation. From this hill a magnificent view is obtained, not only of the entire island, but far away to the shores of Long Island, 18 miles distant, and to the main shore of Rhode Island, 12 miles away. Point Judith is a prominent landmark and Newport can be seen 30 miles to the northeast.

The ponds are scattered all over the island, some of them near the highest points and others near the sea-level. The water of the near-shore ponds, although fresh enough to be drunk by animals, is too brackish for domestic use, so that the inhabitants depend mostly upon cistern water. The largest of the ponds is named Great Pond, and was so called by Roger Williams in 1649. It is said to cover 1,000 acres, and is about 3 miles long by 1½ miles wide. Its maximum depth is 12 fathoms. A narrow roadway that is often overflowed separates this pond from the sea. By many this pond is supposed to be sustained by springs flowing from the surrounding hills; others claim that it is supplied from the ocean by the water filtering through the sandy beach, and that its brackishness is caused by a partial evaporation of the salt. Enough salt is retained from this cause as well as from the overflow from high tides and storms to sustain oysters and other shell-fish up to about half-growth, at which time they die. A breach through the beach into the sea is much needed, and this question is now agitated by the inhabitants. With a small outlay thousands of bushels of fine oysters could be made to add to the yearly income of the fisheries.

At present the fishing industry is, as it was two hundred years ago, the main reliance of the inhabitants. From April 15 to June 1 they fish off the southeastern end of the island, at a distance of 6 to 10 miles, and off the southern side at a distance of 2 miles from shore. Most of this spring fishing is, however, over by May 15. The catch is mainly cod, which annually

visit these grounds in spring and fall. The best grounds are Coxswain's Ledge, The Bank, and Coggeshall's Ledge, all of them from 12 to 30 miles south and southeast of the island. Thither numerous open, two-masted sail-boats plow their ways when the cod-fishing season is at hand. The daily routine of a fisherman visiting these ledges for cod was graphically described as follows in the Providence Bulletin, April 26, 1873:

"A fisherman's life is a hard life, and cod fishing in open boats taxes physical vitality to a degree which is hardly realized by those unacquainted with its hardships. The fisherman leaves home at from 12 to 3 a. m., goes to the harbor and starts for the fishing ground. It is well if he has a breeze of wind, better if it be fair, but if perchance, as often happens in spring, during the latter part of the night there be no wind, he must get out his oar and help row the boat to the fishing grounds 10 or 12 miles away, and there is a vast difference between rowing a wherry for pleasure and rowing a heavy fish-boat capable of carrying from 2 to 20 tons. He arrives at the fishing ledges, and, if there are plenty of fish, stands up and hauls fish with a 30-fathom line and heavy lead (for there is a strong tide here) for three or four hours, and there is no harder work than hauling heavy fish. It would puzzle a novice to stand up in one of these boats in good weather, but when the wind blows and there is a bad swell running, the boat ends up and down and rolls her gunwales under in a manner that would be apt to try not only the muscles but the nerves and even the stomachs of those who were not experienced fishermen. About 2 o'clock in the afternoon he gets under way and comes home. Then his boat is to tie up, his fish to be brought ashore in a skiff or small boat, then they are thrown out on the beach, divided, dressed, washed, carried up a steep bank in hand-barrows known as 'kids' and salted. This usually takes about two hours, and he seldom gets home before sunset. Then, if he thinks he has sufficient bait, he eats his supper and goes immediately to bed. If he has but little bait he must look up some that is fresh, sometimes traveling two or three miles to catch some alewives for the next day's fishing. In rough weather his work is increased and intensified, and the uninitiated know but little of the labor and exposure endured in 'beating in from the edge of the bank in a norther.' When the captain says 'Start,' the first thing to be done is to reef the sails and get the anchor, and in rough weather the crew of the larger boats have enough to do before the anchor is at the bow. It is not an uncommon circumstance for three or four good men to be from half an hour to an hour in getting the anchor on board of one of the larger boats. Then sail must be hoisted before the boat falls off in the trough of the sea, and by the time the sails are up and the sheets trimmed aft the crew are ready to drop down with exhaustion; but now the pumps must be manned and one man stationed at the fore-sheet (the helmsman attends to the main-sheet), while the captain, his eyes almost blinded with spray, watches the seas and eases the boat over them as best he can.

"I have only described the *modus operandi* of beating a boat to windward in what would be termed, in fishermen's parlance, a 'three-reef breeze,' but the boats are occasionally caught down to leeward in some terrible periodical storm, and then they get home *somehow*, though no seafaring man not acquainted with their sea-going qualities would suppose the boats could live a minute. It would be difficult for any one to attempt to say how rough a sea would have to be or how hard the wind would have to blow to prevent a large Block Island boat, with a good crew, from going to windward under close-reefed sails. I know of no case on record where one of the large boats, in good working condition, with good spars and sails, has been absolutely compelled to keep off and run to leeward. In fact, some of them would probably live as long, if not longer, on the wind than they would before it."

From October 15 to November 1, dogfish are caught for their oil and for fertilizing purposes, after which date, and extending to January 1, cod again become abundant; this time about half a

mile from shore, off the northeastern side of the island. These codfish are seldom large, averaging 9 pounds; but, being thick fish and carefully cured, they stand high in the markets. The grounds above enumerated are visited by Connecticut and Massachusetts fishermen, as well as by Block Islanders. The latter always fish with hook and line, being decidedly opposed to the use of any apparatus unknown to their ancestors. They regard the fishing grounds as their own property, and only ask the "foreigners" to let them alone and to keep at a distance with trawls and other modern appliances.

The spring catch is placed in pickle for four days, spread on flakes until thoroughly cured dry, and then sent to market. The fall catch is retained in pickle until it is wanted, and is then dried the same as the spring catch. All codfish are cured before sale; most of the catch being marketed in Rhode Island and Connecticut.

Although the leading catch on the fishing grounds about Block Island is cod, yet numerous other species are found in greater or less abundance. One of the most important species outside of cod is the large bloater mackerel that frequently visit this vicinity in the spring of the year. During 1879 hundreds of barrels of these fish were caught. They measured 16 to 19½ inches in length, weighed from 1¾ to 3 pounds each, and sold for $20 to $25 a barrel. These fish appear irregularly.

The boats used by Block Island fishermen are very peculiar in construction. They are sharp-pointed at each end, 20 to 25 feet long on the keel, a few attaining 29 feet, 3½ to 4 feet deep, with open deck and lap-streak sides, of schooner or sloop rig, chiefly the former, with narrow tapering sails, small masts well forward, with no shrouds, registering from 5 to 9 tons, and worth $250 to $800 each. From their odd appearance, which is increased by their lying very low in the water, they immediately attract the attention of a stranger. They are most excellent sea-boats, and, in the hands of a practical island fisherman, are as hard to drown as a duck, and rarely lost. There are twenty-three of these vessels, aggregating 199.35 tons and carrying eighty-five men. In addition to these "double-enders" there are fifty small boats of less than 5 tons register, with crews of two men each. These follow the same fisheries as the larger vessels.

In 1867 net-fishing on a limited scale was introduced. In April, 1879, two heart-pounds were set on the west and one on the north side of the island. They remained down until September 1 to September 15. Fish were found to be plentiful; but, on account of the exposed position of the island, it is doubtful if pound-fishing will prove very profitable. In these nets squeteague, bonito, scup, and tautog were taken in 1879. Spanish mackerel have been occasionally taken. The catch of the pounds is shipped to New York in ice usually by sailing vessels interested in the pounds. Bluefish are caught and used at home by the hotels. Lobsters are caught, but mostly by the Connecticut fishermen, only 150 pots being set by the Block Island fishermen. Irish moss is found in abundance. This is gathered, and has been since 1850, in warm weather by women and children; then it is washed and dried (many washings being requisite before it is bleached) and sold to the grocers, who, as a sufficient quantity accumulates, ship it to the woolen and flannel mills of Connecticut. The crop in 1880 was 400 barrels.

As only a small part of the year is given to fishing, ample time remains to cultivate the ground. Nearly all of the island is under cultivation or used for grazing, the land being well fertilized by refuse fish and seaweed. The latter is gathered in large quantities for this purpose. It is estimated that over $30,000 worth of fertilizing products are so used each year. Each farmer or fisherman gathers any amount he may wish free of cost, except for his time and team.

The capital invested in the fisheries at Block Island in 23 vessels with their outfit, 60 shore-boats, 12 gill-nets, 3 pounds, 150 lobster-pots, and other apparatus, is $28,040. The number of

persons employed is 263. The products in 1880 are valued at $36,824, and consist of 748,720 pounds of dry cod, 300,000 pounds of fresh fish, 120,000 pounds of refuse fish for manure, 6,000 pounds of lobsters, 3,250 gallons of fish-oil, and 24,000 pounds of Irish moss.

HISTORY OF BLOCK ISLAND.—The earliest records of this island date back to the year 1524, when the French navigator, Verazzano, reported to Francis I, King of France, that the island was in shape triangular, about three leagues from the mainland, full of hills, covered with trees, and well peopled, for "we saw fires all along the coast."

This opinion of Block Island was doubtless formed at a distance from the island itself, for the first record obtained of a landing was dated 1614, when the Dutch explorer, Adrian Block, explored the coast and gave to it its present name. In 1636 John Oldham, a trader from Boston, while landing to trade with the Narragansett Indians, was murdered by them, for which act an expedition was sent under Col. John Endicott, to punish the Indians. After executing their commission they explored the island and established a claim by right of conquest.

The Indians who first dwelt on the island called it Manisses, after the name of their tribe. The first explorer called it "Claudia," in honor of the mother of his king, Francis I. The Dutch maps of 1614 have it marked "Adrian's Eyland." About the same time appeared the name Block Island. In 1672 it received the additional name "New Shoreham," at which time also a charter was given to it by the Rhode Island assembly. The island was once covered with trees, but they have well nigh disappeared, so that now only a few scattering trees can be seen.

A town record of April 14, 1702, states:

"Capt. John Merritt brought before us one John Meeker for being a delinquent for absenting himself from out of said Merritt's employment, being his servant for the fishing season, for 40 shillings a month, with 6 pounds of bread and 6 pounds of pork a week, for the which considerations the said Meeker did promise to him his faithful service till the middle of June, or thereabouts, as by witness on oath doth appear before us. We, therefore, determine and give our judgment that the said Meeker shall perform the said conditions as above said. The 40 shillings per month is to be paid in current money of this colony, with cost of court, which is 1 shilling for the constable's fee, and 2 shillings for other charges which said Meeker is to pay.

"Given under our hands.

"SIMON RAY, *Sen. Warden.*
"EDWARD BALL, *Dep. Warden.*"

In 1670 the legislature first took action for the improvement of the harbor for "incouraging fishing designs," and in 1723 the legislature again granted aid in building a new pier "for the encouragement of the navigation of the colony, especially the fishery."

In 1695 one Robert Carr was engaged "to be forward in making a harbor and promoting the fishing trade." In later years storms swept away the piers, which were in 1816 replaced with white oak poles, or small piles driven into the beach. These offered little protection in rough weather, and the fishermen on stormy days were compelled to use oxen in hauling their boats out of danger's reach. The piles above alluded to were 12 to 15 feet above water, and were far enough apart to allow small vessels to pass in between. As business increased more poles were added, until in 1876 there were 750 of them, hence the name "Pole Harbor," the first object of attraction to every stranger. To these relics of old times the fishermen still make fast their boats; but the old piers are superseded by substantial breakwaters of granite, built by the Government. On February 16, 1870, Congress appropriated $30,000, and on October 22 of the same year the work was commenced. In 1871 an additional appropriation of $75,000 was made, and in

1872 another of $50,000. The total expenditure, therefore, was $155,000. This pier has been of great service, yet it is incomplete, and large appropriations are still necessary.

Block Island has two light-houses, one on the northwestern end, known as Sandy Point, on which spot four have been built, the first one having been erected in 1829, and the other on the southeastern end, built in 1874. This is a two-story brick dwelling, with octagonal tower, and cost $75,000. It is on a bluff, 152 feet above low water, the light being 52 feet from the ground. It was first used on February 1, 1875, and is visible 35 miles out at sea. One hundred feet to the southeast of this light is a fog-horn, blown by steam. Two life-saving stations, Nos. 2 and 3, of district 3, have been established, the one in 1872, the other in 1874. The fishermen constitute the crews. A signal station was established on July 28, 1880, and connects with the main land by cable.

A most remarkable feature of the administration of law on Block Island is that it boasts of not a single lawyer, policeman, or jail. The total population is 1,208, nearly all of whom are natives. The same names are found now which were common in the early history of the settlement. The inhabitants are industrious, frugal, and contented. The children are well provided with schools, there being five common schools and one high school. The two churches on the island belong to the Baptist denomination. The island has lodges of Free Masons, Odd Fellows, and Good Templars, two ministers and a doctor. There are quite a number of summer hotels, some of them quite large, fine buildings, and all of them owned and managed by the islanders. The first hotel was opened in 1842, and the first pleasure party entertained there numbered seven persons, one of whom was Martin Van Buren. Of late years the island has become well-known, and is annually visited by hundreds for health and pleasure.

D.—GENERAL FISHERIES OF BRISTOL, PROVIDENCE, AND KENT COUNTIES.

99. FISHING TOWNS FROM BRISTOL TO WARWICK NECK.

BRISTOL AND WARREN.—Bristol is situated nearly at the head of Bristol Harbor, an arm of Narragansett Bay. The fishing grounds are off Walker's Island, in the bay opposite Bristol City, at the head of Bristol Harbor, and in Mount Hope Bay. Five heart-pounds are used from the last of April until September. In the spring, alewives, scup, and shad are taken; and later, squeteague, tautog, bluefish, flounders, and eels. In winter a small amount of fishing is carried on by fyke-nets, the catch of which consists mainly of flounders. At the northern end of Narragansett Bay fish become less abundant, possibly owing to the pollution of the water by the refuse from the numerous factories. A few lobster pots are set about the ledges and islands. The boats used at Bristol are all cat-rigged, with the exception of one sloop, one yacht, and small skiffs for the traps. Each of the heart-pounds requires the attention of two men. A good week's produce is estimated at 1,000 pounds. There is a small amount of hook-and-line cod fishing, also sword fishing, from a sloop at the lower end and outside of the bay. One seine and one gill-net are also in use at Bristol. About twenty-five eel-pots are set in the bays.

Fishing at this place has deteriorated to such an extent that many of the men have left the business and have found employment in the Bristol rubber works. Large numbers of destructive fish are caught in the traps, and for that reason one would suppose that the smaller species would

increase yearly in abundance. One-third of the 1879 catch was sent to New York and Providence, the remainder being consumed at home. The lobsters are all sold in Bristol.

The capital invested at Bristol in traps, boats, and fixtures, nets and seines, and a small sloop, is $2,655. The value of the products is $4,755, and comprise 100,000 pounds of fresh fish, 30,000 pounds of swordfish, 5,000 pounds of eels, and 23,000 pounds of lobsters.

Warren represents the northern limit of the fishing industry in Narragansett Bay, with but a small amount taken here. During the spring five heart-pounds are fished for shad in the Warren River near its outlet into the bay. The catch of 1880 averaged 1,000 shad to each pound, of an average weight of 3⅓ pounds each. Two-thirds of the catch was sold at Providence and one-third at Warren and Bristol. Clams are found quite plenty. On an average twelve men in the summer and four during the winter work the clam flats. Six men with three small sail-boats and eighteen dredges fish the scallop-beds during the season, which by law lasts from September 15 to May 15. The State law also limits the catch of each boat to 15 bushels a day. The law as to quantity is not as generally observed or enforced at the various fishing stations as the time; the close season being quite generally observed. Scallops are sold at New York and Providence; clams at the latter city and at Rocky Point, Rhode Island.

The capital invested in the fisheries of this place in five heart-traps, three scalloping boats, eighteen dredges, and ten boats with fixtures for clam digging, amounts to $1,872. The products for 1880 are 5,000 shad, 2,500 bushels of clams, and 1,000 gallons of scallops, worth $3,862.50. The number of fishermen employed six months in the year are eighteen, all of them Americans.

PAWTUXET.—Pawtuxet is located on the Providence River, 4 miles south of the city of Providence, and is the clam town of the State. The main business of the place is the fishery for clams and scallops. Seventy-five men are engaged most of the year in that industry or in net fishing. During the summer season nearly twice that number are engaged, and the average number for the year is one hundred. The products of 1880 amount to 40,000 bushels of clams and 10,000 bushels of scallops. The latter are always opened before they are sent to market and many of the clams. This gives employment during the busy season to one hundred persons, mostly women and children.

Clams are dug on both sides of the Providence River. Of late years some complaint has been made of their not being as plenty as in former years. During 1880 large clams were not as abundant as usual, but small clams were more plenty than for years and give promise of a bountiful supply in the future. During the summer months most of the clams are used at the summer resorts, where they sell from $1.25 to $1.40 a bushel. Providence and the local trade take any surplus. A small amount are forwarded to Boston. The price during the winter is from 75 cents to $1 a bushel. An average price during the year being $1. Scallops are shipped to New York and to Providence for a market.

From April until November scup, tautog, squeteague, and bluefish are taken in seines and nets, twelve men fishing them in Mount Hope and Greenwich Bays. Eels are plenty. They are caught near home and sent to New York. One smack, 26 feet long, is used; the other boats are of the skiff pattern. Two gill-nets are fished; each is 115 fathoms long and 21 feet deep. They are made of 4 to 4½ inch mesh. In these nets are caught bluefish and sea-trout. An average day's catch is 50 pounds, although 1,000 pounds have been taken in one day by one gill-net. The two seines are 100 fathoms each in length and 15 feet deep. The mesh is 3½ inches. Three men are required to haul one of these nets, which are fished from March until September. The species chiefly taken is scup. The average daily catch is 200 pounds, taken at about five hauls of the net.

In September a hundred eel-pots are fished near the town, and succeed very fairly. Six years ago the net fishing produced results six times as large as at present.

The investment in this place amounts to $3,130; and the products, which include 40,000 bushels of clams, 10,000 bushels of scallops, and 37,500 pounds of fresh fish, are worth $47,100. The number of persons employed is 175.

WARWICK COVE AND WARWICK NECK.—During the summer nine men fish in Warwick Cove for bluefish and three at the Neck for tautog. Some hand-lining is also carried on from the boats during April, May, and June. Most of the men here give up fishing during the summer and hire their boats to pleasure parties. This is a good indication of the state of the fisheries.

Two men fish for eels. In 1879 two tons of eels were shipped to New York, where they sold for 5 cents a pound. Most of these eels were speared in the winter.

100. THE FISHERIES OF APPONAUG AND EAST GREENWICH.

APPONAUG.—Apponaug is 12 miles south of Providence, at the northern end of Greenwich Bay. In past years it has done considerable fishing; of late years the business has largely decreased. The fishermen claim that chemicals and refuse from the large print-works have driven away the fish and killed every clam in the immediate vicinity of the town.

There is quite a little fleet of sail-boats owned here by the fishermen. At least one-half of them are chiefly used for pleasure parties. On the average nine are used for fishing purposes. Hand-lines and seines are used by the fishermen in Greenwich and Narragansett Bays. The catch consists of bluefish, squeteague, tautog, flounders, and scup, mostly caught in the spring; no winter fishing. The leading products of the fisheries are clams and scallops. The same men follow line and net fishing and dredging, each in their season. The scallop beds are quite extensive and productive, extending from Wickford, on the south, along the west shore of Narragansett Bay, into and on both sides of Greenwich Bay, to Warwick Light, on the north, a distance of 20 miles. The boats average 4 dredges each, which are used in about 2 fathoms of water. The catch, from 3,000 to 4,000 bushels a year, is brought home and shelled. The opening is mostly by girls, some thirty being employed during the busy season. They receive 12½ cents a bushel for shucking. Clams of the various kinds—round, long, and quahaugs—are found in abundance on Prudence and Patience islands, the shores of Providence River, and Greenwich Bay.

A novel feature of the fishing industry is a small steamer of 10 tons, from this port, engaged exclusively in gathering clams, and probably the only one so engaged in the United States. The steamer visits the numerous beds along the shores mentioned, where captain and crew of from sixteen to twenty men take on their cargo direct from the beds. They also stop at points along the shores and buy from the diggers, but rely chiefly on their own digging. The cargo is taken to Rocky Point, Kent County, the celebrated resort of thousands for clam-bakes. The entire season's work of this steamer is contracted for in advance by the hotels, and to insure the clams a steamer is required. The catch of this steamer in 1880 was 5,000 bushels of clams, worth $7,000. Some idea of the amount of clams annually consumed at this celebrated roasting place may be judged by those who have often seen over 10,000 persons at a time at a Rocky Point clam-bake. There are also numerous other well-known points along the beautiful waters of Narragansett Bay that are noted for their clam-bakes, and yearly consume large quantities of shell-fish, but the one mentioned is the leading one.

The catch of fish by seine and hand-line is mostly sold at Providence. In case a surplus happens in that market they are forwarded to New York, all being sold fresh. Scallops are mostly

sold in New York; clams, chiefly used at the summer resorts in their season and sold throughout the near towns and cities at all seasons.

The investment in the fisheries of Apponaug in 1 steamer, 9 sail-boats, 36 scallop-dredges, 4 seines, 30 small boats and fixtures, and the fish-houses, is $4,609. The catch includes 3,300 gallons of scallops, 6,000 bushels of clams, and 37,500 pounds of fresh fish, worth $11,975. The number of persons employed is 38.

EAST GREENWICH.—East Greenwich is located at the head of Greenwich Bay, in which fishing is carried on for six or eight months in the year. Seines, gill-nets, and fyke-nets are used. The same species of fish are taken here as at Apponaug. The fishing by Greenwich men is extended as far south as Newport; but, wherever they go, a scanty living only is their reward.

The gill-net fishery is the most important. These nets are set in about 4 fathoms of water. Sandy Point is a noted bluefish ground. The boats used by the gill-netters are those which have already served as seine-boats and will yet fill the place of scallop-boats later in the season. June and July are the two best months for gill-netting. Eleven nets are used; they are each 75 fathoms long and are made with a mesh of 4 inches. In these no fish of a less weight than 2 pounds are taken.

Four seines, each 100 fathoms long and 12 feet deep, of 1½ to 2-inch mesh, are used. Each seine requires the labor of three men. April and May are the best months for this fishery, but it is kept up by some all the year round. In addition to bluefish, these seines catch squeteague and tautog. Before menhaden steamers were so extensively used one seine would at times catch 250 barrels of menhaden at a single haul.

About a hundred fyke-nets are set in Greenwich Bay, close inshore, under the ice. Very little hook-and-line fishing is done.

Near Greenwich numerous scallops and clams are taken. The former are obtained by dredging the beds between Greenwich and Wickford, from September 15 to May 15. Clams are dug on the main shore and near islands at all seasons, but chiefly during the summer. The scallops are shipped to New York and Providence or are used for local consumption. The clams are sent to Providence and the summer resorts, any balance being reserved for home trade.

The capital invested in East Greenwich in 16 sail-boats, 12 row-boats and fixtures for clamming, 75 dredges, 4 seines, 11 gill-nets, 100 fyke-nets, and fish-houses, is $5,190. The catch is valued at $12,500 and includes 6,000 bushels of scallops, 4,000 bushels of clams, 5,000 pounds of eels, and 125,000 pounds of fresh fish. The number of persons employed is 50.

E.—GENERAL FISHERIES OF WASHINGTON COUNTY.

101. FISHERIES FROM WICKFORD TO NARRAGANSETT PIER.

WICKFORD.—Wickford is a small place, situated on the west side of Narragansett Bay, 12 miles northeast from Newport, a steamer from the latter port connecting with a branch of the Shore Line Railroad to this port.

A small amount of fishing is carried on in cat-rigged boats and skiffs by hand-line fishermen; also by nets and traps. Four heart-pounds are set on the west side of the bay, north and south of the harbor. They are fished from the 1st of May until November. Boats fish all over the bay, and during a small part of the year outside for cod. Eels are found plenty, and are taken by traps and spears. Fyke-nets are mostly fished during the winter; the leading catch by them is flounders.

The leading catch by the traps is squeteague, tautog, butterfish, and scup; the scup are not as plenty here as at the lower end of the bay. A few Spanish mackerel are caught. The catch is sold to Providence, Newport, and the near home local trade. Lobsters are mostly sold to the numerous summer hotels and local trade. Quite an amount of refuse fish are caught, consisting of menhaden, skates, and sculpins. These are all saved and sold to farmers for fertilizing, selling for 25 cents a barrel.

Lobsters are taken from February until the next winter about Dutch Island, and in all the inlets on both sides of the bay as far north as Hope Island. The ledges in the middle of the bay are excellent lobster grounds. The flatfish fyke-nets catch some, but the modern lobster-pot is generally used, and also the old-fashioned hoop-net, made from the iron hoop of a barrel, to which is fastened a net-bag. About one hundred and fifty pots are in use. Refuse fish, called "shuck-fish," are used for bait. Crabs are also caught, either by the use of "bow," "dip," or "crab" nets, from June until August. Eels are taken by the use of pots and spears.

Trap-nets are diminishing in number, there being now only four in use. They are supposed to have aided most materially in diminishing the supply of fish.

The investment in this place in nets, traps, boats, and fixtures is $2,425. The production is worth $5,700, and consists of 198,000 pounds of fresh fish, 160,000 pounds of refuse fish, 10,000 pounds of eels, and 15,000 pounds of lobsters. The number of persons employed is 20.

DUTCH ISLAND AND SAUNDERSTOWN.—At Dutch Island Harbor and vicinity three trap-nets are owned, two of which are set in the harbor and the other at Beaver Head from the middle of April to the 1st of September. They have been in use since 1871, and are set in 18 feet of water. The leaders are 75 fathoms long. The mesh in the leader is 5 inches, and in the bowl 2¾ inches. The tunnel-mouth is 6 feet wide. To aid in lifting the traps three "trap-boats" are used. These are worth $25 each. Frequent repairs, owing to ravages of storm and tide to the nets, are necessary, and cost about $50 to the net per annum. The nets used here are similar in shape to those at Wickford. The offal fish caught in the traps are used as bait for lobsters.

Only one gill-net is used here; this is 75 fathoms long, with a 4-inch mesh. It is used through June and July. Bluefish and a few squeteague are caught. This net is also used as a shore-seine.

In April and June a few eel pots are fished on the east side of the island in Sheffield Pond. From the harbor to Whale Rock some lobster-pots are set.

The hook-and-liners fish from April till December; in September they chiefly seek cod and tautog; at other times bluefish and sea-bass, which latter is here called "bluefish."

During the past eight years the catch of young fish has been increasing, while that of mature fish has been steadily decreasing.

The fishermen here, as in most of the places already alluded to, do not confine themselves to fishing. They act as pilots, dig clams, and do anything whereby they may improve their financial condition.

Most of the fish are shipped in boxes to New York, Newport, and Philadelphia. The lobsters are sent to Newport and Philadelphia. The price paid for a box containing 400 pounds of fish was, in 1879, only 60 cents. The next year there was an improvement.

The capital invested in boats, nets, traps, and fixtures is $2,877, and the product is worth $1,715.

Saunderstown lies on the coast exactly opposite Dutch Island. Three bass traps, but no gill-nets or seines, are used here, one on the west side of Dutch Island, one at South Ferry, and one at Casy Point. They have been in use for five years, and are set in 17 feet of water from April to November. The mouth of the tunnel is only 24 inches wide. In them are caught striped bass,

tautog, flat fish, squeteague, and a few shad, but no scup. The bass are caught only in the fall. Some lobsters are taken, and hook-and-line fishing is followed to a small extent.

NARRAGANSETT PIER.—At Narragansett Pier no traps are used. Four gill-nets and two seines are fished about a quarter of a mile from the pier, during June, July, and August. Menhaden are caught almost exclusively. Ten men are engaged here for about half their time. One man catches lobsters. The traps south of this place are supposed to prevent the fish from coming further north and are therefore looked upon with jealousy. The fishermen are less energetic than some years ago; were it not for this, it is thought, a great deal more might be done in the fishing industry. The hotel is said to require four times the amount of fish taken by all the fishermen. Between this place and Rocky Point, a distance of 6 miles, twenty men follow fishing, setting trawls for cod during the spring and fall, gill-nets for bluefish and squeteague during the summer. also setting 150 lobster pots about the ledges along the sound.

102. POINT JUDITH TO PAWCATUCK RIVER.

POINT JUDITH.—In the rear of this promontory lies Judith Pond, 6 miles long and 1 mile wide; the water is brackish and is from 8 to 12 feet deep. Formerly oysters were very plentiful, 10,000 bushels having been taken out in 1870. The mouth of the pond has become so filled up that now no oysters are to be found, the water having stagnated for want of free circulation. The bass fishery has, on that account, also failed. Ten thousand dollars have been realized by one owner on the capture of bass. Now that business is entirely at an end. A small outlet still permits the entrance of alewives. The fishing is carried on from December to June by farmers, mechanics, and fishermen. Last spring (1880) smelts were a little more abundant. Perch are still taken in large quantities. Most of the fishing operations are conducted by the use of fifteen seines; traps being out of the question where the fish average so small. The average length is 100 fathoms, depth 18 feet, and mesh from 1½ to 2 inches. In winter heavier seines are used, requiring six men to haul. Perch and some bass are then taken. Twelve years ago 198 barrels of bass were taken at one haul. In spring the catch is confined to alewives of which 2,000 barrels were taken in 1880. The alewife seine has a light thread and is handled by three men. Smelts are taken from February until the end of March.

One hundred and fifty eel-pots, like small fyke-nets, are set in spring and fall, being baited with crabs.

The investment here in seines, eel-traps, boats and fixtures, is $3,375, and the value of the product, which consists of 500 bushels of clams, 2,000 barrels of alewives, 60,000 pounds of smelts, 60,000 pounds of perch and flatfish, and 4,000 pounds of bass, is $10,800. The number of persons employed is 60.

FISHERIES OF CHARLESTOWN, QUONOCHONTAUG, AND WARD'S PONDS.—In Charlestown Pond six pounds and six shore-seines are used; in Quonochontaug Pond, three pounds and two seines; and in Ward's Pond, three pounds and two seines. Herring, bass, perch, flounders, eels, and some smelts are caught. Charlestown Pond is the largest, being about 6 miles long, and a maximum depth of 15 feet. The water is quite salt. About forty boats are used by the pound-fishermen. These boats are of all sizes and shapes, and are worth $20 each. The pounds are set from the middle of April until the early part of June. Some also are set in the fall. Four men work in a gang. The pot is usually about 30 feet in diameter. These nets are set in shallow water. The seines average 80 fathoms each in length, 18 feet in depth, with a 1¼-inch mesh, and are

worth $80 each. They are used from November until June, eight men to the seine. There are also fifteen fyke-nets set inshore. The same kinds of fish are taken in pounds, seines, and fykes.

Most of the fish, one-half of which are herring, are shipped to New York. The remainder are eels, perch, flatfish, and bass. The herring are salted, dried, and smoked, and are retailed at 1 cent each. Four days intervene between the capture and sale of the herring.

Menhaden fishing in this vicinity was commenced thirty years ago, and has been increasing ever since. Until 1870 bass fishing was good, but it has been partially destroyed by the steamers fishing with purse-seines. Sixty barrels of young bass have been taken at one haul, and the whole lot consigned to the oil-works.

ROCKY POINT AND SANDY POINT.—At Rocky Point, a small place on the waters of Long Island Sound, there is one square trap used, employing six men and stocking about $2,500 annually. Sandy Point is the dividing line between the sound and Little Narragansett Bay. In the sound, between Rocky and Sandy Points, one hundred and two men find employment in the fisheries, twenty being hook-and-liners, forty-two pound-netters, and forty seiners.

Six pound nets are set in from 20 to 30 feet of water east and west of Watch Hill, during May. Scup and mackerel are taken. The leaders range from 200 yards to half a mile in length. The size of the pound is about 40 feet by 60 feet. The mesh in the pounds is 1½ inches, in the leaders 2 to 2¼ inches.

Five seines, averaging 100 fathoms each, of 25 feet depth and 1½-inch mesh, are used, each requiring eight men. In the fall these seines are set for bass, in the spring for scup. They haul the seines in May and October. Formerly $1,000 was regarded as an average year's earnings for the owner of the net by the capture of bass alone.

The boats used by pounders and seiners are not fitted with sails; they are called "double enders," and are about 18 feet long.

Hook-and-liners catch cod, haddock, bluefish, blackfish, bass, and squeteague. In the fall only the first two species mentioned are caught. All the scup, bass, and bluefish are sent to New York Some of the cod was cured, but most of it sold green.

LITTLE NARRAGANSETT BAY AND PAWCATUCK RIVER.—The varieties of fish caught in Little Narragansett Bay and Pawcatuck River are scup, eels, flounders, smelts, menhaden, bluefish, weakfish, shad, backies, and alewives.

Pound-nets are set west from Watch Hill Pier to Sandy Point Channel, and on the north from Stonington to the mouth of Pawcatuck River, and for a distance of three miles up the river. It is claimed that these pound-nets kill forty young fish for each one fit for market. If this be true, then the fisheries must decrease in importance, inasmuch as the pound-nets are increasing in number every year.

Of the seventeen pound-nets now in use six are in the river and eleven in the bay. They are set between the first and the middle of September, and remain down until the ice forms too great an obstruction. Some few remain down throughout the winter. They are seldom set in spring. Three men are required to lift a trap. These traps are from 25 to 40 feet in diameter, 6 to 12 feet deep, with a leader from 25 to 200 yards in length. The mesh is so close that none but the smallest fish can possibly escape.

Four shore-seines, called also bass-seines, averaging 100 fathoms in length and 22 feet in depth, with mesh from 1½ to 2 inches, are in use. From six to eight men are required to haul one of these seines; bass, weakfish, and shad being the principal species caught.

One or two gangs of gill-nets, altogether about 2,000 fathoms in extent, are also fished for bluefish in summer and fall.

There are fully fifty fyke-nets employed. These are set thus: At about the center of one side of the heart of a pound-net a hoop-fyke is attached, opening into the heart; when the net is lifted, instead of "bunting" the net toward the further end of the bowl and then bailing the fish out, as is usually done, they are driven into one of the hearts, and thence into the fyke; the end of this is lifted into a boat into which the fish are emptied. The mesh in these fykes is very fine. Fyke-nets are also set all along the shore in shallow water, and catch chiefly bass, flounders, and perch.

There is no hook-and-line fishing of importance. Eel-pots are set all along the river. In 1879 probably $900 worth of eels were taken.

The capital invested in the fisheries of this district is about $8,500, and the number of persons employed is 75. The products are valued at about $8,000.

PART V.

THE COAST OF CONNECTICUT AND ITS FISHERIES.

By A. HOWARD CLARK.

NOTES ON GENERAL FISHERIES GATHERED BY W. A. WILCOX AND FRED. MATHER.

ANALYSIS.

A.—General Review of Connecticut and its Fisheries:
103. The coast towns and importance of the fishing industry.
B.—Fishing Towns East of Connecticut River:
104. The fisheries of Stonington, Mystic, and Noank.
105. New London to the Connecticut River.
C.—Connecticut River to New Haven:
106. Fisheries of the Connecticut River; Saybrook and Westbrook.
107. Fishing towns from Clinton to East Haven.
D.—Fisheries of New Haven and Vicinity:
108. General fisheries of New Haven.
109. The oyster industry.
E.—Coast Towns of Connecticut West of New Haven:
110. General fisheries of the district.
111. Origin and present importance of the oyster industry.

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PART V.

THE COAST OF CONNECTICUT AND ITS FISHERIES.

A.—GENERAL REVIEW OF CONNECTICUT AND ITS FISHERIES.

103. THE COAST TOWNS, AND IMPORTANCE OF THE FISHING INDUSTRY.

DESCRIPTION AND STATISTICS.—The coast line of the State of Connecticut, including the numerous small indentations, is from 150 to 175 miles in extent. The water adjacent to the coast abounds at certain seasons of the year with various species of fish, the more important species being menhaden and shad, while oysters and other shell-fish are more or less abundant. The fisheries of the State include the seal and whale fisheries of Stonington and New London, the menhaden fishery carried on by a large fleet of vessels that sell their catch to factories along the coast, the shad fishery of the Connecticut River, and the oyster fishery, which is especially important in the vicinity of New Haven.

The number of men employed as fishermen or shoremen in the State is 3,151; the amount of capital invested is $1,421,020; and the value of the products is $1,456,866; as may be seen by the accompanying tabulated statements.

In the eastern part of the State the most important fishing town is New London, which is the principal food-fish producing port south of Cape Cod. Noank is an important place for the cod and lobster fisheries, and several fish weirs or traps are set by Noank fishermen at the Elizabeth Isles, in Massachusetts.

The oyster industry in the State employs 1,006 persons and $361,200 capital, and the value of the product is $672,875. In the menhaden fishery the number of persons employed is 631, the capital invested is $392,370, and the value of the product is $256,205. The Antarctic sea-elephant and fur-seal fishery and the whale fishery of Stonington and New London employ large capital and nearly 400 men. The products of these fisheries for 1880 is valued at $143,899.

SUMMATION OF THE FISHERIES OF CONNECTICUT FOR 1880.—The following statements show the number of persons employed, the amount of capital invested, and the quantities and values of the various products:

Summary statement of persons employed and capital invested.

Persons employed.	Number.	Capital invested.	Amount.
Number of vessel-fishermen	1,544	Capital in vessels and boats	$871,318
Number of boat-fishermen	1,041	Capital in nets and traps	91,852
Number of curers, packers, fitters, and factory hands	546	Other fixed and circulating capital	a457,850
Total	3,131	Total	1,421 020

a In menhaden factories, $139,000; in other fishery industries, $318,850.

Detailed statement of capital invested in vessels, boats, nets, and traps.

Vessels and boats.	No.	Tonnage.	Value.	Value of gear, exclusive of boats and nets.	Total value.
Vessels.					
In food-fish and lobster fisheries	105	2,835.18	$192,100	$158,088	$350,188
In menhaden fishery	72	2,304.76	191,950	27,600	219,550
In oyster fishery	100	2,016.88	69,000	5,990	74,990
In whale fishery	5	860.41	24,000	17,000	41,000
In seal fishery	9	1,192.72	37,000	54,900	91,900
Total	291	9,215.95	514,050	263,578	777,628
Boats.					
In vessel fisheries	368		21,365		21,365
In shore fisheries	805		52,220	20,105	72,325
Total	1,173		73,585	20,105	93,690

Nets and traps.	No.	Value.
Nets.		
Gill-nets	67	$4,395
Purse-seines	58	23,500
Haul-seines	48	9,045
Total	173	36,940
Traps.		
Pounds and weirs	58	48,532
Fykes	255	2,480
Lobster and eel pots	3,900	3,900
Total	4,213	54,912

Detailed statement of the quantities and values of the products.

Products specified.	Pounds, fresh.	Pounds, prepared.	Bulk.	Value.
Grand total	83,509,367			$1,456,866
Fresh fish.				
For food	a7,884,982			280,960
For bait and fertilizers	4,600,000		23,000 barrels	7,500
Total	12,484,982			288,460
Pickled fish.				
Alewives	500,000	400,000		6,000
Mackerel	1,266,900	844,600		24,282
Total	1,766,900	1,244,600		30,282
Shell fish.				
Lobsters	723,885			27,145
Clams	750,000		75,000 bushels	38,000
Oysters	2,691,600		330,450 bushels (natives)	b672,875
Total	4,165,485			738,020
Miscellaneous.				
Menhaden, for oil and scrap	65,092,000		256,300 galls. oil; 9,000 tons scrap	256,205
Whale oil			22,144 gallons	11,248
Whalebone			10,400 pounds	20,800
Sea-elephant oil			42,000 gallons	21,420
Fur-seal skins			9,275 skins	90,431
Total	65,092,000			400,104

a The proportion of different kinds of fish in this amount is estimated as follows: Alewives, 270,000 pounds; sea bass, 351,900 pounds; striped bass, 86,900 pounds; blackfish or tautog, 173,550 pounds; bluefish, 514,500 pounds; cod, 2,738,000 pounds; eels, 80,250 pounds; flounders and flatfish, 142,000 pounds; halibut, 830,000 pounds; mackerel, 37,000 pounds; pollock, 20,000 pounds; scup or porgy, 930,000 pounds; shad, 1,318,032 pounds; smelts, 27,000 pounds; squeteague, 102,750 pounds; swordfish, 73,500 pounds; mixed fish, 239,000 pounds.

b Includes $286,250 enhancement on 515,000 bushels of southern oysters.

B.—FISHING TOWNS EAST OF CONNECTICUT RIVER.

104. THE FISHERIES OF STONINGTON, MYSTIC, AND NOANK.

STONINGTON.—The harbor at Stonington is capacious, and is partly protected by a breakwater built at a cost of $100,000. In the first part of the present century, prior to 1835, the people of this place were profitably engaged in the seal and whale fisheries. It is stated, on good authority, that some years as many as 100,000 seal skins have been landed at this port. A few vessels continued in the seal fishery until the year 1854, when the fleet numbered four vessels. In 1873 the business was renewed, and since that date from one to three vessels have been annually sent to Cape Horn and other Antarctic grounds in search of fur-seal. It was the enterprise of Stonington sealers that helped to open up the fur-seal fishery at the South Shetlands in 1819 to 1821. Nine Stonington vessels were included in the fleet of thirty sealers that visited those islands in 1820. Most of this fleet were American vessels hailing from Stonington, New Haven, Nantucket, and other ports. Captains Palmer and Fanning, of Stonington, were famous fur sealers, and there still lives here the veteran Capt. Thomas Davidson, who was one of the pioneers in this industry. For further particulars concerning the fur-seal fishery from this town, the reader is referred to the section of this report on special fisheries.

The whale fishery of Stonington was of importance for a number of years, especially from 1844 to 1856. The last whaler was owned here in 1861. The number of vessels each year from 1840 to 1861 was as follows: 1840, 11; 1841, 8; 1842, 9; 1843, 14; 1844, 13; 1845, 20; 1846, 26; 1847, 27; 1848, 24; 1849, 20; 1850, 18; 1851, 16; 1852, 17; 1853, 16; 1854, 15; 1855, 14; 1856, 16; 1857, 6; 1858, 5; 1859, 4; 1860, 4; 1861, 1. The products of this fishery in 1847 were 705 barrels of sperm oil, 18,460 barrels of whale oil, and 146,900 pounds of whalebone. In 1853 the products were 561 barrels of sperm oil, 14,142 barrels of whale oil, and 110,300 pounds of whalebone.

In 1880 the fisheries of this place employed 124 men, of which number 82 were in the seal fishery and the rest in the menhaden and other fisheries. The sealing fleet numbered three vessels of 309.52 tons, valued, with gear and outfit, at $39,000. Two vessels of 55.73 tons were engaged in the capture of food fish, and one vessel was employed in the menhaden fishery.

Some shore fishing is done in this vicinity by the use of gill nets, fykes, and other apparatus, but the quantity and value of fish thus taken is very small.

At one time Stonington owned a fleet of vessels in the Bank cod fishery. In the fall of 1810 the largest haul of bass ever known is said to have been made here. With an enormous seine a great school of these fish was shut up in a cove and "guarded" for several days. Twenty-one vessels loaded from the catch and great quantities were sold in this vicinity.

MYSTIC AND NOANK.—At Mystic the fishery interests are centered in the menhaden industry, a fleet of steam and sailing vessels being employed during the season in catching menhaden for the oil and guano factories located here. Four small smack vessels, some small boats, three haul-seines, and about forty fyke-nets are employed in the capture of sea bass, cod, bluefish, and other species. The vessel fishermen use the hook and line and cruise from Montauk Point to Block Island. There was formerly a greater number of fishing vessels owned here, but they have been sold and more attention given to the menhaden business. The fyke-nets are set in the spring as early as the ice will permit and are fished till August. They are set again in October and kept down till winter. Some seasons they do quite well, averaging five barrels per day of flounders,

eels, squeteague, bluefish, and numerous other species. These fykes are set anywhere along the shore on the flats.

The haul-seines are used from November till February and are not allowed to fish in summer. They take mostly smelts and eels. Smelts sometimes come into the river here very abundantly.

The village of Mystic River has an interest in the menhaden industry and also owns a vessel of about 47 tons burthen employed in the capture of food fish.

The village or town of Noank is a small but very enterprising place. There is owned here a fleet of fifty-one vessels, measuring 1,261.06 tons, employed in capturing lobsters, cod, halibut, tautog, and other species. These vessels have crews aggregating 220 men and are valued, with gear and outfits, at $169,145. Several small boats, a haul-seine, about 50 fyke-nets, and 2,400 lobster and eel pots are also owned in Noank. Four traps owned by fishermen here are set in the summer time at the Elizabeth Isles and are often quite successful. The total capital invested in the fisheries of Noank is $178,165. The catch in 1880 included the following:

Species.	Amount.	Species.	Amount.
	Pounds.		*Pounds.*
Sea bass	20,000	Halibut	340,000
Striped bass	189,000	Mackerel	27,000
Black fish or tautog	63,550	Scup	930,000
Bluefish	46,000	Squeteague	100,000
Cod	1,445,000	Mixed fish	9,000
Eels	5,000	Lobsters	337,885
Flounders and flatfish	92,600	Menhaden and refuse fish	60,000

105. NEW LONDON TO THE CONNECTICUT RIVER.

NEW LONDON.—New London is on the right bank of the Thames River, 3 miles from its entrance into Long Island Sound. The harbor is one of the best in the United States, and is defended by Fort Trumbull and Fort Griswold. The latter fort is built on Groton Heights, opposite New London, and is memorable for being stormed on September 6, 1781, by Benedict Arnold, a native of Connecticut, after he had become a traitor to his country. Here seventy men, the best in the town, were cruelly murdered after they had surrendered themselves prisoners. A monument has been erected on the spot in memory of those who fell. At Groton is a United States navy yard. The inhabitants of New London have for many years been engaged in the fur-seal and sea-elephant fishery in Antarctic waters. Vessels from here were the first American sealers to visit Desolation Island and Heard's Island in the Southern Indian Ocean, and large cargoes of sea-elephant oil were annually obtained from these islands for many years. The fur-sealers cruise also in the Southern Atlantic Ocean at South Georgia, South Shetland, Cape Horn, and other sealing grounds. The sealing fleet of New London in 1853 numbered eight sail. In 1858 it had increased to twelve sail, and has annually numbered from five to ten vessels since that time.

The whale fishery from this port at one time was of much importance, but is now prosecuted by only five vessels. In 1846 seventy whaling vessels were owned here, but in 1857 the fleet was reduced to fifty-four sail. Since that date the number of vessels in this fishery has been from five to forty-five, and the largest number in the past ten years was fourteen in 1871. The receipts of whale products at New London in 1846 were 1,307 barrels of sperm oil, 27,441 barrels of whale oil, and 183,450 pounds of whalebone; in 1880 the receipts were only 22,144 gallons of whale oil, and 10,400 pounds of whalebone. The fishery in the vicinity of Davis Straits and Hudson's Bay has

been a favorite pursuit of New London whalers. The Davis Straits grounds had been abandoned by Americans for nearly half a century when the ship McLennan, of New London, under Captain Slate, cruised there in 1846. This vessel continued her annual voyages there for several years, and was finally lost while en route to these grounds in 1852. In 1853 two vessels were fitted for this fishery, and in 1855 a third vessel was added to the fleet. In 1860 the fleet numbered ten sail, and the fishery from that date became more profitable. Larger and better vessels were sent out, and the cruising grounds extended through Hudson's Straits into Hudson's Bay. It was a New London whaling vessel cruising in those northern waters that found the abandoned ship Resolute, of the Franklin search expedition, and brought it to this country. For further particulars concerning the seal and whale fisheries of New London the reader is referred to the sections of this report which treat of special fisheries.

New London is the most important receiving and distributing point for fresh fish between Boston and New York. The fishing fleet is exceeded in numbers by but few ports on the New England coast. The larger class of vessels cruise on George's and other offshore banks for cod and halibut, and market their catch fresh in New York. A few vessels are engaged in the mackerel fishery and generally sell their fares in Boston.

The smaller vessels fish nearer home and land their fares in New London. One-fourth of the catch of the near-home fleet goes to New York by steamer, and the remainder is distributed direct from here throughout the country, either by rail or by numerous peddlers that secure their supplies from the vessels or have their fish forwarded by rail. Most of the vessels are well-smacks, so that the fish are generally alive when received in New York or New London. Large floating tanks or cars, made of wood, are moored to the wharves in New London, and in these tanks the live fish are kept for days, or even weeks and months before they are sold.

Most of the vessels use hand-lines, but those fishing on the offshore banks use trawls. Lobsters are taken by the vessel fleet as far away as Block Island, and at the mouth of Buzzard's Bay, while the small boats set their lobster traps near home in Fisher's Island Sound. As the State has no protective law for lobsters, a large part of the catch is too small to be of much benefit to any one, and if sold in Massachusetts or New York would subject the seller to punishment.

A small amount of net fishing is carried on by fykes, and the catch is mostly flounders. Four heart-pounds are set near the mouth of the river Thames, one at Avery Point, one at Pine Island, and one at each end of Bushy Point Beach.

From New London to Norwich, a distance of 14 miles on the Thames River, quite an amount of fish are taken during the year by men that are farmers, mechanics, or laborers the greater part of the year. They fish more or less during the summer season and catch bluefish, bass, eels, flounders, and shad, and a few mackerel. During the winter their catch is smelts, frostfish, eels, and flatfish. The summer fishing is carried on mostly by drag-nets or seines. Eels are taken in pots and with spears in the winter. The principal fishing season from New London is from April until October, but little fishing being carried on by the large vessels during the winter, and by the smaller vessels during only a small part of the year.

The catch of the vessel fleet of New London in 1880 included 1,230,000 pounds of cod, 490,000 pounds of halibut, 467,500 pounds of bluefish, 73,500 pounds of swordfish, 159,800 pounds of bass, 4,223 barrels of mackerel, and 170,000 pounds of lobsters. The shore fisheries yielded about 150,000 pounds of flounders, eels, tautog, smelts, and other species, and about 30,000 pounds of lobsters. The menhaden fishery of this port is important, and employs a fleet of sixteen vessels aggre-

gating 811.76 tons and valued at over $75,000. The statistics of this business are included in the summation for the State.

Mr. Ingersoll reports as follows on the oyster interests of this region:

"The extreme eastern point on the Connecticut shore, where any oysters occur, is in the neighborhood of New London. A few miles east of the mouth of the Thames, in the township of Groton, is an inlet and river known as Pequonock. In 1877 several gentlemen leased about 35 acres of ponds on the east side of this river. In one of these ponds, containing about 15 acres, native oysters grew upon the rocks and around the edges. A portion of the bottom of this pond they prepared for oyster-raising, by spreading scallop-shells over 6 acres, and gravel and beach-sand over 2 acres. Here they planted some 2,500 bushels of seed from Stony Creek, Clinton, and Fair Haven, Conn., at a total expense of between $4,000 and $5,000. These oysters have grown finely, but as yet few have been taken to market. This year (1879–'80) has been a comparatively poor one for them.

"The oysters in Pequonock River are deep and cup-shaped, not of large size, and with a thin, white, flinty shell. Locally they are very highly esteemed. Another locality where this firm has undertaken oyster-cultivation is in the Niantic River, an inlet just west of the Thames, where they have had 20 acres set off for the purpose, and have already planted some seed. In Alewife Cove, between Niantic Bay and the Thames, they have also several acres of ground which they purpose preparing in the near future. A few oysters are now being put upon the market from these ponds, and have met with a good reception, at high prices. These planters believe that a grand success awaits them; others assert that the waters are unsuitable, and that little of importance will result. Three persons are employed.

"In the river Thames, years ago, were great numbers of indigenous oysters. Thousands of bushels were annually obtained for the markets of the neighboring towns. These oysters were of good quality, and generally of immense size. Planting, however, was never a success, owing to the great freshets which often sweep down the river, and also owing to the impurities that are cast so plentifully into the stream from the drainage of the towns and from multitudinous factories along the tributary streams. Nevertheless, a few native 'Norwich River' oysters are annually caught, except in the close season, between March 1 and November 1, and there are half a dozen persons in Norwich who deal in them and in other oysters, but the whole city's trade, probably, does not amount to 10,000 bushels a year of 'natives' and 'Chesapeakes' combined, and is decreasing.

"At New London the oystermen own ground at Bullock's Point and Drownville, in Providence River, Rhode Island. Upon those tracts, in 1879, they bedded about 15,000 bushels of Virginia oysters, in addition to receiving a winter's supply of 35,000 bushels. New London and its neighborhood also consumes about 700 bushels of fancy oysters annually, mainly brought from Providence, R. I. The prices at this point, in 1879, were, for southern oysters, 80 cents to $1 a gallon; for native stock, 50 cents a quart, or $1.60 a gallon, wholesale. Twenty cents a solid quart is paid for opening.

"There are employed here in the winter months twelve men on oyster-vessels and twenty-five men on shore, besides the principals. These are mostly heads of families, who engage in menhaden fishing in summer."

NIANTIC.—Between New London and the Connecticut River there is no fishery of importance, except the menhaden industry carried on at Niantic, at the factory of Luce Brothers, where one hundred and twenty-five men are employed, and some $50,000 capital invested in vessels, buildings, and apparatus for the capture of menhaden and the manufacture of oil and guano.

C.—CONNECTICUT RIVER TO NEW HAVEN.

106. FISHERIES OF THE CONNECTICUT RIVER, SAYBROOK, AND WESTBROOK.

THE CONNECTICUT RIVER AND SAYBROOK.—The Connecticut River, which empties into Long Island Sound at the town of Saybrook, has long been known as abounding in fish of various species, especially shad and alewives. These are taken at different points along the river as far up as Holyoke, in Massachusetts. Within the limits of the State of Connecticut, and especially towards the mouth of the river below Middletown, there are fishing stations where gill-nets and haul-seines are used for the capture of these fish. At present the number of gill-nets used in the river is 57, worked by 114 men, and 20 haul-seines, handled by 49 men. The catch in 1880 was 92,824 shad in number, and 2,700 barrels of alewives.

At the mouth of the river, on the western shore, is Saybrook, for many years famous not only for shad catching but also for the packing and shipment of shad from towns in the vicinity. Shad are taken here in pounds or traps of the usual heart shape. These are set outside of Saybrook Point and just west of the river along the sound. From Lynde's Point, at the mouth of the river, to Cornfield Point, a distance of 3 miles to the westward, there are five of these traps, as follows: One each at Lynde Point, Gardner Place, Guard House, Willard's Bay, and Gillett's Bay. It is a singular fact, that although shad were formerly taken in abundance in pounds set east of the river and near its mouth, the catch of late years has so decreased that pounds in those localities have been abandoned, except for the capture of a few menhaden and a few squeteague, blackfish, herring, and bass.

Just above the point, inside the river, on the western bank, small piers are built out a short distance from the shore. These are used in the shad fishery and named "Washington," "Federal," and "Jamaica." In years past they were considered to be in the best locations to be found for catching shad. As long as thirty years ago the catch from each pier averaged 20,000 shad, but of late years the annual yield has gradually decreased, and if the falling off continues, a few years more will see these old fishing piers given up.

From the piers sweep-nets of 1,920 feet in length and 30 feet deep of 5-inch mesh are used, each pier fishing two nets managed by seven men. One end of the seine is made fast to the pier with a line. The seine is then paid out from the boat and is swept round the fish and the other end brought back to the pier and placed around a capstan by which the seine is drawn in to the pier and the fish removed.

The gill-nets or drift-nets used here are 960 feet long, 25 feet deep, and 5¾-inch mesh. They are taken about 2 miles up the river and allowed to drift down with the current, catching nothing but shad.

By the three methods of pounds, seines, and gill-nets the shad fishery is carried on. Most of the catch in this vicinity is outside the river in the heart-pounds. The season commences about April 20, varied a few days by an early or late spring, and continues till June 20, when the law requires fishing with nets and pounds to cease.

The railroad station is located on the steamboat piers, at the mouth of the river, and here the fish are received, packed, and shipped. They are usually put up with snow or crushed ice in boxes holding about 300 pounds each, and in this manner sent to Hartford and New York, whence they are distributed all over the country, the entire catch being marketed fresh. The total number of

shad taken in the Connecticut River and vicinity, during 1880, was 268,608, or about 1,074,432 pounds. Striped bass and numerous other fish that were formerly plenty in the river have grown scarce, and yearly show a decrease. The cause is attributed to the pollution of the water by the large factories along its banks.

Twenty-five fyke-nets are set in this vicinity, a few outside and some inside of the river. They are fished during the fall and winter months, and capture flatfish, herring, bass, and a few shad. Two hundred lobster-pots are set about the mouth of the river and fished by four men. The catch of lobsters is small, and mostly sold in this vicinity. From 10,000 to 15,000 pounds of eels are annually taken. The refuse fish caught by the traps amount to about $500 worth annually.

For trap or pound fishing the twine for the nets is bought and the knitting hired. The twine costs 25 cents per pound and 15 cents per pound to knit it. The work is mainly done by women. The six fishing companies average 2,500 pounds of twine per year for repairs, together with 2,000 pounds of rope at 15 cents per pound. A new pound-net takes from 800 to 1,000 pounds of twine, and costs, with stakes and all the gear, from $800 to $1,000. The men employed fish on shares, receiving one-third of the net proceeds of the fish after deducting rent, packing, cartage, commissions, &c. The fisheries are held by "prescriptive right." The decisions of the courts have been that persons owning the land own the fishery opposite. These fisheries are rented at from six to twenty shad in every hundred caught.

The fishermen and owners of pounds here are mainly well-to-do farmers, and of a higher order of intelligence than is usually found among fishermen. They think that many shad either spawn in salt water or at the mouths of the creeks; and a small creek near by was a famous resort for shad years ago. In proof of this theory they say that they take many shad which have spawned. These they call "racers," and they are taken in April before the temperature is high enough in the river to induce the shad to ascend for spawning, and one was caught in November. They caught small shad of 2½ to 4 inches long in salt water in the latter part of May, 1875, and ask where they come from. In the first week in June, 1881, Mr. Denison found among a haul of six hundred shad sixty-eight of these "racers."

Mr. Samuel A. Chalker, of Saybrook, says that in 1849, the fishing was no longer profitable, and that it had gradually decreased all along the coast under seine-fishing. In that year the pounds were introduced, and since then the shad have not only increased along the coast, but in the river also. It is worthy of note that these pound-nets are not in the river, but run out from the coast just west of it, and that the middle ones take as many as the outer ones. The fishermen think that the shad come in toward the shore at flood-tide to feed, and so run into the middle nets; and in proof of this say that fifty years or more ago there was a trap here called a "weir," which was formed by stone-walls running out from the shore on the flats, and that just before the tide fell a net was stretched across the entrance, and the shad were inclosed and taken out at low tide.

Of menhaden ("whitefish") but few are now taken for manure. There has been talk of keeping the pounds set to catch these for the oil-works on Long Island, but it has not been done.

Near Saybrook there is a small stream called Oyster River that produces a variety of the bivalves after which it is named, which are said to be of superior quality. Fifteen or twenty persons engage in taking these at odd hours, but do not take more than 100 bushels a year.

WESTBROOK.—At Westbrook, the next town west from Saybrook, the shad fishery is carried on by pound fishers, using twenty-one bowls and hearts. These pounds are owned by eleven companies, and an annual average catch is about 12,000 shad, which are sold at Saybrook. About 200,000 pounds of "whitefish" or menhaden were taken here in 1880. In 1851, 5,000,000 of these fish were caught here, but they have gradually decreased in abundance. One hundred men fish

part of the year, and do other work the rest of the time. They make a scanty living. About 35,000 pounds of various edible fish are caught, and either consumed locally or sent to market.

Mr. R. H. Stannard writes as follows, under date of Westbrook, June 4, 1881:

"Our company has fished with pounds for thirty-two years, and occupied the same fishing ground with seines for a much longer time. The catch of shad this spring has been very good, fat, and large, owing to the great abundance of shad-food all along the shore this season. In dressing the shad we find them filled up with it. I think the shad have been the best this spring for twenty-three years. In 1860, 1861, 1862, and 1863 the shad were about the same as this spring. Our record shows for thirty-two years a little increase in catch. Since 1875 the catch by our company has been about 13,000 shad per year. The jelly-fish have been very destructive to pound fishing several times within the past thirty-two years. There have been more or less every year in the sound. In 1861 the best part of the season was destroyed, and in 1868 half the season was destroyed by the jelly-fish taking away the twine and stakes. In the year 1878 jelly-fish were very plenty, and almost entirely destroyed shad-fishing with pounds. This year, 1881, the jelly-fish have destroyed about one-third of the catch or time, or at least one-third of the season."

107. FISHING TOWNS FROM CLINTON TO EAST HAVEN.

CLINTON.—From Clinton to Guilford there are twelve pounds, managed by fifteen men. The catch of shad at the former place is marketed at Saybrook.

The oyster industry is of some importance at Clinton. Mr. Ingersoll reports on this business as follows:

"At Clinton, a little village settled under the name of Kenilworth (afterward corrupted into Killingworth), at the mouth of the Hammonaset River, the oyster business is of long growth, and is somewhat peculiar. The harbor, in old times, contained an abundance of large, succulent oysters, but these have been all but exhausted in one way or another. About twenty-five years ago the planting began in the harbor, the seed then used being caught mainly at home or brought from Block Island. The harbor at present contains about 200 acres suitable for oyster-growth. Formerly there was much more, but a few years ago the sea made a breach through the peninsula which incloses the harbor, by which the southerly storms are given so fierce an entrance into the bay, that any attempt at oyster-work, or even at navigation, over much of the water-space, is rendered utterly futile. If this breach, locally known as the Dardanelles, could be filled up—and the cost, I was informed, would not exceed $1,000—a thousand acres or more would be added to the oyster-bottom. The bottom is hard, the water nowhere too deep for tonging, and of about the right degree of freshness. Mud and sand drift so badly in winter, however, that no oysters can be left down during that season. The practice, therefore, is to put down not only Virginias, but natives of so large a growth that they shall be marketable the next winter. Years ago a much larger number of Virginia oysters were planted than at present—often 20,000 bushels—but the business has changed, until now only 8,000 bushels a year are demanded. The freight from the Chesapeake is 12 cents a bushel, and the following four schooners find employment: J. H. Chaffee, 130 tons; Mary Stow, 160 tons; G. A. Hayden, 108 tons; Helen P., 146 tons.

"A fair 'set' occurs in Clinton Harbor every year, and in 1877 there happened a very heavy one. A certain quantity of this survives, and about 1,000 bushels are utilized annually. The majority of the 'native' oysters, however, are raised from seed bought along the shore to the westward, that from Norwalk being preferred. This costs from 75 cents to $1 a bushel, and is planted in April. It is ready to take up late in the following autumn, and has grown rapidly and into handsome shape. The quality, also, is most excellent, such oysters selling at from $1 to $1.50 a

bushel at wholesale. The annual production of this stock amounts to 2,000 bushels. The only enemy of the oyster here is the drill; but this is sadly abundant.

"To recapitulate, Clinton produces annually, of southern plants, about 8,000 bushels; of Connecticut plants, about 2,000 bushels; of native oysters, about 1,000 bushels; total 11,000 bushels.

"The total investment here, which at present will not exceed $10,000, is divided among about fifteen planters, and affords a partial livelihood for perhaps a score of families.

MADISON TO EAST HAVEN.—At Madison there is a menhaden oil factory, with a capital of about $8,000 invested in four vessels of 53.22 tons, buildings, and apparatus for capturing and preparing the fish. Another factory, located at Guilford, employs about $35,000 invested in buildings and fixtures, and seventeen vessels of 329.79 tons, valued at about $25,000.

The oyster interests of this region are thus reported by Mr. Ingersoll:

"The bottom of the margin of the sound off the villages of Madison and East River has been staked off to a considerable extent, but is utilized by only one firm of oyster producers. Mr. Elihu Kelsey has kindly reported to me, by letter, upon the extent of their operations. Their beds consist of 6 acres or more, and are near a small island called Overshore. This area is protected on its southern side by high reefs of rocks. They have a second bed of about 12 acres extent a mile and a half eastward, near Tufas Island, in 20 feet of water, with hard, sandy bottom, where they are experimenting. They also own a third bed near Guilford Harbor of 24 acres, on which they have spread '2,000 bushels of shells and a good many small stones, on which the oysters "set" and grew for four years, and were the best in the world; but the water is too shoal without artificial protection, and the storms and thieves have ruined the bed.' As not enough 'set' is caught upon the stools, a thousand bushels or so of seed-oysters are annually raked from the natural beds in the vicinity of East River, or bought from dealers in Stony Creek and New Haven, and planted upon the beds. These various beds yielded, during 1879, about 1,200 bushels, the most of which were sold in the shell at $1 to $1.50 per bushel. For opened oysters $1.60 a gallon was received. No southern oysters were handled in any shape. In respect to the drawbacks and general condition of the business at East River, Mr. Kelsey writes: 'The first drawback to success is the lack of good protection from storms, which might be remedied by the construction of a breakwater. The second is the constant alteration of the State laws designed to protect the industry. The third drawback is thieving. The present condition of our producing-beds is good, and the prospect is that with plenty of hard labor our venture will be remunerative. We find the character of the soil to be of the greatest importance. On our producing-bed the mineral ingredient of the soil is iron. This renders the oysters healthy and of the finest flavor, so that our customers say they cannot be excelled.'

"At Guilford some inshore ground is cultivated, but this is not of great capacity. Outside, west of Goose Island, they have improved about 160 acres in water from 7 to 10 fathoms deep, upon a hard, sandy bottom. This outer tract has not as yet had time to yield much. The spreading of shells in the hope of catching spawn appears futile, for the sufficient reason that there are no living oysters in the vicinity to produce the spat. A large quantity of seed has therefore been placed on this area. This seed was procured partly in the Guilford River, although there is great opposition to its being taken, and has largely been bought in the western part of the State. Besides this, several hundred bushels of large-size oysters have been scattered among the planted shells to produce the spawn which it is desired to catch. A small set has already been obtained, and next year some harvest will begin.

"The oysters heretofore and at present obtained at Guilford, from the artificial inshore beds which have been in existence for thirty years, are of large size and fine shape. Their flavor is

excellent. Formerly they were sold regularly to Hartford buyers at $8 and $9 a barrel; now, however, they are worth only $4 to $5. About 800 bushels a year comprise the total yield at present. No Virginia oysters are planted at Guilford. Experiments showed that the practice was not successful. The great drawback upon the inshore ground is the drifting of sand and mud, which is likely to occur in storms; the drills also are troublesome, but I did not hear that starfishes had caused much damage thus far.

"The native river-oysters at Guilford formerly lined the whole river, opposite the town, for 3 or 4 miles. A town-regulation early prohibited the taking of more than 2 bushels a day by one person, but this has been more or less evaded, and now the fishery is of little value, all the oysters taken being very small; yet there is so strong a popular prejudice against utilizing any of this product in seeding the artificial beds, or against allotting the suitable ground in the exhausted river for cultivation, that the town voted to not avail itself of the privileges granted by the State in general statutes, which are as follows:

SEC. 12. "'The selectmen of Guilford may lease, for not exceeding ten years, all ground of the town in East and West Rivers, suitable for planting or cultivating oysters, to the highest bidder,' at public auction; but no lease shall be made to any person of more than five acres, nor to a minor. 'The leases shall be executed by the selectmen, as deeds of real estate, reserving to said town the rents for such grounds, * * * and any lessee shall, during the term of his lease, be the owner of all the oysters thereon, but shall not take any oysters therefrom in the night season.'

"This ratification, as I have stated, was refused, and a two-bushel protective regulation was made instead.

"About 600 acres of land have been set apart for oyster cultivation in the waters of the sound, outside of this harbor, besides that already mentioned near shore. No improvement, however, has yet been made upon this area.

"The next point of oyster-culture is Stony Creek, where the large collection of islets known as The Thimbles affords excellent opportunity for planting and raising. Organized business here is of comparatively recent date, but native oysters of extra quality were always to be had for the raking in the harbor. The largest dealer is the Stony Creek Oyster Company, N. P. Miner, president, which was established in 1868, and now owns 400 acres of ground devoted to the growing of oysters, and has a capital stock of $42,000.

"The Stony Creek Oyster Company raises annually about 15,500 bushels of natives, and employs six men. All the stock is sold in shell, shipping in barrels, and opening little or nothing. The other persons engaged in planting have spent a good deal of money here in getting the foundation of a business laid, but with small actual results as yet. There is also a large class of citizens who cultivate for personal use, or sell to a trifling extent, and so get a partial support out of the industry. It was very difficult to gather any exact or approximate figures, therefore, outside of the oyster company's report; but I judge that all the other producers together, added to the 15,500 bushels reported by President Miner, will not bring the total production of Stony Creek in 1879 above 20,000 bushels.

"The prospects at this point seem very good. Some large sloops are employed in dredging, and it is proposed to employ steam very soon. An air of unusual thrift is observable about the oyster-houses on the shore, which do not, as is too often the case, disfigure the pleasant scene. Stony Creek is a favorite source of seed-supply to the planters of Rhode Island, and probably one-fourth of the year's yield is sold in the spring for this purpose, the purchasers sending sloops to be loaded. Stony Creek beds had a good set in 1879, very little in 1878, but a massive collection of spawn in 1877. The great obstacle to success along this part of the coast is the lack of smooth,

hard bottom, and the liability of the ever-present mud to be moved about and settle upon the oyster-beds in such quantities as to kill the young and stunt the old ones. The oysters grow in clusters, and are likely to be of large size, long and slender, forming 'coon-heels' and 'razor-blades.' They are so clogged with mud when brought ashore that a stream from a hose must be turned upon the heap before the clusters can be broken apart, preparatory to the culling for size."

West of Guilford there are four companies of pound-fishers, employing ten men. Mr. H. Fowler, of Guilford, says he has fished for twenty-five years, principally for menhaden, and takes a few shad, but not in paying numbers. Some tautog, eels, flatfish, and other species are taken with nets and lines, but the total amount captured is not great.

From Sachem's Head to East Haven there are sixteen pound-nets, handled by twenty men, who report the fisheries as failing for years past. But few menhaden are taken, and although shad are more abundant than for several years past, the catch in 1880 was only 20,000. Edward Kelsey has three pounds on Durrey's Island (included above), and takes menhaden, and occasionally other fish. The catch of edible fish in this district was only 20,000 pounds, and of eels 3,000 pounds. A menhaden factory at Branford employs about twenty-five men, and in 1880 produced about $12,000 worth of oil and guano. Three small vessels are used in carrying menhaden to the factory or in capturing these fish.

Mr. Ingersoll reports, concerning the oyster interests hereabouts, that the river at Branford was once a "great natural oyster-bed, but has now become nearly depopulated, and it is hard to get any seed for the outer beds. The star-fishes are reported to have damaged the beds very greatly in 1878, and the drill is an ever-present enemy. Southerly storms often bury the oyster-beds here wholly out of sight. This misfortune happened to one planter, after an expenditure of over $1,200 on artificial beds inside of Stony Island. The whole product of the locality last year was about 3,500 bushels, and half a dozen families are supported. Off Branford and East Haven coast, in the deeper water of the sound, more or less ground has been granted to strangers, but the results are nothing, as yet.

"At the village of East Haven about 80 acres are under cultivation in the offshore waters of the sound, devoted wholly to native oysters, for which seed is procured from neighboring beds, or spawn is caught on planted shells. In 1879 the catch was 3,000 bushels, all of which were sold in the shell at an average price of $1 per bushel. It is supposed there remain 20,000 bushels of oysters on the ground, subject to risks from heavy storms and creeping enemies. The mode of catching is by dredges at all seasons, and three men find employment at $2 wages per day."

D.—FISHERIES OF NEW HAVEN AND VICINITY.

108. GENERAL FISHERIES OF NEW HAVEN.

History and present importance.—At about the close of the last and the beginning of the present century, New Haven was quite extensively engaged in the fur-seal fishery at the Falkland Islands, South Shetland, Masafuero, and other seal islands. One of the famous sealing voyages from this place was that of the ship Neptune which sailed in October, 1796, and returned to New York July 17, 1799, having taken 50,000 fur-seal skins from the seal islands to China, where they were exchanged for goods that yielded over $260,000 in New York. Other voyages were those of the ship Sally in 1800, and the ship Draper in 1803. The northwest coast of America

fur trade also claimed the attention of New Haven merchants. No sealers have been owned here for many years past, that fishery being carried on from New London and Stonington.

At present almost the only fishery engaged in at New Haven is the oyster fishery. Some lobsters, about 100,000 pounds yearly, are taken off New Haven Harbor, and a large seine, nearly a mile long, is sometimes set for menhaden. The fish markets of New Haven are supplied from New York, Boston, Gloucester, and Portland.

109. THE OYSTER INDUSTRY.

HISTORY: IMPORTATION OF SOUTHERN OYSTERS.—The oyster business is fully reported by Mr. Ingersoll. He says: "New Haven is one of the principal depots of the oyster trade in Connecticut, and in the United States. From the earliest times the borders of the Quinepiac River, on the eastern boundary of the city of New Haven, have been the scene of oyster operations. Shell-heaps along its banks show how the aborigines sought in its waters, season after season, the best of bivalves, and the earliest settlers followed their example. Natural beds of oysters were scattered over the bottom of the whole river for 3 miles, clear up to the North Haven salt meadows, and at intervals along the eastern shore of the harbor, where favorable coves existed. At all points these mollusks were convenient of access. The result was that the raking of oysters in this river, and along the eastern shore of the harbor at its mouth, which was a free privilege, was early adopted as a business by many persons who lived near the banks, and a considerable retail peddling trade was thus kept up throughout the neighborhood, in addition to the home supply. Wagon loads of opened oysters in kegs traveled in winter to the interior towns, even as far as Albany, and thence westward by canal.

"It came about, that among the first places in New England to import oysters from New Jersey, and then from Virginia, to be transplanted for additional growth, was Fair Haven; and it is probable that far more oysters were brought there from the Chesapeake twenty years or even ten years ago than now are. At that time a large fleet of Connecticut vessels was employed in this traffic every winter, and some stirring traditions remain of perilous voyages during that icy season. They were better oysters that came in those days, also, than now. While a large majority of these cargoes were at once sent into the current of winter trade, and distributed to customers all over the State (for no other harbor fattened 'Chesapeakes' to any extent), a quarter or so of the whole season's importation was regularly bedded down, in April and May, to supply the summer and fall demand. The favorite bedding ground then, as now, was 'The Beach,' a sand-spit running off into the harbor for more than a mile from the Orange (western) shore. This is bare to a great extent at low tide, but covered everywhere at high tide, and is the best possible place for its purpose. The ground on this beach rents at from 2 to 5 cents a bushel, according to location. Those occupying the Beach each year—in 1879 they were twenty-three in number—form themselves into a mutual protective association, and provide watchmen who never leave the ground. Formerly these watchmen lived in boats housed in, but now, upon opposite extremities of the Beach, piles have been driven and two houses have been built, where these men live, and whence they walk or row about day and night to guard the property. They go on duty at the time of the first planting, and remain until the last oyster is gathered, a period usually about nine months long. Their wages are only $40 a month, and it would seem to be an extremely tedious duty; yet there is no lack of volunteers for the places. But I have shot ahead of my subject, in following out this matter to its present status; let me return to a past period.

"The Virginia trade began about forty or fifty years ago, Capt. Merritt Farran having been the first man to bring them. His cargo was a sloop-load of about 600 bushels, profitably sold.

The trade rapidly grew into immense proportions. Just when it was at its zenith it is hard to say —probably about thirty years ago—and it was then very profitable. The Fair Haven establishments had branch houses in all the inland cities, as far as Chicago and Saint Louis, and it was reported that the profits of a single house, from 1852 to 1856, amounted to $25,000 a year. Levi Rowe & Co., alone, in 1856, are said to have employed twenty vessels, and one hundred openers, and to have sold 150,000 gallons of oysters, while companion houses shipped from 1,000 to 1,500 bushels per day throughout the season. In 1857–'58, according to De Broca, from 200 to 250 schooners were employed in supplying the establishments of Connecticut from the Chesapeake and Fair Haven, which alone, he says, made use of 2,000,000 bushels, but this undoubtedly was a large exaggeration; one-half of that would certainly more than cover the facts. Half a dozen years later the decline was very perceptible."

SOUTHERN OYSTERS AT FAIR HAVEN.—At Fair Haven in 1857 the oyster business was quite extensive. About eighty schooners of 2,000 to 4,500 bushels capacity were mostly owned at this place, and many additional vessels were chartered to bring oysters here. The capital invested was about $1,000,000. Mr. Ingersoll continues:

"With the growth of so extensive a business, in so confined a space, came the attendant evil of too severe competition. About 1850, therefore, one or two Fair Haven men of energy conceived the idea of taking their warehouses to the oysters, instead of bringing the mollusks so far to the salesroom. They therefore opened branch houses in Baltimore. Others followed, and the names of Maltby, Mallory, Hemingway, Rowe, and their confrères, long familiar in Connecticut, and identified then as now with the oyster business on the Quinepiac, became equally well known along the Chesapeake, and, through wide advertisements, over the whole country. All the great Baltimore firms of old standing originated in Fair Haven, just as Wellfleet, an obscure village on Cape Cod, supplied Portland, Boston, and Providence with its oystermen. The result was the same in both cases; the home interests retrograded when metropolitan advantages began to be used in competition, and at Fair Haven considerable and rapid changes in methods, as well as the results of trade, have come about.

"All of the foregoing remarks have applied to the imported Chesapeake oysters, which were brought in the spring, fattened on the sand bars in the harbor, and taken up in the autumn. Then, as now, New Haven harbor had no competition in this branch of trade worth speaking of anywhere else in the State; and it may be dismissed, so far as the whole of Long Island Sound is concerned, with the remark that many or all of the old dealers continue to bring and plant southern oysters, which they open in the fall and winter, but a good proportion confine themselves wholly to raising and disposing of natives.

"The Chesapeake oysters brought into this locality in 1879 amounted to about 450,000 bushels. Those from the Rappahannock are the favorites for winter use, and are imported almost exclusively; for planting purposes, however, Rappahannock oysters are undesirable, and those from Fishing Bay, Saint Mary's, and Crisfield are preferred. But this may be wholly changed in a year or two.

"EARLY OYSTER CAMPAIGNS ON THE QUINEPIAC.—The remainder of my history will apply to the gathering, transplanting, and propagating of native oysters in the waters of Long Island Sound, opposite New Haven.

"It has already been mentioned that native beds existed within recent years, if they do not now flourish, in every harbor westward of the Thames River, and that many of these old localities, as Stony Creek, Branford, &c., still furnish large quantities of small oysters for the plantations. None of these localities ever equaled, however, the importance of the Quinepiac and its tributaries

at New Haven as a natural field of oyster production, while this harbor was equaled, if not surpassed, by several inlets still farther west.

"Until lately, however, all this wealth was used up in private consumption, sold in the shore towns as 'fancy,' or mixed in with the southern stock, without being taken into account. The fishing was done mainly for each man's winter supply, and nobody paid much attention to any regulation of it beyond the close-time in summer. Gradually, however, these public river oysters became more rare and coveted. The law was 'off' on the 1st day of November, and all the natural beds in the State became open to any person who wished to rake them. In anticipation of this date great preparations were made in the towns along the shore, and even for twenty miles back from the seaside, boats and rakes and baskets and bags were put in order. The day before, large numbers of wagons came toward the shore from the back country, bringing hundreds of men, with their utensils. Among these were not unfrequently seen boats, borne on the rigging of a hay-cart, ready to be launched on the expected morning. It was a time of great excitement, and nowhere greater than along the Quinepiac. On the day preceding, farmers flocked into Fair Haven from all the surrounding country, and brought with them boats and canoes of antique pattern and ruinous aspect. These rustics always met with a riotous welcome from the town boys, who hated rural competition. They were very likely to find their boats, if not carefully watched, stolen and hidden before they had a chance to launch them, or even temporarily disabled. These things diversified the day and enlivened a community usually very peaceful, if not dull. As midnight approached, men dressed in 'oilskin,' and carrying oars, paddles, rakes, and tongs, collected all along the shore, where a crowd of women and children assembled to see the fun. Every sort of craft was prepared for action. There were sharpies, square-enders, skiffs, and canoes, and they lined the whole margin of the river and harbor on each side in thick array. As the 'witching hour' drew near, the men took their seats with much hilarity, and nerved their arms for a few moments' vigorous work. No eye could see the great face of the church clock on the hill, but lanterns glimmered upon a hundred watch-dials, and then were set down, as only a coveted minute remained. There was a hush in the merriment along the shore, an instant's calm, and then the great bell struck a deep-toned peal. It was like an electric shock. Backs bent to oars, and paddles churned the water. From opposite banks navies of boats leaped out and advanced toward one another through the darkness, as though bent upon mutual annihilation. 'The race was to the swift,' and every stroke was the mightiest. Before the twelve blows upon the loud bell had ceased their reverberations the oyster-beds had been reached, tongs were scraping the long-rested bottom, and the season's campaign upon the Quinepiac had begun. In a few hours the crowd upon some beds would be such that the boats were pressed close together. They were all compelled to move along as one, for none could resist the pressure of the multitude. The more thickly covered beds were quickly cleaned of their bivalves. The boats were full, the wagons were full, and many had secured what they called their 'winter stock' before the day was done, and thousands of bushels were packed away under blankets of seaweed in scores of cellars. Those living on the shore, and regularly engaged in the trade, usually secured the cream of the crop. They knew just where to go first; they were better practiced in handling boats, rakes, &c.; they formed combinations to help one another. That first day was the great day, and often crowds of spectators gathered to witness the fun and the frequent quarrels or fights that occurred in the pushing and crowding. By the next day the rustic crowd had departed, but the oysters continued to be sought. A week of this sort of attack, however, usually sufficed so thoroughly to clean the bottom that subsequent raking was of small account. Enough oysters always remained, however, to furnish spawn for another year, and the hard scraping prepared a favorable bottom, so that there was usually a fair supply the

next season. It was not long, however, before the old-fashioned large oysters, 'as big as a shoe-horn,' were all gone, and most of those caught were too small for market. Attention was therefore turned to the cultivation of oysters, and as the Chesapeake trade declined this subject began to receive more and more earnest attention and to arouse an unexpected opposition upon all sides.

"ALLOTMENT OF GROUNDS; ORIGIN OF OYSTER-PLANTING.—The laws of the State provided for the setting apart of tracts of land under water for the planting or cultivating of oysters. The position and amount of these tracts that were to be set apart were left to the judgment of the people of each town, who chose a committee of three to five electors, termed the 'oyster-ground committee,' to act in such matters. Two restrictions, however, were always jealously insisted upon: First, that no 'natural oyster-beds' should be set apart or 'designated' (the legal term) for purposes of planting or cultivation; second, that no more than two acres should be allotted to each applicant. All the early designations made in New Haven harbor, therefore, were in the shallow districts near and below the mouth of the Quinepiac, where no natural beds existed, and the allotments were of various sizes. They were owned by women and minors as well as by voters, and thus it was possible for a citizen who cared to do so to acquire for his use several acres, being those taken out in the name of his wife, his sons, and even of his relatives of remote degrees. Moreover, it was permitted to assign these rights and privileges; but any one who applied for grants of land 'for the purpose of speculation,' was guilty of a misdemeanor. It was thus an easy matter for a man who desired to cultivate native oysters extensively to get under his control a large amount of land through assignments from family and friends; nor, in the great majority of cases, was any money consideration given for such assignments. It soon became common, indeed, for an application to be made by 'A, B, and others,' a score or more, perhaps, everybody understanding that while the 'others' were actual inhabitants of the town they had no intention of making any personal use whatever of the privileges. This, of course, was an evasion of the law, which practically amounted to its annulment, yet no one objected, for the spirit of the statute was not considered to have been broken; perhaps it ought to be said, no one objected at first, for within the last few years there has been loud murmuring against the largest dealers, who have obtained the control of hundreds of acres, and who have found it necessary to secure amendments and additions to the laws in order to make their titles sure and strong.

"It will be understood by this that the business of catching and cultivating native, home-bred oysters at New Haven had grown, out of the old haphazard condition, into a definite and profitable organization by the time the last decade began. It was not long before all the available inshore bottom was occupied, and the lower river and harbor looked like a submerged forest, so thickly were planted the boundary stakes of the various beds. Encroachments naturally followed into deeper water, and this proceeded, until finally some adventurous spirits went below the light-house and invaded Long Island Sound.

"Who was the originator and pioneer in this bold move is undecided; the honor is claimed by several with about equal right. At any rate, Mr. H. C. Rowe first showed the courage of his opinions enough to take up some hundreds of acres outside, in water from 25 to 40 feet in depth, and to begin there the cultivation of native oysters.

"Incessantly swept by the steady and rapid outflow of the Quinepiac and Housatonic (whose currents flow eastward), the hard sandy bottom of Long Island Sound, off New Haven and Milford, is kept clean throughout a considerable area, beyond which is soft, thick mud. There are reefs and rocks scattered about, to be sure, and now and then patches of mud; but over large areas extends only a smooth, unincumbered bottom of sand or gravel. This makes this region peculiarly adapted to oyster-culture.

"This new departure, or unlooked-for expansion of the business, caused considerable excitement as it rapidly developed. It was soon seen, in the first place, that the existing statutes, which never had contemplated this sort of thing, would not fit all the exigencies, and after the codification of 1866 alterations and amendments rapidly followed one another, in which the conflicting interests of the deep-water cultivators and the small inshore owners were sought to be harmonized or guarded against opposition. Although recognized by law and acknowledged by clear heads since the earliest times, the rights of proprietorship under the water, and the notion of property in the growth and improvement ensuing upon ground granted and worked for oyster-culture, have hardly yet permeated the public mind and become generally accepted facts. Cultivators of all grades found many and many instances in which their staked-out ground was reappropriated, or the oysters, upon which they had spent a great deal of time and money, were taken by their neighbors even, who angrily resented any imputation of stealing. Not uncommonly the proceeding was much after the manner of mining in a new gold or silver region, such as the Leadville district of Colorado, for instance, where prospectors 'locate claims' on top of one another, and all went to digging side by side, the first one to strike 'mineral' having a right to any or all of his rivals' territory, within stipulated limits.

"Having put some oysters on a piece of ground and found them to do well, a man would put in a claim for a grant of that piece, and feel greatly abused because it had previously been designated to some man who knew that the only proper or safe way was to get legal possession of the ground first, and make a trial afterwards.* Then number one would claim the right to remove his oysters, and in doing so would be sure to be charged by number two with taking more than belonged to him. It was easy, too, for unscrupulous persons to dump seed or large oysters upon ground that they pretended not to know was already granted, and then, in taking their stuff away, to rake up a large addition.

"If a man neglected to take out a title to his ground, or omitted any technicality, somebody stood always ready to rob him of all the results of his work in open daylight, with the calmest effrontery. 'All that is under water is public property' was the maxim of the million, 'unless every form of law is observed'; and unless it is watched with a shotgun besides, they might have added. An authentic incident that happened many years ago will illustrate this temper; and I should not devote so much attention to this matter were it not that this false philosophy has been almost universal, has proved the greatest stumbling-block to the prosperity of efforts at oyster-culture along this whole coast, and is almost ineradicable from the 'longshore mind.

"Two of the veterans of the native oyster business at this point were born and spent their boyhood on the shore, and early became accustomed to the habits and haunts of all the fishes and mollusks. When they were lads of seventeen they sought out a suitable place near the western shore, and gradually accumulated there an artificial bed of native oysters, which soon attained a merchantable size. There were several hundreds of bushels, and the young men were congratulating themselves as fall approached that upon the early completion of the engagements which then occupied their time they would reap a rich harvest from their labor and patience. The time when they intended to take them up was only a few days distant, and no harm by storm or otherwise had come to the bed, when one morning they went out only to find that every oyster had disappeared. It was a cruel disappointment, but inquiry soon solved the riddle. In the darkness

* Perhaps some excuse or explanation of this sore feeling is found in the fact that the town of Branford allowed a man to apply for and try a quantity of land a year; at the expiration he could pay for it or "heave it up," as he thought best. This was a purely local regulation, however.

of the preceding night several teams, fully prepared for the work, came down from miles and miles back in the country, from away up about Westville and Woodbridge and North Orange, and their owners had raked up the whole bed and carted it away to hide in their cellars. No robbery could be plainer, and there was little attempt to secrete it; but there was no redress, and the perpetrators chuckled over it as a good joke without a scruple about the propriety of the thing. Nothing in the sea was private property.

"LEGAL PROTECTION FOR OYSTER-PLANTERS.—A vast amount of this sort of stealing and interference with proprietary rights granted by the State was perpetrated and sanctioned by the great majority of the watermen, under the plea that the locality in question was 'natural ground.' Any definition or restriction of this ground was impracticable and resisted. The only resource for the man who had invested money in oyster-culture, and wanted the opportunity to develop his investment, was to declare that no 'natural oyster ground' existed in New Haven Harbor, and that designations past and to come were valid, even though the areas so designated might once have been natural oyster-beds. This checkmated the men who 'jumped claims,' yet refused to be considered thieves; but it caused a tremendous howl against the movers, in which a large number of persons, having small information of the facts, joined, on the general principle of 'death to the capitalist.' It may have worked discomfort in a few individual cases, as all sweeping changes must, but on the whole, considering how nearly exhausted and worthless the Quinepiac fisheries had become, I think it must be regarded as not unjust. At any rate, the legislature of 1875 passed an amendment exempting Orange, New Haven, and East Haven from the enactment prohibiting the setting apart or 'designation' of 'natural oyster-beds' for purposes of planting or cultivation, leaving, however, the law intact for the rest of the State. Had this measure not been passed, systematic cultivation would have been vastly hindered, if not altogether killed, by thieves and malcontents, so far as New Haven harbor is concerned. Elsewhere, under different conditions, no such necessity exists as yet, in order to be able to prosecute the artificial raising. Instantly upon the passage of this act there was a rush by everybody for the possession of lots in all parts of the Quinepiac and West Rivers. The oyster committee of the towns decided that each owner of land abutting on the river should possess the right to the bottom opposite his land for 100 feet from high-water mark. This was a concession to popular feeling, though that opinion had no foundation whatever in law, since the title to riparian real estate in this State terminates at the high-water tide limit. Between these boundaries, or 'wharf lines,' tracts equal in width to each man's water front, and extending to the channel, were allotted to the land owners at $10 to $15 an acre; but the majority of them were not more than half an acre in extent. Lucky receivers of these river grants at once found themselves able to sell for from $25 to $50, and before long there was brisk demand and little sale, at prices ranging from $100 to $150. The deep-water men found this river property of great use as a nursery for seed, and as a place to make temporary deposits of surplus stock, &c. The Quinepiac thus began to bristle with boundary stakes, much as the harbor had done for many years previous, and many of these river lots are now valued at more than $500.

"In 1877 a very full set was obtained everywhere in the river and harbor; in 1878, however, there was almost a total dearth; but 1879 again saw a partial set.

"PRESENT CONDITION OF OYSTER-CULTURE IN THE VICINITY OF NEW HAVEN.—Situated on the western shore, the township of Orange (West Haven) owns the western half of the harbor of New Haven. These shores have always been populous with oysters, which were raked as public property. If any attempts at cultivation were made until within a few years, they were desultory

and of small account. When the general oyster statutes were passed, Orange at once acted under them, but delegated to its selectmen the powers of an oyster committee instead of erecting a second board, as was done in all the other towns. This arrangement has been found to work very well. The first designation was made in April, 1864, and all the suitable ground in West River and in the harbor was soon set apart, amounting to about 45 acres. Mr. Samuel Smith, chairman of the selectmen, tells me that nothing was charged for this ground, but that it was put under taxation, and now pays on valuations running from $50 to $500. When, four years ago, the experiment of deep-water cultivation was begun, Orange issued designations, almost wholly to citizens of other towns, for about 2,450 acres, at $1 an acre. It is impossible to come nearer than this to the town's revenue from its oyster-lots, since no separate account is published by the treasurer. The deep-water area is taxed at a merely nominal rate at present.

"Only two producers of any consequence now reside in West Haven. The small allotments in West River which they possess are nearly ruined by the drifting of sediment, and the total product of the river last year would hardly exceed 500 bushels. One planter told me he had had 12 acres in one lot in the harbor spoiled by becoming covered with mud.

"Between Orange and East Haven lies New Haven, priding herself upon her harbor. She had begun to set apart oyster-planting ground for the use of her citizens. Before long, however, it was claimed that she was allotting spaces of bottom over which she had no jurisdiction. This brought on suits at law and aroused inquiry. The forgotten fact was then brought to light that in 1863 a joint commission (of which Noah Webster, the lexicographer, was a member) determined the boundary between New Haven and East Haven to be, in general terms, the ship-channel down the Quinepiac and down the harbor. This was ratified by the general assembly. A few years later some disputes caused the appointment of a commission to settle upon the boundary between New Haven and Orange. This was reported to be the middle of West River, and thence eastward to the ship-channel in the harbor. It seems to have been the intention of this commission that this line should intersect and terminate at the East Haven line, but by some error this was not quite done. The recommendations of this commission were adopted by the legislature and decreed to be the boundary between the two towns. This left to New Haven only the waters just about her wharves and a very narrow, wedge-shaped strip down the channel. When, by later laws, it was decided what of the deeper ground of the sound should be 'designated' by East Haven and Orange, respectively, New Haven was allowed a strip 1,500 feet wide, running southward into the sound from a line drawn from the old light-house to Savin Rock.

"Although these boundaries were settled nearly a century ago, the New Haven oyster committee not long ago designated ground in Orange waters, where they had no right to. Unscrupulous persons at once took possession, and in some cases refused to yield to the legal owners deriving their designations properly. Hence expensive suits and much personal animosity has arisen. Many lessees, however, learning their mistake in time, took out new deeds from the rightful authorities, and so saved themselves. But this was done at additional expense, for New Haven had never charged anything for her privileges.

"Out of the 7,000 or 8,000 acres 'designated' in New Haven Harbor and its offing only from 3,000 to 3,500 are in actual use as yet. The largest possession is Mr. H. C. Rowe's; he operates upon about 1,500 acres. Several other planters have from 200 to 600, while many have 100 acres under cultivation. The major part of this is in deep water, and is yet regarded to a great extent as an experiment, particularly by those who live in other parts of the State. Thus far the success has been encouraging. One gentleman calculates that he has 200,000 bushels of oysters of all

ages on his offshore land. Another planter gives me his estimated wealth as follows: On 70 acres 75,000 bushels, suitable to be sold as seed in the spring of 1880, at an average of 50 cents a bushel; on 50 acres, shells and a good set; elsewhere, in one tract, about 3,000 bushels of young spawners, on which shells are to be thrown; on another tract, 20,000 bushels of seed useful in 1880; and, lastly, an area holding about 5,000 bushels of 'set'. A 30-acre lot yielded this firm 12,000 bushels in three years, which were sold at 70 cents."

E.—COAST TOWNS OF CONNECTICUT WEST OF NEW HAVEN.

110. GENERAL FISHERIES OF THE DISTRICT.

FISHERIES FROM MILFORD TO NEW YORK.—There are no important general fishing stations in Connecticut west of New Haven. At Milford there is a menhaden oil factory with a fleet of twelve vessels, aggregating 316.62 tons, and a large capital invested in buildings and machinery. In the Housatonic River eleven seines, handled by forty-seven men, are used in the annual capture of about 28,000 pounds of shad and 165,000 pounds of other fish.

At Stratford seines are hauled for menhaden for manure, and a few blackfish or tautog, flounders, and striped bass are taken. The total catch of these fish is about 6,000 pounds yearly, and 20,000 pounds of eels. No one lives entirely by fishing. Ten men take eels in summer.

W. D. Cook & Sons, fish dealers at Bridgeport, report that a few bluefish, weakfish, and striped bass are taken near there with lines, mainly for sport. A seine is sometimes hauled, but it does not pay. Fykes are set for flounders, and a sturgeon is sometimes caught. The bluefish seldom exceed 2 pounds. Eels are taken in pots and with spears. The market supply of fish comes from New York, Boston, and Gloucester. The above firm has sold 44 barrels per week. The catch here amounts to 2,000 pounds of eels and 5,000 pounds of other species. No one lives by fishing entirely; it is mainly done for sport. The fishermen throw small eels on shore to die. Mr. W. D. Mills has a small seine 30 rods long, 14 feet deep, and of 2½-inch mesh. He says that there are nine seines owned here, but that if a man depended upon fishing he would starve. They fish when other work is dull. Blackfish and flatfish are the main fish. A few lobsters are caught.

The supply of fish for South Norwalk comes almost entirely from New York, and there is no fishing here except for sport. Some of the people take a few eels and flatfish, but not enough to amount to anything for market.

From South Norwalk to New York the same story is told. All fish come from New York to the big markets. A few men drag out an existence by fishing when nothing else offers, but they are of an idle class who do not care to do too much of anything. A few anglers fish for sport, and an occasional big bass is taken. The following notice is from Forest and Stream of June 2, 1881:

"NEW ROCHELLE, NEW YORK.—On the 24th of May, Mr. Walter J. Davids caught with a hook and line, using a squid for bait, a striped bass 4 feet 2 inches long and weighing 53 pounds. It was taken in New Rochelle Harbor, Long Island Sound, in about 12 feet of water, near the village dock.—H. W. M."

Anglers find sport occasionally, but from a commercial point of view there are practically no fisheries here.

111. ORIGIN AND PRESENT IMPORTANCE OF THE OYSTER INDUSTRY.

MILFORD.—Concerning the oyster industry of Milford, Mr. Ingersoll says:

"Leaving New Haven, the first stoppage for oyster studies is at Milford, one of the most interesting and beautiful places in the State. It was settled in 1639, and long ago had an extensive West India trade and ship-building industry. The business in that line declined forty years ago. The gulf, harbor, and estuaries have always been more or less prolific of shell-fish. Milford long-clams have a good reputation. Milford Point, at the mouth of the Housatonic River, was a famous oystering place many years ago. Old citizens remember a row of huts, built of wreckage and covered with banks and thatching of seaweed, which used to border this wild beach. In these huts lived fifty or sixty men, who made here their home during the greater or less part of the year, and devoted themselves to clam-digging and oyster-raking. Many of these men, who were utterly poor, thus got together the beginnings of a fortune, which, invested in active agriculture, placed them among the most influential inhabitants. But for the last thirty or forty years such sea industries as these have been declining, until nothing whatever was done on the water by Milford people, except the catching of menhaden, for the utilization of which two large factories have been built.

"About eight years ago, however, Mr. William H. Merwin, knowing what had been done about New Haven, began his valuable experiments in cultivating native oysters. He and some others had once before started an enterprise of raising oysters in the 'Gulf Pond' at the mouth of the Indian River. But the other stockholders, being older men, disregarded his advice, though he had always lived by the shore, and the effort failed. They insisted upon damming the river, so that the sediment brought down by the stream was deposited upon and smothered the oysters. It is this episode that gave rise to section 10 of the oyster statute.

"Eight years ago Mr. Merwin resolved to try oyster-planting for himself. He took up a few acres off the shore in water 8 feet deep at low tide. He had just got his oysters well planted and had high hopes of success, when a storm destroyed them all. His labor and money got no return but costly experience. He then tried again, further out toward the sea, in 18 feet depth of water, near the Government buoy. He got so heavy a set, and his young stock grew so well, that he estimated his crop at 10,000 bushels. Cultivators from Providence and Boston came down and bargained with him to take it all about the middle of April, but the last of March there came a gale which drifted so much sand upon the oysters that they had not strength, after the severe winter, to 'spit it out,' and before they could be taken up so many died that only 3,000 bushels were sold. There had been an immense excitement over the seeming success of oyster culture; a joint-stock company had been formed and the whole harbor taken up; but this storm put an end to the enthusiasm, and everybody, except Mr. Merwin and his two sons, retreated. Mr. Merwin, however, saw that the trouble lay in the shallowness of the water. He therefore went down to Pond Point, eastward of the harbor, and buoyed off 200 acres in water from 25 to 40 feet deep, upon a hard gravelly and sandy bottom. He placed upon this ground a quantity of full-grown oysters and shells and secured a large set, which has been augmented each year since, until he now has 100 acres under cultivation. In 1877 there was a very heavy set hereabouts; in 1878 less, and in 1879 least of all.

"Having thus got assurance of a profitable farm, for storms no longer seemed able to affect him, Mr. Merwin saw that he needed more rapid and sure means of harvesting his crop than the row-boats and skiffs afforded. He therefore employed the firm of Lockwood & Co., of Norwalk, to build him a steamer for the express purpose of dredging, and introduced the proper

machinery for that work. With this steamer, which is to a large degree independent of wind and weather, he can do three times the amount of work possible for the same number of dredges worked without steam (500 bushels is not an uncommon day's result with two dredges), and do it best on the 'dull' days, when it is too calm for his neighbors' sloops to work. Its owners often find profitable employment for their leisure in chartering the steamer to other oystermen, who desire aid in dredging or in raking off the starfish that infest some beds. One single instance of the advantage the use of steam was to this firm will be pardoned. In the spring of 1879 a Rhode Island planter sent a sloop, capable of carrying 1,500 bushels, to New Haven to buy small seed. The Merwins were invited to contribute to the cargo, the captain of the sloop buying on the principle of 'first come, first served,' until he had filled up, haste being the great desideratum. It happened that upon the very day the sloop arrived a dead calm fell, and not a sloop from Fair Haven or Oyster Point could haul a dredge. Meanwhile Mr. Merwin's steamer was puffing back and forth through the quiet sea, without an hour's cessation, and in two days placed 1,200 bushels of seed upon the sloop's decks.

"There are two rivers which come down to the sea at Milford, the pleasant Wepawaug, along whose banks the town lies, and whose upper waters turn numerous mills; and Indian River, which empties into the harbor close by the mouth of the former stream. Indian River debouches in an estuary called the Gulf, or Gulf Pond. Except in one little spot no oysters grow now, or ever did grow, in this inclosed salt-water pond, although it would be the best possible place to cultivate them. But the popular feeling of the town is so strongly against the utilization of these advantages by private effort, that no ground is permitted to be set off, and any oysters put down there are liable to be seized as public plunder. Once, indeed, the oyster committee assigned to Mr. Merwin a tract in the gulf; but as soon as it was found out, an indignation meeting was held and mob law was loudly threatened. Cooler judgment overruled that, but any cultivation of this valuable ground, otherwise wholly useless, was sternly interdicted.

"Inspired by Mr. Merwin's success and pluck, various persons have taken up ground in the vicinity of his tract off Pond Point, amounting in the aggregate to about 750 acres, divided among eight owners. One of these gentlemen, in addition to 100 acres here, has several smaller tracts at different points along the shore to the westward; in all, about 400 acres, upon which some thousands of bushels of young oysters are growing. There is plenty of good bottom still remaining off this shore, however.

"SEED OYSTERS AT STRATFORD AND VICINITY.—Having passed to the westward of New Haven and Milford Harbors, we come upon a new feature of the oyster business. This is the systematic dredging of natural beds in the sound and along the inlets of the shore, for seed to be placed upon the artificial beds in the eastern part of the sound, in the East River, and on the south shore of Long Island. This department of the business will demand more and more attention as I progress toward its headquarters at Norwalk. The most easterly natural bed which these dredgers attack is one off Clark's Point, just east of the mouth of Oyster River. (In Oyster River itself, by the way, no oysters have ever been known within the memory of tradition, although that name appears in a map drawn prior to 1700.) The next natural bed consists of a reef, 5 acres in extent, on the western side of Pond Point. Beyond that, off Milford Point, at the mouth of the Housatonic, lies the Pompey bed, which afforded sustenance to the sea-hut colony that used to frequent Milford Point, and where now a crop can be gathered about once in five years.

"Upon the opposite side of the entrance to the Housatonic lies one of the principal seed-grounds in the sound; that side of the Housatonic River is one vast natural oyster-bed all the way from Stratford Light up to the bridges, a distance of about 3 miles. There are many persons who

live along the shore in Stratford, who devote almost their whole time to the gathering of the young oysters and selling them to the vessels which in summer throng the bay. They get from 15 to 25 cents a bushel, and there are perhaps fifty men who make this a business.

"In May sloops and small schooners begin to come after the seed, which is of a year's (or less) growth. They hail principally from Norwalk and its vicinity. This fleet gradually increases, until in mid-summer there are sometimes to be seen from seventy-five to one hundred vessels at once in the mouth of the river. These vessels do not dredge for the seed. They anchor near the bed and send out skiffs, with a crew, who tong the oysters up until their skiff is full, when they take it to their vessel to be unloaded. From one to half a dozen skiffs are employed by each vessel, which is thus able to load up quickly, go home with its cargo, and be ready to return. To avoid any loss of time, however, in voyages back and forth, some owners of beds keep one or more vessels anchored in the Housatonic all the while, upon which the crews live, who load other vessels that are constantly passing back and forth. The rapidity of this work is shown by the fact that one man with two assistants will put upon his sloop a full cargo of 500 bushels in two days, and be off and back in another two days, ready to go at it again. Persons who live upon the shore, and who claim to found their estimate on trustworthy facts, say that 400,000 bushels of seed were taken off these Housatonic beds between May and November, 1879.

"Notwithstanding this heavy and long-continued drain these nurseries do not seem in danger of depletion. Few oysters, of course, manage to reach maturity, but there are enough to furnish spawn to repopulate the district, which the constant scraping fits in the best possible manner for securing a set. The people of Stratford, however, are beginning to object to longer allowing an unrequited privilege to everybody to rake the beds. Such an indiscriminate crowd embraces many loose characters, and frequent petty annoyances, with some serious trespasses, have occurred on shore. There seems no way to get rid of the nuisance, however, except to declare the whole ground available for culture and stake it off. This is urged by some of the shoremen, who think they see in this plan some chance of making the meadows and river bottom a valuable property, and a blessing instead of a curse to them. This meets with considerable opposition, however, and the old foolishness about 'natural beds' seems an unsurmountable obstacle. Every year the staking off and cultivation of this river bottom is delayed Stratford loses by it in a way she will one day regret. Stratford also possesses along her front very good deep-water ground, running from Stratford Point to the Middle Ground, which remains to be utilized. The Housatonic seed, however, could not be utilized on this outer ground, since it is the long, fresh-water variety, which would not flourish in water so salt as that of the outer sound.

"OYSTER BUSINESS AT BRIDGEPORT.—At Bridgeport there is a small but flourishing oyster business, participated in by three firms of planters. The natural oyster-producing ground off this harbor extended from Stratford to Black Rock, a distance of about 5 or 6 miles, but by 1850 it had become exhausted of all salable oysters, and even became of little value as a seed-producing area. Previously to that seven boats were owned at Bridgeport, all of which, since 1850, have been obliged to go elsewhere or change their work. Long ago, however, a Fair Haven man utilized ground at the point of the beach, at the mouth of the harbor, to bed down southern oysters, and his example was followed in a small degree by Bridgeport men. The first planting of native seed, however, was not until 1844, young oysters being brought from the Saugatuck and from Westport. At present Stratford and Housatonic seed is chiefly used. For opening purposes the Housatonic River seed is regarded as the best, because it becomes salable one year quicker than the sound

seed; but for shipping in the shell the deep-water seed produces more profit, though of slower growth, the mature stock being single, shapely, and of large size.

"The practice of catching seed-oysters on shells prevails here with much success, but will be so fully discussed in a future chapter that I refrain from doing more than mention the fact here; and add that Mr. Wheeler Hawley, the largest planter at Bridgeport, believes himself to have been one of the first, if not *the* first, to adopt this method of oyster culture in Long Island Sound, putting the date of his experiments at 1853.

"Replying to my questions in regard to methods and cost of following this practice in this harbor, one of the planters informed me that, in his case, he counts expenses per acre in preparation of oyster-bottom as follows:

500 bushels shells ("stools") at 5 cents	$25 00
50 bushels of "spawners" (unculled)	12 00
Total cost of seeding	37 00

"From this he thought he ought to take up 1,000 bushels of seed to the acre of marketable oysters after two years, with a remainder left for the third year. The cost of taking up would be about 20 cents a bushel. If seed-oysters are bought to be placed upon the ground, from 25 to 60 cents a bushel must be paid for them.

"The total acreage under cultivation at Bridgeport, for which a rental of $2 an acre is paid to the town, is about 110 acres. On this ground there were raised in the winter of 1879–'80 about 8,000 bushels, which were mainly sold in the shell to New York buyers, at an average of about $1.12½ a bushel. These oysters were large and fat, often opening six quarts to the bushel, as I was informed. In 1857 they brought $12 a barrel.

"The fleet employed by the oystermen here consists of nine sail-boats, worth, perhaps, $2,500 in total; the care of the beds and running of the boats give support to about a dozen families, and occasional wages to others at the height of the season, the pay being about $2 a day.

"OYSTER BUSINESS AT WESTPORT.—Westport is a little harbor on the Saugatuck River, one of the most beautiful of the many charming streams that debouch along this part of the coast. The river has long been celebrated for the abundance, large size, and excellent flavor of its natural oysters. They grew almost continuously, in favorable seasons, from the mouth of the river up to the village bridge, a distance of about 4 miles, and the farmers who lived along the river were accustomed to gather them in any desired quantity, without a thought of exhausting the supply. The depletion came at last, however, and now few marketable oysters, native to the Saugatuck, are ever procured.

"Some years ago, when attention was first called to the desirability of transplanting oysters and raising them upon artificial beds, the Westport men staked off a large area at the mouth of the Saugatuck. No ground within the river, however, was allowed to be assigned, the town reserving all this as 'common ground,' where seed might be gathered by poor men and everybody, to be sold to the planters. The amount of seed thus procured annually varies greatly with different years. The highest trustworthy estimate given me for any one year (and this not recently) was 50,000 bushels. Last year, however, only about 4,000 bushels were caught; half was planted locally and half sold to outside buyers. In midsummer a score or so of men in skiffs may often be seen in the river at once raking seed-oysters, but these work only occasionally, and there are less than a dozen men who really derive their support 'by following the creek' (chiefly oystering) in the whole town. The seed used is between one and three years of age, and it is sold by the skiff-

men for 35 or 40 cents a bushel. Smaller mixed stuff sometimes sells for 20 cents. There are only two or three sail-boats devoted to this work.

"The first efforts at planting were made in the mill-pond east of the village—a pond of salt water about 40 acres in extent. The bottom of this pond is a soft mass of mud, not barren, clayey mud, but a flocculent mass of decayed vegetation, &c., apparently inhabited through and through by the microscopic life, both vegetable and animal, which the oyster feeds upon. Although the young oysters placed there sank out of sight in this mud, they were not smothered, on account of its looseness, but, on the contrary, thrived to an extraordinary degree, as also did their neighbors, the clams and eels, becoming of great size and extremely fat. Ten years ago oysters from this pond sold for $3 a bushel, and for one lot $16.50 is said to have been obtained. Before long, however, a rough class of loungers began to frequent the pond, and the oysters were stolen so fast that planting there has almost wholly ceased, and prices have greatly declined.

"Something over 500 acres of oyster ground have been set apart in the waters of the sound belonging to Westport. This ground lies in the neighborhood of Sprite's, Hay, Calf-pasture, and Goose Islands. Two-thirds of it is owned by Norwalk men and other non-residents, and therefore the town has derived no revenue of consequence from it.

"The principal planter in town is Mr. Eli Bradley, who gave me the most of the information obtained here. He has been long engaged in the business, and has planted many thousands of bushels of seed upon his beds, as also have his neighbors; but there has been so much litigation concerning boundaries, so much actual thieving, and so incessant persecution by the starfishes and drills, that not much has been realized. Last year (1879) no oysters whatever of consequence were placed in the market from these beds. Outsiders, however, shifted certain oysters into Westport waters temporarily and saved a good crop, the figures relating to which appear elsewhere. All the residents at Westport assert strongly the extreme suitability of their ground for successful oyster-raising, barring the damages inflicted by the starfishes, which they think they can keep free from with sufficient labor.

"SOUTH NORWALK.—Just eastward of Rowayton lies the city and harbor of South Norwalk, one of the most important oyster-producing localities in Long Island Sound, as well as one of the 'oldest.' The bay at the mouth of the Norwalk River is filled with islands, which protect the shallow waters from the fury of the gales. This whole bay, in old days, was full of native oysters from the sound all the way up to Norwalk itself. Long before the elaborate means for growing oysters at present in vogue were thought of, therefore, Norwalk supplied the people of that region with fine, large, natural oysters, just as it had for centuries been a store-house of shell-fish food to the Indians, the remains of whose feasts and feasting places are still to be found.

"About forty years or more ago, however, the natural beds in the vicinity of Norwalk Harbor had become so depleted that they no longer afforded to anybody employment that amounted to anything; nor was it until toward the year 1850 that any transplantation of seed, or anything in the shape of the propagation, was attempted. The business of oyster-growing here therefore, which at first sight seems of immemorial age, is only about thirty years old. The history of its growth need not be given here. It will be sufficient to publish the statistics I have accumulated in regard to the present status of the business at this point.

"The principal planters and shippers at South Norwalk (with which I include its suburb, Village Creek) are the Hoyt Brothers, Graham Bell, Oliver Weed, C. Remsen, Raymond & Saunders, Peter Decker, the Burbanks, and several others who raise more than 1,000 bushels a year. In addition to these there are many men who have small beds which they keep increasing as fast as circumstances permit, and who make a part of their living by working at wages for planters

whose operations are more extensive than their own. There is one firm, for instance, which employs the services of eighteen or twenty men nearly all the time, and in some seasons largely increases this number. These smaller planters sell their little crops of from 100 to 1,000 or 1,500 bushels to the half a dozen shippers, chief among whom are the Hoyt Brothers and Mr. G. Bell, wisely preferring cash, at a small discount, to the trouble and risk of themselves taking their oysters down to New York, or elsewhere, in hopes of a slighty larger price.

"The total production of this locality, during the season of 1878–'79 (the present season, 1880, will probably be found not greatly to differ from it), is given at about 65,000 bushels.

"These oysters, as I have said, were the property of fifty planters, which gives an average of 1,300 bushels to each one. It is probable, however, that as many more persons got their living out of these oysters, from first to last, so that I do not hesitate to say that one hundred families in South Norwalk and its immediate vicinity are supported by the cultivation and sale of oysters there. The estimate of two hundred families, which I have often heard made, is undoubtedly too high. This question is ever a hard one to answer, because, in many cases, the head of the family depends only partially upon his professional means of support, the attention he pays to it and the income he derives varying with each good or bad season. Most oystermen are also farmers or fishermen. Many of them also keep summer hotels, and thus add largely to their income during the dull season at the beds.

"Every supposed available spot for oyster operations, probably, is now set apart for that purpose, not only inside of the Norwalk Islands, but also in the outside waters of the sound off the mouth of the harbor. Only a portion of this is in use, however; in all, about 680 acres out of 2,300, in round numbers, which have been designated in Norwalk harbor. The average production at present, therefore, is less than 100 bushels to the acre of land actually cultivated, and only about 28 bushels to the acre of bottom held for the purpose of oyster cultivation. I see no reason why future years ought not to see ten times as large a proportion.

"The fleet of Norwalk used by the oystermen in their business consists of two steamboats, a dozen sloops, and about thirty sharpies and sail-boats, of less size and value than the 'sloops,' most of them being without decks. Besides this there are skiffs innumerable. This disparity in the number of large sloops between so important a place as Norwalk and some of the small ports westward is explained by the fact that the planters here do not often themselves take their goods to New York.

"From a particular part of Norwalk harbor, many years ago, came to Tom Donan's famous old shop in Broad street, New York, the original 'Saddle-rocks,' named from the reef around which they grew. These oysters were so large that twenty-five would fill a bushel basket, yet they were tender and luscious, and often sold for from 15 to 30 cents apiece. But they were not very numerous, and the raking of them was so profitable that the supply was quickly exhausted. Like the generous host who gave them name and fame, they have long ago departed except from the branding-iron and sign-board of the dealer, whose 'Saddle-rocks' now may have come from anywhere except Norwalk.

"That is the story as I was told it at South Norwalk; since writing it I have seen an article on the subject, taken from the New York Observer and vouched for by the Rev. Samuel Lockwood, who speaks of the writer as 'our friend, Dr. O. R. Willis.' This article places Saddle Rock on the opposite shore of the sound. It reads thus:

"'The original Saddle-rock was not only very large, but possessed a peculiar, delicious flavor, which gave it its reputation. And it received its name because it was discovered near a rock

known as Saddle Rock. A high northwest wind, continued for several successive days, always causes very low tides in Long Island Sound and its bays. On the farm of David Allen, situated near the head of Great Neck, on the eastern shore of Little Neck Bay, is a rock about 20 feet high, and from 15 to 20 feet in diameter. The shape of the top of this rock resembles somewhat the form of a saddle, and from that circumstance is called Saddle Rock. At low water the upper or land side of this rock is left bare, while the opposite or lower side is in the water. In the autumn of 1827, after a strong northwest wind had been blowing for three days, a very low tide occurred, and the water retreated far below the rock, leaving a space wide enough for a team of oxen to pass quite around it. This extraordinary low tide revealed a bed of oysters just below the rock. The oysters were very large, and possessed the most delicate flavor; we collected cart-loads of them, and placed them in our mill-pond (tide-mill). The news of the discovery spread among the oystermen, and boat-loads soon found their way to the city, where, on account of their excellent flavor, they commanded fancy prices, even reaching $10 a hundred—an enormous price for those days. In a very short time the locality was exhausted, and for more than forty years there has not been a real Saddle-rock oyster in the market.'

"ROWAYTON, DARIEN, STAMFORD, AND GREENWICH.—The next point is the very important station known as Five-Mile River or Rowayton, where the cultivation of oysters has been systematically pursued for many years. In all, at present, there are about thirty-five planters or firms, and nearly or quite as many families are supported. The little creek-mouth is perfectly filled with oyster-boats, and the other conveniencies of this pursuit. I find upon my list of the oyster-fleet twenty-eight sloops and sail-boats, which belong here, some of them very large and well built. I estimate the value of these 'sail' and the other floating and shore property at Rowayton, directly concerned in the oyster trade of the port, at not far from $30,000. Rowayton produced, in 1879, which was considered a very poor year, something near 50,000 bushels. How far this is beneath occasional crops, if not beneath the recent average, is shown by the statement made to me that about five years ago a single dealer in New York City bought 32,000 bushels of Rowayton oysters. Little of the stock raised at this point fails to reach New York, and within the last three years Rowayton has supplied a large proportion of the oysters sent to Europe, partly by direct shipment. Like all other parts of the East River, the oysters are sold here wholly in the shell, and almost always by the barrel or bushel—the selling 'by count' belonging to the region farther west and to the Long Island shore.

"At Darien about 3,000 bushels a year are sold from about 250 acres. They have ten or a dozen sail-boats, and a value in oyster interests, generally, of perhaps $5,000.

"The next oyster-producing point is Stamford, where, also, I found the planters bewailing the decline of their fortunes. The number of men raising oysters is about a dozen, and perhaps as many more are employed. From about 150 acres of improved harbor bottom Stamford yielded for market, in 1879, about 5,500 bushels of oysters, the majority of which was shipped to New York. Their fleet counts up nine sloops, which, with boats, floats, and so forth, are stated to be worth about $15,000. The principal men at Stamford are A. M. Prior and Capt. John Decker.

"The next point westward, and the last in Connecticut, is Greenwich, where, at Mianus, Cos Cob, Greenwich Cove, Old Greenwich, and Greenwich, a large business is done and a large number of persons is engaged, though oysters are not now raised here to as great an extent nor of so fine quality as formerly.

"The mouths of all the rivers and each of the many coves that indent this rocky coast are filled with planted oysters, though a general feeling of discouragement, arising from various

causes, prevails. In all about 800 acres are under cultivation, all in shallow water, and the total annual product for last year of the whole region may be set down at 33,000 bushels, the majority of which was taken to New York in the boats of the respective owners, and sold to the dealers at the foot of Broome street.

"The number of families supported in this township out of this occupation it is hard to state. I estimate it at about forty. The craft employed amounts to one steamer, about thirty sloops, and perhaps one hundred small open boats. These, with other estimated fixtures, foot up an invested capital approaching $30,000, exclusive of oysters now growing on the beds."

PART VI.

NEW YORK AND ITS FISHERIES.

By FRED. MATHER.

ANALYSIS.

A.—General Review of the Fishery Interests of the State:
- 112. Statistical recapitulation.
- 113. Introductory remarks regarding Long Island.

B.—The North Shore of Long Island:
- 114. Explanatory statements with statistics.
- 115. Flushing Bay.
- 116. Little Neck Bay.
- 117. Hempstead Bay.
- 118. Oyster Bay.
- 119. Huntington Bay.
- 120. Smithtown Bay.
- 121. Conscience Bay and vicinity.

C.—The Eastern End of Long Island:
- 122. General description of the fisheries.
- 123. The fishing towns between Baiting Hollow and Southold.
- 124. Greenport and its fisheries.
- 125. The fishing towns between East Marion and Southampton.

D.—The South Shore of Long Island:
- 126. Explanatory statements.
- 127. Shinnecock Bay.
- 128. Moriches Bay.
- 129. Great South Bay.
- 130. South Oyster Bay.

E.—The West End of Long Island:
- 131. Explanatory statements.
- 132. Jamaica Bay.
- 133. Sheepshead Bay.
- 134. Gravesend Bay.

F.—New York Harbor:
- 135. General description of the fisheries.

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PART VI.

NEW YORK AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

112. STATISTICAL RECAPITULATION.

GENERAL STATEMENT.—New York takes a prominent place in the fisheries, coming fourth on the list of the fish-producing States, with products valued at $4,380,565, and in several special branches holds a still more important position. The menhaden fisheries are more extensive than those of any other State, and in 1880 the value of the oil, scrap, and compost reached $1,114,958, being more than half the yield for the entire country. The products of the oyster fishery for the same period reached $1,577,050, representing a greater value than that of any State, except Maryland, Virginia, and New Jersey. The fishermen secure annually larger quantities of both quahaugs and soft clams than those of any other State. In 1880 the amount of money realized by them from the sale of these two species exceeded half a million dollars. In the shad fisheries, this State is surpassed only by North Carolina and Maryland.

STATISTICAL RECAPITULATION FOR 1880.—The following statements show in detail the extent of the various fishery interests of the State for 1880:

STATISTICS OF THE FISHERIES OF NEW YORK.

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	5,650
Number of shoremen	1,265
Number of factory hands	351
Total	7,266

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels	*541	$777,600
Boats	3,441	289,885
Pound-nets	87	43,500
Fykes, pots, and baskets	3,950	6,750
Gill-nets	10,016	93,127
Purse-seines	126	50,400
Drag-seines	1,418	78,013
Minor apparatus, including outfit	.....	117,810
Factories and shore property	.....	1,052,400
Additional cash capital	.....	119,500
Total capital	.....	2,629,585

*11,582.51 tons.

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total of fishery products	333, 522, 813	$4, 380, 565
Sea fisheries.		
Bluefish	3, 000, 000	67, 500
Clams (hard)	2, 795, 480	262, 110
Clams (soft)	3, 407, 750	255, 581
Cod	3, 580, 000	67, 125
Crabs	1, 624, 583	69, 234
Lobsters	135, 000	5, 062
Menhaden (including that used for food)	288, 931, 200	1, 114, 958
Oysters	7, 303, 100	1, 577, 050
Squeteague	4, 000, 000	120, 000
All other species	11, 008, 100	522, 125
Total for sea products	325, 785, 213	4, 060, 745
River fisheries.		
Alewives	250, 000	8, 750
Shad	2, 733, 600	136, 680
Sturgeon	144, 000	8, 640
All other species	540, 000	15, 880
Total for river products	3, 667, 600	164, 950
Great Lake fisheries.		
Trout	569, 700	23, 100
White fish	1, 174, 000	56, 000
All other species	2, 326, 300	75, 770
Total for Great Lake products	4, 070, 000	154, 870

113. INTRODUCTORY REMARKS REGARDING LONG ISLAND.

Long Island may be divided into four districts, which are distinct in the character of their fisheries, as well as in their geographical position. Each one of these faces one of the cardinal points of the compass. The divisions are: (1) the North Shore, extending from Astoria to Roanoke; (2) the East End, including Peconic and Gardiner's Bays, the sound fisheries to the north of them, and the sea fisheries lying south; (3) the South Side, including the bays of Jamaica, South Oyster, Great South, Moriches, and Shinnecock; and (4) the West End, including New York and Gravesend Bays and the East River. The character of the fishing in all these districts is such that it is a most difficult matter to determine how many men are engaged as professional fishermen and how many as semi-professional, from the fact that they are fishermen, oystermen, farmers, clammers, yachtmen, and gunners by turns, following either one of these occupations at different seasons as their interest or inclination leads. A description of these men is given in the section of this report devoted to the fishermen.

Most of the wealth of Long Island has been derived from the waters surrounding it. In the western portion, where the soil is good, market gardening was once very profitable, owing to the proximity of New York; but since the introduction of steam as a motor, the increased facilities of transportation have led other States, and even the distant Bermudas, to compete for the early vegetable trade of the great metropolis, so that the business, although still extensively carried on, now yields much smaller profits than formerly. But the sea has contributed even to this source of income, since the principal fertilizers used have always been marine products, such as fish and seaweed.

The eastern end of the island is sandy and but little adapted to agriculture. The whale fisheries formerly furnished subsistance for most of the inhabitants there, and on the decay of that industry they turned their attention to the menhaden and other fisheries.

The oyster and clam business now exceeds in value the fisheries proper, and furnishes employment to a greater number of men, and the business is increasing yearly. The demand for small oysters for shipment to Europe has changed the market so that those which were formerly sold to "open" and market by the gallon at a small price are now sought for at a great advance; and such is the influence of fashion that the Americans have begun to imagine that they can detect the superiority of these smaller "Blue-points" to the large "Saddle-rocks"—names which formerly designated oysters from particular localities, but are now applied, the former to small and the latter to large oysters, regardless of the region whence they come. The figures relating to the water products shipped by railroad to the western terminals, including New York and vicinity, were furnished by favor of Mr. H. M. Smith, general freight agent of the Long Island Railroad. In certain localities all the products go by rail; at other points only a portion are so carried, while at some places near the city nearly all shipments are made by water.

B.—THE NORTH SHORE OF LONG ISLAND.

114. EXPLANATORY STATEMENTS, WITH STATISTICS.

EXPLANATORY STATEMENT.—The western half of the north side of the island, beginning on the west at Flushing and extending east to Port Jefferson, includes all that is of importance in the fisheries. The eastern half has an unbroken coast line, without bay or indentation, and furnishes no point of land to protect a pound-net from storms until Horton's Point is reached, which, for convenience, has been included in the eastern section. The country between Port Jefferson and Roanoke Point, which is nearly opposite Riverhead, is sparsely inhabited, and differs in character from the western half. The latter is a high rolling country, with its hills well wooded, and abounding in deep bays, which are well land-locked and form excellent harbors.

RECAPITULATION.—There are on the north side of the island 1,081 men engaged in the fisheries, of whom 1,000 are oystermen, and 2,586 persons are directly dependent upon their labors. They have invested $38,650 in boats, $15,000 in nets and tools, and $342,200 in oysters. They produce, and either market or consume at home, 426,300 bushels of oysters, 156,900 bushels of hard clams, 190,600 bushels of soft clams, 6,000 bushels of mussels, 2,000 pounds of scallops, 6,000 shad, 37,000 pounds of eels, 1,405,500 pounds of other fish, and 3,106 barrels of crabs, besides $24,500 worth of menhaden for manure.

115. FLUSHING BAY.

FLUSHING.—In the spring of the year about six pound-nets are set in Flushing Bay for shad and striped bass. Each pound has a "heart-bowl" and a leader running out from 400 to 500 feet. There is no spawning place for shad here, and why they enter the bay is not known. They are said to be going east when taken. Four thousand were taken last spring, and although this has been the average for five years past, it is considered far from satisfactory, and it would not pay to wet the nets but for the menhaden taken at the same time. The latter are used for manure here, and bring 10 cents per bushel, which contains about 100 fish. One man, Mr. O. C. Durling, says that when the northeast wind blows, more shad are taken than at other times, as they then come into the bay for shelter. Bass have been scarce this year, only 3,500 pounds having been taken. Ten years ago the bass were plenty, but they are gradually decreasing.

Twenty men, with six cat-rigged boats, measuring 4 or 5 tons each, are engaged in carrying clams and oysters. Few oysters are taken in the bay, the men being mainly clammers. "Flushing Bay clams" are larger than "Little Necks," and are solid and fat. The shells of the first are dark, while those of the latter are light, a difference traceable to the dissimilarity of their habitats, the former being embedded in the dark mud of the bay, while the "Little Necks" are found in the sand. Last year 5,000 bushels of oysters and 30,000 bushels of hard clams were marketed, all the shipments from this place being by boat to New York.

Of the score of men interested in the fisheries fourteen are married; including the families of these, we find sixty-five persons dependent on the fisheries at Flushing. Oysters are planted and beds claimed. The capital invested in the fisheries is as follows: In nets, $3,000; in boats, $3,000; in oyster-beds, seed, tools, &c., $8,000.

COLLEGE POINT.—Four men from this locality oyster in Flushing Bay, using two boats of 4 tons each. Daniel Hill is the principal planter. Three of the men are married, having eight persons depending upon them; $6,000 invested; product, 8,000 bushels. All shipments by boat.

116. LITTLE NECK BAY.

OYSTER GROUNDS.—The oyster grounds in the bay are free of cost, but are staked off in private claims and planted. This gives a man a right which is respected by his neighbors, but he has no legal claim upon it. The seed is usually obtained from the East River, and is worth 25 cents per bushel.

Edward Radcliffe, of Great Neck, has 7 acres staked off, on which he plants yearly 50 bushels of seed to the acre. He says it takes them three years to mature. At the time of my visit, December 8, it was too cold to work the night tides, and there had been only three of the day tides in the past week when he could work. On these three he made $27. The clam grounds are free. Comparatively few fish are taken. Shad are caught in pounds, fykes, and seines. During the run of shad there are five pound-nets set in the bay. There is not much other fishing, except for sport. There have been no smelts, scallops, or terrapins in the bay for the past ten years.

WHITESTONE.—There are forty men here engaged in fishing, oystering, and clamming, of whom twenty-two are married. There are, in all, one hundred and twelve persons dependent upon these industries for support. Seven vessels of 25 tons are used, one of 15 tons, and five of 4 tons. Some shad are taken in the spring, but not so many as formerly; 2,000 were taken last year, together with 3,000 pounds of bass, and $2,000 worth of menhaden for manure; 4,000 pounds of weakfish were taken in the fall of 1879. John Webster is a large oyster shipper. He ships 2,000 bushels per year, and other parties ship 2,500 bushels, making a total of 4,500 bushels, with 40,000 bushels of hard clams, and 100 bushels of soft clams, shipped annually. Capital in boats, $6,700; in oysters, tools, &c., $32,000. A few shipments are made by rail, but the majority are sent by boat. In the year ending June 30, 1880, 67 barrels of oysters, 858 barrels and 2 bushels of hard clams, and 100 pounds of fresh fish were carried by rail. Most of the fish taken are consumed locally.

LITTLE NECK.—There are two fishermen and thirty oystermen and clammers here. Of these, eight are married, and, including their families, there are one hundred and ten people dependent on the fisheries. Eight sloops, aggregating 75 tons, are employed, only one of which measures over 20 tons. Not over 200 bushels of soft clams are taken, the principal part of these being consumed on the island. The hard clams from this bay have a good reputation among epicures, and are in great demand at the time when oysters are out of season. They are most esteemed when about the size of a quarter dollar, and are usually eaten raw. The bottom of the bay is sandy, and

the shells are light colored. Some of the shad and bass are sent to market, but most of the other fish are consumed locally. Capital invested, $6,000 in boats and tools; $2,000 in oyster-beds, and $1,000 in nets. Ten thousand bushels of oysters and 50,000 bushels of hard clams are marketed.

GREAT NECK.—The oyster business is the principal interest of this locality. There are twenty men engaged in it, of whom ten are married, and a total of sixty-two persons are dependent upon the business. All shipments go in boats owned at Little Neck. A total of $5,000 is invested in seed.

PORT WASHINGTON.—This place has a greater number of persons engaged in oystering than any other point in the bay. Two hundred men are engaged in the business, about eighty of whom are married; and the whole population, numbering between six hundred and seven hundred, is dependent on the fisheries. The average yearly sales are: Oysters, $60,000; hard clams, $10,000; soft clams, $200. There are not fish enough caught for home consumption. Some are bought from the codfish smacks, and some are brought from New York to supply the demand. The railroad does not reach this place, and all shipments go by boat. No oysters are opened, and the greater part go to market in bulk in sloops, some going in baskets and barrels by steamer. Soft clams go in shell, and but few are taken, although in former years they were plenty. All vessels owned here or in this bay hail from New York. There are two sloops measuring over 20 tons, twenty others ranging between 10 and 20 tons, and an equal number of smaller size. About $3,000 worth of menhaden are taken yearly for manure, and some crabs, perhaps 1,000 barrels, are taken for home consumption. Some tautog, or "blackfish" (*Tautoga onitis*) are taken, as well as a few sheepshead. Formerly weakfish were plenty, but few are found at present. All these fish are consumed here, together with about 3 tons of flounders.

117. HEMPSTEAD BAY.

THE FISHERIES OF HEMPSTEAD BAY.—This bay has much the same character as Little Neck Bay, but does not seem to be so prolific of oysters and clams. Perhaps not over seventy-five men live from fishing and oystering. The people living at the bay get most of their fish from New York, except flounders and tomcod (frostfish). Quite a number of small bluefish are taken, with an occasional large one of 6 to 10 pounds weight. The natural growth of oysters here is poor, and the planters send south for seed. A few terrapins were taken some years ago, but the species has now nearly disappeared. Scallops have also been taken, but not recently.

ROSLYN.—There is no commercial fishing here. Thirty men occasionally rake for oysters and clams, but do not depend entirely upon this business. They have merely a skiff and a rake, the entire outfit costing less than $45 per man. Of these thirty men one-half are married, and have forty children, making eighty-five persons partly dependent upon the business, perhaps equaling forty persons wholly so. They gather several thousand bushels of oysters and a considerable quantity of clams yearly. Mr. Thomas Clapham, a yacht builder and well-known fishculturist, lives here, and has a trout pond, in which persons may fish for an equivalent. Year before last, besides his revenue from the above source, he sold $250 worth of trout; last year $240 worth, and this year $80 worth. One of his ponds covers 2 acres.

GLEN HEAD (GLENWOOD).—There are fifty men fishing for clams and oysters in this locality. Thirty-five of these are married, and a total of two hundred persons are dependent on the business. There are two sloops measuring 22 tons each, five measuring 9 tons each, and three of 4 tons, or 101 tons in all. Most of the products are shipped by boat, only 155 barrels of oysters and clams going by rail in the year ending June 30, 1880.

GLEN COVE.—There are fifteen men fishing for clams and oysters here; ten of these are mar-

ried, with sixty persons dependent upon them. About $5,000 are invested in seed oysters, and $2,500 represents the value of the boats and tools. One sloop of 15 tons and some skiffs and small boats are used. All shipments go by boat. Last year 20,000 bushels of oysters were sent. Cox Brothers also sent 1,000 barrels of hard and 250 barrels of soft clams to New York. There is no fishing, except for sport. A trout pond of 5 acres, owned by the Glen Cove Starch Company, is free to the public to fish from the shore, but not from boats. Some 2-pound trout are taken here, and one of twice that weight is recorded. At Mattinicock Point is a pond of 100 acres, which can be made fresh or salt, owned by Mr. Charles A. Dana, of the New York Sun. This pond could be utilized for fish or oyster culture.

118. OYSTER BAY.

This bay is a famous locality for oysters, and notwithstanding the line between Queens and Suffolk Counties strikes the bay at its eastern end, leaving Cold Spring on one side and the remaining villages on the other, the same laws prevail. The oyster beds are leased by the towns at 50 cents per acre, the number of acres being unlimited. Some oystermen object to this method of leasing, and a few of the principal ones refuse to pay the rental, staking off their claims and holding them by force. About three-fourths of the bay is staked off, and the greater portion is planted. The seed is obtained at Bridgeport, Conn., at 25 cents per bushel, which counts out about 5,000 oysters. It is not necessary to buy much when the spawn "sets" as it did this year and last. A few shipments are made by rail, but most of the catch goes by boat. A few lots have been packed for Europe. Soft clams are more plenty here than in the more western bays, but hard clams are not as abundant. Menhaden are taken in the spring of the year in seines for manure; about $5,000 worth were secured last spring. Many flounders are also taken for local consumption. Every few years there is a good crop of scallops; this year great quantities about the size of a quarter dollar may be seen; if these do not "winter-kill" there will undoubtedly be an immense crop next year. The fishermen tell me that a few scallops may be found at any time, but they are not always sufficiently abundant to render the fishing profitable. They say that the young in the first stages cling to the eel-grass until their weight bends the grass down or breaks it, when they drift out of the bay with the grass which goes out in the fall. Last spring the grass came in and brought young scallops, which they claim accounts for the quantity of young ones this year. There has not been a good crop in six years. A few terrapins were formerly taken, but not many are found of late. Not many crabs are caught. No fish are sent to market.

LOCUST VALLEY.—This is the terminus of one branch of the railroad, but there is no fishing here, as all of the fishermen of the region live on Oak Neck, at Bayville. One hundred and fifty barrels of oysters, 159 barrels of hard clams, and 66 bushels of soft clams in shell were sent by rail last year.

BAYVILLE.—Here we find a population of four hundred depending entirely on the fisheries; one hundred and thirty men are actively engaged, of whom seventy-five are married. About eighty women are frequently employed in opening soft clams and oysters. Mr. William R. Bell, postmaster, storekeeper, and oyster planter, estimates the average yearly revenue to be from $20,000 to $30,000, claiming that it sometimes reaches $50,000, $15,000 of which is from oysters. Thirteen sloops, of from 10 to 30 tons each, are employed; they are worth, on an average, about $1,000 each. Four small cat-boats, worth $100 each, and one hundred small row-boats are also employed. About $60,000 are invested in oyster beds. Most of the oysters go to New York and Connecticut by sail, steamer, and rail; a few are sent to Europe. James R. Ellison says that 500 bushels of hard and soft clams go from here each week; he sends 1,100 bushels of soft clams yearly, and from 300 to 500

bushels of hard clams during the season, which lasts from April to October; $2,000 worth of menhaden are taken.

OYSTER BAY.—This village has one hundred men interested in the fisheries; thirty-five of these are married, giving a total of three hundred persons dependent on the industry. Ten sloops averaging 14 tons, eight averaging 6 tons, and five of 4 tons are employed; $25,000 are invested in oyster beds and $2,000 in nets; $1,000 worth of menhaden are taken for manure in seines; 50,000 bushels of soft clams, 6,000 bushels of hard clams, and 75,000 bushels of oysters are taken.

COLD SPRING.—At Cold Spring Harbor, Oyster Bay, forty-five men are engaged in oystering during the season, and from December to April fifty others find employment on the clam flats. In this harbor there are 500 acres of oyster-beds planted under the regulations which govern the oystermen of the bay. The harbor is 3 miles long by 1 mile wide, three-quarters of the entire area being planted. Seven sloops, averaging 8 tons each, are used. In freezing weather, when the boats cannot run, shipments are made by rail. The total shipments are estimated at 25,000 bushels of oysters, 2,000 bushels of hard clams, and 18,000 bushels of soft clams; $2,000 worth of menhaden were taken.

SYOSSET.—This station, on the Long Island Railroad, sometimes receives a few barrels of oysters and clams from the bay when the boats are frozen in.

For the whole of Oyster Bay it is estimated that in the past year there were taken and consumed at home 300,000 pounds of fresh fish and 2,000 barrels of crabs.

119. HUNTINGTON BAY.

The principal products taken from this bay are mollusks. The fishing proper is almost wholly for supplying the villages of the locality, few, if any, being taken for shipment to New York, though considerable quantities are carried to the interior towns of the island. Many flounders and crabs are taken, but they are not shipped to any extent.

HUNTINGTON.—This village is situated on an arm of the bay which is well land-locked, and out of a population of 2,500, perhaps ninety men are engaged on the bay, of whom forty are married, giving a total of two hundred and fifty dependent upon the waters. Two thousand dollars' worth of menhaden are sold yearly for manure. The boats owned here are small ones, mostly skiffs; $1,800 are invested in boats, $8,000 in oyster beds, and $2,000 in seines. Many of the oysters are shipped in boats belonging to other places on the bay; 15,000 bushels of oysters, 20,000 bushels of hard clams, and 35,000 bushels of soft clams were shipped last year.

CENTREPORT.—Here we find one hundred men engaged in oystering, &c.; sixty are married, and not less than four hundred people depend upon the business for a living. Three sloops of 18 tons; 9 of 7 tons; and 15 of 4 tons sail from this place. About $100,000 are invested in the oyster business, and $3,000 worth of nets are employed in the fisheries; 50,000 bushels of oysters, 75,000 bushels of soft clams, and 25,000 bushels of hard clams were shipped last year; $3,000 worth of menhaden were sold for manure.

NORTHPORT.—Few fishermen live here. Most of the oyster planters in the adjacent waters live at Centreport. Mr. A. Ackley, an oysterman, resides here, but the figures of his business are blended with those of Centreport.

EAST NORTHPORT.—Fifteen men from this town and the adjoining country are engaged in oystering. They have no large boats; $150 will cover the investment in small boats; $1,500, in all, are invested in the oyster business. The bulk of the product is marketed in boats belonging to other places, though 363 barrels of oysters and 4 of hard clams were shipped by rail.

120. SMITHTOWN BAY.

This great bay is an indentation of the Sound into the shore line extending from Sugar Loaf Rock on the west to Crane Neck Point on the east, a distance of 7 or 8 miles in a line from point to point. It is not at all land locked. The Nissequague River empties into it, and Stony Brook Harbor, with its long inlet stretching east, called "Porpoise Channel," affords shelter for small craft. Formerly a number of pound-nets were set in the bay, near its eastern end, but on account of the scarcity of fish in this part of the sound they have been taken up. The fishing in the bay is done chiefly by men from other localities.

SMITHTOWN.—The are no fishing interests here worth noting, if we except the trout ponds of Mr. Aaron S. Vail and Mr. John M. Tyler. Mr. Vail is one of the oldest trout breeders in the country.

SAINT JAMES.—There are two or three fishermen here, but their catch is consumed at home. A fisherman from the next village estimated the products at 800 bushels of oysters; 500 bushels of hard clams; 900 bushels of soft clams, and 10,000 pounds of fresh fish.

STONY BROOK.—Eighty men, fifty of whom are married, live by fishing in the bay. With their children there are three hundred persons dependent on the fisheries. There are 16 sloops, aggregating 110 tons, used here, none of them being over 10 tons; $10,000 are invested in boats and tools and $20,000 additional in oyster beds. The shipments all go by boat; 20,000 bushels of hard clams, 30,000 bushels of soft clams, and 18,000 bushels of oysters were sold last year. About 20,000 pounds of fish, including flounders, bluefish, and other species found in the sound, were caught last year, the entire quantity being consumed locally.

121. CONSCIENCE BAY AND VICINITY.

Conscience Bay, and Setauket and Port Jefferson Harbors, lying between Old Field Point and Mount Misery Point, are practically one fishing ground, and it is almost impossible to separate the interests of the different villages. Port Jefferson Harbor is a favorite wintering place for pleasure yachts of the first class on account of its depth of water and its being securely land-locked.

SETAUKET.—Six men from this place devote their attention to oystering and clamming. John Sharpe and his son Charles buy soft clams at 40 cents per bushel, taking them across the island to Patchogue, where they sell them for $1. About 200 bushels were handled by them last year. There are two oyster planters, George E. Hand and William Risley; they secured 3,000 bushels of oysters last year. They employ two sloops of 500 bushels capacity. The catch is sent to Bridgeport, Conn.

EAST SETAUKET.—Fifty men from here are engaged in oystering in Port Jefferson Bay. Fully $25,000 are invested in oyster beds. The oyster business was not good this year; the oyster spat has not "set" well for four years. Thirty thousand bushels of oysters and 5,000 bushels of soft clams were marketed. Hard clams are plenty, and not less than 20,000 bushels were shipped. Eels are taken in pots of basket-work; 15,000 pounds were marketed. Twenty thousand pounds of fresh fish were taken for home consumption.

PORT JEFFERSON.—Thirty-five men from this town are engaged in the work on the bay; twenty are married and one hundred and thirty persons depend upon their industry. All shipments go by boat. Hard clams are taken in summer and soft clams in winter. Sometimes scallops are taken here, as well as crabs and lobsters. Many soft clams and oysters go from this place to Norwalk, New Haven, and Bridgeport, Conn. In former years oyster beds were free, but they are now leased by the town at $3 per acre, 4 acres being the limit allowed to one person.

This season 575 bushels of seed oysters were planted by Mr. Hand and others on the west side of the bay. The seed was purchased in Stratford, Conn., at 25 to 30 cents per bushel. This is the first season that any systematic planting has been done. Five thousand dollars are invested in the oyster business, and as much more in small boats, tools, etc., used for taking oysters and clams. Four of the boats are over 5 tons. Many flatfish are taken here in fykes and gill-nets for supplying the surrounding country; perhaps 50,000 pounds of all kinds of fish, excluding eels, are taken annually. The last-named fish are taken in pots and with the spear. Herbert Dayton took 3,000 pounds and other parties took 10,000 pounds. Bluefish, seldom exceeding 2 pounds in weight, are caught outside the bay in the sound; about 10,000 pounds were taken last season, half of which were sent to New York. The bay is full of small bluefish. Some white perch are taken with hand-lines, it being contrary to law to net them. Five years ago scallops were plenty and could be taken by the boat-load, but they have never been less abundant than now; only 2,000 pounds (opened) were taken last year. Charles M. Ivines is engaged in gathering and shipping mussels; in May and June he averaged 900 bushels per week, for which he got $1.25 per barrel. They are used mainly for pickling. Mussels are exceedingly plenty, but the demand is limited, and they are "full" in the spring only. Inquiry at the ship yards of John R. Mather, and of the sail-makers F. M. and A. Wilson developed the fact that nothing is now done here in building and rigging fishing vessels, and that the few vessels which are engaged in fishing only do a local business, none going to distant waters.

MOUNT SINAI.—This village is located on a bay to the east of Mount Misery Point. It contains six fishermen and oystermen. A little fishing is done with gill-nets for home consumption. A few hard and soft clams are taken, as well as a limited quantity of lobsters and crabs. Last year there were 800 bushels of oysters, 200 bushels of soft clams, 400 bushels of hard clams, 100 barrels of crabs, 2,000 pounds of eels, and 5,000 pounds of fresh fish taken. The brothers George W. and Samuel Hopkins have carp ponds between Mount Sinai and Miller's Place.

There are no fishing towns of consequence east of the above until we approach the district included in the next section.

C.—THE EASTERN END OF LONG ISLAND.

122. GENERAL DESCRIPTION OF THE FISHERIES.

This division, for convenience, will include the fisheries in Long Island Sound on the north, beginning at Baiting Hollow and extending to Orient Point, including those of Gardiner's and Peconic Bays. It will also include the fisheries of the Atlantic on the south, extending from the eastern extremity of the islands as far west as Southampton. The capture of menhaden for oil and fertilizers is extensively carried on in this region, and it is not an uncommon sight to see fifteen or more menhaden steamers lying at the wharf, at Greenport, on Sunday. Pound-nets are used. They are located as follows: On the sound shore there are three west of Horton's Point, and one just east of it; a fifth is placed just east of Rocky Point, and four others are located between that and Oyster Pond Point, at the extreme end of the northern shore. Inside of Oyster Pond Point, in Gardiner's Bay, are two other pounds, with three on Long Beach Point; two in Orient Bay; one on Shelter Island; one near Southold; two in Peconic Bay, between Jamesport and Mattituck; three in Little Peconic Bay; one on the eastern side of Hog Neck; two on the eastern

side of Gardiner's Island; two on Napeague Beach, and three in Fort Pond Bay; making, in all, thirty-one. These pounds are changed from place to place, their position depending largely on the run of fish. Fewer are fished now than formerly. Last year there were three more between Culloden and Shagwong Points, and a number of others on Gardiner's Island. They are usually constructed with a heart and bowl, although many have no heart but merely a funnel running into a square bowl, these being locally known as "traps." In my report I shall class them all as "pounds." They are all built in the usual manner of stakes and netting, with a leader running toward the shore, and are often owned by men who live at a distance and who own or lease the shore privileges. It is proposed to build one on a larger scale with iron piles, running out into the Atlantic from Napeague Beach, and circulars are out soliciting subscriptions to the capital stock. I take the following notice of it from the pages of Forest and Stream of December 2, 1880, headed "A Gigantic Fish-Trap":

"We have seen a circular headed 'The Long Island Fish Company,' which is now being circulated. It states that the company has been organized under the laws of the State of New York 'for the purpose of leasing and owning suitable locations for the erection of weirs, and erecting weirs or pounds (sometimes called traps) at such locations, and catching and selling all kinds of fish, and rendering fish for the oil and for fertilizers.'

"We also learn that the company has become the owner of a tract of land at Napeague Beach, near the eastern end of Long Island and a few miles west of Montauk Point. Here they propose to put out a monster trap; and as one built in the ordinary manner with poles would not stand a week on this straight line of the Atlantic beach, which is so frequently storm-swept, they propose to put down iron piles after the manner of the ocean piers at Long Branch and Coney Island. They have chosen a place where the island is only half a mile wide—Napeague Bay—an indentation in Gardiner's Bay being on the other side, where their vessels can load for Sag Harbor and where their factories and ice-houses can be built. There is no question about the millions of fish to be captured there, as all the fish which traverse the beach coming from the east, seeking the inlets of Shinnecock Bay and Fire Island, as well as those moving to the eastward to round Montauk and enter Gardiner's and Peconic Bays, or to enter Long Island Sound, traverse this route, and the fishermen often make enormous hauls there when the weather permits. Here, too, they come nearer the shore than at any other point, for there are no sand bars outside the beach to force them out for deeper water.

"This monstrous affair will fish night and day the year round, and take fish which should be allowed to fill their mission of spawning. They say 'a weir is fishing night and day, and not only catches the schools of fish accidentally seen from the shore or from the deck of a fishing smack, but catches everything that comes along, and schools of fish not apparent from the surface.'

"The weir is to run 600 to 700 feet into the ocean, into 30 feet of water, and with this they suggest that persons taking stock may receive a great return, say $1,000 per annum for every $100 invested, and assert that 'with the iron weir more menhaden can be caught than the whole fleet of boats can catch.' We have no opinion to offer as to these statements, being content, for the present, to present the facts as they appear. We do not hesitate to say, in this connection, that all fish seeking our shores to spawn should be allowed to do so, and that the Menhaden Association are killing their goose by allowing the fish to be taken for manure when they come to spawn and are worthless for oil.

"An article in the New York World describes the trap as follows: 'The weir will be an iron pier 10 feet wide, with bents or sections 20 feet long. It will run out 700 feet, with 30 feet of water. At the outer end will be the heart-shaped pound, the larger end of the heart inshore,

This heart is about 70 feet across, and outside of it is a box of iron piles and netting about 75 feet square. The fish striking the pier netting will run out seaward to the heart, and, passing out at the lower end, will find themselves in the outer receptacle. In the sections of the iron weir storage for thousands of tons of fish can be provided, where they will keep alive in their native element for a month or longer, and need not be brought to market when the price is low.'"

The waters of both Peconic and Gardiner's Bays contain scallops in considerable quantities, although there are many places too deep to dredge for them. Soft and hard clams also abound, as well as eels, crabs, and lobsters. On the eastern end of the southern "limb" of the island, near Montauk Point, is a large fresh-water pond. The fishing privileges of this entire point, from Napeague Bay to the extreme end, have recently been leased to Mr. E. G. Blackford, of Fulton Market, New York.

The region west of Napeague Beach, now called "Promised Land," is the site of many of the oil and fertilizer establishments known as "bunker factories." These, from Amagansett east, are the "Ragged Edge Oil Works," of Ellsworth, Tuthill & Co., Greenport; those of Jonas Smith & Co., Promised Land; "Ranger Oil Company," owned by T. F. Price & Co., Greenport; the Oil and Guano Works belonging to H. R. Dickerson, of Staten Island; "Falcon Oil Works" of George T. Tuthill & Co., Greenport; Oil and Guano Works of W. A. Abbe & Co., Promised Land. On Hick's Island, east of the above, are the oil works of William P. Green & Co., Greenport; and a little farther on, in Napeague Harbor, are those of W. M. Tuthill & Sons, of East Marion, and those of William Y. Fithian & Co., of Southold. At North West, near Sag Harbor, are the factories of Henry E. Wells & Co., Greenport, and the Sterling Oil Works, of which J. M. Raynor & Co., of Greenport, are agents. On Shelter Island are those of Hawkins Bros. & Co., Bunker City, and the Peconic Oil Works, of B. C. Cartwright & Co. At Deep Hole, between Promised Land and Springs, is the factory of Higgins & Payne, of Sag Harbor; and at Southold is that of W. H. H. Glover. Near Orient, on Long Point Beach, the "Atlantic and Virginia Fertilizing Company" are building a new factory to replace the one burned last winter.

Mr. W. Z. King, naval surveyor, has for some years been in the habit of gathering such statistics as could be obtained from all points on Gardiner's and Peconic Bays and forwarding them to the United States Bureau of Statistics. In his report he has included the figures for the menhaden factories of Vale & Griffin and Hawkins Brothers, on Barren Island, as the owners live at Greenport. Mr. King's figures for fresh fish are made up from the boat shipments, and are doubtless below the actual catch, for at times men from Connecticut have owned pound-nets in the vicinity and have marketed their fish in their own boats without reporting them. I give below the figures as obtained by him for the past year, beginning with July, 1879:

Quarter ending September 30, 1879.		Quarter ending December 31, 1879.	
Number of menhaden taken	75,000,000	Number of menhaden taken	46,000,000
Gallons of oil produced	350,350	Gallons of oil produced	207,000
Tons of guano	7,500	Tons of scrap produced	4,600
Tons of edible fish	350	Tons of edible fish taken	280

He sums up the catch of the year by estimating the total value of the products of the fisheries of the district for 1879 at $975,000. The total catch of menhaden by the bay fishermen is claimed to be 211,000,000 fish, producing 1,013,350 gallons of oil and 22,100 tons of scrap. The

entire menhaden catch for the bay, including those taken by the residents and other fishermen, is estimated at 400,000,000 fish. The figures for the first two quarters of 1880 are as follows:

Quarter ending March 31, 1880.		Quarter ending June 30, 1880.	
Bushels of hard clams	2,300	Number of menhaden taken	60,000,000
Bushels of scallops	7,000	Gallons of oil produced	120,000
Tons of edible fish	115	Tons of scrap produced	6,000
		Tons of edible fish (exclusive of those for home consumption)	330

Mr. W. S. Havens, collector of customs at the port of Sag Harbor, has gathered statistics of the fisheries for all points on Peconic and Gardiner's Bays, and for the ocean shore from Riverhead to Montauk and Orient Points. Mr. King informed us that these figures were included in the statistics furnished by him, but as they differ in many particulars, we furnish a copy as taken from Mr. Havens's books:

Products.	Quarter ending September 30, 1879.		Quarter ending December 31, 1879.		Quarter ending March 31, 1880.		Quarter ending June 30, 1880.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Oysters ... bushels	1,000	$1,000	3,000	$3,000	1,000	$1,000	1,000	$1,000
Other shell-fish ... do	2,500	2,000	15,000	7,500	...	8,100	6,000	4,800
Fresh fish ... pounds	876,000	43,800	630,000	31,500	440,000	17,600	760,000	30,400
Oil, other than whale ... gallons	446,250	124,050	258,750	113,500	...	...	120,000	42,000
Fish and scrap for fertilizers ... tons	9,400	112,800	5,750	69,000	50	500	6,000	60,000
All other products of the fisheries	...	1,000	...	...	...	1,500	...	1,500
Total	...	285,050	...	224,500	...	28,700	...	139,700

The items of "Fresh fish," "Other shell-fish," and "All other products" I think too low, and in the account of the different towns of the district I give my estimate for each.

123. THE FISHING TOWNS BETWEEN BAITING HOLLOW AND SOUTHOLD.

BAITING HOLLOW.—Six fishermen, four of whom have families depending upon them, reside at this place, which is an inland village with no harbor. Nearly all of them fish along the sound shore with haul-seines. The seines and boats aggregate about $1,600. The principal species taken are flounders, bluefish, striped bass, and weakfish, the first-named being the most abundant. Last year 40,000 pounds of fish were taken and marketed in the locality at an average of 6 cents per pound. Very few were shipped during the season.

RIVERHEAD.—This is a place of about 2,700 inhabitants. It is situated at the head of Peconic Bay, which separates the two peninsulas of the eastern end, or, as a citizen expressed it, "right in the fork of the boot-jack." A small river empties into the bay at this point, but a dam prevents any fish from ascending. A long pond, said to be 50 feet deep in places, is formed by the dam, and contains pike or "pickerel" (*Esox*), which, from the descriptions, I think are *E. reticulatus*. Black bass and carp have been introduced this year. One hundred of the men are engaged in fishing. Eighty-eight are employed in the menhaden fisheries, and twelve live by clamming, eeling, &c. Sixty out of the entire number are married, which, if the families be included, gives a total of three hundred and fifty persons dependent on the fisheries. Oysters were planted about 2 miles below the village last spring, but they do not thrive well. A company of six members was formed, with shares of $50 each, and 1 acre was planted with 675 bushels of seed from New Haven, Conn.

They have 12 acres of ground, but only 1 was planted, as an experiment. Of fresh fish, 100,000 pounds were taken last year; 1,975 pounds were shipped by rail, 800 pounds by boat, and the remainder was consumed at home. The fish are taken in seines and fykes, in which $400 are invested. Flatfish constituted the bulk of the catch. Three years ago a few shad were caught here, and if it were not for the dam it is possible that shad might become colonized in the river, as these places are suitable for spawning grounds. There is fresh water for half a mile below the village at low tide, and at high tide it is brackish up to the ship-yard. Charles H. Homer has been engaged in the menhaden fisheries, but he claims the business is so poor now that he is obliged to fish for eels and clams, along with twelve others. Clamming for hard clams was good last spring, but it has not been remunerative this fall. The season lasts from March to October, and two men average 50 bushels each per month; the others get less. Clams are sold at $1 per bushel to peddlers, who take them in wagons to other places. The year's catch amounted to 2,500 bushels. The soft clams were nearly destroyed a few years ago, but they are increasing again. The present catch is 100 bushels annually. But few scallops are taken here, as on account of the shallow water and its freshness, the river and the head of the bay close early.

Eels are taken both by "firelight" (spear) and pots. The former method is practiced during July, August, and September, and the latter during the rest of the year. Charles H. Homer makes the pots, which are 18 inches long by 12 inches in diameter, of pine strips woven into baskets. After dyeing them with logwood to make them less conspicuous, he sells them to the fishermen at 60 cents apiece. They are baited with "mummies" (minnows) in the early spring, but when the "horsefeet" (*Limulus polyphemus*) "crawl," in May, these are used in preference. About 2,500 pounds of eels were taken last year; of these, 1,740 pounds were shipped by rail to the larger markets, and the rest were consumed locally.

It is claimed here that Sylvester Petty, of Franklinville, invented the purse-net for taking menhaden. The old way was to take them in gill or "fly" nets. The menhaden steamers George Hudson and Nat. Strong are owned here. They cost $15,000 each, fully equipped with seines and boats. The boats cost $400 and the nets $500 each. The men in the menhaden fishery pay their own expenses, receiving a definite share in the catch, while the captains get an additional amount, usually a percentage of the gross stock, or so much per barrel for the fish landed.

JAMESPORT.—Sixteen men take scallops and clams in this vicinity, and eleven women and fifty children are employed in opening these bivalves. About ninety people depend in part on the business, equal to about forty people entirely dependent. About $7,000 are invested in boats and houses. The scallop fishery is described more fully under the town of New Suffolk. There are eight boats here, aggregating 30 tons; 8,500 pounds of scallops were taken during the season, of which 2,680 pounds were shipped by rail, and 3,000 pounds went by boat. Of the remainder, 1,500 pounds were sold to peddlers, and the rest were consumed locally; 2,000 bushels of hard clams and 500 bushels of soft clams were taken. A pound-net here, valued at $300, is estimated to take about 20,000 pounds of fresh fish during the year.

FRANKLINVILLE.—Four men from this town live by fishing. They have about $1,500 invested in boats, and nearly $500 more in nets; 8,000 pounds of scallops and 25,000 pounds of fish were taken. Nearly all of the latter were shipped by rail to New York.

MATTITUCK.—Five residents of this place are fishermen. Three of them are married, and eighteen persons are dependent upon them. Three women and fourteen children are employed in opening scallops during the season. There are three fishing boats, aggregating 14 tons. A capital of $3,000 is invested in boats and buildings for the scallop industry; 18,000 pounds were

taken last year, of which 14,968 pounds were sent west by rail, and the others were distributed elsewhere. A few hard clams, probably 600 bushels, were taken. A pound-net west of the village took 25,000 pounds of fresh fish, and about 15,000 pounds of eels were taken with spears and pots.

NEW SUFFOLK.—This small place has been built to accommodate the scallop trade. Shipments by rail are made at Cutchogue. The scallop fleet numbers sixteen sloop-rigged boats, ranging from 5 to 15 tons each, the aggregate being about 120 tons. Seventy men are engaged in fishing for scallops; while twenty men, thirty women, and eighty children are employed in opening the product, making a total of two hundred persons, the majority of whom are Americans, engaged in this industry. The fishery is carried on at any time between October and the following May, when weather and ice do not interfere. The fleet averages 100 bushels (in shell) per day, or 18,000 during the season. They "open out" half a gallon of meats to the bushel of shells, making 9,000 gallons, which, at an average of 60 cents a gallon, net the producers about $5,400. They are shipped in boxes to commission merchants in New York, the selling price varying from 25 cents to $1.50 per gallon. Not less than $20,000 are invested in boats, houses, and tools. The scallops are caught with dredges (pronounced *drudges* by the fishermen), similar to those used in taking oysters, except that they have no teeth. The bottom part of the bag, which holds from 1½ to 2 bushels, is made of chain and the upper part of net. The boats drift with the tide, and, if possible, with the wind. The dredges are used in 2 to 30 feet of water, 7 fathoms of line being the average length in shallow water; the length is, however, varied according to circumstances, for when it is windy they must pay out more, and when moderate less, to regulate the speed and prevent anchoring the boat. If very deep water is dredged, additional lines must be bent on. Scalloping has been practiced here twenty-five years, and it is claimed that the discovery that the species was eatable and marketable originated here.

Women and children are employed for shucking the scallops; the former ordinarily open from 15 to 18 gallons per day, according to the size of the scallops, and it is not uncommon to see a woman standing at her place working while she is rocking the cradle with one foot. The work is all done in frame buildings and the people stand in a row at a bench. Children often come down after school and open 5 or 6 gallons. The price paid for opening was formerly 25 cents per gallon, but it was reduced to 15 cents last season, and to 12 cents this year. If the demand for scallops is good, 15 cents will doubtless again be paid. From 80 to 200 scallops fill a quart cup, equal to 320 to 800 to the gallon. Every part of the scallop is used. The hard adductor muscle is all that is eaten, and it is the only part marketed. The soft parts called "rims" were formerly sold for manure at $1 per barrel, but they are now mainly used by the dealers on their own land. Fifty thousand bushels of shells have been sold at 2½ cents per bushel; they are used for catching oyster spat and are in growing favor on account of the ease with which they go to pieces when the oysters get large. They are often taken from the beds and turned over with a shovel to separate the oysters and keep them from bunching.

Some of the scallop boats are used in the "off" season for taking hard clams. About twenty-five men are engaged in clamming in the summer, averaging 4 bushels per day from April to October. They catch most of the clams in the early spring and bed them down for summer; 10,000 bushels were taken last year; 200 bushels of soft clams were dug for home supply.

PECONIC.—Three pound-nets on the sound side are owned by residents of this place. The principal sources of revenue from the fisheries are from these nets and from the catch of menhaden and scallops. Sixty men are engaged in these fisheries, forty of whom are married, with two hundred persons depending upon them. George H. Vail, a pound fisherman, claims that the fisheries are

decreasing. There are $1,500 invested in nets, exclusive of those used in the menhaden fishery, and $3,000 worth of fishing boats and tools are used. Most shipments of fishery products go by boat to New York or to Connecticut. Last year 18,000 pounds (2,000 gallons) of scallops, 1,200 pounds of eels, and 600,000 pounds of other fish were caught.

SOUTHOLD.—Mr. W. H. H. Glover has oil works at this place, and Mr. W. Y. Fithian, owner of works at Napeague, resides here. Mr. Fithian says that now (October 1) the menhaden yields an average of 3 gallons of oil per thousand fish, but that the average for the season, up to September 10, was only 2½ gallons. He owns a steamer worth $13,000, and two sail craft; his factory is worth $18,000. Some menhaden seining is done at Peconic in the spring, the fish being sold for manure. Perhaps $2,000 worth were so taken last spring.

Outside of the menhaden business there are six men engaged in the fisheries; three are married and twenty persons are dependent upon them. Two men, W. Maynard and John Dunkle, take scallops; three women and ten children find employment in opening them. One boat is used in the fishery and 40,000 pounds of scallops were obtained last year, 13,025 pounds of which were shipped by rail; 200 bushels of soft clams, 400 bushels of hard clams, and 50 barrels of hard crabs were taken. The other products were 30,000 pounds of dressed eels, of which quantity 9,290 pounds were shipped to New York by rail; 800,000 pounds of fresh fish, four-fifths of them being consumed locally; 200 bushels of oysters and 50 barrels of lobsters. Oyster culture is being attempted here by Mr. John P. Terry, who has 50 acres planted.

124. GREENPORT AND ITS FISHERIES.

GREENPORT.—This place, with its deep, spacious harbor, was formerly a great whaling center, but on the abandonment of that industry the capital was mostly transferred to the menhaden business. Many owners of factories live here. Mr. David G. Floyd, now seventy-nine years old, went into the whaling business in 1847, but, to use his own language, has now "got down to menhaden." He says that he remembers the first bluefish he ever saw; fifty years ago they were called "horse mackerel." In 1838, when the first Spanish mackerel were caught here, the people were afraid to eat them; they were taken in "Narrow Bay," between Moriches Bay and Great South Bay. Between 1850 and 1860 menhaden were usually plenty, with the exception of one year, when they failed. His father told him that the eastern end of the island did not raise grain enough to feed the inhabitants until they began using fish for manure; this practice began about fifty years ago. Rye was the main dependence for bread up to that time, but after applying fish they could raise wheat as easily as rye. He now has one factory and two steamers in the menhaden business. He first engaged in the business in 1865, when he bought a sail vessel, and, after putting oil works on board of it, went down to Chesapeake Bay. The business was a new one, and, having had no experience, he did but little. The next season he went to Maine, but the people objected to his fishing inside of the 3-mile limit, and thinking the point hardly worth contesting he gave it up temporarily and returned home.

This year the fish have been poor and have made but little oil, probably not over 2½ or 3 gallons per thousand, an average yield for other years being about 4½ gallons. Mr. Floyd says that the fish were plenty in May, but that they were very poor, and taking the season through it has been an unprofitable one so far; but as October and November are the best months, the fish then being fatter, it may help to bring up the average. Capt. B. F. Conklin, of Jamesport, says: "Six or seven years ago, in July, the fish in Gardiner's and Peconic Bays were very fat and made from 12 to 15 gallons of oil per thousand." Mr. Henry E. Wells, of D. D. Wells & Sons, says that he began

fishing for menhaden on July 4, 1850, and was the first person in the business. He put up steam oil works on Shelter Island. The fish were at first taken wholly in shore-seines. In 1852 he went into the purse-net fishing, with small boats; later he employed yacht steamers. "We built," says he, "the first steam factory in the State of Maine, at South Bristol. The firm was Wells & Co. We also built the first steam works in Virginia, on Tanner's Point, where we staid one year, after which we returned to South Bristol." He thinks the business varies from good to bad, as other business does. The catch for 1880 was better than that of the previous year. He thinks it would be better policy not to capture any menhaden before June 1, so as to allow them to spawn. In August, 1873, he took one boat load of menhaden in Little Peconic Bay which yielded 24 gallons of oil per thousand fish.

Bluefish and weakfish have been abundant this season, but Spanish mackerel were very scarce. Some shad have been caught in the pounds during the past few years. The schooner Storm Child, a well-smack running to the New York market, is owned here, and from the middle of April to the 1st of October fishes for lobsters and then goes to Nantucket for cod. Lobsters taken at Gay Head (Martha's Vineyard) are easily kept alive in the well, but those taken from the colder waters of Maine often die. The captain says: "This season would have been a good one had it not been for the 10-inch law, which has worked disastrously. If this law affected the canneries it would be an excellent one, but under it they can work up small lobsters, while the market is closed on them to us." When fishing for cod he gets his bait (sea-clams) from Rockaway. His catch being taken outside the limits of the island and marketed in New York, I have not included it here. Five smacks sail from this place, and two belonging to New York marketmen are often laid up here. They have not been out much this season, as they say it was too dull to pay expenses. Exclusive of the menhaden business there are forty men engaged in fishing here; twenty of these are married, and, including their families, one hundred and fifty persons are dependent on the fisheries; $15,000 are invested in boats and $5,000 additional in nets and implements.

Ten boats with twelve men were employed in the scallop fisheries. The season begins the last of September and ends about March 1. In the winter of 1876–'77 some of the boats took 50 to 60 bushels per day. They are opened by boys from nine to sixteen years old and are sent to Fulton market by express; 15,000 bushels, averaging a half gallon of meat each, were taken in the season of 1879–'80. These sold at an average of 60 cents per gallon. In July the young scallops are as big as a man's thumb-nail. In November they have increased to the size of an old-fashioned copper cent. The fishermen think that they spawn in June.

The yield last year, including the products shipped to New York and Connecticut, and those consumed at home, was 3,000,000 pounds of fresh fish, 20,000 pounds of eels, 80 barrels of lobsters, 75 barrels of hard crabs, 10,000 pounds of scallops, 1,000 bushels of hard clams, and 400 bushels of soft clams. Ten men take scallops and 14 women and 40 children devote their attention to opening the catch. The soft clams are not considered very good until snow comes; the fresh water from snow is said by the clammers to fatten them.

125. THE FISHING TOWNS BETWEEN EAST MARION AND SOUTHAMPTON.

East Marion.—There are seventy-five men engaged in the fisheries from this point. The pound fishers living here fish in Orient Bay, along the sound, at Niantic, Conn., and at Napeague. Capt. Henry Bellost formerly owned two pounds in Napeague Bay, just inside Rocky Point. He fished them regularly for nine years, but has now given up the business. He sent his fish to New

York in boxes averaging 225 pounds of fish each. The following are the shipments for the nine years, copied from his books:

Year.	Number of boxes.	Pounds of fish.
1871	272	61,200
1872	321	72,225
1873	363	81,675
1874	320	72,000
1875	251	56,475
1876	146	32,850
1877	236	59,175
1878	251	54,225
1879	113	25,425
Making a total of		515,250

His fishing season was from May to October. He has no record of the Spanish mackerel caught, but gives his recollections as follows: 1871, 6,000; 1872, 2,500; 1873, 1,000; 1874 to 1878, 500; 1879, 10 fish. He says in 1871 Spanish mackerel were plenty; in 1872 the pound-nets began to increase in numbers, and kept increasing until 1875, when this fishery was at its height; in 1878 it began to decrease, and there are not as many nets this year as last.

Capt. James McDermott is now engaged in the capture of flatfish for two months in the spring, beginning about the 1st of March. He fishes ten fykes, the hedgings to these extending fully 7 rods from the shore, while the wings are about 16 feet in length. The fykes proper have two funnels each. They are about 9 feet long and 4 feet in diameter. In the spring of 1881 he reports the flatfish much less abundant than formerly, his entire catch not exceeding 600 pounds per week. This he attributes to overfishing in the bay, where a large number of fykes are set.

Capt. Willard Rackett, of the sloop Laura Thompson, is engaged in running lobsters to the New York market. In the spring and early summer he visits Deer Isle, on the coast of Maine, to secure his supply, but later, owing to the loss of lobsters in transportation, he buys them of the Massachusetts fishermen. He can carry about 20,000 pounds of lobsters in cool weather. When the weather becomes warm only half that quantity can be taken with safety. During the season he carries about 80,000 pounds, the average weight of the lobsters being about 1½ pounds each. Vessels owned here hail from Greenport, and their tonnage is included in the fleet of that port. The fresh fish caught from different waters by the men living here is estimated at 150,000 pounds for the year. In addition to these, 10,000 pounds of eels, 100 barrels of lobsters, 100 barrels of hard crabs, 200 bushels of hard clams, and 50 bushels of soft clams were secured.

The fishermen report that bluefish are holding their own in numbers; weakfish decreased slightly from 1874 to 1877, since which time there has been little change; porgies (*Stenotomus chrysops*) have decreased, and butterfish (*Stromateus triacanthus*) hold their own. There are $4,000 invested in nets, and $6,000 in boats, by the resident fishermen.

ORIENT.—This is the most easterly village on the northern peninsula. There are five professional and eight semi-professional fishermen here. Two of the former are married, having nine children, giving sixteen wholly dependent on the fisheries. Of the latter, six are married, and having twenty-seven children, make a total of forty-one partly dependent on the fisheries. It has been my custom to take half the semi-professionals and add them to the others. This would make nine men, five married and thirty-six dependent. The owners of pound-nets from here to Oyster Pond Point are farmers, who own the beach. In Orient Bay are two pounds, which are owned in East Marion, and their catch is included in the figures of that place. There are three pounds and

a fertilizer factory on Long Point Beach, two pounds south of Oyster Pond Point, and five in the sound, between the last-named place and Rocky Point, lying to the west of Orient. There are $6,000 invested in nets, and $12,000 in boats for fishing. There are no men here engaged in fishing for either menhaden, mackerel, or halibut; all are pound-netters, here or elsewhere. The fishing is better than last year for all kinds of fish. A few Spanish mackerel (150) were taken. Both bluefish and porgies have increased.

The average cost of a pound-net is about $500. The pound proper requires 100 pounds of twine, and the leader from 100 to 150 or even 250 pounds, according to length and the depth of the water.

The Atlantic and Virginia Fertilizing Company, on Long Beach Point, lost their factory by fire last winter. When running they employed forty men all the year round. They are rebuilding. They buy fish-scrap from the oil factories and mix it with other materials, thus making an excellent fertilizer.

The catch last year was 300,000 pounds of fresh fish, 50 barrels of crabs, 100 barrels of lobsters, 800 bushels of oysters, 500 bushels of hard clams, and 200 bushels of soft clams.

GARDINER'S ISLAND.—Formerly ten pound-nets were fished here, but now only two remain. No fishermen live here, and the catch is therefore included in the figures of other places.

MONTAUK POINT.—Here is Great Pond, a pond of fresh water containing 1,500 acres. It sometimes empties into the bay, and the owner, Mr. Benson, has talked of making an opening with a sluice-way, so as to render it brackish and make an oyster-pond of it. It contains neither yellow perch (*Perca americana*), pike, nor pickerel. W. S. Gardiner, of East Hampton, once rented its fishing privileges at $100 per year. He caught white perch (*Roccus americanus*), a few striped bass (*Roccus lineatus*), eels, and one codfish; also some menhaden, tautog or blackfish, mullet, weakfish, and flatfish. The white perch were the most abundant. He sounded the pond from Big Island to the south end, and it showed a regular depth of 12 feet, except very near the shores. Oyster Pond has yellow perch and oysters.

FORT POND BAY AND NAPEAGUE.—There are three pounds in Fort Pond Bay, and two in Napeague, but, being owned elsewhere, the catch is reported in the towns where the owners live. Napeague Bay and Harbor are together called "Promised Land," and several menhaden factories are located here. On the Atlantic side the great pound-net which it is proposed to build, with an iron pier, referred to in general remarks on the east end, is to be located.

SPRINGS.—Here are forty professional and ninety semi-professional fishermen, equal to eighty-five men, of whom thirty are married, making fully two hundred and twenty persons dependent upon the fisheries. There are $8,000 invested in nets and apparatus, and $32,000 in boats. The aggregate for the boats is about 100 tons. During the fall and winter of 1879, 10,000 bushels of scallops were taken in Three-Mile Harbor. Two men dug 800 bushels of soft clams last fall and sold them at Watch Hill, Conn. Mr. Bennett, one of the interested parties, says that men from Block Island and from Connecticut took from Three-Mile Harbor, about a mile from Springs, 4,000 bushels of soft clams last season, and that they do so every year. The entire catch was 8,000 bushels, of which fully half were shipped. One thousand bushels of hard clams were taken for consumption in the vicinity. Of fresh fish 120,000 pounds were taken; of eels, 2,000 pounds; of crabs, 100 barrels; of lobsters, 60 barrels. Striped bass (*Roccus lineatus*) are taken in seines and traps from October until the weather gets too cold.

AMAGANSETT.—Fifteen professional and thirty semi-professional fishermen live here; $20,000 are invested in boats, and $5,000 in seines, traps, and fykes. Many of the farmers of the locality set fykes, and they occasionally fish with seines for striped bass and other species on the Atlantic

side. The bass have been scarce this year, and now (November 6) the men say none are to be found. Daniel Loper lives in his boat and fishes wherever he finds fish, at Montauk Point, Block Island, or elsewhere. He reports fishing as poor this year. Many men living here are engaged in the menhaden fisheries during the season, after which they fish with seines for other species. Few fish are shipped from the place. The catch for the past season has been: Fresh fish, 40,000 pounds; soft clams, 200 bushels; hard clams, 100 bushels; crabs, 30 barrels; eels, 4,000 pounds.

EAST HAMPTON.—The men here fish along the ocean shore and in Gardiner's Bay. They take scallops, clams, eels, and other fish in the latter and bass and other fish in the former. There are twenty-five professional and seventy-five semi-professional fishermen. The bass season begins in October and lasts for five or six weeks, or until cold weather sets in. Flat-fish are taken in fykes. Eels are speared, potted, and seined with a seine of fine mesh. The scallops taken are consumed locally; $10,000 are invested in nets and gear, and $30,000 in vessels and boats. The catch for the year was: Fresh fish, 50,000 pounds; soft clams, 500 bushels; hard clams, 150 bushels; scallops, 4,000 pounds; eels, 6,000 pounds.

SAG HARBOR.—This is the terminus of a branch of the railroad, and many fish caught by the men living at other points are shipped from here. Sixty men are engaged in the menhaden and other fisheries; half of them take clams and scallops. Three large and ten small sloops, aggregating 150 tons, are engaged in the business. At the time of my visit, October 21, the scallop season was not fairly opened, as the weather was too warm for them to keep well, but the outlook was good and the scallopers were confident of a good catch. Hard winters kill the species, but last winter was an open one and there was plenty of seed and few storms to drive them ashore to perish. They go in schools, and when driven on shore they soon freeze. In a storm Capt. S. Pidgeon, of sloop F. L. Nora, says that, if possible, they will work to windward, but if not possible, they are then drifted to leeward. He has seen them swimming in a crowd ten feet deep.

John Talmage, who has fished for fifty years, says that the porgies are increasing both in numbers and size; striped bass are getting scarcer every year; weakfish are not so plenty as ten years ago, but still fairly abundant, while bluefish are increasing. In referring to Spanish mackerel he said: "They were plenty twenty-five years ago, when they first came, and I have often caught one hundred in a night near Mattituck. This abundance lasted only four or five years, and they are very scarce now."

Mr. L. Palmer says: "Three years ago I was the agent of the railroad at this place, and during cold weather there were from 3 to 5 tons of flat-fish per day shipped from this station." It may be proper to remark here that the Long Island fishermen do not distinguish the difference between the several species of *Pleuronectidæ*, but class them all as "flat-fish." The names flounder, plaice, dab, window-pane, &c., seem to be unknown, and in conversation with fishermen in different parts of the island I observed that they knew that some had the mouth on the right and others on the left side, and that there were a few other differences, such as shape of the tail-fin, &c., but they either seemed to regard these things as accidental or not of importance. A few of them had noticed that those which lay upon a certain side of the body and had different tails grew larger than the others, but on the island the term "flat-fish" covers all the species found.

There are $4,000 invested in nets and tools and $30,000 in boats. The year's catch was as follows: Fresh fish, 2,000,000 pounds, of which 600,000 pounds were flat-fish; eels, 40,000 pounds; scallops, 50,000 pounds; soft clams, 3,000 bushels; hard clams, 1,000 bushels; lobsters, 200 barrels; hard crabs, 100 barrels, none shipped; oysters, 500 bushels. With the fresh fish are included some cod caught by men living here, though taken in other localities. The sloop Georgiana sails from Sag Harbor and fishes occasionally for bass, and at other times goes for cod,

as does also the sloop Eveline, Captain De Castro. The men fish with hand-lines, and for bait use "bunkers" or menhaden, and clams. Captain De Castro says that the trawls and pound-nets have spoiled the fishing.

BRIDGEHAMPTON.—At this place are ten professional and forty semi-professional fishermen. John Ludlow fishes for bass and finds them decreasing. There are $3,000 invested in nets and $7,000 in boats. The catch last year amounted to 150,000 pounds of fresh fish, 10,000 pounds of eels, 50 bushels of hard clams, 150 bushels of soft clams, 50 barrels of crabs, and 8,000 pounds of scallops.

WATER MILLS.—Twenty men fish from this place; eight are married and forty persons are dependent upon the fisheries. About $4,000 are invested in nets and $8,000 in boats. The catch last year was 200,000 pounds of fresh fish, 8,000 pounds of eels, 10 barrels of crabs, 20 barrels of lobsters, 180 bushels of hard clams, and 75 bushels of soft clams.

SOUTHAMPTON.—Forty men fish from this place; eighteen are married and one hundred and twenty-five persons are dependent on the fisheries. Six thousand dollars are invested in nets and $12,000 in boats. The fishing is done chiefly in the Atlantic and the small bays. The yield last year was 200,000 pounds of fresh fish, 500 bushels of oysters, 1,000 bushels of hard clams, 400 bushels of soft clams, 2,000 pounds of eels, 80 barrels of crabs, and 20 bushels of mussels. Nelson Burnett claims that the bass are getting scarce, while the porgies are growing more plentiful; that the weakfish are decreasing, while the bluefish are increasing.

D.—THE SOUTH SHORE OF LONG ISLAND.

126. EXPLANATORY STATEMENTS.

This division, beginning at Shinnecock Bay on the east and ending at Rockaway on the west, is flat, level, and sandy. The peculiar feature of the district is that the bays are not indentations in the coast line, as in other parts of the island, but are formed by a long sand-bar running nearly parallel to the main shore, which is locally known as "the beach." This beach being nearly straight and the shore quite irregular, the intervening strip of water varies greatly in width, expanding and contracting in turn so as to form a succession of salt water lagoons which are respectively known under the names of Shinnecock Bay, Moriches Bay, Bellport Bay, Great South Bay, South Oyster Bay, and Hempstead Bay. Here the oyster industry takes the first rank, and comparatively little fishing is done for market. The region is, however, a favorite resort for anglers, who often take hundreds of pounds in a day of various species, chief among which is the bluefish (*Pomatomus saltatrix*). It is also noted for the number and size of its trout streams, most of which are preserved. Many ponds have been constructed, and trout are being bred both for anglers and for market.

127. SHINNECOCK BAY.

This bay is about ten miles in length and varies from one to four miles in width. In former times it was connected with Moriches Bay on the west, but for many years it has had an opening of its own which is occasionally closed by storms in autumn which drive the sand into it. On these occasions the inlet will remain closed until the spring storms open it, unless it is opened by the people living upon the bay. It is a singular fact that all the inlets on the south side are working westward, and Shinnecock Inlet is no exception, for each time it closes and opens of its own accord it goes in this direction. When closed the waters become higher than those of the Atlantic, and

leach through the sand. They become quite fresh from the influx of the streams emptying into the bay, and the sea fish thus shut in die when the waters get cold. In this way untold millions of valuable food-fish have perished. Such a closing happened in October last (1880), and among the fish lost were thousands of small bluefish, weakfish (*Cynoscion regale*), porgies or scup (*Stenotomus chrysops*), and menhaden (*Brevoortia tyrannus*). Several public-spirited citizens offered to dig an opening at their own expense, but there is said to be a law forbidding it. They all want the inlet opposite their own houses, and so commissioners were appointed to select a location for it. These commissioners put it off until their fall farming work was done, and in the meantime the fish died. Mr. William N. Lane, at Good Ground, says that when the fish die in the bay in such quantities it seriously interferes with the fish which desire to enter it to spawn the next season, as the oil or "slick" which is produced upon the water is very offensive to them. In former years Spanish mackerel (*Scomberomorus maculatus*) were taken in this bay, but none come now. The principal species at present are bluefish, weakfish, eels, and porgies. It is claimed to be the best place for eels on Long Island.

"Duck clams" come into the bay periodically and when they are here the porgies (scup) come in and feed upon them in great numbers, as do several species of wild fowl, as red-heads, canvass-backs, broad-bills, coots, boobies, and old-squaws. This clam came in last summer, after an absence of three years. Their stay is usually three or four years, when they all die from some cause unknown.

GOOD GROUND.—Seventy-five men at this settlement derive their support from the water. They divide their time between fishing, clamming, wild-fowl shooting, and taking out parties of pleasure fishermen in their sail-boats. The fishing season continuing more than two-thirds of the year, the number of fishermen may be placed at fifty. Twenty of the men are married, and one hundred and thirty persons in all are dependent upon the fishery. Small boats of 2 tons are used, of which there are fifty, worth $4,000. About $5,000 are invested in seines, fykes, and gill-nets. Eels are taken in great numbers. Mr. Lane, alluded to above, took eels from twelve to fifteen years ago, and averaged 25,000 pounds per year. He thinks that in the whole bay there are fifty men eeling at the present time, but their labors are not rewarded with the same success as formerly, and the entire yearly catch probably does not average more than 100,000 pounds. About 30,000 pounds of eels are taken at Good Ground, together with 1,000,000 pounds of fresh fish, including flat-fish. Crabs are plenty, but not many are sent to market. The catch reaches about 100 dozen of soft crabs and 200 barrels of hard crabs, the latter being consumed at home.

ATLANTICVILLE.—Forty men fish here, of whom twenty are married. There are one hundred persons in all dependent on the fisheries. The apparatus of capture is similar to that of the neighboring towns. Fifty 2-ton boats, worth $4,000, and $6,000 worth of nets, are used in the fisheries. The products consisted of 50,000 pounds of eels, 1,200,000 pounds of other fish of various species, 50 barrels of hard crabs, 300 dozen of soft crabs, 200 bushels of oysters, and 500 bushels of hard clams.

QUOGUE.—This locality has ten fishermen, six of whom are married. Including these men and their families a total of thirty persons are dependent upon the fisheries. In the months of May and June, and sometimes in October, these fishermen devote their attention to the capture of striped bass with seines and gill-nets on the outer shore. The catch of this species has fallen off greatly in the past few years. The total production of the fisheries of this place for the last year amounted to 20,000 pounds dressed eels, 40,000 pounds fresh fish, and 50 barrels hard crabs.

At Pond-Quogue, or Canoe Place, as it is otherwise designated, is a menhaden factory owned by Mr. Albert Terry, of Riverhead.

128. MORICHES BAY.

This bay is 16 miles long and from 1 to 2 miles wide, and has 5 feet of water in its channel at high tide. It opens on the west end into Great South Bay, and has no independent inlet into the ocean. Its nearest connection with the sea is Fire Island Inlet, some 25 miles to the west, and in consequence its waters are at times rendered quite brackish by the large fresh streams flowing in at Seatuck Cove and Forge River.

Most of the hard crabs shipped from Long Island come from this bay, the people of other localities never having engaged so extensively in the work. They are taken from small boats by means of long lines, with short ones, or snoods, attached at intervals of 2 or 3 feet, which are baited with pieces of eel or other fish. The fisherman "overruns" the line from one end to the other, and as the unfortunate crustaceans are successively lured within reach he secures them with his dip-net. The crabs are shipped to New York in second-hand cement barrels. These cost 10 cents each, and are delivered to the shippers free of transportation from New York by the Long Island Railroad for the sake of the return freight when full. There are no oysters in the bay east of West Moriches. The water is too fresh for scallops, hard or soft clams.

WESTHAMPTON.—Forty men belonging to this place are occupied in fishing. Fifteen of these have families, which raises the total number depending upon the fisheries to one hundred. Seine fishing in the surf is carried on from May to November. Each seining crew consists of eight men, and is accompanied by two horses, which are used for hauling the seines and carting away the fish. The men fish on shares, one-third going to the owners of the net and the remainder being divided equally among the members of the gang. An outfit, consisting of nets and small boats, costs $1,200, the total amount invested in apparatus for the five gangs thus reaching $6,000.

Striped bass (*Roccus lineatus*) and white perch (*Roccus americanus*) are taken in South Bay from November to May.

Ten men devote a portion of their time to the capture of eels. An eeling outfit costs $150. This includes boats, cars, eel-pots, and shrimp-nets for taking bait. Mr. S. B. Topping, who was an eeler thirty years ago, informs us that he has taken 300 bushels of them in a day from April 1 to July 1. At that time minnows were used as bait in this fishery, but they are now rather scarce.

About forty years ago Mr. John Lawrence put some "mud-pike" (*Esox americanus* [*nobilior*] Gmelin) in a pond which he made for them at Mastic. A high tide overflowed the pond and let them into the bay, where they have increased to the detriment of the trout streams. They are now in all the mill-ponds, and have exterminated the trout in some places. Many are taken for market in fine gill-nets. They attain the weight of from one-half to three-quarters of a pound.

The products of the fisheries of Westhampton amounted last year to 3,000 pounds of eels, 500,000 pounds of fresh fish, and 100 barrels of hard crabs, all of the latter being consumed locally.

SPEONK.—Ten men fish from this place in the waters of the bay. Four of these are married, and have fifteen persons depending upon them for support. Five hundred dollars are invested in boats and $1,000 in nets. The yield last year was 3,000 pounds of eels and 30,000 pounds of fresh fish.

EASTPORT AND EAST MORICHES.—At Eastport and East Moriches there are twenty-five fishermen, ten of whom fish outside and the remainder in the bay. Ten are married, and, including the families of these, seventy-five persons derive their living from the fisheries. One thousand dollars are invested in boats and $2,000 in nets. The catch last year was: Fresh fish, 100,000 pounds; dressed eels, 150,000 pounds. The crab catch is included with that of Moriches Station, below.

CENTRE MORICHES.—Twenty of the residents of this town are engaged in taking hard crabs from June to November. Twelve are married, and sixty persons depend upon their labors. The men make from $10 to $15 per week during the season. Crabs are sold on commission, sometimes netting them 25 cents per barrel after all expenses and sometimes as high as $2.50. The average is about $1. The business is only three or four years old and is growing. At the approach of winter the crabs go into deep water and the men turn their attention to the capture of eels and other fish.

Besides the crabbers there are thirty other fishermen here, two-thirds of whom are married. About eighty persons are dependent upon their exertions. There are two gangs of surf-fishermen, numbering six men each, who fish with seines on the outer beach from October to December. Each gang has an 18-foot boat propelled by three pairs of oars. The seines used are 175 fathoms long and 2 fathoms deep in the middle, with a 2-inch mesh, and are hauled without the help of horses. Five hundred dollars are invested in boats and $2,000 in nets and traps. The year's catch was: Fresh fish, 200,000 pounds; eels, 250,000.

MORICHES STATION.—This place is quite inland, and only six fishermen live near here. It is, however, the principal shipping point for all the surrounding region. Four-fifths of the shipments of fish are made by express, and the remainder by freight. Eels are commonly shipped on Thursdays, as many being sent on that day as in all the rest of the week together. On October 28, 1880, 3,000 pounds of eels were shipped, and on November 4 1,980 pounds. The figures for hard crabs in 1880 were as follows, each barrel containing from 225 to 250 crabs:

	Barrels.
June	126
July	403
August	1,194
September	1,941
October	905
November (to 10th)	92
Total	4,661

129. GREAT SOUTH BAY.

Great South Bay is a body of water 36 miles long and from 3 to 6 miles wide. Its waters mingle on the east with those of the bays of Moriches and Bellport, extending westward to South Oyster Bay, from which it is separated solely by an imaginary line. The only direct communication with the sea is at Fire Island Inlet, which opens well to the westward, opposite Bay Shore. There are but few islands, and these are near the beach or ocean side. The region is a famous resort for anglers, but its commercial fisheries are not large. Oystering is extensively carried on in the western half and clamming in the eastern.

The winter of 1880–'81 was a severe one, the bay being frozen nearly solid, but the oysters did not suffer as much as was expected. One of the old oystermen, Mr. Floyd R. Skinner, of Sayville, has noticed that a long hard winter leaves them weak and in bad condition, but that the losses by death are less than when the weather is changeable with high winds. The winter of 1879–'80 was mild and but little loss occurred. As no dredging is allowed in the bay, all oysters are taken with tongs except the few which are gathered with rakes in shoal water. The bay lies in the townships of Brook Haven and Islip, the oyster district extending from Brook Haven on the east to Ford's River on the west. The oyster beds in the former township are free to citizens of the town on payment of a "toleration fee" of $1 per year. The beds are places where there are deposits of old shells. The "grounds" are staked off or buoyed into 4-acre lots, which are leased to citizens.

The price was formerly $1 per acre, but is now $3 for 4 acres. In the town of Islip, the eastern portion, which was formerly part of Brook Haven, is still under the above rules, but in the western part the grounds are leased at $1 per acre without a toleration fee for public beds. They plant under a special act of the legislature. Most of the oystermen use cat-boats, averaging 4½ tons each, of which there are about three hundred in the bay. One thousand men and two hundred boys, composing the entire fishing population, engage in oystering during the greater part of the season, which lasts from the 15th of September to the 15th of June. The boys "cull," that is, pick over the oysters and throw back the shells. In former years more boys and fewer men were employed. On public grounds a season's work for a man is 500 bushels. The quantity was much greater in years past, but the species has been failing for years. The oysters are sold by the "tub," holding about a bushel. It is part of a barrel, and should be 10 inches high, 17 inches across the bottom, and 19 inches at the top, inside measurement. The price varies from 75 cents to $1.25 per tub, the average being about a dollar. The men generally sell to shippers by rail or boatmen who buy for markets. About one-half the catch goes to New York, and the remainder is divided between Norwich and Providence. Messrs. La Salle & Day buy for both the New York and the European markets. Many are now shipped in barrels to Europe, but no special packing is done for this trade except to wash them clean, so that no mud gets in.

Mr. Skinner, referred to above, says that during the third quarter of the present century the oysters in the bay spawned only once in three years, but that during the last five years they have spawned oftener, although from causes in part unknown the greater portion of the seed have died soon after. One fruitful agency in their destruction is the "drill," which attacks the thin shell of the young and bores through. Their work can be plainly seen. There are very few star-fish, and the drill is the only known enemy. This is disappearing to some extent, and prospects seem better, as an unusually large proportion of the last year's crop survived. Much seed from Virginia, the Hudson River, Newark Bay, and Connecticut has been planted in the bays. The planters think that the last is best, because more likely to stand the winters and live. The Virginia seed is not so hardy; 50 per cent. dies the first winter and 30 per cent. of the remainder dies afterward. The Hudson River seed is the next best.

Forty years ago the principal oyster grounds were at Blue Point, near Patchogue. They have, however, been moving westward at the rate of from one-quarter to 1 mile per year, having gone 15 miles in thirty years. Sayville is now the center of the "Blue Point" oyster industry. The clams are going east at the same time, a few now being taken as far east as Terry's bed, opposite Brown's Point, one-third of a mile east of Sayville. Seed was formerly shipped from the bay; now it is brought in. Thirty-five years ago 10,000 bushels of seed were shipped to Boston, and sold at 10 cents per bushel. In those days the oysters grew thickly on old shells, and in selling 3 bushels the purchaser took 2 of oysters and 1 of shells. Seed is worth 50 cents per bushel, and from 1,000 to 2,000 bushels are planted on a 4-acre lot, according to the size of the seed.

Mr. La Salle believes that the days of oyster-planting are numbered, unless the plants are guarded from their enemies, human and other. In the flush oyster times seed often sold from this bay for 4 cents per bushel.

There are plenty of shells in the bay for oyster spat to set on, but there has not been a good catch of spat in five or six years. The "drills" have made their appearance within this period. They thrive in the salter water nearer the inlet, decreasing in numbers toward the eastern end of the bay. About $750,000 are invested in the oyster business, and the annual yield amounts to 800,000 bushels. As has already been mentioned, 1,000 men are engaged in the fisheries of this

bay. One-half are married, and about 3,000 persons, altogether, are dependent upon the products of the salt water.

Besides the oyster, clam, fish, and menhaden industries, a little revenue is derived from the "horsefeet" (*Limulus polyphemus*) and the common mussels (*Mytilus edulis*). Smith's Point, on Bellport Bay, is the eastern limit of the horsefeet on account of the freshness of the water. They are used to bait eel-pots, feed chickens and hogs, and for manure. Farmers pay 50 to 75 cents per hundred for them. Eelers pay 2 cents each for females, but will not buy males. The season is May and June, when they "crawl" or come ashore to lay their eggs between tide marks. They are picked up on shore at night or speared with an iron pike in the water by day. If speared in the carapace, the juices run out and they die and are worthless. A man can load a small boat at low tide in season. There are probably 10,000 caught in a season, which, at $1 per hundred, would only net $100, and yet their actual value must be much more.

Mussels are taken around the islands with oyster tongs principally, although a few are caught with rakes. They are worth 3 cents per bushel for manure. Probably 200,000 bushels are taken between Moriches and Babylon. A very few go to market for pickling, but the demand is small. Minnows, "silversides" (probably *Engraulis rittatus* and other species), are taken with a net made of milnet for eel bait, but usually by the eelers themselves, so that there is no regular price.

Hard clams are taken from the opening of the bay in spring to its close. The season is more active when oysters are out, from the middle of June to the middle of September. The same boats are used, probably two hundred, ranging from 2 to 6 tons each. During the height of the season five hundred men and two hundred boys are employed. A good day's work for a man is 1,000 clams (about 3 bushels). They sell for $2 per thousand or 70 cents per bushel. The yearly production is about 150,000 bushels, of which about 20,000 bushels are put up by the cannery at Islip. The tongs and rakes used are made rather heavier than those for oysters, and cost $5 and $6, respectively. Three-fifths of the catch is taken with tongs the heads of which are of iron. Gill-nets, or set-nets as they are here called, are used, to a certain extent, in the fisheries of the bay. They are 600 fathoms long and 6 feet deep, being made of cotton twine, 12-thread, and having a 3-inch mesh. A "fly-net," another common kind of apparatus, is a seine not hauled to shore; one end is fastened to a stake and the boat pays it out and rows around to the starting point.

Off Fire Island Inlet about seventy-five men fish for cod in winter. They use hand-lines and bait with sea clams and razor clams. Three or four men fish from one boat of about half a ton burthen. The twenty boats take 2,000,000 pounds in the course of a season. A portion of the catch, perhaps 500,000 pounds, goes to New York by boat, the remainder is sent by rail and is included in the figures for the different stations.

In addition to the products already mentioned, 50,000 barrels of soft clams and $10,000 worth of menhaden are taken in the bay, the latter being used for manure.

BROOKHAVEN.—The shipping station on the railroad is Yaphank, 3 miles north. Twenty-five fishermen live here (not included above), of whom fifteen are married, and seventy persons in all are dependent upon the water. Ten of the men fish outside and the remainder in the bay. There is no hand-lining for cod. Seines are used outside, and set-nets, fykes, and "run-arounds" or "fly-nets," inside; $500 are invested in boats and $2,500 in nets. Eeling has been poor this year, the catch amounting only to 2,500 pounds; 25,000 pounds of fresh fish of other species have been taken.

BELLPORT.—At Bellport fifteen men are engaged in the fisheries proper; nine of these are married, and have thirty-five persons depending upon their exertions. In addition to these, fifty oystermen are numbered among the residents of the village. No fishing is done outside; $2,500

are invested in nets and $500 in boats; 1,000 pounds of eels were taken for local consumption. A few clams are obtained about Fire Island. The shipments are included in Patchogue.

PATCHOGUE.—Patchogue has twelve married and eighteen single fishermen, with a total of seventy-five persons dependent on the fisheries. Besides these, one hundred oystermen are included for this place in the general report on the bay. The yearly catch amounts to 5,000 pounds of eels, 600,000 pounds of fresh fish, 400 barrels of hard crabs, and 300 dozen of soft crabs. Fykes, seines, and eel-pots are used; $1,000 are invested in boats and $2,000 in nets.

BLUE POINT.—Here were formerly taken in great quantities the famous oysters which still retain the name of "Blue Points," although the grounds here do not yield as formerly, and the same quality of oysters are now taken at Sayville, 2½ miles west. Ten men fish from Blue Point with fykes, seines, and eel-pots, and six of them are married and have twenty persons dependent upon them. The catch for the last season was divided as follows: Eels, 5,000 pounds; fresh fish, 80,000 pounds; hard crabs, 300 barrels; soft crabs, 200 dozen. About $800 are invested in boats and $1,500 in nets.

BAYPORT.—Very little fishing is done here. The men engaged in oystering and other bay work set a few fykes and eel-pots. The catch was as follows: Eels, 1,000 pounds; fresh fish, 15,000 pounds; hard crabs, 100 barrels; soft crabs, 150 dozen. There are $600 invested in boats and $1,200 in nets.

SAYVILLE.—Sayville is now the center of the "Blue Point" oyster trade. (See introductory remarks to Great South Bay.) Twenty fishermen fish and eel here, twelve of whom are married. Seventy persons in all are dependent upon the fisheries. Seines or "fly-nets," fykes, and eel-pots are used. Five thousand pounds of eels, 100,000 pounds of fish, 300 barrels of hard crabs, and 400 dozen soft crabs were taken; $2,000 are invested in boats and $2,000 in nets.

The owners of the three menhaden oil works on the beach live here. Mr. William H. Bedell, superintendent of W. J. Terry's works, says (August 20, 1880):

"All factories have been closed since July 1 because there were no fish. The steamers drive them off. They chase the schools and capture or scatter them. We often take them when full of spawn, when they are of little use, as the eggs mix with the oil and cannot well be separated. They are only good for guano, and should be left to breed. These spawners do not mix with the others. They spawn and go, and give place to a run of smaller fish. They struck in about April 15 in fair numbers. The run which comes in June is best, the fish are fat, and it is our main run."

Striped bass were plenty in South Bay forty years ago, on what is called "Bass Flat." Mr. Terry has seen wagon-loads taken of fish weighing from 10 to 60 pounds. There are none there now, although the character of the ground has not changed. He attributes their absence to the increase of sailing vessels, which are continually on the grounds. Formerly there were but few nets, and no pounds. Forty years ago they took small bass of 2 to 3 pounds in winter by means of nets under the ice.

The bay men hardly distinguish flounders from other flat-fish, and do not consider any flat-fish good eating. A few flounders are taken in spring and sent to market. Weakfish are holding their own as well as any fish excepting the bluefish. The latter are actually increasing, while all others are decreasing.

Josiah Smith fishes with a fly-net 1,500 to 1,800 feet long, with meshes 3⅛ inches. He says that no Spanish mackerel of any account have been taken since 1876. Then they were quite plenty. Few, if any, spawn here.

Hon. Robert B. Roosevelt, one of the Fish Commissioners of New York, resides here in

summer. He reports that kingfish, or barb (*Menticirrus nebulosus*), are not as plenty as formerly; bluefish seldom get further in the bay than the main channel, near Fire Island, on account of pound-nets in the channel; striped bass have disappeared; and "Porgy Flat" is about deserted. In regard to the Spanish mackerel he says: "Seven years ago I saw a school of Spanish mackerel 20 miles wide, and as far up the beach as I cared to go." He pays $1 a thousand for menhaden for manure for his land.

C. W. Smith fishes with a fly-net 100 fathoms long, 18 feet deep, with 3⅛-inch mesh, made of cotton twine, No. 9, tarred. He and his father fish together with two nets, requiring four men to handle them. He says there are many young kingfish now in the bay, and he never knew of them here before so small and in such numbers. Men go from here to Oakdale to fish for eels in winter. They take them in Great River with spears through the ice. Formerly they averaged 25 pounds a day per man before pots were used. Eels are now smaller. The season is from November to March, and the average for forty men is 8 pounds per day to the man.

As has already been said "Blue Point" oysters now come from Sayville, at "Browns Point." Floyd R. Skinner and Day & La Salle are oyster packers and ship to Europe.

"South Bay Oil Works," owned by Capt. W. J. Terry, of Sayville, are situated on the beach east of Fire Island Inlet, and are the most western of the three works situated there; $20,000 are invested in the factory, and in two sloops and a small steam yacht. When working, he employs twenty to twenty-five men which are paid, on an average, $22 per month, without board. The expenses are $700 per month for wages and fuel.

"Fire Island Oil Works," owned by Comstock Brothers, are next east, the middle one of the three. Twelve to fifteen men are employed in busy seasons. This year (1880) has not been a very successful one. They made 2,000 gallons of oil, now worth 45 to 46 cents. Last year it was only worth 28 to 30 cents. The scrap is worth $2.40 per unit of ammonia, per ton. Last spring it sold for $24 a ton. The factory closed July 22.

Smith & Yarrington, owners of the third oil and guano establishment, say that the steamers are killing the business, and that Church & Brother, who own a factory on the east end of the island, and Louis C. D'Homergue, owner of a factory at Barren Island, both offer to burn their steamers if others will do the same. Smith & Yarrow have three boats of 20 tons each, and buy menhaden of others. They keep thirty-four men during a season of five and a half months. They have seen small menhaden in the eastern end of the bay in September, but there is no more fall fishing for them. The capital invested amounts to $15,000.

There are five hundred men in this town, or election district, who live partly by fishing, but none who do so wholly. They are what are known as "bay men," turning their attention in different seasons to whatever branch of the various occupations connected with the water may promise to be most profitable at the time. Captain Terry says that fish forms one-fourth of the animal food used in the district of 2,700 inhabitants, and that more fish are consumed here than are shipped to other places. The railroad agent says that for the year ending June 30, 1880, there were 95,000 pounds gross weight of fish shipped from here. Six-tenths of this was ice and boxes, leaving a net weight of 38,000 pounds. The freight rate to New York is 21 cents per hundred. Clams all go by boat. For the year as above, 3,655 barrels of oysters were shipped to New York.

OAKDALE.—Few fish, except eels, are taken here. The fishermen and fish are included in other places. Many eels are taken near here but shipped at other points. The land is largely owned by wealthy gentlemen.

CLUB HOUSE.—Half way between Oakdale and Islip the well-known "South Side Sportsman's Club" is located on the Connetquoit River. Their trout preserves are very fine, and artificial

breeding is practiced. Their angling is mainly done in April, May, and June. The following is the catch, from their books: Brook trout, 1876, 903 pounds; 1877, 350 pounds; 1878, 1,087 pounds; 1879, 1,583 pounds. The catch of 1880 has not been drawn off, but exceeded that of any previous year. In 1881 they sent a surplus to market for the first time. It was said that it would be 4,000 pounds. The club is limited to one hundred members, who are restricted to twelve trout each, per day. The hatching-house has a capacity of 250,000 eggs. The trout are fed on "mummies" (minnows) and liver. The average amount expended for the latter is $50 per month.

ISLIP.—A clam and vegetable packing establishment, belonging to Messrs. J. H. Doxsee & Low is located at Islip. Eight years ago they put up small menhaden under the name of "American Lunch Fish," but the business not proving very profitable was abandoned. Two brands of clams are put up: "Little Neck clams," and "clam chowder." In 1880 the above cannery used about 5,000,000 hard clams in number; soft clams, none; number of men employed in factory, 10; number of women, 12; boys and girls, 4; men employed catching clams, about 80; number of 2-pound cans clams 75,000; number of 1-pound cans clams, 40,000; number of 2-pound cans clam chowder, 10,000; number of 3-pound cans clam chowder, 3,000; amount of capital invested, $10,000. The packing was done during the summer months, from the 1st of May to the 1st of October. During the winter only three or four hands were employed making cans.

The "Olympic Club" have their house here. They are a club of salt water anglers and employ five men. Islip is quite an angling resort, and many handsome boats are kept to supply the city sportsmen on their annual visits to the locality. This is the case with most other places, but this town is preferred by many both on account of its proximity to the inlet (to which it is nearly opposite) and of the lower price charged for boats, $3 to $4 per day. Of the fifteen fishermen at Islip nine are married. A total of fifty persons are dependent on the fisheries. The methods of fishing are the same as at other places. A few hard crabs are shipped from the village. The catch, exclusive of the clams, was distributed as follows: Eels, 7,000 pounds; fresh fish, 350,000 pounds; hard crabs, 500 pounds; soft crabs, 600 dozen. About $1,200 are invested in boats, and $1,500 in nets.

BAY SHORE.—Some pound-nets owned here are set on the south side of the bay, in the channel, although their use is unlawful. Some hard crabs are taken for market; some are kept in boxes and fed until they shed their shells, the others are sold in the hard state. From three to six men do quite a business at times during the season in the sale of menhaden to anglers, for bluefish bait. In May and June there are forty or fifty fly-net boats taking menhaden for manure. They sell bait also. In August the demand for bait is often greater than the supply. Most of the men fishing with fly-nets for menhaden go with purse-nets, outside, later in the year.

Mr. Frank Doxsee, a "bay man," says that the fishery for bluefish and weakfish was better in 1880 than for five or six years prior to that date. Older fishermen say that thirty years ago it was not uncommon to take 10-pound bluefish on the shallows among the grass where only those of 1½ pounds are now found.

In the "bunker fisheries" (menhaden) there were formerly twenty to thirty boats, each carrying 25 to 40 tons of fish, but for the past few years, especially the last two, not much has been done in this line, only two or three schools having been seen outside the beach. No men from this place now follow this fishery, although a few menhaden were taken this spring and used as a fertilizer upon the land.

James Wicks, seventy-three years old, says:

"About fifty years ago the first bluefish was caught, and no one knew what it was. Jonathan

Smith, better known by the name of 'Governor Smith,' the father of Mr. S. I. Smith, now proprietor of the Watson House, at Babylon, caught it while pulling in a sheepshead."

An observant angler, who has a summer cottage here, says that ten years ago Spanish mackerel were plenty, although they are very rare now. He does not fish on Sundays, but notices that those who do, find the best fishing on that day because the fish are not disturbed then by the dragging of the fly-nets.

Mr. George L. Benjamin, pound-netter, says: "Every other year there is a large catch of porgies; this year, 1880, they are plenty, but small, mostly under a quarter of a pound. Sheepshead have been plenty this year."

The catch of eels this year amounted to 3,000 pounds; of fresh fish, 1,000,000 pounds; hard crabs, 1,500 barrels; soft crabs, 1,000 dozen. There are twenty fishermen here, of whom fifteen are married; and a total of eighty persons live from the fisheries; $5,000 are invested in boats and $4,000 in nets.

BABYLON.—Babylon, like several of the preceding places, is a popular angling resort and fashionable retreat for summer visitors. Boats are let here at $4 to $5 per day. Fifty persons here are dependent upon the fisheries, including the ten fishermen and the families of the six married ones; $500 are invested in boats and $2,000 in nets. The catch for the past year has been: Eels, 1,000 pounds; fresh fish, 1,000,000 pounds; hard crabs, 200 barrels; soft crabs, 300 dozen.

BRESLAU.—Most of the inhabitants of the town of Breslau live by cigar making. Four men devote part of their time to fishing, but their catch, which last year amounted to 800 pounds of eels, 10,000 pounds of fresh fish, and 50 barrels of crabs, is consumed locally.

AMITYVILLE.—Eels form the principal product of the fisheries of Amityville. Forty men are engaged in taking this species in the bay, and cod in the outer waters. Twenty-five of the fishermen are married, and one hundred and fifty persons in all are dependent on the fisheries; $8,000 are invested in boats and $6,000 in nets. Four large seines are used, in addition to a number of fykes, fly-nets, and eel-pots. The pots are of the same form as those described under Riverhead, in the chapter on the East End, and are worth 60 cents each. Oysters are planted, and some hard and soft clams are taken. Some of the men fish for menhaden at times. The catch was divided as follows: Eels, 200,000 pounds; fresh fish, 250,000 pounds; hard crabs, 200 barrels; soft crabs, 200 dozen.

130. SOUTH OYSTER BAY.

South Oyster Bay is the central portion of that expansion of the coastal lagoon of which the eastern part has already been described under the name of Great South Bay. It begins at the line dividing Suffolk and Queens Counties, lying wholly in the latter, and in the township of South Oyster Bay, which extends across the island to Oyster Bay, on the north shore. A cluster of large islands serves to separate it from Hempstead Bay on the west, and numerous other groups and single islets diversify its surface. The oyster and clam interests are the principal industries on this bay.

There are five hundred men engaged in the oyster and clam business, and twenty in fishing. Twelve of the latter are married, and seventy persons derive a livelihood from the fisheries proper. Five hundred boats are used of 1 or 2 tons each, worth from $25 to $100. The yearly value of menhaden taken for use as a fertilizer is $1,000. The catch of oysters per annum is 20,000 bushels; hard clams, 7,000 bushels; soft clams, 2,000 bushels; mussels, 50,000 bushels (for manure). A large part of the products are sent to New York by water. Some shipments, however, are made by rail or teams. The oyster ground is leased in three-acre lots from the town of Hempstead, at

$5 per acre. There are no free grounds or toleration fees. The beds used to be carefully watched to prevent stealing. The stealing of oysters or other products of the water is not looked on as an offense so great as stealing the products of the land. In the prosecution of an oyster thief no oysterman can sit on the jury. It is difficult to prove theft in the night, as the location of the boat is hard to swear to. An average catch of oysters for a man is 60 bushels per week on good grounds. They are worth from $1.25 to $1.50 per bushel. Planting is increasing, although most grounds which are fit are now planted. Not many of the animals which elsewhere prove such destructive enemies of the young bivalves frequent these waters. No borers or drills are ever found, except when brought in on foreign seed. Seed comes from Newark Bay and up the sound. The men think that seed from New Haven, Conn., grows faster, but that that from Blue Point is surer. Clams are not very plenty. Crabs are caught when hard and kept until they have shed. They are worth $1 to $1.50 per dozen in the spring, and 30 to 75 cents in summer. Eels are taken in pots mainly, and are mostly consumed at home. Surf fishing for striped bass and bluefish was poor in the fall of 1880, but good in the previous spring. Three 10-ton sloops, carrying three men each, fish for cod from November 1 to April, having an average catch of 90,000 pounds. The total tonnage of the small boats on the bay is about 600 tons.

SEAFORD, OR SOUTH OYSTER BAY.—There are six fishermen here, of whom four are married. The families dependent upon the latter contain about fourteen persons. The capital invested in boats amounts to $500; in nets, $1,500. The catch last year was as follows: Eels, 5,000 pounds; fresh fish, 10,000 pounds; hard crabs, 100 barrels; soft crabs, 200 dozen.

RIDGEWOOD, OR BELLMORE.—There are five fishermen here, and ten persons are dependent upon the three who are married; $500 are invested in boats and $1,000 in nets. The following is the catch for the past year: Eels, 3,000 pounds; fresh fish, 10,000 pounds; hard crabs, 100 barrels; soft crabs, 100 dozen.

MERRICK.—The settlement of Merrick has ten fishermen, of whom six are married, and a total of forty of the inhabitants are dependent upon the fisheries; $1,000 are invested in boats, and in nets $1,500. The catch last year amounted to 2,000 pounds of eels, 30,000 pounds of fresh fish, 200 barrels of hard crabs, and 300 dozen soft crabs.

HEMPSTEAD BAY AND ROCKAWAY.—This bay opens into the western end of South Oyster Bay, and, like the latter, is dotted with islands. Four hundred men are engaged in oystering and clamming in its waters. The Rockaway oysters are well known in the markets, 200,000 bushels being produced annually. The capital invested in the oyster business amounts to $100,000; 15,000 bushels of hard clams and 75,000 bushels of soft clams are taken, and 400 bushels of mussels are sent to market for pickling. Three-fourths of the shipments go to New York by boats. Fishing is done with seines, fykes, hand-lines, and eel-pots. Some of the fish are hauled to New York by wagon and sold outside the markets.

FREEPORT.—There are ten fishermen at this place, of whom four are married; twenty-five persons in all are dependent on the fisheries. About $1,000 are invested in boats and $2,000 in nets. The catch for the last year was as follows: Eels, 24,000 pounds; fresh fish, 650,000 pounds; hard crabs, 100 barrels; soft crabs, 300 dozen. At times the fishermen get extra help, and form gangs of four men each for seining in the bay, or of nine men each for surf fishing in the fall or spring. A few shad have been taken here, the number last year amounting to 500.

BALDWIN.—Twenty fishermen live here, and, including the families of the ten who are married, seventy-five persons are dependent upon the fisheries. There are $3,000 invested in boats and $8,000 in nets. The catch for last year was: Eels, 10,000 pounds; fresh fish, 250,000 pounds; hard crabs, 300 barrels; soft crabs, 2,000 dozen.

ROCKVILLE CENTRE.—Rockville Centre has twenty fishermen, of whom twelve are married and have families, averaging five persons each; $2,500 are invested in boats and $5,000 in nets; 3,000 pounds of eels, 120,000 pounds of fresh fish, 200 barrels of hard crabs, and 300 dozen soft crabs comprised the last year's catch.

PEARSALL'S.—Four men from this locality are engaged in the fisheries and twenty persons depend upon them; $600 are invested in boats and $1,500 in nets. The products for last year were as follows: Eels, 1,000 pounds; fresh fish, 20,000 pounds; hard crabs, 300 barrels; soft crabs, 1,000 dozen.

FAR ROCKAWAY AND LAWRENCE.—These places, which are only a mile apart, have six fishermen, of whom four are married, and twenty persons in all dependent on the fisheries. About $500 are invested in boats and $1,000 in nets. The catch for 1880 was: Eels, 3,000 pounds; fresh fish, 50,000 pounds; hard crabs, 400 barrels; soft crabs, 1,000 dozen.

HEWLETT'S.—At this place and Woodsburg, one-half a mile distant, are ten fishermen, eight of whom are married, and thirty-five people depend on the fisheries. There are $600 invested in boats and $1,500 in nets. The catch consisted of 5,000 pounds of eels, 100,000 pounds of fresh fish, 500 barrels of hard crabs, and 800 dozen soft crabs.

E.—THE WEST END OF LONG ISLAND.

131. EXPLANATORY STATEMENT.

The remaining portion of the island, which is here included in the "West End," begins on the south, at Rockaway Beach, and includes Jamaica, Sheepshead, and Gravesend Bays. The report does not include the drift and stake net fisheries for shad in New York Bay, as it is not practicable to separate the interests of the New York and New Jersey fishermen in the bay. The shore fishing practically stops at Fort Hamilton. The East River is too swift to admit of the use of nets, and it affords no fishing, except to anglers, who go out in small boats for weakfish and other species.

132. JAMAICA BAY.

This bay is deeply indented in the coast and is filled with islands. Its waters are generally shallow and its northern shore is marshy. It is inclosed on the south by Rockaway Beach, a fashionable watering place. The principal villages are Canarsie and Flatlands. The inlet has moved 3 miles to the westward within the past twenty years. Scallops and terrapin were taken in the bay in former years, but more of the former are obtained at present and of the latter only an occasional one is secured. Mussels are gathered in considerable quantities around the islands. They are not used for manure, as in the South Bay, but are sent to New York and Newark, N. J., where a portion of them are eaten fresh and the remainder are pickled. Not many fish are shipped, most of them being consumed near home. Some Spanish mackerel used to be taken, but for the last ten years only occasional specimens have been secured. Sheepshead are scarce, notwithstanding the splendid mussel beds, which might be expected to attract them. Eels are moderately plenty, and are taken in pots made with hoops and netting, as well as in fine-meshed seines and with spears. The fishermen say that the eels do not bed in the bay as they did formerly, some attributing it to the disturbance of the water caused by the passing of sail and steam boats, and others to the jar of railroad trains running to Rockaway Beach and to Canarsie. Oyster beds were

leased for the first time in 1880. Three acres are leased for $10 per year to each applicant. The clammers object, as the grounds have always been free; but soft clams are giving out, and the grounds are more valuable for oysters.

CANARSIE.—There are one hundred "bay men" here, who take fish, clams, mussels, &c. About fifty of these fish for cod outside of the bay at certain seasons. There are forty-nine registered boats here, aggregating 343 tons. These cost on an average $800 each. None of them are of over 20 tons burden. Sixteen boats, with three or four men each, fish outside with hand-lines for codfish; they use the "sea" and "razor" clams for bait. The catch of cod, which amounts to 10,000 pounds in a season, is shipped to New York by water, all other fresh fish going by wagon. The entire quantity of fresh fish, including cod, taken by the Canarsie fishermen last year, was 100,000 pounds; of eels, 15 tons; oysters, 10,000 bushels; hard clams, 10,000 bushels; soft clams, 100 bushels; and mussels, 24,000 bushels. The mussel season is from April 1 to the end of July, during which time about 100 barrels go to New York by wagon each night. They are worth 50 cents per barrel. Many hard crabs are consumed here, and a few are sent to market, in all about 1,000 barrels; some are kept confined in pens until they have cast their shells, when they are sold at a much higher figure. The men can readily distinguish a "shedder." One dealer ships 500 dozen soft crabs per week from June 15 to October 15, the entire catch being 13,000 dozen, having an average value of 62 cents. The value of menhaden taken for manure is $2,000. The capital invested in nets amounts to $10,000.

FLATLANDS.—This village has forty fishermen; twenty are married and, including the families of the latter, one hundred persons depend on the fisheries. Ten boats, aggregating 80 tons and valued at $600 each, are employed; $4,000 are invested in nets and $1,000 in oyster beds. The annual production is about 3,000 bushels of oysters, 4,000 bushels of hard clams, 100 bushels of soft clams, 5,000 bushels of mussels, 10,000 pounds of eels, 50,000 pounds of fresh fish, 200 barrels of hard crabs, 2,000 dozen of soft crabs, and $800 worth of menhaden for manure. The methods of fishing are the same as at Canarsie.

133. SHEEPSHEAD BAY.

This little bay, which lies to the eastward of Coney Island, was formerly a famous resort for the fish whose name it bears. It is frequented by anglers, by whom many bluefish, weakfish, &c., are taken. Two fishermen from Gravesend fish here to supply the local demand. A few men take clams. The yield of the bay, including Coney Island Creek, is estimated at 1,000 pounds of eels, 5,000 pounds of fresh fish of other species, 100 barrels of hard crabs, 200 dozen of soft crabs, 500 bushels of hard clams, and 500 bushels of mussels. This is intended to include the catch both of the fishermen and sportsmen.

134. GRAVESEND BAY.

This is an indentation in the lower part of New York Harbor, formed by the western end of Coney Island on the south, and extending to Fort Hamilton, in the Narrows, on the north. Coney Island Creek (a small sound) makes in at the lower part. There are no islands in the bay. Shad are taken in pounds, fykes, and gill-nets. Two pounds stand the greater part of the year and four more are put in during the shad season, which lasts from the 1st of April to June. These pounds cost $1,000 each, including two sets of netting, one of which is used while the other is being dried and repaired. The shad fykes, which are 9 feet in diameter, are often placed at right angles to the leaders of the pounds, which are very long. The gill-nets are drifted. They have a 5-inch mesh, are 300 fathoms long, and fish 27 feet deep, being valued at $125 apiece. Small fykes are

used for bass and fine-meshed seines are employed for eels. Crabs are taken in winter by means of rakes, similar to ordinary clam-rakes. These have a 4-foot bar with 32 to 36 fingers, and a handle 30 feet long. Hard and soft clams are taken, but no oysters.

NEW UTRECHT AND BATH.—Forty men are engaged in the fisheries of these places, of whom 18 are married. Including the families of these, 100 of the inhabitants are dependent on the fisheries. Six boats of 10 tons each are used. These are worth $800 apiece. Last year 60,000 shad were secured; 35,000 of these were taken by 5 fyke and pound fishers, while the remainder were caught by the 25 gill-netters. In the season of 1881 a fisherman named Stephen Morris took 12,000 shad prior to May 12. There are $10,000 invested in nets in the two villages. The yield of the fisheries last year was: Eels, 100,000 pounds; fresh fish, exclusive of shad, 150,000 pounds; hard crabs, 1,200 barrels; hard clams, 5,000 bushels; soft clams, 300 bushels. Fifteen men fishing from an equal number of small boats average about 3 bushels of hard clams per day during the months of May, June, July, and August.

FORT HAMILTON.—Eight of the 10 fishermen of Fort Hamilton are married, and 30 persons are dependent upon them for support. The methods of fishing are similar to those employed at Bath. William J. Cropsey owns a pound and 20 shad-fykes, while another pound is fished by other parties. About $4,000 are invested in nets and $1,500 in boats. Two 10-ton boats are used, and many smaller ones. The catch last year was 20,000 shad, 20,000 pounds of eels, 30,000 pounds of other fresh fish, 400 barrels of hard crabs, 2,000 bushels of hard clams, and 100 bushels of soft clams.

F.—NEW YORK HARBOR.

135. GENERAL DESCRIPTION OF THE FISHERIES.

This section does not include the fisheries of Gravesend Bay, which are given with those of the western end of Long Island. It refers chiefly to the fisheries of Staten Island and the Upper Bay, though it naturally includes fishermen from New Jersey that fish in New York waters. It has been a difficult matter to separate these fisheries and to assign them to their respective States, as men living in one State fish during the shad season in the waters of both. This is especially true of the drift-netters. In this matter the only way seemed to be to credit each State with the fish caught by its citizens, no matter where taken, and this system has been followed. Another difficulty has been the migratory character of the fishermen who take shad in the harbor, and the impossibility of interviewing any considerable portion of them. This has been overcome by intelligent estimates of old and reliable native fishermen. The drift-netters come from many parts, especially from up the Hudson, even as high as Catskill. They come down and "drift" in the Narrows as long as it suits them to do so, and then follow the shad up the river to or even beyond the Highlands. Shad are taken in fykes and in gill-nets. There are two forms of gill-nets; but in the local idiom one is a "drift-net," while the stationary form of stake-net is technically a "gill-net." In drifting they use two nets. They put one in at near the last of the ebb tide and drift down until the first of the flood, when that net is overhauled and the fish taken out. The other net is then dropped in and drifted up stream. These nets are from 200 to 250 fathoms long. They are fished in deep water, and sunk about 25 to 28 feet below the surface. They are weighted so heavily that the float-lines are sunk to this distance, where they are held by occasional buoy-lines which keep them from going deeper. Even at this distance the suction of large steamboats often draws

the nets together in a mass, and even at times actually lifts them into the wheels. Three men go in one boat on a fishing trip; two are engaged in rowing and the third handles the net. The fishing season is usually from April 1 to May 15. The season of 1881 was short on account of cold weather and the men had only one month's fishing. During the first of the season there were 100 drift-nets in use, but at the close only 4 were employed. Mr. Joseph McLyman, a drift-netter living at Tompkinsville, Staten Island, says that the season of 1880 was better for this mode of fishing than that of 1881. In the latter year his highest catch on a tide was 42 shad, while in the former it was 153. Some tides do not yield more than half a dozen fish. He thinks a fair average for 1880 was 50 shad to each net on a tide, while it was only about 18 in 1881; a tide, in this case, meaning the last of one tide and the first of the next, two tides a day being fished.

The "gill-nets" or stake-nets are made of linen, coated with verdigris, white lead, and oil. They are made of 5½-inch mesh, 80 meshes deep and 70 meshes wide. These nets are stretched between poles which are set in rows. They are weighted at the bottom with heavy rings which slide up the poles when lifted, and are suspended from the top by lines called "arm lines."

None of these stake-nets are fished below Staten Island. On the island there is a company (A. Simonson & Co.) that fishes four rows of nets, with twenty in a row. They employ eight men in two boats. William Wardell, of Bay Ridge, Long Island, fishes in the same manner. Isaac Van Duzer, of A. Simonson & Co., has fished thirty-five years, and 1881 is the lightest season he has known, though 1880 was light in comparison to former years. In the last-named season he took 16,000 shad, while in 1881 he caught only 9,500. His best season was in 1874, when he secured 21,000. He attributes the bad catch of 1881 partly to the late season and partly to the pollution of the river, which is distasteful to the fish. He thinks that sewage is the main cause of his poor success, as he fishes near the city, north of Staten Island, while 5 miles below, at New Dorp, the fykes and pounds have had the best season in twenty years. Mr. Van Duzer says that there is a coating of coal oil on the water, and he further adds that even the crabs taste of coal-tar. At New Dorp, or Cedar Grove, there are two pounds and two fykes. The catch here has been good. Robert Barnes owns the pounds, and Stephen Berger and John Kettletash fish the fykes. The fykes have brush wings which extend greater or less distances. One fyke was set from Governor's Island running from the south battery off southwest. The same parties fish for eels and flounders in winter. A few lobsters were taken in former years, but none are found now. No crabs are taken for market. One hundred men are engaged in fishing; forty are married, and two hundred and fifty persons are dependent on the fisheries; $16,000 are invested in boats and vessels, and $5,000 worth of nets are employed.

NEW YORK CITY.—There are few fishing vessels hailing from New York City, though a very large fleets from Long Island and New England ports resort to this market to dispose of their catch. There are also great quantities of fishery products received by rail from all parts of the Atlantic coast, the Gulf of Mexico, and from the Great Lakes. The receipts of fresh fish in 1880 aggregated nearly 56,000,000 pounds, valued at about $3,500,000 at wholesale.

The most important species, as regards weight, was cod, of which the receipts were 9,250,000 pounds. Among other species were bluefish, 5,500,000 pounds; halibut, 3,650,000 pounds; shad, 4,002,000 pounds; large quantities of haddock, mackerel, herring, porgies or scup, smelts, flounders, bass, sturgeon, whitefish, and other salt-water and fresh-water species; besides clams, crabs, lobsters, scallops, frogs, turtles, and other aquatic animals.

The quantity of ice used for refrigerating fish in 1880 was 6,981 tons, valued at $41,655. There are some large refrigerators, occupying buildings two or three stories high, where fresh fish are stored during seasons of abundance, to be marketed throughout the year.

There are about fifteen establishments for fish-curing. The principal method is by smoking. Sturgeon is more largely smoked than other species, though salmon, herring, eels, mackerel, and smelts are also cured in this way. About 3,000,000 pounds of sturgeon were smoked in 1880, and consumed mostly by the German population.

Boneless cod, shredded cod, caviare, and many kinds of canned products are prepared here. Pickled eels are growing in favor with the foreign residents, particularly with the Germans, who are also very partial to caviare. The twenty-five leading salt-fish dealers in 1880 sold products valued at $3,940,000.

Further details of the fish trade of New York City will be given elsewhere in this report.

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PART VII.

NEW JERSEY AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of the Fishery Interests of the State:
136. Statistical recapitulation.
B.—The New Jersey Shores of New York Bay:
137. Statistical recapitulation.
138. Lower Bay.
139. Upper Bay.
140. Newark Bay.
C.—The Coast Fisheries of Northern New Jersey:
141. Statistical recapitulation.
142. General account of the various fishery interests.
143. Description of the more important fisheries.
D.—The Coast Fisheries of Southern New Jersey:
144. Statistical recapitulation.
145. The principal fishery centers described.
146. Descriptions of the more important fisheries.

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PART VII.

NEW JERSEY AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

136. STATISTICAL RECAPITULATION.

GENERAL SUMMATION.—New Jersey produced in 1880 $3,176,589 worth of fishery products, taking the sixth place in the list of fish-producing States. In some special fisheries it takes a higher rank. Its oyster products, valued at $2,080,625, are exceeded only by those of Maryland and Virginia. Its crab fisheries, from which the fishermen realize $162,612, are more extensive than those of any other State, while its quahaug fisheries are second only to those of New York. In the menhaden fisheries it stands fifth on the list, the oil, scrap, and compost produced in 1880 being valued at $146,286. Its river fisheries are of minor importance, the total yield being only 2,752,000 pounds, netting the fishermen $91,435.

STATISTICAL RECAPITULATION.—The following statements show the extent of the fishery interests of the State for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	5,659
Number of shoremen	419
Number of factory hands	142
Total	6,220

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (10,445.91 tons)	590	$545,900
Boats	4,065	223,963
Pound-nets	27	10,800
Fykes, pots, and baskets	3,417	15,966
Gill-nets	852	25,203
Purse-seines	20	8,000
Drag-seines	415	30,570
Minor apparatus, including outfit	.....	132,800
Factories and other shore property	.....	470,000
Additional cash capital	.....	20,000
Total capital	.....	1,492,202

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	65, 151, 486	$3, 176, 569
Sea fisheries.		
Bluefish	3, 635, 000	82, 125
Cod	1, 667, 000	31, 256
Clams (hard)	3, 132, 280	195, 767
Clams (soft)	660, 280	33, 014
Crabs	1, 470, 800	162, 612
Lobsters	156, 800	5, 880
Menhaden, for oil and compost	29, 064, 000	140, 286
Oysters	13, 825, 000	2, 080, 625
Squeteague	4, 430, 000	132, 900
All other species	4, 358, 226	214, 689
Total for sea products	62, 399, 486	3, 085, 154
River fisheries.		
Alewives	1, 200, 000	17, 335
Shad	750, 000	35, 000
Sturgeon	300, 000	15, 000
All other species	502, 000	24, 100
Total for river products	2, 752, 000	91, 435

B.—THE NEW JERSEY SHORES OF NEW YORK BAY.

137. STATISTICAL RECAPITULATION.

In the discussion of the sea fisheries of the various localities, the State has been divided into three districts, namely, the New Jersey shores of New York Bay, the ocean shore of Northern New Jersey, including the coast-line between Sandy Hook and Barnegat, and the southern district of New Jersey, including the shore between Barnegat Inlet and Cohansey Creek, on Delaware Bay.

STATISTICAL RECAPITULATION OF THE SEA FISHERIES FOR 1880.

THE NEW JERSEY SHORES OF NEW YORK BAY.—Mr. Fred. Mather, while engaged in the investigation of the fisheries of New York State, visited the New Jersey shores of New York Bay and gathered the data from which the following statistics of the sea fisheries have been compiled. He has also furnished the succeeding discussion of the fisheries of the three bays which are comprised in this division.

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	75
Number of shoremen	5
Total	80

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	70	$4,200
Pound-nets	5	3,000
Fykes, traps, and baskets	100	7,000
Gill-nets	200	4,000
Drag-seines	10	1,000
Minor apparatus and outfit		750
Factories and shore property		2,000
Additional cash capital		1,000
Total capital		22,950

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	664,000	$19,476
Terrapin	3,800	633
Hard and soft crabs	24,000	2,650
Soft clams	10,000	500
Quahaugs	87,272	5,454
Miscellaneous products (including seaweed, mussels, &c.)		7,000
Total		35,713

a Including 150,000 pounds used for fertilizing purposes.

138. SANDY HOOK BAY.

LOWER BAY.—The fishing interests of New Jersey in this bay are confined to the manufacture of menhaden oil and guano. Five large factories are in active operation during the summer months, most of them doing a large business. The oil and guano factory of Day & Shipman, at Highland Park, is a small one which runs only part of the season. Next come the establishments of Carter & Co., Vale & Griffin, and Osborn & Vail; all of which are located near Port Monmouth. Half-way between the latter place and Keyport is the large phosphate factory of Preston Brothers. This firm makes some oil and scrap, but their main business is the manufacture of fertilizers. They buy scrap from other oil works to be mixed with phosphates, which they bring from the beds near Charleston, S. C.

In early spring a good many menhaden are taken in pounds and fykes, but when the water gets warm few are caught, as at this time the fish are schooling near the surface, and it is said they will then seldom enter the traps. Twenty pounds, and five gangs of fykes, with from six to ten baskets each, are fished along the beach near Port Monmouth. Each gang has a leader like that of a pound, with two fykes set opposite each other at intervals throughout its length. Various kinds of fish are taken, some of the larger ones being used for food, though the menhaden and all of the smaller and worthless fish are sent to the factories.

During my visit to the locality in May, besides menhaden, I saw the following fishes go into the boilers at the factories: Small butter-fish, perch, and blackfish; goosefish or anglers, skates, sting-rays, and alewives; besides several species of crustaceans.

Oyster-culture is practiced quite extensively at Keyport and Perth Amboy, in Raritan Bay.

139. UPPER BAY.

The fisheries of the New Jersey shore of the Upper Bay are mainly for shad. The fish are taken in fykes which are set at the end of hedges made of brush, and in gill-nets. Thirty hedges

with two fykes each are usually fished in the bay. Eight men are engaged in the fishery, the catch for 1880 amounting to 20,000 shad, in addition to 50 tons of other fish. Joseph Slater sets two fykes for shad off Constable Hook, and two for other small fish, while Mr. Nicholas and others have a number at Bayonne. Mr. Slater reports 12 to 15 shad a fair catch for a fyke in twenty-four hours. The shad season usually lasts from the middle of April until late in May, but other species, including bass and weakfish, are taken up to the middle of December. In 1880 the price of shad ranged from $8 to $15 per hundred. The principal fisheries, if we except the gill-net shad fishery, which is carried on to a limited extent by these fishermen in New York waters, are off Bergen Ridge, between Bergen Point and Communipaw. Bergen Ridge separates Upper New York Bay from Newark Bay, and fishermen living on it often fish in both localities.

140. NEWARK BAY.

The fisheries in this bay are said to have been greatly injured by coal oil. Newark Bay shad formerly sold at high prices in the neighboring towns, but as they often taste of oil they have lost their reputation. At times even the oysters in the bay are tainted with coal oil, and the fishermen complain loudly against the emptying of such substances into the rivers, as well as against the practice of carrying oil across them in submerged pipes.

Ten men fish regularly throughout the year, and in the shad season as many more fish with gill-nets in New York waters; $1,500 are invested in nets, with $300 additional in small boats. The catch of shad for the past two seasons has been very light. In 1880 it amounted only to 4,000 in number, with 32 tons of other species. A few crabs are taken here for local consumption. The smelts which enter this bay are esteemed beyond those of other localities. They are taken chiefly about the Hackensack and Passaic Rivers. They are quite small, seldom exceeding five inches in length. The catch is now quite insignificant, but when Eastern smelts are selling in New York at from 5 to 15 cents per pound these find a ready market at 25 cents.

C.—THE COAST FISHERIES OF NORTHERN NEW JERSEY.

141. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—This district, which includes the ocean shore from Sandy Hook to Barnegat Inlet, has extensive fisheries. They are carried on exclusively from small open boats, and sloops and schooners under 5 tons measurement. The fishing is chiefly about the mouths of the brackish bays and coves, and along the outer beach, though a number of species are taken several miles from land. The fishing begins in early spring and continues without interruption till late in the fall, after which most of the fishermen turn their attention to clamming, though a few of the larger boats are employed in the winter cod fisheries.

STATISTICAL RECAPITULATION.—The following statements show the extent of the sea fisheries of the district for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,800
Shoremen	50
Total	1,850

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels		
Boats	1,331	$58,160
Pound-nets	13	16,000
Fykes, traps, and baskets	2,453	6,125
Gill-nets	260	5,968
Drag-seines	111	9,130
Minor apparatus, including outfit		18,000
Factories and other shore property		30,500
Additional cash capital		11,000
Total		154,883

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	9,356,766	$278,735
Terrapin	2,800	467
Lobsters	156,800	5,880
Crabs	1,343,300	150,412
Soft clams	630,430	31,522
Quahaugs	550,720	34,420
Miscellaneous products		3,000
Total		504,436

a Including 200,000 pounds used for fertilizing purposes.

142. GENERAL ACCOUNT OF THE VARIOUS FISHERY INTERESTS.

The material for the following description of this district and of its more important fisheries was gathered during a personal visit to the locality in the fall of 1880:

THE GEOGRAPHY OF THE REGION.—That portion of the coast lying between Sandy Hook and Barnegat Inlet, for convenience of treatment called Northern New Jersey, has, for the most part, a low sandy shore, which is interrupted at several points by shoal and narrow inlets that open into shoal-water bays or rivers, extending a short distance from the sea. The Shark and Squan Rivers are the most important ones in the section. These have extensive tide-flats along their shores. They receive a limited amount of fresh water from small and unimportant streams that reach some distance into the interior, but are affected to such an extent by the ocean tides that in their lower portion they are usually quite salt during a greater part of the year. There are also shoal-water bays or lagoons of larger size extending parallel with the coast at a short distance from it. These are fed chiefly from the sea, but they also receive a limited quantity of fresh water from the small creeks that drain the surrounding country.

The bays running parallel with the coast often expand into large sheets of water, and frequently separate the outer shore from the main land by a considerable distance. Such is the case at Sandy Hook, where the outer shore is reduced to a low and narrow sand bar, some 10 miles in length, formed by the action of the tides and currents. This bar is separated from the main land by the waters of Sandy Hook Bay and its two important branches, known as the North and South Shrewsbury Rivers.

The southern portion of the district is of similar formation, the outer shore being reduced to a low barren sand bar separated from the main land, for a distance of 20 miles, by the northern arm of Barnegat Bay, which varies from one-quarter to 4 miles in breadth.

The ocean-bed slopes rapidly downward, and a depth of 5 or 6 fathoms is reached within a short distance of the shore. From this point the descent is very regular and gradual, and for a considerable distance to seaward the bottom is a level plateau of sand, interrupted here and there by small patches of rocks, and larger areas of clay and mud.

NORTHERN NEW JERSEY AS A SUMMER RESORT.—The district, especially in its northern portion, is one of the most popular resorts for invalids and pleasure-seekers in the entire country, and during the summer months the beaches are lined with people from the larger cities of the interior, who seek to avoid the sultry weather by coming to the seashore. Many of them have bought land and are building cottages along the shore, while a larger class take rooms at the fashionable hotels that may be found at short intervals for miles along the coast. The region is then one vast summer resort, and a large percentage of the resident population are employed in catering to the wants of the visitors during their sojourn in the locality. Owing to the nearness of New York and Philadelphia another class are extensively engaged in supplying these markets with produce and fish.

NORTHERN NEW JERSEY AS A FISHING DISTRICT.—The natural advantages of the region as a fishing district are perhaps a little above the average, but the fact of having good markets for the catch and facilities for shipping are matters of much greater importance to the fishermen. The fishermen of other regions find no difficulty in catching an abundance of fish, but they are so far from the larger cities that it is often quite impossible to market their catch, while in other cases the cost of transportation is so great as to make such a course unprofitable. Under such circumstances they are obliged to content themselves with supplying the home demand, which is often quite limited. With the fishermen of this region the case is quite different, for fish can be put upon the markets of New York or Philadelphia a few hours after they are taken from the water. They are thus in excellent condition, and bring higher prices than those sent from a distance, while the cost of transportation is proportionately less. The large local demand for the hotel and cottage trade also tends to make the prosecution of the fisheries more profitable here than in other districts.

The fishing season begins early in May and continues till November, while a small number of men fish for cod in winter. The fishing is chiefly in the salt water at the mouths of the various bays and rivers, where many of the species congregate in considerable numbers in the spring, and remain throughout the season for the purpose of feeding and spawning. The crabs and clams are also most abundant in these localities, and a large number of men and boys devote the entire season to their capture. Many of the species are also abundant along the outer shore; and along its northern portion, or in that section lying between Squan River and Sandy Hook, an extensive fishery has been developed.

This coast fishing, as distinguished from that of the bays, is of two kinds. The first, called ground or bottom fishery, is confined to the capture of such fishes as live and feed at the bottom. These seem to have no special feeding grounds, but are distributed on all of the hard and rocky spots, of which there are many scattered along the entire coast. The second is confined to the migratory species living and feeding at or near the surface, and is of considerable importance.

There is also another fishery extensively prosecuted by the fishermen of the region in the fresh water at the head of Barnegat Bay during the winter months. Rock (*Roccus lineatus*) and perch are the principal species taken. They are caught chiefly in haul-seines, a single draught of several tons being occasionally made.

Shrewsbury is one of the oldest oyster regions in the neighborhood of New York, and the oysters from this region have always stood high in the markets. There are no natural beds here,

but the stock is raised from transplanted young, obtained chiefly at Keyport. At Shark River about 200 lots of oyster-beds are leased, but the product is only enough to supply the local consumption at the summer hotels.

THE PRINCIPAL FISHING CENTER.—There are no large cities or even villages of note that can be treated separately as fishing centers. The fishermen very naturally gravitate toward the bays and rivers that have been mentioned, and toward the shore at that portion where the coast fisheries are extensive. There they usually become scattered along the water-line, owning small farms or gardens in the rural districts. The nearest approach to a fishing center is Seabright, a few miles south of Sandy Hook, which, owing to its landing and shipping privileges and its nearness to the fishing grounds, has become a popular resort for the fishermen of various localities during the fishing season. The whole section from Sandy Hook to Long Branch is an important one, and many fishermen live within these limits. There are also several settlements along the bays and rivers, where the majority of the inhabitants are dependent on the fisheries for a livelihood. The more important of these are Fair Haven, on the Shrewsbury River, and Mannasquan, on the Squan River, where crabbing and clamming are extensively carried on; and Waretown, near Barnegat Inlet, is a center for the gill-net fishing of Barnegat Bay during the summer months.

THE FISH-LANDINGS NEAR LONG BRANCH.—The property along the shore between Sandy Hook and Long Branch, owing to the demand for building sites, is now very valuable, and, as the region has become more thickly settled, the fishermen, who formerly landed their catch where it was most convenient, have gradually been driven from place to place until they are now obliged to use property set apart exclusively for this purpose. Such places are called fish-landings. A company of men now usually own or rent a piece of ground fronting on the water, and after building a large number of ice-houses on it, and arranging with the railroad company to have a convenient shipping station established, they rent privileges at the landing, together with the use of an ice-house, to any and all fishermen who may desire them. The usual price paid for the privilege of landing is $5 a year for each boat, equal to $2.50 per man, while the rent for the ice-house varies according to its size and the number of men that are interested in it.

The ice-houses are from 75 to 100 feet in circumference, and have a conical roof. They are about 14 feet deep, with the floor usually 8 feet below the surface of the ground. The portion above ground is well banked with sawdust, tan-bark, or earth, to protect it from the weather. The average ice-house costs about $200, and holds from 150 to 250 tons, according to its size. Several of the fishermen use an ice-house in common, and divide the expense of rent equally. The price paid averages about $15 a year. With the line-fisheries it is customary for eight men, or the crews of four boats, to join for this purpose, but in pound-fishing one or even two ice-houses may be required for each net. The fishermen gather their ice in winter from the ponds in the locality, doing their own work as far as possible, but hiring men and teams whenever it may be thought necessary. If the labor of the fishermen is neglected, the cost of filling the house is about $60; and all who have assisted in the work and contributed toward the expense are at liberty to use as much ice as is needed for the preservation of their catch until the supply is exhausted. The men, however, are never extravagant in its use, as they must pay freight on all that is shipped with the fish, and care is taken that each package shall be as light as possible. In all cases where the fish are shipped, ice-houses similar to those described are constructed and filled from ponds in the locality. When there is a scarcity of ice the fishing is often discontinued, as it is not profitable to import it from other regions for fishing purposes.

Owing to the high price for land, the fish-landings are fewer than formerly, and from 50 to 75 boats have their headquarters at the same point. The most important landings are at Sea-

bright, Monmouth Beach, and Long Branch. At other places along the shore and in the bays the fishermen are more scattered and the ground is less valuable. Here they are allowed to land at various points, and they frequently use the public or other landings, or have small landings of their own.

THE DISPOSITION OF THE FISH.—As a rule the fishermen ship their own fish. A few are sold to middlemen, but these are chiefly for local supply. On reaching the shore they at once clean, box, and ice their catch, and ship to the commission dealers of New York and Philadelphia by the first train. They never weigh the fish, but merely keep account of the number of packages, trusting to the dealers to send correct returns. The rates charged by the dealers are 10 per cent. of the selling price, and the transportation charges vary from $1 to $1.50, according to the size of the package and the distance it has been carried. These with the cost of packages make the expenses about one-quarter to one-third of the gross sales.

143. DESCRIPTIONS OF THE MORE IMPORTANT FISHERIES.

THE DIFFERENT FISHERIES OF THE DISTRICT ENUMERATED.—The fisheries of the district may be divided into branches as follows: Bluefish trolling, still-baiting, the pound-net fishery, the gill-net fishery, the haul-seine fishery, the hand-line fishery, the winter cod fishery, the eel fishery, the lobster fishery, the crab fishery, the quahaug fishery, and the soft-clam fishery. Of these, all are to a greater or less extent separate and distinct, though the fishermen often engage in two or more during the year, while some may be interested in several at the same time.

TROLLING FOR BLUEFISH AND OTHER SPECIES.—Trolling, or "squidding" as it is sometimes called, is chiefly confined to the region lying between Sandy Hook and Squan River, and to Barnegat Inlet. Open boats and small sloops are generally employed for this purpose, each crew using from one to four lines. The "squids" vary considerably; some are made of bright metals in the form of a fish and are provided with a single hook, others are painted in brilliant colors and may have several hooks, while a piece of red or white cloth attached to an ordinary fish-hook sometimes answers the same purpose. The lines are towed through the water at an average speed of 2 to 4 miles per hour. The principal species taken are bluefish, Spanish mackerel, and bonito. The average daily catch for a boat with two men is from 300 to 400 pounds, though the quantity varies greatly and may exceed 1,000 pounds.

The method of trolling was introduced into the region at an early date, and was more extensively adopted by the fishermen ten years ago than at the present time, as other methods have since been introduced that are thought to be more desirable. Trolling is now extensively practiced only by the "still-baiters" and gill-net fishermen. At Sandy Hook the vessels and boats using this method usually fish a number of miles from the shore and trolling is confined largely to the months of May and June, a few following it at intervals during the greater part of the summer. At Barnegat trolling is the method employed by the pleasure-seekers during the entire season, the fishing being confined to the waters near the inlet.

THE METHOD OF STILL-BAITING DESCRIBED.—"Still-baiting" was not extensively followed by the fishermen of the region prior to 1870, but the method is rapidly growing in favor. It is probably the outgrowth of the old method of mackerel "hooking," and, as far as known, is peculiar to the fishermen of Sandy Hook and Long Island. By this method two men usually fish from the same boat, one chopping and throwing the bait, which in most cases consists of fresh menhaden, to toll up the fish, while the other catches them on a hook baited with pieces cut from the backs of the menhaden. The season continues from the last of May till November; and the fishing grounds

extend from one-half to 6 miles from the shore. Bluefish (*Pomatomus saltatrix*) constitute about four-fifths of the entire catch, the only other species taken in any numbers being bonito (*Sarda mediterranea*) and Spanish mackerel (*Scomberomorus maculatus*). The "still-fishermen" also fish with hook and line occasionally for "bottom-fish," and with gill-nets for other species. The total catch of these fishermen amounts to $800 to the boat during the season.

THE POUND-NET FISHERY.—Pound-nets were introduced into the region by Mr. George Snediker, of Gravesend, Long Island, about 1855. The first used, being of small size, were set in Sandy Hook Bay for protection from the ocean storms. They did not come into general use till about 1873, when it is said they were first extensively used on the outer beach. With the exception of one fished during a part of the seasons of 1878 and 1879 near Barnegat Inlet, and small ones in the Shrewsbury Rivers, the pound fishery has been confined to the vicinity of Sandy Hook. In 1879 there were six pound-nets between Long Branch and Sandy Hook, stocking an average of $10,000 each, and clearing fully $7,000 apiece on fish taken during the season. In 1880 there were eleven pound-nets in the same section, and two smaller ones in Sandy Hook Bay. These outer pounds averaged about $8,000 each, and cleared $5,500, the best one having a gross stock of nearly $12,000. The pounds are set in May and fished regularly when the weather is suitable till November. Placing the gross stock at $8,000, the catch of each pound, according to reliable estimate, would be as follows: Weakfish (*Cynoscion regale*), $4,800; Spanish mackerel (*S. maculatus*), $1,200; butter-fish (*Stromateus triacanthus*), $700; bluefish (*Pomatomus saltatrix*), $500; sheepshead (*Diplodus probatocephalus*), $300; bonito (*Sarda mediterranea*), $125; shad (*Clupea sapidissima*), $55; other species, $300.

THE GILL-NET FISHERY.—Gill-nets were formerly used almost exclusively for the capture of bluefish in this region, and are now largely used for that purpose, but they are also extensively used for Spanish mackerel, and, to a limited extent, in the rivers and bays for weakfish and other species. Between Sandy Hook and Squan River, nets of 3½ to 4 inch mesh, 100 fathoms in length, are extensively used at a distance from the shore between August and November. These were formerly "set straight" and caught only bluefish. Later they were used as sweep-nets for Spanish mackerel with indifferent success. About 1873 it was accidentally learned that by having sharp angles in the net Spanish mackerel could be readily taken. This led to various experiments, which have resulted in an extensive fishery. The nets are now set in a manner similar to that on which the pound-net is constructed. Two nets are set together, one taking the place of the leader, while the other is set in various shapes as a pocket for the fish. The nets are held in position by anchors and lines. The more common "sets" are known as the square-set, t-set, and harpoon-set. A gang of two nets fished in this way has stocked $1,092 between August and November. The average stock for the nets north of Long Branch is about $400 for each gang, one-half of the money being for Spanish mackerel and the remainder about equally divided between bluefish and weakfish. Between Long Branch and Squan River the nets are more commonly "set-straights." A fisherman in this locality with two nets usually stocks about $250, of which $150 are for bluefish and the balance for Spanish mackerel and weakfish in equal proportion.

At Waretown nets of 3¼-inch mesh, 25 fathoms in length, are extensively used. These are usually anchored at one end and allowed to swing with the tide. One man fishes four of them and stocks from $200 to $250 in a season, three-fourths of the entire catch being bluefish.

At different points along the bays and rivers, especially in the Shrewsbury Rivers, small gill-nets are used for catching weakfish and other species for local supply, but the business is unimportant.

Gill-nets of large mesh are also used for taking sheepshead in the vicinity of Barnegat Inlet, where they are allowed to drift over the feeding-grounds of the fish. This fishing is carried on chiefly at night. It is seriously objected to by the line-fishermen, who claim that the nets frighten the fish away and "break up" the fishing.

THE SEINE-FISHERY.—Haul-seines were formerly extensively used in many of the rivers and bays of the district. They are now used at different points along the shore by the crews of the various life-saving stations for rock (*Roccus lineatus*) and other species, and to a limited extent in some of the bays and rivers. In most regions, however, their use in the rivers is prohibited by law, and as the run of rock along the shore is quite small, the seine-fishery is now of little importance, except in the winter rock and perch fisheries of Metedeconk Neck, at the northern end of Barnegat Bay. Here one hundred and ninety-six men with forty-nine seines are engaged in fishing from November till April, hauling their seines both in the open water and under the ice. Rock and perch are said to have been first taken in this locality about the beginning of the present century, and for the last forty years the fishery has been extensive. A single haul of 80,000 pounds is reported about 1850, while 15,000 to 25,000 pounds are occasionally taken in a day by a single seine at the present time. The total catch in the winter of 1879–'80 reached over half a million pounds, netting the fishermen $36,700. After this fishing is over a few of the nets are hauled for herring (*Clupea vernalis* and *C. æstivalis*) in the locality for several weeks, while others are taken to the Delaware River, where they are used in the capture of shad and herring.

THE HAND-LINE FISHERY.—The hook-and-line fisheries, when separated from the still-baiting, trolling, and the winter cod fishery, include only the catch of such parties as are employed in the capture of the different species with hand-lines in the bays and rivers, together with those engaged in "bottom-fishing" on the various rocky spots along the shore. The former class comprises a large number of men and boys of all ages and occupations who fish occasionally or with considerable regularity for pleasure and profit during the summer months, together with the summer visitors, who fish extensively for amusement. The catch of this class is composed chiefly of weakfish and bluefish. The second class is made up of the professional fishermen who fish for "bottom-fish" on the rocks whenever gill-net fishing, still-fishing or trolling ceases to be profitable.

It often happens that for some reason the bluefish are less plenty, or that they refuse the hook either at certain times of the tide or for days together. The fishermen usually carry lines and bait, and on such occasions spend their time in fishing on the rocks. At certain seasons of the year a considerable number of fishermen devote their entire attention to "rock-fishing," and the catch is often quite large. The principal species taken are sea bass (*Serranus atrarius*), blackfish (*Tautoga onitis*) and porgies (*Stenotomus chrysops*), though it is said that the last-named species is much less abundant than formerly.

A DESCRIPTION OF THE COD FISHERY OF THE REGION.—About the 1st of November the codfish reach the shore, and the other species having mostly disappeared, many of the fishermen between Sandy Hook and Squan River engage in the cod fishery during the winter months. This fishery is confined wholly to the locality named, with the exception of an occasional trip by the crews of the various life-saving stations further south. At first hand-lines are used, but later in the season these are superseded by trawls or scrawls as they are often called. These have an average of two hundred to two hundred and fifty hooks each, and a boat with two men usually carries two of them. They are set at a distance varying from one-half to 6 miles from the shore, and allowed to remain for an hour and a half, after which they are hauled and the boat returns. The gangings of many of the trawls are provided with corks; these were introduced into the

region about 1875, and answer the purpose of keeping the bait off the bottom. The fishing continues during pleasant weather, the regular fishermen averaging five fishing days in each fortnight from November till the middle of April. The fish leave early in May.

Cod are quite abundant, as shown by the large catches that are often made. Late in November, 1880, four men caught 1,600 pounds with hand-lines in three and one-half hours, and December 7, six men landed 2,600 pounds, as the result of four or five hours' fishing.

From a careful investigation of the subject it seems quite probable that the cod fishery of this region is destined to become important, and that the number of men engaging in this fishery, both here and in other portions of the State, will increase from year to year, until many of those who now spend a greater part of the winter in idleness will find remunerative employment in this way. The present difficulties are the lack of suitable vessels, and the small size of the trawls. The limited number of harbors will, of necessity, confine the vessel fisheries to a few localities, but by the use of larger boats, together with trawls having three or four times the present number of hooks the business could doubtless be made very profitable.

NORTHERN NEW JERSEY THE SOUTHERN LIMIT OF THE LOBSTER FISHERY.—Lobsters are found all along the New Jersey coast, but not in sufficient numbers in its lower half to warrant the fishermen in engaging in their capture. The lobster fishery of the State is therefore confined to its northern portion, or to the region lying between Sandy Hook and Squan River, this being the southern limit of the lobster fisheries of the United States. The fishermen of Northern New Jersey have been engaged in the capture of the lobster for many years, and about 1860 the fishery is said to have been quite important. From that date the business gradually declined, until in 1870 the capture of the species was almost wholly discontinued. In 1872 the fishery again began to revive, and at the present time large quantities of lobsters are taken in the region. In 1880 there were fourteen boats with twenty-eight men engaged regularly in the capture of lobsters in connection with their work in the line and net fisheries, the catch being sold partly in New York and Philadelphia and partly to the local trade. The pots, which are covered with netting, are usually set in May, and the fishing continues till October, though a few men begin fishing early in March, and others fish till the last of November.

THE CRABBING INTEREST.—The crab fishery of this district is perhaps more extensive than that of any other portion of the entire coast. It furnishes employment to over five hundred men and boys during four months of the year. The crabs are very abundant in all of the shoal-water bays and rivers of the district, coming out of their winter quarters in the mud in the early spring. The season for shedding begins about the 20th of May and lasts till October. During this period all of the old boats and scows that will float are pressed into service, and many of the unemployed men and boys, and even a number of women, engage in the fishery. There is a limited trade in hard crabs for fish-bait, but usually these are discarded by the fishermen, who reserve only the soft ones and those that are beginning to shed. This is a very profitable employment, and the best fishermen will make $1,000 during the season, while the average for all (boys included) is fully $250. The crab fishery has been prosecuted in this district for a long period of years. As early as 1855 cars were towed behind the boats to receive the "busters" or such as were taken in the act of casting their shells. About twenty years ago the shedding-pens were introduced, and from that date "comers," or those that give evidence of shedding in a day or two, have been saved. For some reason crabbing is confined largely to particular localities—Shark, Squan, and the North and South Shrewsbury Rivers being the most important places. The people of other places almost as favorably located give little attention to crabbing, probably owing to a lack of information of the

money made by those who engage regularly in the business. A large part of the catch is sent to New York, and the remainder is divided between Philadelphia and the local trade.

THE FISHERY FOR QUAHAUGS AND SOFT CLAMS.—The quahaug fishery of the district is confined largely to Sandy Hook Bay and to the waters about Barnegat Inlet, where the species is taken from low-water mark to a depth of 20 feet. The fishing is chiefly during the summer months, many small vessels from different ports of Raritan Bay fishing about Sandy Hook during the height of the season. Four methods are employed in this fishery, as follows: Dredging, raking, tonging, and treading. Dredges are used by vessels, usually sloops of from 5 to 30 tons, and also by smaller boats; tongs, similar to those employed in the oyster fishery, are used from small boats; rakes are used from boats, and by men who wade about upon the shoals; and treading is a method by which the men, who wade in the water up to their waists, feel the clams with their feet. The average fisherman who makes a business of clamming clears from $150 to $200 in a season. Two-thirds of the entire catch is carried to New York by the vessels, and the remainder used locally or shipped to Philadelphia by rail.

Soft clams are very abundant on the sand and mud flats in the salt water at the mouths of the rivers and in the various bays; but in the former they are occasionally killed by freshets, so that fishing in such localities often becomes unprofitable for several seasons. It is said that such was the case in Shark River in 1880, when the clammers of that region were obliged to turn their attention to the other fisheries or to visit other places in order to find clams of marketable size. This fishery is prosecuted during the entire year, but it is most extensive during the spring, fall, and winter months, as many of the fishermen turn their attention to the quahaug fishery in summer. The fishing is at present confined largely to Sandy Hook Bay, including the mouths of the Shrewsbury Rivers and to Squan River; and, though the species is very abundant all along the New Jersey coast and may be taken in fair numbers as far south as Cape Charles, Virginia, Squan River marks the southern limit of the extensive fishing for the species for shipment to the principal markets. A few are, of course, taken at different points farther south for bait and local use, but no extensive shipments are made to other points, though the business might be carried on with profit as far down as Cape May.

D.—THE COAST FISHERIES OF SOUTHERN NEW JERSEY.

144. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—The fisheries of this district, which includes the coastline between Barnegat Inlet, on the ocean shore, and Cohansey Creek, on Delaware Bay, are less extensive than those of the district just described. If we exclude the cod fleet at Atlantic City and the small vessels from Delaware Bay that are occasionally employed in the capture of the different species, the fisheries are confined almost wholly to the waters lying between the outer sand bars and the mainland, which are the resort of immense numbers of fish during the summer months. Owing to limited shipping facilities, the commercial fisheries of many localities are little developed, the fishermen engaging in the business chiefly to supply the hotels at the various summer resorts and to furnish food for themselves and their neighbors. Nearly all of them are engaged in oystering and clamming during a considerable portion of the year, while some devote their entire attention to the crab fishery during the summer months.

STATISTICAL RECAPITULATION.—The following statements show the extent of the fishery interests of Southern New Jersey for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	2,205
Number of shoremen	30
Number of factory hands	12
Total	2,247

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (98.04 tons)	8	$10,500
Boats	1,812	85,003
Pound-nets	9	800
Fykes, traps, and baskets	530	2,173
Gill-nets	58	1,735
Drag-seines	274	10,940
Minor apparatus and outfit	.....	23,450
Factories and other shore property	.....	10,000
Additional cash capital	.....	5,000
Total capital	.....	149,601

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	4,060,460	$141,339
Terrapin	2,400	400
Crabs	103,000	9,550
Soft clams	10,850	992
Quahaugs	2,494,288	155,803
Miscellaneous products (including 3,000,000 pounds of king crabs)	.....	9,920
Total	.....	318,094

a Including 200,000 pounds used for fertilizing purposes.

145. THE PRINCIPAL FISHERY CENTERS DESCRIBED.

THE GEOGRAPHY OF THE REGION.—The ocean shore of Southern New Jersey, including the coast-line from Barnegat Inlet to Cape May, is formed by a number of low sandy islands, varying from 3 to 20 miles in length and from a few rods to a mile or more in breadth. These are separated from each other by shoal and narrow inlets and from the mainland by a net-work of tide-creeks forming a salt marsh usually several miles in width. In the northern portion of the district these creeks unite to form a large bay, known as Little Egg Harbor, which may be regarded as a southern prolongation of Barnegat Bay. At other points where rivers of any considerable size empty into the ocean large shoal-water bays are found, the two most important ones being Great Bay and Great Egg Harbor.

On the Delaware or western shore a similar belt of low land or salt marsh extends for a considerable distance, while the water lying beyond the shore-line deepens so gradually that extensive mud and sand flats are exposed at low-tide.

THE PECULIARITIES OF THE INHABITANTS.—The inhabitants are scattered along the higher lands overlooking the marshes, or congregate to form small settlements at the head of the shoal

creeks several miles inland. The shore islands, with the exception of such as have become popular as summer resorts, are almost uninhabited, and even these places are often deserted during the winter months. Many of the people are wholly dependent on agriculture, but the greater number of those living near the water own small patches of land, on which they raise scarcely enough to supply their own tables. These are largely dependent on the bays for a livelihood. There is also a large class that "follow the bay" during the entire year, oystering in winter and fishing or clamming at other seasons.

It is urged by some that the fisheries are a positive injury to the State, in that they encourage idleness and cause the people to neglect the cultivation of the soil. It is doubtless true that the great wealth of sea products lying at their very doors has given these people a feeling of security that works to their disadvantage, for with their knowledge that there is an abundance of fish, oysters, or clams that can be had at any time for the taking, and that these will not only supply food, but can readily be turned into money, they soon become improvident, spend a greater part of their time in idleness, and go to the bays only when necessity compels.

THE MORE IMPORTANT FISHING CENTERS DESCRIBED.—There is more or less fishing for local supply along the entire shore, and almost every man living near the water catches a few fish and gathers a sufficient quantity of clams and oysters for his own table, while some in nearly every locality fish to supply the country trade, except in that portion of Delaware Bay lying to the north of Dennis Creek, where the fishing for marine fishes is limited to the capture of weakfish, which occur in such small numbers that the fishing is not extensive.

The commercial fisheries of Southern New Jersey center about the larger summer resorts along the shore. These either afford an excellent market during the summer months, or, from their location, offer superior advantages for shipping. The principal centers are Barnegat, Tuckerton, Atlantic City, and Cape May.

Barnegat, a settlement of 1,100 inhabitants, is a favorite resort for the sporting classes from the larger cities of the interior. Being located near Barnegat Inlet, it is chiefly important on account of the large number of bluefish taken by trolling. It ranks low as a market, as the inhabitants are largely supplied with fish free of charge by the pleasure fishermen.

Tuckerton, a village of 1,400 inhabitants, is situated nearly opposite New Inlet, in the center of the most extensive quahaug fisheries of the entire coast. It affords good shipping facilities by both land and water, and many of the people for miles in either direction are largely interested in clamming and fishing. There is also an excellent local market both in Tuckerton and at Beach Haven, a few miles distant.

Atlantic City, the largest summer resort of Southern New Jersey, is located on one of the islands of the outer beach at Absecon Inlet. It is the principal fishing center of the district. It has a winter population of 5,500, which is increased during the summer months to many times that number, every hotel and boarding-house being packed from the middle of June till late in September. During this season the demand for fish is very large, and six firms, with eighteen men, in addition to a large number of fishermen and hawkers, are engaged in catering to the trade. According to Mr. J. V. Albertson, fully $30,000 worth of fish and $35,000 worth of oysters are consumed in the city each season. The principal species used are weakfish (*Cynoscion regale*) and sheepshead (*Diplodus probatocephalus*), and market-boats often go 20 to 30 miles to get their supply.

In addition to its advantages as a market, Atlantic City is favorably situated for the prosecution of the ocean fisheries. There are two well smacks that supply the city in part with sea-bass (*Serranus atrarius*) in summer, and it is more largely interested in the winter cod fisheries than

any other city in the State. It is the only port on the entire coast south of New York where a vessel is licensed for the fisheries.

Cape May, at the southern extremity of New Jersey, is also a favorite resort, and it is said that not less than 10,000 people spend their summers there. There is a large demand for fish at this season, and many fishermen, for miles on either side of the cape, are engaged in fishing for this market with seines, pounds, and hand-lines. According to Mr. J. H. Farrow, who is one of the principal dealers in the place, not less than $12,000 to $15,000 worth of fish are consumed yearly, a majority of them being taken within 15 miles of the city.

146. DESCRIPTION OF THE MORE IMPORTANT FISHERIES.

THE HAND-LINE FISHERY.—More fish are taken with hook and line than by any other method. The summer line-fishing begins about the 1st of June and continues till late in October. At this season the water of the shoaler bays and flats becomes very warm, and the fish are often driven into the deeper channels beyond the reach of the seines; while in some portions of the district seining is prohibited by law during certain months, so that the hand-line is necessarily employed. In addition to those who fish for local supply only, many of the professional net-fishermen, oystermen, and clammers, together with a number of farmers and mechanics, engage in the line-fishing during the summer months, selling their fish to the numerous hotels along the shore, or shipping them to the larger markets. The average fisherman makes from $1 to $1.50 daily in this way. The catch is composed largely of weakfish and sheepshead, the former representing fully three-fourths of the money value.

Weakfish are very abundant in all of the bays and creeks on both the ocean and bay sides from May till October, and the catch is governed wholly by the demand. These fish are quite small, averaging only one-half to 1 pound each, and many of the smallest are thrown away as unfit for market. In the fall, schools of larger individuals, varying from 2 to 8 pounds each, are found along the outer shore, and a few fishermen from the vicinity of the inlets are now beginning to engage in their capture. This fishery promises to be a very important one, for, while the fishing is at present very limited, and the catch is used almost exclusively for local supply and for salting, the large size and abundance of the fish will make their capture very profitable.

Sheepshead weighing from 3 to 10 pounds are very abundant about the principal inlets on the ocean side, and, according to Mr. J. E. Otis, of Tuckerton, one hundred and sixteen boats have been counted at one time fishing for them at the inlet opposite that city. At Atlantic City three men fishing from one boat have made $40 in a single day. In Cape May County sheepshead are taken in considerable numbers in the larger creeks and channels some distance from the inlets. They are seldom seen on the bay side.

THE HAUL-SEINE FISHERY.—Haul-seines from 30 to 80 fathoms in length are extensively fished in this district for weakfish during the spring and fall. The seines are owned at various points along the shore, and fished with more or less regularity, but the more important seine fisheries are confined to the vicinity of Atlantic City and to Cape May County. On the ocean side the fishery is confined to the inner bays, while on the bay side the seines are usually hauled on the outer beach.

A seine with a crew of four men, fished regularly during the spring and fall, will stock from $300 to $500 net, two-thirds of this sum being for weakfish, and the remainder chiefly for Cape May goodies (*Liostomus xanthurus*), and rock (*Roccus lineatus*).

PLEASURE-FISHING.—The pleasure-fishing from the many summer resorts of the district comes next in importance when the quantity of fish taken is considered.

At almost every village fishermen own small yachts for carrying pleasure-parties on fishing or sailing excursions. At Barnegat there are about twenty-five of these boats; at Tuckerton and Beach Haven, thirty; and at Atlantic City, eighty. These, added to the number owned at other smaller places, swell the total for the district to one hundred and eighty-five yachts, with fifty additional row-boats, engaged in pleasure fishing and sailing from the middle of June till late in September. These yachts vary in size from 1 to 50 tons, and have an average value of $400 to $600. They are fully provided with fishing-gear and bait, and carry from one to two men each to sail the boat and assist in baiting the hooks. At Barnegat trolling for bluefish (*P. saltatrix*) is a favorite pastime, but at other points the fishing is chiefly for weakfish with hand-lines. The catch, which is often very large, is usually given to the boatman to dispose of as he may think proper, or taken to the boarding-house where the parties are stopping; some, however, box their fish and ship them to friends at a distance. The village of Barnegat is nearly supplied with fish taken by the pleasure-seekers, and at Atlantic City many of the cottages receive an abundance from the same source.

THE EEL FISHERY.—The eel fisheries of the district are of considerable importance. In the northern portion the fishing is usually with spears during the winter months, the greater part of the catch being taken near Oceanville; but in Cape May County haul-seines, 25 to 50 fathoms in length, are employed during the summer. A small vessel, owned by Captain Mitchell Howell, of Dyer's Creek, is engaged in the fishery. She has a crew of three men, who, having provided themselves with eel-pots, fish at different points along the shores of Delaware Bay.

In addition to the above, many of the farmers, mechanics, and men engaged in other branches of the fisheries, fish occasionally for eels during their leisure hours both in summer and winter. The bulk of the entire catch is consumed locally, while a small part is sent to the New York and Philadelphia markets, netting the fishermen from 4 to 5 cents a pound.

THE WINTER COD FISHERY.—The winter cod fishery comes next in importance. Codfish make their appearance in this region about the middle of November and remain till the last of April. They seem to be quite generally scattered over the bottom, and may be found along almost any part of the coast from one-half to 10 miles from the shore, though they are more abundant on the rocky and clayey spots.

THE FISHING GROUNDS FOR COD.—As far as known there is but one important fishing-bank off the New Jersey coast. This lies nearly east of Cape May, about 12 miles distant, and, according to Captain George Hildreth, extends 15 miles in a northeast and southwest direction, and has an average width of nearly a mile. This is known as "Five Fathom" or "Hereford Bank." There is also a larger bank known as "The old grounds," lying to the southeast of Cape Henlopen. These banks have long been frequented by a number of the New York market-smacks during the winter months, and at the present time no less than thirty of them engage regularly in the cod fisheries here and at other points along the New Jersey coast.

THE COD-FISHERMEN OF ATLANTIC CITY AND TUCKERTON.—When the residents of this district only are considered, the capture of the cod is confined to the fishermen of Atlantic City and Tuckerton, though a few are taken by the crews of the various life-saving stations along the shore, and by the pilot-boats in the vicinity of Cape May.

At Atlantic City the cod fishery began, according to Capt. Washington Yates, fully forty years ago, when the fishermen went out occasionally in boats or small vessels, selling their catch locally. There was no regular fishing, however, and the practice was soon discontinued, so that between 1855 and 1871 very few cod were taken. In 1871 Captain Yates, who is a harbor pilot at Atlantic City, visited the fishing grounds and, finding cod plenty, engaged regularly in the fishery. In 1875 three other boats joined him, and trawls were then introduced. From that date

the business has increased until, in the winter of 1880–'81, there are thirty-eight men with six vessels and several boats engaged in the cod fisheries from this city. This is the only point between New York and Charleston, S. C., where vessels are engaged in the shore line fisheries. The fishing is in 7 to 8 fathoms of water, from one-half to 5 miles from the shore, the average catch being about 100 pounds of fish daily to the man.

Tuckerton is also engaged in the cod fisheries to a limited extent. The fishery here is said to be of recent origin. Small open boats are exclusively employed, and the fishing is carried on with little regularity, the men going out only one or two days in each week.

THE POUND-NET FISHERY.—The pound fisheries of Southern New Jersey are confined wholly to that portion of the Delaware Bay lying between Cape May and Dyer's Creek, and, with the exception of a pound fished for several years in Great Bay, none are known to have been fished elsewere in the district. These pound-nets are much smaller and less expensive than those at Sandy Hook, having an average value of only $90. According to M. J. W. Gandy, of Cape May Court-House, pound-nets were introduced into the region by Mr. Holmes, of Green Creek, about 1870. In 1880 there are nine of them on the flats along the shore, some having 2 or 3 feet of water at low tide, while others are entirely dry. They differ considerably from the pound-nets of other portions of the coast. The leader is about 50 fathoms long, and in the place of the fore-bay are two wings each 25 fathoms in length. The pound proper, or bowl, is divided into two compartments, the first being intended for king-crabs (*Limulus polyphemus*) that are taken in enormous numbers during the early summer. The second compartment is connected with the first by means of a funnel-shaped opening large enough to allow the fish to enter, but too small to admit the crabs. The lower part of the pound is made of stakes imbedded in the mud and extending a foot or more above it. To these stakes the netting is attached, the object being to keep it above the crabs that would otherwise destroy it.

The pounds are fished only from the 1st of March to the middle of June, after which they are taken up, as the water on the flats becomes so warm that the fish retire to the deeper channels. Weakfish constitute fully three-fourths of the entire catch, the remainder being mostly rock and Cape May goodies. Often enormous quantities of weakfish are taken, the catch being so great that it is found desirable to save only the largest individuals. It frequently happens that the price is so low that the fishermen are not warranted in shipping the fish, and the entire catch is often turned back into the bay. On account of the difficulty of finding a market for their catch the net stock for each pound is quite low and in 1880 averaged only $400.

THE GILL-NET FISHERY.—The gill-net fishing is quite unimportant, and there are no professional gill-net fishermen in the district. A number of small nets are owned at various points along the shore, and fished irregularly, for local supply; and at several of the inlets nets of 60 to 100 fathoms are allowed to drift with the tide over the feeding grounds of the sheepshead, and longer ones are used as sweep-nets in the principal channels.

FISHING FOR BLUEFISH OFF CAPE MAY.—Off Cape May there was formerly a limited amount of gill-net fishing for bluefish between the 1st of October and the middle of November. Mr. J. W. Gandy says that large bluefish may be taken within a few miles of the shore during a greater part of the summer, and that they follow the menhaden into the shoaler water in October. These fish vary from 5 to 18 pounds in weight, the average being about 10 pounds.

In 1875 the fishing vessels, while en route for the bluefish grounds of the North Carolina coast, found these fish and set their nets for them. For two or three years the vessels fished in this locality, as many as thirteen being counted at one time. For the past two seasons, however, the vessels have abandoned these grounds as the fish have been less abundant. The boat-fisher-

men of the shore, who formerly engaged in the fishery to a limited extent, have also given it up, and in the fall of 1880 there was but one net, 150 fathoms in length, set off Cape May. This was fished but a few days and took only twenty-five fish, or an average of 250 pounds, daily.

THE WINTER ROCK AND PERCH FISHERIES.—The winter rock and perch fisheries of the district are confined largely to Mullica and Great Egg Harbor Rivers, where these species remain in the fresh waters during the winter months. At the former place the fishing is prosecuted from November to April by means of diving-nets, hoop-nets, and haul-seines. The diving-net originated in and is peculiar to this locality. It consists of a large funnel-shaped net opening into a small bag or pocket, and is so arranged that it can be set at various depths. The hoop-net is simply a large bag attached to poles, by means of which it is raised and lowered through an opening in the ice. In Great Egg Harbor and Great Egg Harbor River seines are extensively used for the capture of the above species in the principal channels and in the numerous creeks, and the catch is often very large. Small gill-nets of 3¼ inch mesh, without lead-lines, are also fished to a limited extent along the grassy flats in the larger bays during the first of the season.

There are one hundred and twenty men engaged in this fishery during a part of the winter, most of them being included with the clammers or with the summer fishermen. The catch reaches fully 200,000. It is shipped largely to Philadelphia and New York, about one-third going to the latter place. The net value of this fishery to the fishermen is about $10,400, divided equally between the two species.

THE MENHADEN FISHERY.—The menhaden fisheries of Southern New Jersey are quite important. According to Capt. George Hildreth, the first oil and guano factory built in the district was located on the shores of Delaware Bay, some distance above Cape May, in 1861; but this, on account of the shoal water, proved unprofitable, and was soon abandoned. In 1874 another factory was built at Dyer's Creek, but it was run only a year or two. Mr. J. E. Otis informs us that the first factory on the ocean side was built at New Inlet, near Tuckerton, by Mr. C. N. Smith, in 1868. In 1880 there were five factories in the district, three of them being located at New Inlet and two near Great Egg Harbor Inlet, all being provided with kettles and pans for cooking the fish. These five factories employ eighty-nine fishermen, with eleven sail vessels and one steamer which was brought into the district from Long Island in 1880. The catch during the season reached nearly 19,000,000 of fish, making 1,138 barrels of oil and 1,850 tons of crude dried guano. There were sixty-two laborers employed at the factories. In addition to the catch of the factory fishermen, a good many menhaden are taken in seines by farmers and professional fishermen for use on the land, and many are taken in the pound-nets of Delaware Bay. A purse-seine was also fished for a few weeks near Cape May, in the summers of 1879 and 1880, by one of the farmers, who used the fish for enriching his land. The total catch, therefore, for the entire district must have reached about 21,000,000 of fish.

THE CLAMMING INTERESTS.—Probably no portion of the Atlantic coast has such extensive quahaug fisheries as that at present under consideration. Almost every bay of any considerable size between Barnegat Inlet and Cape May contains large numbers of these clams. Especially is this true of Little Egg Harbor, Great Bay, and Great Egg Harbor, which are doubtless the most important clamming grounds in the United States. They occur only in limited numbers in the waters of Delaware Bay, and the fishermen of that region are obliged to cross to the ocean side to engage in the fishery.

Nearly all of the fishermen and oystermen living along the shore engage in clamming during certain months, while many follow it throughout the entire year. In some localities the fishing is chiefly in spring; in others, in the spring and fall, and in still others during the summer also. It

is not so extensive in the winter on account of the ice in the bays and the limited demand for clams in the markets, where oysters are usually preferred.

The only methods in use in this district are "treading" and "tonging," the latter being the more common. Treading is said to have originated with the Tuckerton fishermen, and to have been introduced by them into other States, both North and South. The clammers work but a few hours in a day. They usually go out at "half-ebb" and return at or before "quarter-flood," thus fishing only during the four or five hours of low water. The average fisherman will "tong" from 1,000 to 1,200 clams in a day, but 4,000 to 5,000 have been frequently taken. The total value of the clams taken in this district is over $117,000 yearly. The catch is usually bought by the captains of small vessels at from $1.25 to $2 per thousand and carried to the New York and Philadelphia markets; but at times the captains merely "freight" and sell the clams, receiving one-third of the gross sales for their services. Many are also shipped by rail to these markets and to the other cities of the interior.

Soft clams (*Mya arenaria*) are quite plenty, but they are used chiefly for bait, and only to a limited extent for food, by the fishermen of the region. None are dug for shipment to the larger markets.

THE CRAB-FISHERIES.—The crab-fisheries are of little importance; and though soft crabs are very abundant in most localities, the people have not yet learned that good wages can be made in catching and shipping them. The principal fishing is by boys and men to supply the line-fishermen and visitors with bait. Many are also taken and sold to the hotels at Beach Haven, Atlantic City, and Cape May; though, on account of the small size of the crabs, many of the hotels get their supply from a distance.

Hard crabs have little value, except for bait, and none are now shipped from the district. An attempt was made several years ago by the fishermen of Tuckerton to establish a winter fishery for the species, but it proved unprofitable. The method of fishing was a novel one. At the approach of cold weather the crabs bed in the mud, where they remain till spring, and for this reason they cannot be taken in the ordinary way during the winter months. The fishermen visited these bedding places in boats, and took the crabs out of the mud with clam and oyster tongs. This is the only instance known to us where crabs have been taken for market in this manner.

At Atlantic City crabbing is a favorite pastime for the visitors, and from twenty to thirty men and boys are engaged in taking pleasure parties out to engage in this fishery. On any pleasant day during the summer season from fifty to one hundred people may be seen engaged in crabbing, and it is now considered by many as better sport than fishing or sailing. Part of the catch is used for bait by the line-fishermen.

FEW TERRAPIN TAKEN.—Terrapin, though not abundant, are occasionally taken by the fishermen during the late summer, and after they have bedded in the mud for the winter. They are usually found on the flats, but not in sufficient numbers to warrant any extended fishery. No traps, dredges, or seines are used in their capture.

THE OYSTER INDUSTRY.—At various points from Barnegat to Atlantic City and Lake's Bay, on the ocean side of New Jersey, and at Maurice Cove, on the shores of Deleware Bay, the oyster industry is important. Mr. Ingersoll fully discusses this industry in his special report; concerning the abundance of oysters along the Jersey shores of the bay, he says:

"The center of the present oyster industry in the Delaware Bay and River, on the New Jersey shore, is at Maurice Cove, in Cumberland County, which is reached by the Cumberland and Maurice River Railroad from Bridgeton. This shore is bordered all the way by extensive marshes, through which innumerable small creeks find their way from the interior, and which contain many

open places called 'ponds.' Throughout these creeks and ponds, in the tide-ways and along the edges of the sedge-plats and islands, oysters have always grown in great profusion. In addition to this the bottom of the bay and of the Delaware River, from Cape May beach clear up to and a little above Cohansey Point, at the southern end of Salem County, a distance of not less than 50 miles, is everywhere spotted with oyster-beds. These oyster-beds are not confined to the shallow waters near shore, or to the sedge-plats, but are apparently scattered over the whole bottom of the bay. Even the ship channel, 90 fathoms deep, contains them, as experimental dragging shows. How this might have been a century ago I know not; but such is the present condition."

PART VIII.

PENNSYLVANIA AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of the Fishery Interests of the State:
147. Statistical recapitulation.

B.—Description of the Salt-Water Fisheries:
148. Extent of the salt-water fishery interests.

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PART VIII.

PENNSYLVANIA AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

147. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—Pennsylvania, though consuming large quantities of fishery products, has no important fishing grounds within its borders. The principal business connected with the fisheries is the oyster industry, for, though no oysters are produced in the waters of the State, a large number of persons are engaged in transporting oysters from the southern beds to Philadelphia, and others make a business of receiving, shelling, and packing them for shipment. From this industry $187,500 is realized by the residents of the State. The sea fisheries are confined to the capture of sea-bass and other species by a fleet of eight vessels, that make occasional trips to the fishing grounds off Cape Henlopen during the summer months. Shad, sturgeon, and other less important species are taken in small quantities in the Delaware and Susquehanna Rivers, and lake fish of different species are caught along the coast-line bordering Lake Erie.

STATISTICAL RECAPITULATION FOR 1880.—The following statements show the extent of the fishing interests of the State:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	511
Shoremen	41
Total	552

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels ($21.99 tons)	11	$10,500
Boats	156	13,272
Fykes, pots, and baskets	2,167	4,334
Gill-nets	4,792	23,244
Drag-seines	42	8,260
Minor apparatus, including outfit	.....	4,700
Factories and other shore property	.....	52,500
Additional cash capital	.....	8,000
Total capital	.....	119,811

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	2,933,000	$320,050
Sea fisheries.		
Blue fish	30,000	675
Oysters	.....	187,500
Squeteague	15,000	450
All other species	555,000	34,875
Total sea products	600,000	223,500
River fisheries.		
Shad	559,600	27,980
Sturgeon	150,000	7,500
All other species	370,400	17,620
Total river products	1,080,000	53,100
Great Lake fisheries.		
Whitefish	975,000	35,150
All other species	278,000	8,300
Total lake products	1,253,000	43,450

B.—DESCRIPTION OF THE SALT-WATER FISHERIES.

148. EXTENT OF THE SALT-WATER FISHERY INTERESTS.

THE SEA FISHERY OF LITTLE IMPORTANCE.—The State of Pennsylvania, though bordered in different portions by navigable waters, has no salt or brackish water within its limits. Its northwestern portion, washed by the waters of Lake Erie, has extensive fisheries for whitefish, trout, and other fresh-water species. A description of the fishing interests of that section will be found in Part XVII, D. The eastern boundary of the State is formed by the fresh water of the Delaware River, in which there are extensive shad and alewife fisheries, while other river species are taken to a greater or less extent.

THE SEA BASS FISHERY BY PHILADELPHIA VESSELS.—At Philadelphia, where the demand for marine species is large, a number of parties own small vessels, ranging from 25 to 50 tons each, for the purpose of engaging in the sea fisheries in the vicinity of the Delaware capes. These vessels fish during the summer only. At this season they make regular trips between Philadelphia and the small fishing bank lying 15 to 20 miles southeast of Cape Henlopen. The catch is composed almost exclusively of sea-bass (*S. atrarius*).

According to Mr. Charles Vezey, superintendent of the Delaware Avenue Market, at Philadelphia, to whom we are indebted for information, there are eight vessels, aggregating 280 tons, manned by ninety-seven men, engaged in this fishery. The season begins about the middle of May, and continues until late in October. The fish are taken with hand-lines from the vessel's deck, an average trip consisting of 12,000 to 15,000 pounds. The vessels are provided with ice for preserving the fish until they reach Philadelphia, where they are sold at from 5 to 8 cents per pound, according to the demand. An average trip requires about two weeks during ordinary weather; but whenever violent storms occur, the vessels are obliged to seek shelter behind the Delaware breakwater, where they are often detained for several days. Mr. Vezey estimates that fully 600,000 pounds of fish, netting the fishermen about $36,000, are landed annually by these vessels.

THE PHILADELPHIA OYSTER INDUSTRY.—Philadelphia parties are also extensively interested in the oyster fisheries of Delaware Bay, and many men and much capital are employed in the

that industry; but the vessels engaged are owned chiefly at various points in New Jersey and Delaware, and are, therefore, credited to those States.

STATISTICAL RECAPITULATION FOR 1880.—The following statement shows the extent and value of the limited salt-water fisheries proper of the State, exclusive of the oyster industry:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	97
Shoremen	4
Total	101

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (279.99 tons)	8	$9,300
Boats	8	240
Minor apparatus including outfit		2,400
Shore property		10,000
Additional cash capital		1,500
Total capital		23,440

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish sold fresh	600,000	$36,000

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PART IX.

DELAWARE AND ITS FISHERIES.

By JOSEPH W. COLLINS.

ANALYSIS.

A.—General Review of the Fishery Interests of the State:
149. Description of the various fishery interests.
150. Statistical recapitulation.

B.—Description of the Fisheries by Towns:
151. Dover and adjacent towns.
152. Frederica, Milford, and Milton.
153. Lewes and its fisheries.
154. The fishing towns south of Cape Henlopen.

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PART IX.

DELAWARE AND ITS FISHERIES.

A—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

149. DESCRIPTION OF THE VARIOUS FISHERY INTERESTS.

PHYSICAL CHARACTERISTICS OF THE REGION.—For a proper understanding of the fisheries of Southern Delaware it seems desirable to give a brief sketch of the peculiar features of the coast line.

The State of Delaware, which has an area of 2,100 square miles, includes within its limits the northeast portion of the low peninsula lying between Chesapeake Bay, Delaware River and Bay, and the Atlantic Ocean. The northern part of the State is slightly elevated in some localities, but the southern portion is almost a perfect level. This flat section of country is, however, somewhat relieved by a low table-land, or ridge of sand, not exceeding 60 or 70 feet in height, which extends the whole length of the State from north to south near the western boundary. Most of the small rivers which empty into the Delaware Bay, and in which a limited amount of fresh-water fishing is carried on, have their source in the swamps which abound in this table-land.

The entire length of the coast line of Delaware is about 95 miles. In the upper portion of the State, however, that section which is bordered by the Delaware River, there are no sea fisheries. The river fisheries will be described in detail in another section of this report. A brief mention will, however, be made here of the fresh-water fishing carried on in the southern portion of the State in conjunction with the sea fishery.

The most northern point in Delaware at which sea fish are taken in any considerable numbers on the shores of Delaware Bay is at Kitt's Hammock, near Dover, this fishing station being about 25 miles northwest of Cape Henlopen. The stretch of coast lying between Kitt's Hammock and the Cape is low and marshy, with scattered sand beaches or hammocks slightly elevated above the surrounding swamps; from these marshes extensive flats or outlying shoals make out into the waters of the bay.

Beyond Cape Henlopen, on the Atlantic side, the coast line runs nearly south in a straight line to Williamsville, the boundary of the State, a distance of 21 miles. This part of the Delaware coast is composed of low, narrow sand beaches, which inclose shoal bays or lagoons of considerable extent. Rehoboth Bay, which is situated 6 miles south of Cape Henlopen, is a basin of this description, and the largest in the State, being about four miles long in the direction of the shore line and having an average width of 3 miles. Just south of Rehoboth Bay, and connected with it

by a channel, is Indian River Bay, which is 6 miles long east and west and has an average breadth of 1 mile. Both of these bays are connected with the ocean by an inlet through the beach, which has sufficient depth to admit vessels with a draught of 6 feet, and through which large numbers of anadromous fish and a smaller quantity of sea fish find their way to the sheltered waters inside.

Having thus briefly outlined the principal features of the coast, it only remains to be said that the bays lying south of Cape Henlopen and the beaches bordering on Delaware Bay constitute the fishing grounds, where the operations of seining, netting, &c., are carried on, a description of which will be given in succeeding paragraphs.

IMPORTANCE OF THE FISHERIES.—Although the sea fisheries of Delaware suffer by comparison with the great commercial fisheries of the Northeastern States, they are, nevertheless, not without importance, especially if we take into consideration the benefit derived by the inhabitants of the State in being supplied with quantities of wholesome food at a price which is only nominal. In nearly all of the coast towns a portion of the inhabitants engage more or less actively in the fisheries during a part of the year—generally in the spring—though, as a rule, these men are semi-professional, depending chiefly on agricultural pursuits, the latter being the principal occupation of the people of this region.

The oyster-beds of Delaware in 1880 produced 300,000 bushels of native oysters valued at $687,725. There were also planted in the waters of this State 650,000 bushels of oysters from Chesapeake Bay and elsewhere, to be left bedded here until suitable for market. In addition there were 184,500 bushels of oysters received from other States and packed in the cannery at Seaford. Little Creek Landing is the headquarters for the native oyster business. The southern oysters are planted on beds at several places along the shore, but chiefly opposite the villages of Little Creek Landing and Mahon's Ditch, and are raised mostly for the Philadelphia trade, the beds and planting being largely controlled by the dealers of that city. Mr. Ingersoll fully discusses this subject in the census report on the oyster industry. The capital invested in the industry in Delaware is given at $145,500, which includes sixty-five vessels at $50,000; three hundred boats, $12,000; gear and outfit, $10,000; shore property, $73,500. The number of oyster fishermen is 820 and of shoremen 245.

THE FISHERY GROUNDS.—The most important sea fishery is carried on along the shores of Delaware Bay, where the trout (*Cynoscion regale*) and the spot (*Liostomus xanthurus*) are the principal species taken, or at least occur in the greatest abundance. The other species of salt-water fish which frequent the shores of the bay are less plenty, some kinds being quite rare.

SHIPMENTS OF FISH AND SOFT CRABS.—The following statistics of the shipments of fish and soft crabs from some of the railroad stations south of Cape Henlopen may be of interest as giving a general idea of the commercial status of the fisheries in that section of the State of Delaware. The figures here given have been obtained from the books at the different railroad stations through the kindness of the agents in charge. In 1880 the following quantities were shipped: Selbyville, 129,450 pounds of fish; Frankford, 8,200 pounds of fish and 9,125 pounds of crabs; Dagsborough, 9,556 pounds of fish and 29,970 pounds of crabs; Millsborough, 3,707 pounds of fish and 69,220 pounds of crabs.

150. STATISTICAL RECAPITULATION FOR 1880.

STATISTICS FOR 1880.—The following tables show the extent of the commercial fishery interests of Delaware:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,662
Shoremen	102
Factory hands	215
Total	1,979

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (1,226 tons)	69	$51,600
Boats	839	33,227
Fykes, pots, and baskets	1,831	1,831
Gill-nets	1,457	27,793
Drag-seines	245	21,330
Minor apparatus, including outfit for vessels and boats	.....	19,370
Factories and other shore property	.....	105,080
Additional cash capital	.....	8,000
Total	.....	268,231

Detailed statement of the quantities and values of the products.

Products specified.	Pounds taken.	Value to fishermen.
Grand total	11,918,203	$997,695
Sea fisheries.		
Bluefish	45,800	1,030
Clams (hard)	5,544	347
Clams (soft)	.....	.....
Cod	.....	.....
Crabs	84,951	8,389
Lobsters	150	6
Menhaden	*a* 522,900	1,114
Oysters	*b* 2,100,000	*g* 687,725
Squeteague	2,618,500	78,555
All other species	*c* 2,245,108	73,413
Total	7,622,953	850,579
River fisheries.		
Alewives (commonly called herring)	*d* 1,800,000	26,000
Shad	1,050,000	52,500
Sturgeon	*e* 450,000	22,500
All other species	*f* 995,250	46,116
Total	4,295,250	147,116

a Including 23,000 pounds of menhaden, valued at $173, used for food.

b An allowance of 7 pounds of meats is made for each bushel of oysters.

c This quantity includes 596,700 pounds of alewives, 25,000 pounds of croakers, 137,500 pounds of drum, 124,000 pounds of eels, 16,500 pounds of flounders, 3,500 pounds of king-fish, 54,700 pounds of mullet, 326,500 pounds of perch, 1,200 pounds of sea-bass, 5,900 pounds of sheepshead, 649,100 pounds of spot, 147,900 pounds of striped bass, 120,000 pounds of sturgeon, 5,000 pounds of tautog, 30,708 pounds of terrapin, and 900 pounds of mixed fish.

d In addition, 596,700 pounds of alewives, valued at $4,475, were taken by the sea fishermen.

e In addition, 120,000 pounds of sturgeon, valued at $4,500, were taken by the sea fishermen.

f Including 196,200 pounds of catfish, 150,000 pounds of perch, 100,000 pounds of striped bass, 15,300 pounds of turtle, and 533,750 pounds of mixed fish.

g Includes $362,725, the enhancement in value of oysters from other States transplanted or canned in Delaware.

B.—DESCRIPTION OF THE FISHERIES BY TOWNS.

151. DOVER AND ADJACENT TOWNS.

THE FISHERIES OF DOVER.—Dover, the capital of Delaware, is situated on the line of the Delaware Railroad, in Kent County, about six miles from the shore of Delaware Bay. Although a very limited amount of sea fish are occasionally taken higher up the bay, Dover is nevertheless the most northern town in Delaware in which any fishermen are employed in the sea fisheries. Eighty-five men, residents of Dover, are engaged in the fisheries, twenty-five of these being professional fishermen, following this industry whenever any fish can be obtained, while the remainder engage in fishing more irregularly, depending largely for their subsistence on obtaining employment in the large fruit-canning establishments of this section of the country and as laborers on the farms at times when the fisheries are not at their height. The same may be said of the fishermen who reside in the small towns in this part of the State. All of the men engage to a greater or less extent in the sea fisheries, resorting for this purpose to Kitt's Hammock, Bower's Beach, and other favorite fishing stations along the shore of the bay. Some of the men, however, divide their time between fishing for the species taken in the salt water and those which may be caught in the fresh-water streams and ponds in the immediate neighborhood of their homes.

Twenty-one boats valued at $360, twenty gill-nets worth $125, and twelve haul-seines valued at $600, are employed in the fisheries of Dover. The products of the fisheries are 1,346,700 pounds of sea fish and anadromous species, 2,400 pounds of fresh-water fish, 300 terrapin in number, 50,000 clams in number, and 7,200 crabs. The most important fishery is that for trout or weakfish (*Cynoscion regale*); next to which is that for shad, herring, and perch; and third, that for sturgeon. Of the trout 792,000 pounds were estimated by competent authority to have been taken in 1880; 31,500 pounds of shad, 180,000 pounds of herring, 120,000 pounds of perch, and 120,000 pounds of sturgeon were also caught in 1880 by the fishermen of Dover.

For the accommodation of the Dover fishermen who resort to Kitt's Hammock to prosecute their labors in the spring, five rough dwellings or shanties have been constructed, the total value of which is $150.

THE FISHERIES OF LEBANON.—Proceeding in a southeasterly direction from Dover, about 3½ miles, we come to the small hamlet of Lebanon. Bordering this place is Jones' Creek, which also runs near Dover. Lebanon has twenty fishermen, who divide their time between fishing in the creek and in the waters of Delaware Bay. Fifteen boats, valued at $300, and five seines, worth $300, are employed in the fisheries of this place. The boats in use are bateaux, built on the pattern of the sharpy, which is the ordinary type employed by all the fishermen along the shores of the Delaware Bay, their average value being $20 each. Most of the fishing is carried on in Jones' Creek for shad, trout, herring, perch, &c., and here have been built five fish-houses, one at each of the several seining stations, these buildings being valued at the total sum of $150. There are taken in all 168,950 pounds of salt-water and anadromous fish, 2,000 pounds of fresh-water fish, 72 terrapin, 30,000 clams, and 3,600 crabs. A large portion of the catch is sold in Dover and to the farmers of the interior of the State, who often go from 30 to 40 miles to secure fish to supply their wants.

THE FISHERIES OF MAGNOLIA.—Magnolia is another small hamlet, similar to Lebanon, and a little less than 4 miles by the road from the latter, and about the same distance from the fishing

station at Bowers' Beach, on the shore of Delaware Bay. Sixteen men from this place engage in the fisheries, employing themselves both in the capture of salt and fresh water species at various seasons of the year, though the principal part of the work is done in the spring and summer. Magnolia has ten boats, valued at $200, and four seines, valued at $400, employed in the fisheries. The catch, according to the estimates of the most intelligent fishermen of this locality, is 252,500 pounds of sea and anadromous fish, 3,500 pounds of fresh-water fish, 72 terrapin, 30,000 clams, and 3,600 crabs.

152. FREDERICA, MILFORD, AND MILTON.

THE FISHERIES OF FREDERICA.—About 5 miles directly south of Magnolia is the village of Frederica, having between 700 and 800 inhabitants, while the town includes within its limits between 1,400 and 1,500 persons. The village of Frederica is situated on Murderkill Creek, about 7 miles from its mouth, where it empties into the Delaware Bay, on the south side of Bowers' Beach, which lies between this and Jones' Creek. Bowers' Beach, one of the principal fishing stations of Delaware Bay, and having a small resident population, is within the limits of Frederica, and its fisheries, fishermen, &c., will be considered in this connection.

Frederica has seventy-two men employed in the fisheries, to a greater or less extent. Sixty-two of these are engaged principally in the spring, thirteen of them fishing wholly in Murderkill Creek for fresh-water or anadromous species, while the other fishermen depend chiefly on catching such species as may be taken in the waters of the bay, though occasionally they may resort to the streams to fish when a favorable opportunity offers. Many of the fishermen of this section depend largely on agricultural pursuits for their livelihood, changing from fishing to farming and *vice versa*, as the prospect of making money in one pursuit exceeds that of the other. There are twelve peddlers at Frederica, who make a business of hawking fish about the villages and farming districts within a radius of 20 or 30 miles. They buy their stock from the fishermen at Bowers' Beach. According to Mr. James Wyatt, a resident of Bowers' Beach, many of the fishermen of this place are employed in catching oysters during the winter.

There are three fishing stations on Murderkill Creek where shad, herring, and other species are taken with seines, and at each of these places is a small shanty for the accommodation of the fishermen and the reception of their catch and fishing apparatus. The total value of these buildings is $90. Five small buildings have also been erected at Bowers' Beach for the same purpose, the total value of these being $150.

The residents of Frederica, as well as those of the adjacent small settlements, resort to Bowers' Beach in the spring and engage in the trout fisheries, capturing at the same time a greater or less amount of other species.

In the fisheries of Frederica are employed forty boats, valued at $800; twenty-nine gill-nets, valued at $89; fourteen haul-seines, valued at $1,315; and seven bow-nets, worth $7.

The products of the fisheries are 1,170,750 pounds of sea fish and anadromous species, 11,950 pounds of fresh-water fish, 1,000 pounds of turtle, 120 terrapin in number, and 6,000 crabs. In addition, about 600,000 pounds of horseshoe crabs for fertilizing purposes are taken by the fishermen of Frederica and the adjacent towns along the shores of Delaware Bay, between Kitt's Hammock and Lewes, an important part of the capture being made by the residents of this town.

Like Dover, the most important fishery of Frederica is for trout (*Cynoscion regale*). The quantity taken by the fishermen of this town is 1,097,250 pounds of this particular species, exceeding that of the catch of any other locality in the State. Next to the trout fishery in importance

comes that for the spot (*Liostomus xanthurus*), of which 25,000 pounds are estimated to have been taken in 1880.

MILFORD.—Milford, which is pleasantly situated on the line of the Junction and Breakwater Railroad where it crosses the Mispillion Creek, some 8 miles from its mouth in a direct line, is the next town south of Frederica, from which it is distant about 8 miles. The village proper has a population of about 3,000, though this enumeration would be considerably increased by including the residents scattered around in the farming districts in the immediate vicinity. According to Mr. J. Lowery, of this place, the principal business is ship-building and agricultural pursuits. On the banks of the Mispillion, in front of the village, are seven or eight ship-yards, while in the town are two foundries, a basket factory, and factories for the manufacture of agricultural implements. Some of the inhabitants are also engaged in the coasting-trade, fifteen or twenty vessels of this class sailing from the port.

Milford has one hundred and fifty-seven men employed in the fisheries for a portion of the year. A considerable percentage of these, however, follow fishing only in the spring and early summer, depending on other pursuits the rest of the year. Fifty-five of these men fish only for fresh-water species, while the remainder depend chiefly on catching sea fish, though they may sometimes engage in the capture of fish in the small streams which flow through the township.

Milford has employed in its fisheries fifty boats, worth $665; twenty-five gill-nets, worth $125; seventy-five haul-seines, valued at $1,700; also twelve buildings, worth $240, the latter being small roughly-constructed shanties such as have been previously described for the towns further up the bay. In addition to the fishermen employed in catching fish there are six peddlers who make a specialty of buying their stock from the fishermen and hawking it about through the adjacent towns.

There are about seventy-five men in Milford who engage in the shad and herring fisheries in the spring, using gill-nets and seines. There are six shad "fisheries" on the Mispillion River, all of which are below Milford. At these places shad and herring are taken with haul-seines. The principal fishing ground on the bay for the people of this township is Slaughter Beach, though a few of the men occasionally resort to other fishing stations further up the bay.

The products of the fisheries of Milford are 435,000 pounds of sea and anadromous fish, 22,000 pounds of fresh-water fish, 3,600 terrapin, and 6,000 crabs.

The most important fishery of Milford is that for sea-trout, of which 305,000 pounds are estimated to have been taken in 1880. Next to this comes the shad fishery, of which about 40,000 pounds were caught the same year. A large portion of the fish taken in this locality are sold at the village or to residents of the interior towns, many of whom, during the fishing season, go to the sea-shore to obtain a supply of fish which they salt for their own use.

MILTON.—Passing by the small and unimportant way stations of Lincoln and Ellendale, on the line of the Junction and Breakwater Railroad, we come to the village of Milton, some 12 or 14 miles in a southeasterly direction from Milford, and the next point of interest in connection with the fisheries. The village of Milton has between 1,000 and 1,100 inhabitants. The principal industries of the place are ship-building, the pine wood trade, and farming; the fishing and oyster industries being of a secondary importance. Milton is situated on Broadkill Creek, about 7 miles in a direct line from its mouth, where it empties into the waters of the Chesapeake Bay. This stream, though comparatively narrow, is nevertheless navigable to the village of Milton. In the spring and early summer, as well as to a greater or less extent in the winter, the fisheries are carried on throughout almost its entire length. Some 5 miles below Milton, and situated on the right bank of the creek, is the post-office station of Drawbridge, which is also

included in the same township as Milton. This latter place has a scattered population of one hundred and fifty persons, principally engaged in farming and fishing. There is also quite a business done at the "bridge" in shipping grain and wood on coasting vessels coming here to load. The fisheries of Drawbridge and its statistics will be included with those of Milton.

Milton has fifty-eight men employed more or less regularly in the fisheries; eighteen of these making a specialty of fishing for fresh-water species, not being employed at all in catching sea fish. There are eighteen boats, worth $160; sixty-five gill-nets, valued at $505; eleven haul-seines, worth $265; and two bow-nets, worth $4, employed in the fisheries of Milton, which has also twelve small rough board shanties for the accommodation of the fishermen, these being valued at $310.

The products of the fisheries are 162,050 pounds of anadromous and sea fish, 3,200 pounds of fresh-water fish, and 240 terrapin. By far the most important fishery of this place is that for spot (*Liostomus xanthurus*), of which it is estimated about 80,000 pounds were taken in 1880. Next to this, in quantity, is the fishery for trout (*Cynoscion regale*), of which 47,250 pounds were caught in 1880. The remainder of the fish taken are divided among the various species of fresh and salt-water species which visit this region.

153. LEWES AND ITS FISHERMEN.

LEWES.—The village of Lewes is situated at the terminus of the Junction and Breakwater Railroad, about 3 miles above Cape Henlopen, and some 10 or 12 miles by the road from Milton. According to the postmaster, D. W. Brereton, esq., the village of Lewes has a population of 1,800. The inhabitants are engaged in a great variety of pursuits, among which may be mentioned as the most important, piloting, following the sea, wrecking, railroading, and Government work.

The fisheries of the place are also of considerable local importance. The principal fishing ground of Lewes is along the beach in front of the village, above Cape Henlopen, where, in their season, large quantities of the various species of sea fish are taken. The fresh-water fisheries of this place are comparatively unimportant, being confined principally to the capture of a limited amount of such species as may be taken in ponds and small streams.

Lewes has eighty fishermen, of whom twenty-five depend wholly on the fisheries, while the remainder, though procuring the chief part of their subsistence by fishing, also engage in other industries more or less regularly during a portion of the year. Besides the fishermen, who peddle their catch to a greater or less extent, there are six peddlers who make a specialty of hawking fish about this and adjacent towns, procuring their goods from the fishermen on the beach.

Employed in the fisheries of this place are twenty boats, valued at $350; two hundred and ninety-two gill-nets, worth $3,294; thirteen haul-seines, worth $395; and fifty eel-pots, valued at $25; besides which there are two small boat-houses, worth $30 each. About half of the boats used at Lewes differ somewhat from those employed by the fishermen of the towns further up the bay, some of them being of the type known as the Delaware Bay shad-boat, and others the New Jersey surf-boat, both of which are described in another section of this report.

The products of the fisheries of Lewes are 609,550 pounds of sea and anadromous fish and 1,500 pounds of fresh-water fish; 4,000 pounds of turtle; 1,500 terrapin, in number; 31,980 crabs; 100 lobsters, and a few hundred clams.

The most important fishery is that for spot, of which 311,000 pounds are estimated by competent authority to have been caught in 1880. Second to this is the fishery for trout, of which 250,000 pounds were taken in the above-named year. Comparatively speaking, the other fisheries are unimportant. This region seems to be the southern limit where lobsters are taken by the fish-

ermen, and even here there is no real fishery for them. If a man desires to obtain a few lobsters for his own table he can usually do this by setting a trap about the breakwater, and occasionally one or more of these crustaceans are hauled ashore in the drag-seines and gill-nets. Capt. W. M. Fowler, of Lewes, says that about 1873 a pound was built for the capture of the Spanish mackerel (*Scomberomorus maculatus*) just below where the wooden pier now stands. This, however, did not prove a success, for though large quantities of other fish were taken, but few Spanish mackerel were caught, and after being kept up for about two seasons the net was removed and no pounds have since been constructed in this locality.

154. THE FISHING TOWNS SOUTH OF CAPE HENLOPEN.

REHOBOTH BEACH.—Rehoboth Beach, 6½ miles distant from Lewes in a southeasterly direction, is a small watering-place facing the Atlantic Ocean on the one side and Rehoboth Bay on the other. Here have been constructed about twenty-five cottages and two hotels for the accommodation of summer residents, many of whom come to this place to attend camp-meeting as well as to be benefited by the ocean breezes. The resident population is about sixty, all of whom depend mainly on farming and mechanical pursuits, as well as upon catering to the wants of the summer residents. There is, properly speaking, no fishing carried on by the men of this place, though occasionally the fishermen of Lewes resort to this locality to fish in the waters of Rehoboth Bay. The statistics, therefore, of the catch, as well as of the men and apparatus employed, have been incorporated with those of Lewes.

ANGOLA.—The next town south of Lewes, at which any fisheries are carried on, is Angola, situated on the west side of Rehoboth Bay, and having a scattered population of about 500. It is about 9 miles distant in a southerly direction from Lewes, lying nearly midway between the latter town and Millsbourough, on Indian River. The principal occupation of the people is farming, though a considerable number of the men engage in fishing during the spring and winter months, following their agricultural pursuits at other times. There are fifty-five men in this town employed in the fisheries, two of whom depend wholly upon this industry for a livelihood. The apparatus includes sixteen boats, valued at $320; eight gill-nets, worth $40; fourteen haul-seines, worth $420; and one hundred and twenty eel-pots, valued at $60.

The fisheries are carried on in the waters of Rehoboth Bay and the streams which empty into it. The products of this fishery are 135,300 pounds of anadromous and sea fish, 3,000 pounds of fresh-water fish, 108 terrapin, and 4,992 crabs. The most important fishery in regard to the amount of fish taken is that for herring, of which 50,000 pounds were caught in 1880, but in point of value this is exceeded both by the fishery for rock and perch, of each of which it is estimated 28,000 pounds were taken in the same year. A portion of this catch is shipped by rail to Philadelphia and other markets. A large percentage of the fish taken are consumed locally or sold to farmers from the interior towns.

MILLSBOROUGH.—The village of Millsborough, situated on Indian River, is 8 or 10 miles distant in a southwesterly direction from Angola, and has a population of about 300. As a rule people depend largely on agricultural pursuits; though, owing to the fact of the railroad passing through this village, and its convenience to the excellent fishing grounds of Indian River and Bay, it is a center of a considerable fishery, the most important to be found in the State south of Cape Henlopen. There are one hundred and eighty-eight fishermen employed here, ten of them depending wholly on the fisheries for a livelihood, while the remainder divide their time between fishing and farming. An important feature of this place is the number of people employed in the summer season in catching soft crabs, which are shipped to the markets of New York and Phila-

delphia. The skiffs employed in this fishery are constructed especially for the purpose, and are described under the head of apparatus as the Delaware crab-skiff; these are let out to the fishermen, many of whom are boys, who sell their catch to the owners of the skiffs for a stated sum. There are employed in the fisheries here two hundred and twenty-two boats, valued at $776; twenty gill-nets, worth $100; twenty-two haul-seines, worth $660; and three hundred eel-pots, valued at $150.

The products of the fisheries are 397,300 pounds of anadromous and sea fish, 111,500 pounds of fresh-water fish, 500 pounds of turtle, 1,200 terrapin in number, 50,000 clams, and 180,000 crabs. The most important fishery in the matter of quantity is that for herring or alewives, of which, in the spring of 1880, it was estimated 105,000 pounds were caught. Some 70,000 pounds of menhaden are taken, about one-sixth of which are sold for food, and the remainder used as a fertilizer. The fishery for soft crabs, which is of considerable importance, as has been mentioned above, began about 1873, when two men, belonging at Long Branch, New Jersey, came to this section and engaged in the business. Since that time, however, this industry has been followed by the residents of the place, the more enterprising of whom have had a large number of boats built for this purpose, which they furnish to men employed to fish for them, buying the catch at the rate of 12 cents a dozen.

DAGSBOROUGH.—The little village of Dagsborough, with a population of about 200, is situated on the line of the Breakwater and Frankford Railroad, some 4½ miles in a southwesterly direction from Millsborough. The residents of this place depend mainly on agricultural pursuits, though in the spring, summer, and autumn they engage more or less regularly in the fisheries. There are employed in this pursuit forty-two fishermen; twenty-eight boats, valued at $130; ten gill-nets, worth $50, and eight haul-seines, valued at $240. A portion of the boats, like those used at Millsborough, though in a far less degree, are used in the capture of soft crabs in their season; the greater part, however, are built on the style of the ordinary batteau, and are used in the various branches of the fisheries, including seining and gill-netting. The fishing grounds resorted to are Indian River and Bay, where essentially the same species are taken as are caught by the residents of Millsborough.

The products of the fisheries are 71,100 pounds of sea fish and anadromous species, 13,700 pounds of fresh-water fish, 100 pounds of turtle, 204 terrapin, 15,000 clams, and 78,000 crabs.

FRANKFORD.—Three miles south of Dagsborough is the village of Frankford, on the line of the Breakwater and Frankford Railroad. This place, though having no fisheries, may be mentioned from the fact that a quantity of the products of the fisheries are shipped from here. About 8,200 pounds of fish and 9,125 pounds of soft crabs were shipped by rail to Philadelphia and other markets in 1880.

BLACKWATER.—Some 6 miles in an easterly direction from Frankford brings us to the post-office of Blackwater. This place has a scattering population of between 100 and 200, depending chiefly on farming. There are, however, eighteen men here employed in the fisheries; four of them depending wholly on catching fish for a livelihood, while the remainder are employed more or less regularly as fishermen, chiefly in the spring. These fishermen make use of twenty-two boats, worth $110; forty gill-nets, worth $200, and two haul-seines, valued at $80.

The products of the fisheries of Blackwater are 71,300 pounds of sea and anadromous fish, of which 36,000 pounds are menhaden, used principally for fertilizing purposes; 3,000 pounds of fresh-water fish, 500 pounds of turtle, 192 terrapin, and 186,000 crabs.

OCEAN VIEW.—The little hamlet of Ocean View, composed of a dozen or fifteen dwelling houses and stores, is six miles distant by the road from Blackwater in an easterly direction,

though in a straight line it would not be more than two-thirds that distance. It has a total population of 400, the greater part of the inhabitants being scattered over a considerable area and principally engaged in farming. There is but little fishing done at Ocean View for commercial purposes, nearly all of the farmers catching fish during their spare time for their own use. But if any of them get more than enough to supply their own wants they generally peddle them throughout the country, while a few are occasionally taken to Frankford and Dagsborough and shipped by rail to Philadelphia. The fishing grounds resorted to are the waters of Indian River and its tributaries, and a few fish are also caught along the beach bordering the Atlantic. There are fifteen men engaged in the fisheries more or less regularly. These employ in their work fifteen boats, worth $66; fifty gill-nets, valued at $150; twenty small haul-seines, worth $225, and fifty eel-pots, valued at $20.

The products of the fisheries are 210,200 pounds of sea fish and anadromous species, of which 105,000 pounds are menhaden, these being almost wholly used for fertilizing purposes; 1,000 pounds of fresh-water fish, 200 pounds of turtle, 72 terrapin, 15,000 clams, and 14,400 crabs.

It may be here stated that one gang of men, nine in number, make a specialty in the summer time of fishing for menhaden with a drag-seine along the outer beach. These men are farmers and do not devote their whole time to the business of catching menhaden, but when a school of fish is seen near the beach the crew man their boat, go out and throw their seine, and haul the fish ashore, using them as a dressing for their farms. Occasionally, when schools of menhaden are expected, one man keeps a lookout for them, being relieved in turn by some of his fellows.

ROXANA.—The village of Roxana is situated about 3 miles in an almost due-east direction from Frankford and is 7 or 8 miles distant, by the road, in a southwesterly direction from Ocean View. The total population of the place is 600, though the village contains only about 200 inhabitants. The principal occupation of the people of this town is farming. There are, however, sixty-seven men engaged in fishing, nine of them following it regularly for a livelihood, while the remainder engage in both farming and fishing, employing themselves in either one of the two pursuits at such times as they think they can obtain the best remuneration for their labor. In pursuing the fisheries they make use of twenty-two boats, valued at $290; ninety-eight gill-nets, worth $490; twenty-six haul-seines, worth $1,205; fifty eel-pots, worth $25; and one small building and press for the extraction of menhaden oil, valued at $400. The fishing grounds to which they mainly resort are in the headwaters of Isle of Wight Bay and along the shores bordering the Atlantic; though they sometimes visit the waters of Indian River and the salt ponds near the beach which borders the ocean.

The products of the fisheries are 467,200 pounds of anadromous and sea fish, of which 300,000 pounds are menhaden, these being almost wholly pressed out for oil or used for fertilizing the land; 39,200 pounds of fresh-water fish; 3,000 pounds of turtle; and 360 terrapin.

A considerable business is done in fishing in winter for rock and perch and in the early spring for herring, while in summer the fishery for the spot exceeds that of any other in value. A small menhaden factory was established at Fenwick's Island in 1878 by Mr. D. N. Warrington, who carries on surf-fishing with a drag-seine to a limited extent. In 1880 he made 10 barrels of menhaden oil and 45 tons of scrap. The fish are caught as they pass along the beach bordering the ocean in their migrations to and from the feeding grounds farther north.

WILLIAMSVILLE.—Williamsville, the southern town on the coast line of Delaware, is about 3½ miles distant from the village of Roxana. Here there is a small collection of houses, though as a rule the population, which numbers some three hundred, is considerably scattered. The principal occupations of the residents of this place are farming and fishing. There are thirty-nine

men who engage in the fisheries, nine of them depending wholly on fishing for a livelihood, while the others attend to their farms in the summer season and are employed in fishing in winter, when otherwise they would be idle most of the time. In the fishery of this town are employed forty boats, worth $200; three hundred gill-nets, worth $1,500; one drag-seine, valued at $175; two fyke-nets, worth $90; seven hundred and fifty eel-pots, valued at $450.

Eel fishing and turtle and terrapin hunting are prosecuted in this place to a much greater extent than in any other of the towns of Southern Delaware; in fact these are two of the principal fisheries of the town. Mr. R. M. Atkins, the postmaster at Williamsville, and one of the principal dealers in fishery products, says that 70,000 pounds of eels and 5,000 pounds of turtle were taken by the fishermen in 1880. The total products of the fisheries for that year were 271,100 pounds of anadromous and sea fish; 12,000 pounds of fresh-water fish; 5,000 pounds of turtle; 2,196 terrapin; and 480 crabs.

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PART X.

MARYLAND AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of the Fishery Interests of the State:
155. Statistical recapitulation.
B.—Review of the Salt-Water Fisheries:
156. Statistical recapitulation.
157. The fisheries of the ocean shore.
158. The fisheries of the bay shore.
C.—Review of the Oyster Industry:
159. The oyster interests of Maryland.

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PART X.

MARYLAND AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

155. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—If the sea fisheries proper be taken as a standard, Maryland has an unimportant place on the list of fish-producing States; but if the oyster and river fisheries, in both of which this State is extensively interested, be included, it ranks second only to Massachusetts in the value of the products, and stands first in the number of persons employed. The 26,008 fishermen and shoremen produced in 1880 $5,221,715, while the 20,117 interested in the Massachusetts fisheries realized $8,141,750 as the result of their labors. This is easily explained by the fact that the fishing season is much shorter in the former than in the latter State, and that the fishermen are as a rule less energetic and not so fully equipped for the work.

The oyster interests are more important than those of any other State. These, according to the report of Mr. R. H. Edmonds, furnished employment to 23,402 persons, with 1,450 vessels and 1,825 boats, the value of the products amounting to $4,730,476.

With so extensive a river system, the fresh-water fisheries are naturally of peculiar importance, and more shad are taken by these fishermen than by those of any other State, while Maryland stands second only to North Carolina in the extent and value of the alewife fisheries.

STATISTICAL RECAPITULATION FOR 1880.—The following tables show the extent and value of the fishery interests of Maryland:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	15,873
Shoremen	1,256
Factory hands	8,879
Total	26,008

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (43,500 tons)	1,450	$1,750,000
Boats	2,825	186,448
Pound-nets	83	13,375
Fykes, pots, and baskets	4,050	6,600
Gill-nets	1,462	44,880
Dip-nets and cast-nets	30	710
Purse-seines	1	400
Drag-seines	139	53,550
Minor apparatus, including outfit	.....	177,630
Factories and other shore property	.....	4,104,050
Additional cash capital	.....	4,800
Total capital	.....	6,342,443

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	95,712,570	$5,221,715
Sea fisheries.		
Bluefish	10,000	300
Clams (hard)	40,000	2,000
Crabs	1,166,667	46,850
Menhaden	3,903,000	11,851
Mullet	30,000	1,200
Oysters	74,200,000	4,730,476
Spotted sea-trout	5,000	150
Squeteague	60,000	1,200
Terrapin	30,000	4,000
All other species	837,000	20,900
Total sea products	80,281,667	4,818,927
River fisheries.		
Alewives	9,128,959	139,667
Shad	3,759,426	140,326
Sturgeon	144,000	1,440
All other species	2,398,518	121,355
Total river products	15,430,903	402,788

B.—REVIEW OF THE SALT-WATER FISHERIES.

156. STATISTICAL RECAPITULATION.

The sea fisheries of Maryland, if we exclude the oyster industry, are quite unimportant. There are no harbors of any size along the outer shore, and the shores bordering Chesapeake Bay are too far removed from the ocean to warrant any exclusive fishing for marine species. This fishery is therefore confined largely to small boats for use in the sounds and bays at different seasons. The following table shows the extent of the sea fisheries, excluding menhaden and oysters, for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	260
Shoremen	15
Factory hands	9
Total	284

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (33.99 tons)	3	$1,400
Boats	196	6,025
Pound-nets	2	1,500
Fykes, pots, and baskets	1,500	1,000
Gill-nets	300	4,500
Drag-seines	60	2,225
Minor apparatus, including outfit	.....	3,100
Factories and other shore property	.....	6,500
Cash capital	.....	4,800
Total capital	.....	31,050

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	10,000	$300
Clams (hard)	40,000	2,000
Crabs	1,166,667	46,850
Mullet	30,000	1,200
Spotted sea-trout	5,000	150
Squeteague	60,000	1,200
Terrapin	30,000	4,000
All other species	690,000	20,900
Total	2,031,667	76,600

157. THE FISHERIES OF THE OCEAN SHORE.

GENERAL DESCRIPTION OF THE REGION.—The State of Maryland, if we consider the Chesapeake and its larger tributaries, has an enormous coast-line of salt and brackish water. Its ocean shore, however, is very limited, being only about 25 miles in extent. The outer beach is formed by a long and irregular sand-bar, varying from a few rods to a mile or more in width, extending throughout the entire length of the State. Lying between this bar and the mainland is a large and very irregular sheet of brackish water, which connects with the ocean near Chincoteague Island, Virginia, and again through Green Run Inlet, in the southern part of Maryland. The lower portion of this lagoon, known as Assateague Bay, is 7 or 8 miles wide and from 10 to 12 miles long. At its northern extremity it suddenly contracts into a long and narrow channel, known as Sinnepuxent Bay, which connects it with Isle of Wight Bay, an irregular sheet of brackish water near the northern boundary of the State. A belt of low swampy land, averaging 3 or 4 miles in width, separates the waters of these bays from the higher lands of the interior, with occasional landings connected by wagon roads with the villages and farming districts a few miles distant. A number of families have located at different points near the southern extremity of the outer bar, and in its northern portion is situated the growing village of Ocean Grove, which seems destined to be the popular summer resort of the region. The main shore, on account of the marshes, is almost uninhabited, the villages being situated on an average of 5 or 6 miles from the water. These, as a rule, are small and unimportant, the only ones of note being Snow Hill, the county seat, and Berlin, a small railroad center.

THE FISHERIES OF ASSATEAGUE AND SINNEPUXENT BAYS.—The fishing of Assateague and Sinnepuxent Bays is of little importance, being confined largely to the capture of mullet (*M. albula* and *M. braziliensis*)—locally known as fat-backs—eels (*A. rostrata*), croakers (*M. undulatus*), drum (*P. chromis*), weakfish (*C. regale*), and bluefish (*P. saltatrix*), for local use, during the summer months, and to the capture of a limited quantity of rock (*R. lineatus*) and perch (*R. americanus*) in the fall and winter. Clamming and oystering are also carried on to a limited extent in this region. The men engaged in the fisheries are for the most part farmers living some distance from the water. These own small boats, which are kept at the various landings in the region. During their spare hours they take their seines and repair to the shore, catching a supply of fish for local use and a few mullet for salting, after which they return home. With the exception of clams, almost no sea products are sent from this region to the larger markets of the country.

FISHERIES OF ISLE OF WIGHT BAY.—In the northern portion of the State, especially at Isle of Wight Bay, the fishing is much more extensive. This region was visited by Capt. J. W. Collins, to whom we are indebted for the following information. In the vicinity of Ocean City there is a limited fishery along the outer beach for menhaden and drum, the former being taken with seines

and used as a dressing for the land, while the latter are taken with hook and line by persons standing along the shore. In this fishery the hooks are baited with menhaden or crabs and thrown well out into the surf, after which they are slowly drawn to land, the fish seizing them as they pass through the water. It is said that the catch of drum in this way is frequently so large that there is a good deal of difficulty in disposing of them in the locality, and many are thrown away for lack of a market. The bay fishing is prosecuted to a greater or less extent during the entire year, though it is much more extensive during the winter months. A few persons may properly be called professional fishermen, as they follow fishing for a livelihood throughout the year, catching any species that happens to be abundant. With the above exception the summer fishery is prosecuted chiefly by farmers for home supply. In the fall and winter, when their farm work is over, many of these devote their entire attention to the fisheries, and, whenever the weather will admit, ship their catch by rail to Philadelphia and New York.

Seines and gill-nets are used to a considerable extent, both being sometimes employed by the same parties. The meshes of the gill-nets vary from 3 to 5 inches, according to the species for which they are intended. The average net is from 25 to 50 fathoms in length and from 15 to 25 meshes deep. The seines vary greatly, according to locality, the small ones ranging from 30 to 100 fathoms, while the larger ones reach and even exceed 300 fathoms. Some of the fishermen are provided with craft large enough to furnish them shelter during their stay in the vicinity of the fishing grounds, but most have only small open boats, and are obliged to camp on shore with no shelter, except that afforded by the trees and hills. They seldom build huts for their protection, claiming that these would be destroyed and the lumber carried away during their absence. They often go 8 to 10 miles from home, and remain from three or four days to even a week at a time, and, being without shelter, they are often exposed to great hardships.

STATISTICS OF THE CATCH.—Enormous catches are sometimes made, though as a rule the fishermen meet with only moderate success. The principal species taken in the winter are rock and perch, while in the spring alewives, pike, and catfish are also secured.

According to Captain Collins, the value of the catch of this region for both fresh-water and salt-water species amounted to $22,655 during the season of 1880, to which should be added $12,889 for the lower portion of the State; giving a total of $35,544 as the amount received by the fishermen of Maryland for sea products, exclusive of oysters, taken along the ocean shore.

158. THE FISHERIES OF THE BAY SHORE.

PECULIARITIES OF THE REGION.—If the State of Maine be excepted, probably no portion of the entire coast is so ragged and irregular as that part of Maryland which borders Chesapeake Bay, and, though no exact figures are at hand, it would doubtless be wholly within bounds to assume that the State has upwards of 1,200 miles of coast line washed by the salt and brackish water of the numerous arms and tributaries of the Chesapeake. The saltness of the water varies greatly at different times, depending largely upon the amount of rainfall in the region. During seasons of drought it is nearly as salt as the ocean, but in rainy seasons it is only moderately brackish, while in the extreme upper portion and in the mouths of the larger rivers it is nearly fresh. As a rule, however, it is so salt that oysters, crabs, and certain marine fishes thrive in almost any part of it.

THE FISHERIES.—With so enormous a coast line it would be natural to suppose that the Maryland people would engage extensively in the Chesapeake fisheries; and such is the case in certain localities, where the prosecution of the shad, herring, and oyster fisheries forms the principal occupation of the people. In many sections, however, the shores are low and damp, with few

inhabitants, except at small villages situated on the uplands of the river banks, and for this reason the fisheries are less important than would at first be supposed.

The shad and alewife fisheries are described by Colonel McDonald in another section of this report, while Mr. Edmonds gives below a full account of the oyster industry. We shall, therefore, speak only of the fishing for such marine species as are most frequently taken in the salter bays along the coast. Many of these, though common in the Lower Chesapeake, do not ascend to the Maryland waters in any considerable numbers, and those occurring there are found chiefly in the southern portion of the State, or in that portion lying between Tangier Island and Annapolis, where the population of the immediate coast line is very small, and where there are few opportunities for shipping.

THE PRINCIPAL FISHING CENTERS.—The principal settlements in this region, and the only ones of note having railroad facilities for shipping, are Crisfield, Cambridge, Easton, and Annapolis. The first named is a town of considerable importance, located on a good harbor, near the southern boundary of the State. The ground on which the business portion of the town is situated is composed almost wholly of oyster shells which have been deposited by the large packing-houses of Crisfield that do an extensive business in opening and shipping oysters during the winter months. The people in this vicinity are almost wholly dependent upon the water for a livelihood. Every able-bodied man is interested in the oyster fisheries in the winter, and nearly all engage in the capture of fish, crabs, or clams during the summer season. The other towns are also more or less interested in the oyster fisheries in winter, and are the receiving ports for considerable quantities of fish and crabs in summer, the bulk of these, after the local trade is supplied, being forwarded to Baltimore, Washington, Philadelphia, and New York. The fisheries proper of the region are growing in importance, and in most localities they have doubled within the last five years.

The principal sea fishes taken are tailors (*P. saltatrix*), bay mackerel (*S. maculatus*), trout (*C. regale*), sheepshead (*D. probatocephalus*), and eels (*A. rostrata*).

SPANISH MACKEREL.—In 1877 gill-nets were first extensively used in the capture of Spanish mackerel in the vicinity of Crisfield, though they had been regularly employed in the shad and alewife fisheries for many years. There are now over a hundred men employed in the gill-net fisheries in this region, exclusive of the large number that belong at Tangier Island who market their catch at Crisfield. The nets used vary from 25 to 30 fathoms in length, and from 9 to 12 feet in depth. Each man is provided with four of these nets and is actively engaged in fishing from the 1st of May till the 1st of October.

TAILORS AND TROUT.—The tailors arrive early in May and form the bulk of the catch for about six weeks. They are again abundant from August 15 to October 1, after which they are less frequently taken up to the 1st of November, when they entirely disappear. They average about 1½ pounds each in weight, and net the fishermen from 4 to 5 cents apiece. The trout are abundant during the entire summer, but are taken chiefly for local consumption, few of them being shipped out of the city.

SHEEPSHEAD.—A number of fishermen are employed in the capture of sheepshead with hook and line, while others are provided with seines for the same work. They usually have small "hurdles," consisting of a dozen to twenty piles driven into the mud, among which the sheepshead gather in considerable numbers. The sheepshead taken in this region are very large, averaging fully 7 or 8 pounds each, while some weighing 14 to 15 pounds were seen by us in the Crisfield market. They find a ready sale at from 7 to 12 cents per pound, the fishermen often

making good wages in the business. Several instances are reported where men have made as high as $18 to $20 in a single day.

EELS.—Eels are everywhere abundant, and, though few are taken for shipment, they are caught in large numbers with hook and line or pots and baskets, for local use, the aggregate of the catch amounting to many thousands of pounds in the course of the season.

MENHADEN.—For a number of years menhaden (*B. tyrannus*), locally known as ellwives, alewives, and oldwives, have been taken in considerable numbers by the farmers of the region, who have used small haul-seines for catching a supply with which to manure their land. Prior to 1880 this was the only method of fishing, but at this time an oil and guano factory was built at Crisfield, and during the course of the season 3,500,000 menhaden were taken. These, according to the statements of the managers, produced 300 tons of dried scrap and 10,575 gallons of oil, the value of the products amounting to $10,000 in the aggregate. Thus far the company has met with good success, and the outlook for the future is encouraging. It is hardly probable, however, that any extended business will be developed in the State, as even its southern boundary is so far removed from the mouth of the Chesapeake that the fish seldom occur in any considerable numbers and the fishermen are usually obliged to enter Virginia waters in order to secure their supply.

THE CRAB FISHERIES.—Crabs are very abundant in the region, and the shipping of both hard and soft crabs is now a very important business. The trade in the latter is said to have begun in 1876, when Crisfield parties first built pens or troughs for confining the crabs until they had cast their shells. After numerous experiments proper apparatus was adopted whereby the business could be prosecuted with considerable profit. The dealers now use shedding-pens or troughs, about 15 feet long, 3 feet wide, and 2 feet deep. The bottom of the trough is made of inch boards, and the sides are built of laths, arranged vertically about half an inch apart, while half-way between the top and bottom, on the outer surface, is a heavy scantling or float which marks the depth to which the box shall sink in the water. These shedding-troughs are placed in the smooth water of some sheltered cove convenient to the packing-house, where they can be frequently visited by the parties in charge, who overhaul them two or three times a day, taking out such as have finished shedding, and carrying them to the shore, where they are packed for shipment. The crabs are purchased from the fishermen at an average of $1 per hundred for such as are beginning to shed. When the shell first begins to open, the crab is styled a "peeler" by the fishermen, and later, as the opening becomes larger, it is known as a "buster." The hard crabs are always rejected by these dealers, and for this reason they are seldom taken by the experienced fishermen, who can usually detect a "peeler" before it is removed from the water. In case a hard crab is taken by mistake it is usually returned to the water, though some parties are in the habit of saving them and shipping them in barrels to Baltimore. The soft crabs are packed in trays 4 feet long, 18 inches wide, and 4½ inches deep; great care being taken that each shall be placed in such a position that the moisture shall not run from its mouth, for if the mouth parts become dry, death ensues in a short time. A crate of the size mentioned will hold about nine dozen average-sized crabs. These are shipped chiefly to New York and Philadelphia, though many are sent to the interior cities of Pennsylvania at from 30 to 50 cents per dozen. The people of both Crisfield and Annapolis are extensively interested in this business, and several hundred men are engaged in crabbing from the middle of May to the 1st of October. It is estimated that not less than 10,000 cases of soft crabs were shipped by Maryland dealers during the season of 1880. In addition to these, considerable quantities were consumed locally.

A company has been formed at Oxford for the canning of hard crabs, which are very abun-

dant in the waters of that region. It is said that fully 1,500,000 crabs were purchased by the company in 1880, the products of the cannery amounting to 135,000 cans, valued at $6,850. There are two similar establishments at Hampton, Va. Aside from the canning interests large numbers of hard crabs are shipped from different points to the larger markets. The crab is thus a very important species to the fishermen, who derive considerable money from its capture and sale.

CLAMS AND TERRAPIN.—Clams are less abundant in Maryland than in Virginia, and most of the clammers of the former State visit Virginia waters to secure their supply, though the laws are supposed to prohibit them from doing so. The species occurs in limited quantities, however, near the southern boundary of Maryland, and some clamming is done in that locality, the catch being used locally or shipped by rail and steamer from Crisfield. A few terrapin are found along the salt-water marshes, but the catch is so small as to be of little commercial importance.

STATISTICS OF THE FISHERIES.—The number of men directly interested in the salt-water fisheries, excluding oysters, is 305, of whom 275 are fishermen, the remainder being shoremen and factory hands. The fishing-vessel fleet is limited to 6 sail, aggregating about 105 tons, and valued at $4,300. In addition to these, 200 boats, worth $6,300; 2 pound-nets, worth $1,500; 1,500 pots and baskets, worth $1,000; 300 gill-nets, worth $4,500; 1 purse-seine, valued at $400, and 60 drag-seines, valued at $2,225, are used in the fisheries of the State. Adding the value of the single menhaden factory at Crisfield and other shore property, and the cash capital of the factory and dealers, we have a total dependent capital of $43,825.

The total quantity of fish taken for food during the year 1880 was 795,000 pounds, of which 775,000 pounds were sold in a fresh state and 20,000 pounds were salted, while 4,050,000 pounds were taken to be used as a fertilizer. About 10,000 terrapin, 3,500,000 crabs, and 5,000 bushels of quahaugs, were taken during the same season; these, together with the foregoing, make a grand total of 6,081,667 pounds of sea products taken by the fishermen of Maryland. The total value of the same to the producer is $88,451, and their estimated market value exceeds $175,000.

C.—REVIEW OF THE OYSTER INDUSTRY.

159. THE OYSTER INTERESTS OF MARYLAND.

By RICHARD H. EDMONDS.

The Chesapeake Bay and its numerous salt-water tributaries contain the most prolific and valuable oyster-beds in the world, probably about equally divided between the two States of Maryland and Virginia. Notwithstanding the great importance and value of the oyster trade of the Chesapeake Bay, it is a subject upon which there has been no reliable information, either as regards its extent, the amount of capital invested, or the past and present condition of the business. The legislatures of Maryland and Virginia have, at every session for many years, revised and re-revised the laws upon this subject for their respective States; but have always been content to work in the dark, knowing nothing practically, and never seeing the value of obtaining full information upon so important an industry. There is, perhaps, no subject of such vital importance to either State that is so little understood. By some it is as greatly overestimated as it is underestimated by others. Many who have never lived near the water, and who gain their information from the rose-colored pictures drawn by correspondents who see only the best features of the trade, imagine that an oyster-bed is a mine of wealth, from which every oysterman may gather a liberal competence with but little labor. Nothing could be more erroneous.

The present report, based upon my investigations made by request of Profs. Spencer F. Baird and G. Brown Goode, must at the best be but the basis for a more elaborate and thorough scientific examination of this subject. From the chaos in which I found the business, so far as regards statistical information, I have tried to evolve some facts and figures which, by showing the importance of the trade, may cause a more careful study to be made of the means to arrest the present depletion of the beds and provide ways for increasing the natural supply of oysters. Until this is done it is almost useless to hope for wiser laws than those now in existence, many of which are not worth the paper upon which they are written. There are so many widely differing interests, each seeking through its representatives in the State legislatures to have such laws enacted as will protect its own particular branch of the trade regardless of what may be desired or needed by other branches, that it is utterly useless to expect to please all. Politicians, however, dependent upon the votes of the unlearned as well as the learned, must seek by all means to please their constituents, however unwise may be their desires. The carrying out of this doctrine results in a conflict of opinion among legislators and, no one being willing to relinquish his own pet theories, much time is wasted in useless discussions; and at last, when a bill is proposed, it is subjected to so many amendments, that when finally passed it would scarcely be recognized by its originator. In this way the laws both of Virginia and Maryland bearing upon the oyster trade are often worse than useless; and if by chance a law should be good, the means of enforcing it and the penalties for violating it will be so inadequate that no good results will follow its passage. It is a lamentable fact that a large part of the oystermen, many of whom are negroes, are so ignorant as to be easily led by demagogues. I have been informed by a prominent and reliable gentleman in Virginia, that during a late political canvass for the State legislature one of the candidates, in an address to the oystermen, promised, upon condition of their voting for him, that should they desire to break any of the oyster laws, he, as a lawyer, would defend them free of cost. My own observation leads me to believe that this is by no means an exceptional case. I am inclined to think that just here lies one of the greatest hindrances to the enactment and enforcement of suitable laws.

The oyster trade of the Chesapeake Bay is of vast extent, giving employment to thousands of workmen and millions of invested capital, and yet there are many intelligent men who believe that the blessings so lavishly bestowed by nature upon the tidewater counties of Maryland and Virginia in the abundant supply of oysters and fish are in reality productive of more harm than good. This belief is based upon the non-progressive character of the oystermen, who, as a class, are illiterate, indolent, and improvident. As the great natural productiveness of the soil in tropical countries has tended to retard man's improvement by taking from him the necessity for constant labor, so has the abundant supply of oysters in the Chesapeake tended to make the oystermen unwilling to engage in any steady occupation. A tongman can at any time take his canoe or skiff and catch from the natural rocks a few bushels of oysters, for which there is always a market. Having made a dollar or two, he stops work until that is used up, often a large part of it being spent for strong drink. When his money is all gone he can repeat the same course. Unless spent in the indulgence of intemperate habits, a small amount of money will enable an oysterman to live in comparative comfort. He can readily and at almost no expense supply his table in winter with an abundance of oysters and ducks, geese, and other game, while in summer fish and crabs may be had simply for the catching. So long as they are able to live in this manner it is almost impossible to get them to do any steady farm work. This cannot of course be avoided, as they have a right to live in the manner which best suits their taste, although several laws have, at different times, been enacted, which, while not so expressed, were really intended to have the effect

of making the tongmen, and especially the negroes, engage in other occupations. Could this be done without restricting the rights of citizenship it would prove a great blessing to the negroes themselves, as it would lead them to regular work in the cultivation of land, and it is well known that as soon as these people are possessed of a house and a few acres of land they become more law-abiding and industrious.

It has generally been a favorite idea of the legislators both of Maryland and Virginia that each State should derive some revenue from the natural oyster-beds belonging to it. To this end many laws have been passed, but no satisfactory results have ever been accomplished. The expense of enforcing laws over such an extensive body of water as the Chesapeake Bay is necessarily very great. In 1879 the entire amount received from licenses to tong, to scrape, and to dredge in Maryland was less than the cost of maintaining the oyster-police force. This, however, was an exceptional year, and very little was collected from dredgers for reasons given elsewhere. Since the oyster-police force was first established up to September 30, 1879, the amount collected from dredging licenses, measurers, and fines exceeded the expenses of the force by $235,156.59. In addition to this there is a county tax upon tonging and scraping which averages about $10,000 a year. This amount is by law paid to the public schools of the respective counties. It would be necessary for the State to maintain the police force, even if it had to be done by appropriations from the general treasury. Disband the force, and in a few weeks the bay would be a battle-ground for tongers and dredgers. This was plainly demonstrated last winter on the Rappahannock River. Virginia having abolished dredging on natural rocks, it was decided to do away with the police force. In the winter of 1879–'80 about 40 dredging boats entered the Rappahannock and began work. The native tongmen, incensed at this depredation upon their beds, undertook to drive the dredgers away. In this, however, they signally failed. The dredgers, being well supplied with rifles, opened fire upon the tongmen. For several weeks the appearance of a tongman at any time, was certain to draw forth a volley from the dredgers. The legislature being in session at the time, it was decided to supply the tongmen with a cannon, a large number of rifles, and a supply of ammunition. Before the arrival of these, however, the dredgers had left. Such is but a sample of what would be constantly occurring if the dredgers of Maryland were not overawed by the police.

In Virginia there are some laws for taxing oysters but as there are no means of enforcing them they are worthless. The total amount of license money received during 1879 was only a few hundred dollars. When gathering the statistics of the oyster trade in Maryland the matter seemed perplexing enough; but when the effort was made to obtain the same information in Virginia the task was found to be even worse. State officials, from county clerk to auditor, knew nothing definite about the business. There was no license, as in Maryland; no record of the number of boats or men; in fact, nothing upon which to begin laying a foundation. The county officials, however, willingly rendered all the aid in their power, and to many of them I am greatly indebted for their kind assistance.

DREDGING.—There are really but two ways of catching oysters practiced in this State: dredging and tonging. Scraping is but dredging on a smaller scale.

Before discussing the merits and faults of our present method of dredging, it may be well to give some description of this manner of catching oysters, which, while very familiar to Marylanders, may not be so well understood by those who have never witnessed the practical working of it. Dredges are bags made of iron rings linked together, forming meshes similar to those of an ordinary seine, the mouth being held open by an iron frame, from the four corners of which project four iron bars converging to a point at a distance of a few feet from the mouth; to this point a

short chain is attached, and joined to the chain is a long rope which winds around the windlass. Projecting downwards from the bar, attached to the lower edge of the mouth, are iron teeth, which, as the dredge is drawn over the bottom, scrape up the oysters and guide them into the bag. Every vessel is supplied with two dredges and two windlasses, the latter being made stationary about midway of the deck on each side of the vessel. At the point where the windlass is screwed to the deck 3 or 4 feet of the rail is removed, and fastened to the side of the vessel is an iron bar over which the chain and rope run when the dredge is being worked. The windlasses are so arranged that each is worked by four men at the same time. When the boat reaches the dredging ground the captain takes the helm, and the men prepare for their laborious task. The dredges are thrown overboard and the vessel continues on her course until it is supposed that the dredge, which usually holds 2 or 3 bushels, is full, and then it is hauled up, and its contents, consisting of oysters, stones, shells, crabs, fish, &c., emptied on deck. If the vessel has passed across the bar, she tacks, and recrosses the ground and continues sailing over the same bar for hours.

If dredging is done in the day-time the oysters are at once culled, but when working at night this is deferred until morning. Culling consists in separating the oysters from the other things brought up by the dredge, and throwing the latter overboard, while the former are placed in the hold of the vessel. In this manner the work continues until the vessel is loaded, when she at once proceeds to market. A trip will generally take about twelve or thirteen days. The effect of dredging upon an oyster bar has been thoroughly studied both in this country and in Europe, and the conclusion almost invariably reached is that it is beneficial to the beds when properly conducted as to time and manner; and my own investigations have satisfied me that this is correct. An oyster bar when left undisturbed for a number of years has a tendency to solidify into an almost impenetrable rock. Dredging prevents this, and by scattering the oysters over a wide area greatly extends the bar. A bushel of wheat placed in one pile will never "increase and multiply," however fertile may be the soil in which it rests; neither will its yield repay for the gathering thereof if the grains are dropped at far-distant points. It is only when well sown, neither too thick nor too thin, that a good harvest may be expected. Such is the case with oysters. Nature has often placed them in one large pile. Dredging, properly conducted, acts like the grain-drill in scattering them over a wider field. But there is great danger that dredging may be carried to such an extent as to leave only an oyster here and there; and then, like the thinly-sown wheat, the yield is too small to be profitable. Such is by some believed to be the present condition of a large part of the bay; and they hold that there is an abundance of oysters, although so widely scattered that it is very difficult to catch them. In a report upon the "Oyster beds of the Chesapeake Bay," made in 1872, by Mr. O. A. Brown, to the auditor of public accounts of Virginia, it is said that "The dredging of oysters is as necessary to their development and propagation as plowing is to the growth of corn; the teeth of the dredge take hold of the rank growth of the oyster beds, and, by being dragged through them, loosen them (which is done by hand in France in the management of their oyster parks), and give them room to grow and mature properly; moreover, beds are continually increased in size, for when the vessel runs off the rock with the chain-bags filled with oysters, the oysters are dragged off on ground where no oysters existed, and thus the beds are extended, and when the vessel is wearing or tacking to get back on the oyster beds, the catch just taken up is being culled off, the cullings thrown overboard to form new cultch for drifting spat to adhere to. Reliable oystermen tell me that since dredging has been carried on in Tangier and Pocomoke, the beds have more than doubled in size; and, with the moderate force that worked upon them prior to the war, were continually improving. During the war the waters were thrown open to every one

who would pay the military officials for a permit to oyster; the consequence was that the oyster beds were scraped bare, and it was two years before they could recuperate."

While dredging, properly conducted, is no doubt beneficial to the beds, I am inclined to think that in this State it is being carried too far, and that its ultimate effect will be the same as in every European country where it has been unrestricted by proper laws. By some it is believed that the oyster beds of the Chesapeake Bay are of such vast extent, and the number of young annually spawned so great, that it will be impossible to destroy them. In view of the experience of Great Britain and France, and of the almost complete destruction of many of the once-famous beds of the Chesapeake, such an opinion is without good foundation. The history of dredging in France and in Great Britain is very instructive, and may be studied with much profit by those who are interested in the preservation of the oyster beds of the Chesapeake Bay. The most valuable records are those of the production of the beds of Cancale Bay, on the northwest coast of France. These records extend over a period of sixty-eight years, from 1800 to 1868. The following extract in regard to these beds is from the report of Francis Winslow, master United States Navy, made to Carlile P. Patterson, Superintendent Coast and Geodetic Survey:

"The beds in the bay comprise an area of about 150 acres, and from 1800 to 1816 produced from 400,000 to 2,400,000 a year. This, however, was the period of the Napoleonic wars, and the fishing was much disturbed by the presence of the English cruisers. During this time the beds became so thickly stocked that the oysters were in some places a yard thick. After the close of the war the fishing improved and the oysters were removed in larger and increasing numbers until 1843. From 1823 to 1848 it is supposed that the dredgers were living upon the oysters accumulated during the period of enforced rest, from 1800 to 1816. In 1817 the number of oysters produced was 5,600,000, and until 1843 there was a constant increase, the number taken in the latter year being 70,000,000. In 1848 it was 60,000,000; thenceforward there was a constant decrease. From 1850 to 1856 the decrease was from 50,000,000 to 18,000,000, supposed to be the effect of over-dredging. From 1859 to 1868 the decrease was from 16,000,000 to 1,079,000; the oysters having almost entirely disappeared from the beds, though on account of the suffering condition of the inhabitants of the shores it was almost impossible to prevent it. In 1870 there was a complete wreck of the bottom, which could only be remedied by a total prohibition of the fisheries for several years. From the beds of the districts of Rochefort, Marennes, and island of Oléron, on the west coast of France, there were taken in 1853–'54 10,000,000 oysters, and in 1854–'55, 15,000,000. On account of exhaustive fishing in 1863–'64 only 400,000 could be obtained. According to the testimony of Mr. Webber, mayor of Falmouth, England, about seven hundred men, working three hundred boats, were employed in a profitable oyster fishery in the neighborhood of Falmouth until 1866, when the old laws enforcing a 'close time' were repealed, under an impression that owing to the great productive powers of the oyster it would be impossible to remove a sufficient number to prevent the restocking of the beds. Since 1866 the beds have become so impoverished from excessive and continual fishing that in 1876 only forty men and forty boats could find employment, and, small as the number is, they could not take more than 60 or 100 oysters a day, while formerly, in the same time, a boat could take from 10,000 to 12,000. According to the statement of Mr. Messum, an oyster dealer, and secretary of an oyster company at Emsworth, England, made before the commission for the investigation of oyster fisheries in May, 1876, there were in the harbor of Emsworth, between the years of 1840 and 1850, so many oysters that one man in five hours could take from 24,000 to 32,000. In consequence of over-fishing, in 1858 scarcely ten vessels could find loads, and in 1868 a dredger in five hours could not find more than *twenty oysters*. The oyster fisheries of Jersey, in the English Channel, afforded employment

to four hundred vessels. In six or seven years the dredging became so extensive and the beds so exhausted that only three or four vessels could find employment, and the crews of even that small number had to do additional work on shore in order to support themselves."

The foregoing are a few of, though by no means all, the instances that may be quoted in order to show the disastrous effects of overworking the beds, and in concluding the remarks under that head it will be instructive to extract from Professor Möbius' work his prophecy with regard to our own beds, which is here introduced:

"In North America the oysters are so fine and so cheap that they are eaten daily by all classes. Hence they are now, and have been for a long time, a real means of subsistence for the people. This enviable fact is no argument against the injuriousness of a continuous and severe fishing of the beds. * * * But as the number of consumers increases in America the price will also surely advance, and then there will arise a desire to fish the banks more severely than hitherto, and if they do not accept in time the unfortunate experience of the oyster culturists of Europe, they will surely find their oyster-beds impoverished for having defied the bioconotic laws."

As the best stocked and most productive beds of Europe were quickly destroyed by unrestricted dredging, so may the hitherto seemingly exhaustless beds of the Chesapeake Bay be depleted if the present rate of dredging is continued. An illustration of this may be seen in the almost total exhaustion of the once famous beds of Tangier and Pocomoke Sounds. Year after year these beds were dredged by hundreds of vessels, and even the summer months afforded them but little rest. The result of this has been plainly seen during the past few years, and more especially during the season of 1879–'80, in the great scarcity of oysters in these sounds. Vessels having found it unprofitable to dredge in these sounds since the oysters became so scarce, have turned their attention to other parts of the bay, and will thus give the beds a year or so of comparative rest. It is doubtful if they will ever again be as well stocked as in former years, for as soon as oysters again become plentiful there will be a rush of all the dredging boats in the State. Thirty years ago the depletion of these beds seemed almost impossible, and yet at the present time it is an admitted fact that oysters have decreased at least four-fifths in Pocomoke Sound and two-thirds in Tangier. If it were possible to restrict dredging so as to give every bed an occasional year of rest, the result would prove the wisdom of such a course. Owing to the great extent of the oyster-beds in the bay and their immense annual production, it may be some years before there is an oyster famine, but sooner or later it is coming, unless there is a radical change in some of the present phases of the business. Properly protected and cared for, the "imbedded wealth" of the Chesapeake might be increased many fold. It is a shame that the gifts so lavishly bestowed by nature upon Maryland and Virginia should receive so little practical appreciation.

Dredging in Maryland is simply a general scramble, carried on in 700 boats, manned by 5,600 daring and unscrupulous men, who regard neither the laws of God nor man. Some of the captains and a few of the men may be honest and upright, but it is an unfortunate fact that such form a very small minority. The tenure by which the captains hold their positions is such that they are almost forced to disregard the laws. Many of the boats are owned by unprincipled men, and I am informed that a number of them are even held by the keepers of houses of ill-repute. An honest captain who complies with the law by not working on Sunday, at night, or on forbidden ground, will take at least a week longer to catch a load of oysters than one who, disregarding the law, gets his oysters whenever or wherever he can. The first captain, upon his return, is informed in language more forcible than elegant that unless he makes as quick trips as the second captain his place will be filled by some one less scrupulous. With such a system as this carried out by a large number of the boat owners, what but evasion of the laws can be expected of captains? When a premium is

placed upon law-breaking, and a man is taught by his employers that oyster laws are only made to be broken, and that the greater the skill displayed in evading them the greater will be his pay, it is scarcely to be expected that many will be able to resist the temptation. It is now rarely the case that a dredger can be found who will admit that he believes there is any wrong in disregarding the oyster laws, and such a thing as being disgraced among his fellow-workmen by imprisonment for violating the laws is totally unknown. In the above facts will be found sufficient reasons why it has been impossible for the oyster police since its first organization to enforce the laws. Seven hundred well-manned fast-sailing boats scattered over such a large space as the Chesapeake Bay are rather difficult to watch, and especially at night.

All blame for violating laws does not, however, attach to the boat owners, as some of them are prominent gentlemen of the most upright character. It is the misfortune of such men that their captains have often been trained by less honest employers, and having once acquired a love of ill-gotten gain, it is difficult to keep them from continuing in the same course. As he usually has a share in the profits, it is of course to his interest to make his trips as quickly as possible; and while the boat owner may be opposed to breaking any laws, his captain may think and act otherwise.

The unscrupulousness of the captain is well assisted by the character of his men. These men, taken as a class, form perhaps one of the most depraved bodies of workmen to be found in the country. They are gathered from jails, penitentiaries, workhouses, and the lowest and vilest dens of the city. They are principally whites, many of whom are foreigners (almost every European country being represented), unable to speak more than a few words of English. When a crew, which usually consists of about eight men, is wanted, the vessel owner or captain applies to a shipping agent, who then gathers these men wherever they may be found, drunk or sober. As one large boat owner expressed it to me, "We don't care where he gets them, whether they are drunk or sober, clothed or naked, just so they can be made to work at turning a windlass." The shipping agent having placed the crew aboard, is then paid $2 for each man furnished. With such a crew as this, who neither know nor care for laws, the captain is of course able to work wherever he desires to. As may be supposed, the life led by these men on board of the vessels is of the roughest kind. When sleeping, surrounded by vermin of all kinds; when working, poorly clad and with every garment stiff with ice, while the wind dashes the fast freezing spray over them, hour after hour winding away at the windlass, pulling a heavy dredge; or else stooping with backs nearly broken culling oysters. Returning from a trip, the men take their little pay and soon spend it in debauchery amid the lowest groggeries and dens of infamy to be found in certain portions of Baltimore. It is a gratifying fact, though, that even amid such surroundings as these, there are some few respectable and honorable men. This is more especially the case on the boats owned in the lower counties of Maryland. The crews of these are often gathered from the surrounding neighborhoods, and even as a class are not as degraded as those on Baltimore vessels.

There are two ways in which these men are paid; the one most generally adopted at present being to pay them a stated amount per month, although payment is usually made at the end of each trip; the amount, of course, being proportioned to the length of the trip. The other plan is to allow the crew a share in the profits. When this is done, the vessel at the end of each trip first pays the "grub bill," wharfage, and commission merchants' charges; then, of the balance, one-third goes to the owner of the vessel and a small bonus, usually about $20, to the captain; after which captain and crew all share alike, except the cook, who receives something less than the others. When the first plan is adopted the men receive their board and from $10 to $12, and occasionally as high as $15 a month. Those working on shares will, during the season, average

about the same as those who are paid a certain amount. A fair average of the amount made by each man would be $11 a month, making $77 for a season of seven months. Computing on this average, it will be seen that during an oyster season the 4,900 dredgers receive about $377,300, and the 700 captains, whose wages will average $50 a month, about $245,000—making a total of $622,300. It would also be proper to add to this amount the cost of boarding these men, since that in fact forms a part of their wages. This costs the vessels about $7.50 a month for each man; equal to $420 a season for each boat, or $294,000 for the entire fleet. This, added to $622,300, gives a total of $916,300 paid to the dredgers of Maryland during every oyster season.

The law requires all boats engaged in dredging to obtain from the State comptroller a yearly license, costing $3 for each registered ton. For reasons explained elsewhere this law has never been fully enforced, and the records of the past season are entirely without value in determining, even to an approximate degree, the number of dredging boats, since more than one-half of them worked without license. Through the kindness of Hon. Thomas J. Keating, State comptroller, I have obtained the record of the past ten years, as shown in the following table:

Statement showing the number of boats licensed to dredge, their aggregate tonnage, and the amount of license money paid during the past ten years, compiled from the books of the comptroller's office at Annapolis.

Fiscal year.	No. of boats.	Aggregate tonnage of same.	Amount of license paid by same.
1870–'71	637	13, 862. 49	$41, 587 46
1871–'72	597	13, 013. 21	39, 033 62
1872–'73	559	17, 604. 23	52, 812 69
1873–'74	621	10, 075. 91	30, 227 73
1874–'75	583	14, 118. 53	42, 355 58
1875–'76	691	16, 156. 23	48, 468 68
1876–'77	677	16, 612. 48	49, 837 46
1877–'78	565	14, 469. 46	37, 408 39
1878–'79	465	10, 391. 10	31, 173 29
1879–'80	327	6, 202. 17	18, 606 50
Total			391, 511 40

It will be seen by examining the above table that the highest number of licenses issued in any one year was in 1875–'77, when there were 691 boats, having an aggregate tonnage of 16,156.23, or an average tonnage of 23.38 each. Since that year there has been a steady decrease in the number of licensed dredgers, although there has been no decrease in the actual number of boats engaged in the business. Knowing this to be true, and also mindful of the fact that even in 1875–'76 there were some unlicensed dredgers, I have thought it safe to place the number of dredging boats working during the season of 1879–'80 at 700. There are some well-informed persons who would make the figure as high as 800, but I have based my statement upon information gathered from many sources. Taking the average tonnage in 1875–'76, and multiplying it by 700, we have 16,366 as the aggregate tonnage of the vessels now engaged in dredging. At $3 per ton for license, this should have yielded the State during the past season a revenue of $49,098, instead of $18,606.50, the amount collected. The 327 vessels which, either from honesty or policy, paid into the State treasury $18,606.50, received no privileges or advantages not taken by the 373 which dredged without license.

Dredging boats range in size from 5 to 75 tons, and in value from $500 or $600 to $8,000, some few owned in the lower part of the State being valued as high as $10,000. The boats owned in Baltimore are generally in every way inferior to those hailing from the counties. The present value of these boats, basing the estimate upon information obtained from all parts of the State,

would be an average of not less than $1,500, and it is believed by many to be much higher. At this rate, however, the seven hundred boats in the trade would be worth to-day $1,050,000. In addition to this, the winders, dredges, rollers, and chains and dredge lines on each boat may be valued at $100, although costing considerably more. Adding this to the value of the boats, we have $1,120,000 as the amount of capital invested in the dredging boats. The total tonnage of the dredging-boats being 16,366, and the estimated value of the same being $1,050,000, the average value will be $64.15 per ton. As some tonnage has lately changed hands in Baltimore at $67, the above estimate can scarcely be too great when the high class of many of the boats is considered. The amount annually expended for repairing these vessels is about $105,000.

SCRAPING AND TONGING.—Scraping, which is simply dredging on a smaller scale, both as to the size of the boat and the dredge, is conducted only in shallow water; and while dredge licenses are issued by the State, scraping licenses are obtained from the counties, and hold good only in the local waters of the county in which issued. Dorchester, Talbot, and Somerset are the only counties in which scraping licenses are issued. In the first two the charge is regulated by the tonnage of the vessel (being $2 per ton), while in the last there is a uniform charge of $10 on each boat, regardless of size. The crews of these vessels average about four men each, the majority of whom are able to return home after each day's work, as the boat does not go out of the county waters, except to make an occasional run to a neighboring market.

The number of scraping boats licensed during the past seven years is as follows:

Counties.	1873-1874.	1874-1875.	1875-1876.	1876-1877.	1877-1878.	1878-1879.	1879-1880.	No. of men employed on same during 1879-'80.
Dorchester	106	149	180	142	142	157	134	536
Talbot*	.....	59	40	47	27	34	29	116
Somerset	224	322	209	165	59	151	57	228
Total	330	530	429	354	228	342	220	880

* No scraping law until 1874-'75.

The above figures have been kindly furnished to me by the clerks of the respective counties, and, while they embrace all vessels that are licensed, they by no means include all that are scraping. From personal inspection and from reports of reliable persons I feel safe in placing the number of scraping boats at 550, carrying 2,200 men. The additional 330 boats are working without license. The pay of these men will average about $18 a month each for the seven and a half months employed, amounting to $135 for the season, and making a total of $297,000 received by the 2, 200 men, including the captains, whose pay is of course larger than that of the men.

The average value of scraping boats, including their outfit, is $800, which gives a total of $440,000 invested in scraping. About $27,500 is annually expended in repairing these boats. Socially and morally the scrapers are somewhat superior to the dredgers.

Tonging, although employing less capital and fewer men than dredging, is probably of greater value to the State than the latter, because the men engaged in it are of a better class, are better remunerated for their labor, and are less prone to evade the laws than the dredgers. While this much may be said in the tongmen's favor, it is yet an unpleasant truth that they, like all others engaged in the oyster trade, either as catchers or shuckers, are as a class indolent and improvident. The majority of them live near the water, often owning a small house and an acre or so of land (the value of which depends upon the proximity of good oyster and fishing grounds), and a canoe or an interest in one, used in winter for oystering and in summer for fishing. Having secured a house their ambition seems to be satisfied and but little time or money is spent in beau-

tifying or improving it. It is too often the case that tongers, especially many of the negroes, who comprise about one-third of the total number, will work only one or two days at a time and then remain idle until necessity forces them again to earn a few dollars. By others, however, tonging is pursued as steadily and systematically as the wind and waves will allow, and when this is done I think it may safely be said that the remuneration is equally as fair as in other trades. Those who pursue tonging in this way form the most intelligent class of oystermen in the State. In some cases farmers and others holding prominent social positions may be found oystering during several of the winter months when their legitimate business does not require close attention.

Tonging necessitates very great exposure to the cold, but is, however, hardly as severe in this respect as dredging, and moreover the tongers suffer less from the fact that they are generally better clad than the dredgers and seldom work either during very cold or very windy weather on account of the smallness of their boats. From this cause I find that even the industrious ones will lose on an average at least two days out of every week, and when the time wasted by the idle ones is taken into account it will be found that one hundred and twenty days out of an oyster season of eight months is about the average length of time for each tonger. In this actual loss of at least one-half of their time may be seen the cause which prevents the tongers, as a class, from making any improvement in their financial condition, upon which depends their social position.

While seeking information from the county clerks as regards the number of boats licensed, I also requested answers to the following questions with a view to obtaining home opinion upon the character of the tongers: No. 1. What is the moral and social condition of your oystermen? No. 2. What is their occupation during the summer months?

In answer, I received the following from Somerset County: No. 1. The oystermen, as a class, are generally poor men residing near the water-courses, living in and mostly owning small houses, with an acre or so of land, or less, attached to their premises, and in morals are equal to any body of men similarly situated. No. 2. In the summer oystermen work on their lots and do some job-work for their wealthier neighbors; but it is still to be feared that much of their time is unemployed.

From Worcester County: No. 1. Of a rather low order; some of them good as to morals, but a large majority reckless and improvident. No. 2. Most as day laborers; others cultivate small parcels of lands.

From Dorchester County: No. 1. As a class, only fair. No. 2. Most of them have small truck-farms to cultivate.

From Saint Mary's County: No. 1. Fair. No. 2. Fishing and agriculture principally.

From Anne Arundel County: No. 1. Unable to answer the question, but believe they compare favorably with other industrial classes. No. 2. Crabbing and bedding oysters.

Tonging, although generally confined to shallow water, is in some of the tributaries of the bay carried on in water varying in depth from 18 to 20 feet. Engaged in tonging there are 5,148 men, using 1,825 canoes or other small boats. To obtain even an approximate average of the amount of money made by each tonger is almost impossible, but I think it will be very near correct to estimate it at $225 a season, at which rate the total amount made by the tongers would be $1,158,300. Many of the larger boats are held in joint ownership by two or three parties.

Statement of number of tonging licenses issued during the past ten years, and number of men employed on boats in the season of 1879–'80.

Counties.	1870–'71.	1871–'72.	1872–'73.	1873–'74.	1874–'75.	1875–'76.	1876–'77.	1877–'78.	1878–'79.	1879–'80.	Number of men employed on boats 1879–'80.	Figures furnished by—
Anne Arundel	307	240	300	421	314	396	250	348	343	301	903	Sprigg Harwood.
Calvert	145	146	324	380	237	207	186	198	243	312	624	S. Sollers.
Charles	8	12	48	22	50	49	28	23	30	41	123	B. G. Stonestreet.
Dorchester	331	441	575	405	472	280	212	182	142	199	597	Charles Lake.
Kent*	.....	.....	.....	.....	120	101	101	106	122	123	369	Samuel Beck.
Queen Anne	118	119	178	183	210	172	146	139	144	145	435	James Wooters.
Somerset	179	252	245	125	329	239	72	59	2	.....	.....	Benjamin F. Lankford.
Saint Mary's	267	220	362	307	325	272	244	197	212	183	549	J. Frank Ford.
Talbot	199	184	274	280	294	276	254	217	258	281	843	J. Frank Turner.
Wicomico	112	106	195	125	172	98	88	133	108	134	492	S. P. Toadvine.
Worcester†	.....	.....	.....	.....	291	241	193	170	211	106	213	I. T. Matthews.
Total	1,666	1,720	2,501	2,248	2,814	2,331	1,774	1,772	1,815	1,825	5,148	

* No records farther back than 1874. † No license required until 1874–'75.

The information contained in the above table was kindly furnished to me by the gentlemen named, who are the clerks of the circuit courts of the respective counties, and from whom all licenses to tong must be obtained. The law in relation thereto is:

"Any resident of this State desiring to use any canoe or other boat in catching or taking oysters, for sale, with rakes or tongs, in any of the waters of this State, shall first obtain, by application to the clerk of the circuit court for the county wherein he may reside, a license therefor, and such license shall have effect from the 1st day of June, in the year in which it may have been obtained, to the 1st day of June next succeeding; provided that such license shall not authorize the use of said canoe or boat in taking or catching oysters in any creek, cove, river, inlet, bay or sound within the limits of any county other than that wherein the license shall have been granted, and that the boundaries of counties bordering on navigable waters shall be strictly construed, so as not to permit the residents of either county to take or catch oysters beyond the middle of the dividing channel; * * * and every applicant for such license shall pay to the clerk of the court where such license may be granted, and before the issuing and delivery of the same, according to the following rates, viz: For any boat measuring in length 20 feet or less, the sum of $2; measuring from 20 to 25 feet, the sum of $3; measuring from 25 to 30 feet, the sum of $4; and all over 30 feet, including sloops under custom-house tonnage, the sum of $5 each; and all oysters taken with rakes or tongs shall be culled upon the natural beds where they are taken; the amount received from tonging license to be paid by the clerk to the school commissioners for the public schools of the respective counties where such license is issued; provided, the sum received from white tongers shall go to white schools, and the sum from colored tongers to the colored schools."

The money arising from licenses issued to tong and to scrape during the year 1879 amounted to $8,959.89, which was turned over to the boards of school commissioners of the various counties, with the exception of $210 received by Worcester County for licenses, and which was used by the county commissioners in purchasing "plants" to be bedded in the county waters. It may be well to explain that the laws in Worcester County are different from those in the other counties in respect to the disposal of license money and also as regards the issuing of license. In this county the license is $1 on each man in the trade, and no account is taken of the boat.

Since 1874–'75 the number of licenses granted has decreased from 2,814 to 1,825 in 1879–'80. There are several causes for this, the principal one probably being the unprofitableness of tonging for several seasons past as compared with former years. From 1865 or 1866 to 1874 or 1875 tonging was quite profitable, as oysters commanded a good price, but since the latter year prices have ruled very low and many have turned their attention to other occupations. It may be that some few tongers are working without license, but from the testimony of those well posted in the business I am led to believe that the number is comparatively small. Mr. Benjamin F. Lankford, clerk of the circuit court of Somerset County, makes the following statement in regard to scraping-boats, which is equally applicable to tongers: "The oyster business has been gradually declining in this county since 1873; during that year the number of dredge [scraping] licenses issued was 327, and the money received therefor was $3,270, which sum was paid into the public-school treasury. I do not think, however, that the great difference exhibited between the years 1874 and 1879 shows the actual amount of the decline in the business. The present oyster law is inefficient or is inefficiently executed." By referring to the table showing the number of tonging licenses issued during the past ten years it will be seen that in Mr. Lankford's county (Somerset) there were 329 in 1874–'75, while in 1879–'80 there was not a single license issued to tong. The size of the tonging canoe ranges from 15 or 16 feet to 30 feet or more, the larger ones being called "bugeyes." Owing to this diversity in size it is very difficult to estimate the value of these boats, but a fair average is about $100, which would cover the entire outfit, making $182,500 the amount invested in tonging-boats.

OYSTER RUNNERS.—Connected with the tongers, and each dependent upon the other, is a branch of the trade conducted by vessels generally known as runners, of which there are owned in this State about two hundred, carrying about eight hundred men. The oysters caught by tongers are either sold to these vessels, and by them carried to some market in the State, or they are bought by boats owned in other States and carried to northern cities. The runner will anchor near some tonging ground, and an empty basket or a small flag will be hoisted to the masthead as a signal that she is ready to receive oysters. In one or two days she will be loaded and is at once off for a market. On some occasions half a dozen or more runners may be seen in the same locality surrounded by forty or fifty canoes. As soon as a tonger has caught as many as his small boat will carry he sells out to the runner and returns to work. The men employed on runners will average about $18 a month, including their board, which, with the pay of the captains (about $50 a month), will amount to $166,400 for a season of eight months, that being the length of time that these vessels are engaged in carrying oysters. Reckoning the average value of the runners at $1,500, will give a total of $300,000 in this branch of the trade. About $30,000 is annually spent in repairing this fleet.

STATISTICAL SUMMARY.—Summarizing the statistics of vessels, their value, &c., it is seen that there are 700 dredging boats, paying $916,300 to 5,600 men; 550 scraping boats, paying $297,000 to 2,200 men; 1,825 canoes, with 5,148 men, earning $1,158,300; and 200 runners, with 800 men, at $166,400 for the season, making a total of 13,748 men engaged in catching oysters in Maryland, with wages and earnings amounting to $2,538,000 during every oyster season, or an average of $184.60 for each man. It is utterly impossible to obtain the number of people supported by this $2,538,000. Perhaps not one-half of the dredgers support any family, but with tongers and scrapers it is different. Five is usually reckoned as the average number of a family, but as very many of these men are single, it would be too high in the present case. It can scarcely, however, be too much to reckon that for every oysterman there is an average of four individuals dependent upon him. This would give 54,992 as the number of people supported by the catching of oysters in this State. In addition to this, there are hundreds dependent indirectly, as shop-keepers and in other ways, upon the oystermen.

The capital invested in oyster-boats is as follows:

700 dredgers, at $1,500	$1,050,000
Outfit of same	70,000
550 scrapers, at $800	440,000
200 runners, at $1,500	300,000
1,825 canoes, at $100	182,500
3,275 Total	2,042,500

The amount annually expended for repairs to these vessels, as near as I can calculate from reports received from ship-builders, is $162,500, of which probably $75,000 is received by carpenters, sailmakers, and other workmen.

SHIPMENTS OF OYSTERS IN SHELL.—From the prolific beds of the Chesapeake Bay immense quantities of oysters are yearly taken for bedding in Northern waters, and also for immediate consumption in the principal cities along the coast from the bay to Portland, Me. It is not the West alone which is dependent upon the Chesapeake for oysters, for without the supplies annually drawn from this bay the Atlantic coast from Delaware to Maine would be but poorly supplied. The Chesapeake is the great storehouse from which several millions of bushels of oysters are annually carried to restock the exhausted beds of other localities. More than two hundred vessels, averaging in value about $3,000 each, are for eight months of the year engaged in the trade between the bay and Northern markets. During the winter the oysters which are taken North are used for immediate local consumption, with the exception of those carried to Fair Haven, Conn., which are packed and shipped elsewhere; those taken in the spring are used almost exclusively for bedding purposes. At Seaford, Del., there is quite an extensive packing trade—Maryland oysters being used. It is well known that oysters are eaten during the summer at the North much more extensively than in Maryland and Virginia. I have been told by Capt. J. T. Bolton, of Norfolk, who was for a long time in the trade, that all oysters eaten in Northern cities in summer are of those which were taken in the previous spring from the Chesapeake and bedded in Northern waters; that the change of water prevents the oysters from spawning until late in the fall, and for this reason they are considered suitable for eating. This statement may be correct so far as concerns the effect upon the oysters of change of water, but I scarcely think that has much to do with the consumption of them, for it is now believed by many that oysters are equally as good during the spawning season as at any other time. Evidence of this may be seen in the growing custom in Maryland and Virginia of using oysters very freely during the summer, and those who eat them maintain that they are in no way inferior to oysters caught in winter. While visiting Chincoteague Island, Virginia, in May, I ate very heartily of oysters, and found them as finely flavored as any I had ever eaten; the thermometer was then about 80° in the shade. During the early part of July I was on board a bay steamer where it became necessary to eat oysters or go without supper, and preferring the former course, I found the oysters remarkably good.

Among many intelligent men, both in Maryland and Virginia, there is great opposition to the shipment of oysters in shell to Northern markets. They claim, and justly, too, that the packing trade of the two States would be much more largely developed if Northern cities were unable to buy oysters in the shell, and as the shucking of oysters gives employment to such a number of people, they hold that it would be a wise policy to heavily tax all oysters shipped in the shell. It is very questionable, however, whether such a measure would be constitutional. Two great objections which might also be urged against the system are that the majority of oysters shipped North are purchased late in the spring, when the packing trade is about over, at prices necessarily low,

and that the beds are seriously injured by being disturbed after the commencement of the spawning season. The oysters purchased and taken North in the spring for bedding would, if allowed to remain until the fall and then sold for immediate use, bring nearly $500,000 more than they now sell for; that is, there would be a yearly gain to the oystermen of Maryland and Virginia of nearly $500,000. There being in the spring no home demand for them, they sell sometimes as low as 4 cents a bushel, and from that up to 12 and 15. In the spring of 1879 a vessel loaded in the Great Choptank River with 16,000 bushels, costing $640, or just 4 cents a bushel. These oysters are taken North and planted, where they grow very rapidly, and during the following fall and winter they come in competition with oysters from Maryland and Virginia packers.

During the spring of 1879 Capt. Samuel M. Travers, of the oyster-police force, directed his deputy commanders to board all vessels loading with plants for Northern waters and obtain the number of bushels taken. He has favored me with the result, which is as follows:

	Bushels.
Tangier Sound and tributaries	353,750
Nanticoke River and Fishing Bay	125,000
Little Choptank River	125,000
Greak Choptank River	375,000
Eastern Bay	62,500
Chester River	250,000
Anne Arundel County waters	112,500
Patuxent River and tributaries	150,000
Potomac River and tributaries	625,000
Total	2,178,750

The average price paid was 7 cents a bushel. Owing to the action of the State legislature at its last session, in forbidding the catching of oysters after April 15, the shipments from Maryland waters in the spring of 1880 were much smaller than for the previous year. I endeavored to ascertain the shipments for immediate consumption as well as for planting during the season of 1879–'80, and through the generous assistance of many correspondents in Northern cities, and of Mr. Ernest Ingersoll, who had general charge of the oyster investigation north of the Chesapeake, I was enabled to compile the following:

Shipments of oysters in shell from Maryland waters from May 31, 1879, *to May* 31, 1880.

To—	For planting.	For immediate consumption.	Total.
	Bushels.	*Bushels.*	*Bushels.*
Portland, Me	9,000	75,000	84,000
Fair Haven, Conn	66,000	50,000	116,000
Providence and Providence River	110,000	30,000	140,000
Boston		80,000	80,000
Delaware Bay	488,880		488,880
Philadelphia		162,960	162,960
Seaford, Del. (for packing and local use)		200,000	200,000
New York			650,000
			1,921,840
Per rail and steamers			100,000
Total			2,021,840

The vessels engaged in carrying oysters from the Chesapeake to the North are generally owned in the cities to which they run, and statistics concerning them are included in reports on those cities. The total number of carriers employed is about two hundred, with a present aggre-

gate value of $600,000. About one thousand men compose their crews, and the wages of these will amount to about $140,000 a season.

The oysters taken north for immediate use cost on an average about 25 cents a bushel, while plants during the past season probably averaged 10 cents a bushel—about 3 cents more than the price during the previous season.

PACKING.—Having given an account of the oystermen, their boats, &c., it is now appropriate to present some statistics of the number of bushels of oysters caught and the disposition made of them. The most important factor in this connection being the packing trade, I will endeavor to show the extent of this business as compiled from the books of the different firms engaged in it.

About 1834 or 1835 a small packing-house was opened in Baltimore, but it soon passed out of existence, and no record of it can now be obtained. The first important enterprise in this line was the establishment of a packing-house in 1836 by Mr. C. S. Maltby, a native of Connecticut. Mr. Maltby, who, by the way, is still in the business, confined his operations exclusively to the raw trade for a number of years. As his business increased he established a line of wagons from Baltimore to Pittsburgh, and was thus enabled to supply the West with fresh oysters long before the Baltimore and Ohio Railroad had stretched out its track to that then distant region. Mr. A. Field was the first to develop in Baltimore the steam trade. He began a few years after Mr. Maltby. His oysters were steamed and then hermetically sealed in small tin cans.

Having been once established, the trade increased quite rapidly, and for some years oyster-packing, both raw and steamed, was very profitable; but as there is an abundant chance of financial success through dishonest means, with but little danger of detection, many unscrupulous firms engaged in the steamed oyster business, and by packing "light weight", *i. e.*, putting in a 1-pound can about 6 or 7 ounces of oysters and filling the remaining space with water, and about the same proportion of oysters and water in larger cans, and either selling them under some fictitious brand, or else entirely omitting any name, they succeeded in gaining for the packing trade of Baltimore a by no means enviable reputation. To enable them to compete with these "tricks in trade," reliable houses were in some cases forced to follow their example, as in many places it was found impossible to sell standard goods at fair prices, while light weights could of course be sold at much lower figures. In answer to the question as to whether light weights were sold extensively in the West, I was lately informed by a gentleman from that section that up to within a year or so it had been almost impossible to obtain full weights, but that some improvement had lately taken place in this respect. The same gentleman, on returning to the West, sent me the names of three packing-houses whose names appeared on the cans and whose oysters were light weights. An examination proved the names to be fictitious, there being no such firms in Baltimore. Close competition, by causing a cutting in prices, helped on the trouble, and for several years previous to 1878 the business was very unprofitable. In 1878, to save themselves, the packers formed a combination known as the "Union Oyster Company," embracing all the leading firms engaged in the steaming business, with the exception of three or four, who, having well-known standard brands, preferred to fight it out alone. The formation of the Union Company was, in itself, an evidence that the trade was in a deplorable condition. The company was established with a capital of $300,000, the stock being divided among the twenty-three firms who entered it, in proportion to the amount of business previously done by them. The affairs of the company are managed by a president, a vice-president, a secretary, and the twenty-three firms who constitute the board of directors. In joining the company each firm entirely relinquishes their own steaming business (although they may still conduct the raw trade) and act merely as agents for the union. All oysters are bought and packed by the union and then sold to the packers at

a uniform price, thus placing every firm on exactly the same level. At the same time the union may sell directly to the trade.

The result of this combination has been to partially break up fraudulent packing, although it is still carried on to some extent. Outside of the union there are three or four influential firms whose oysters sell on the reputation of their brands, and it would obviously be impolitic for them to engage in packing light weights. The raw-oyster business has always been more profitable and less subject to the vicissitudes of trade, although there are many losses from spoilt oysters when the weather happens to turn suddenly warm. Raw oysters after being opened are packed in small air-tight cans holding about a quart, and these are arranged in rows in a long wooden box with a block of ice between each row, or they are emptied into a keg, half-barrel, or barrel made for this purpose. When the latter plan is pursued, the keg or barrel is filled to about five-sixths of its capacity, and then a big piece of ice is thrown in, after which the top is fastened on as closely as possible and it is at once shipped to the West, usually by special oyster trains or by express. Packed in this way, with moderately cold weather, the oysters will keep very well for a week or ten days. During the most active part of the raw season there are daily oyster trains of from thirty to forty cars from Baltimore to the West, where nearly all the Baltimore oysters are consumed. From the shores of the Chesapeake Bay as far as Detroit there is scarcely a city or town, connected with any of the great trunk lines, which is not supplied with Maryland raw oysters. Farther west, and to a considerable extent in European countries, the demand is supplied by steamed oysters. The oysters used in the raw trade are of a finer quality, and consequently command better prices than steamed. In fact, nothing in the shape of an oyster is too small to be available for the steamed trade. And from this arises one of the great sources of injury to the oyster beds. So long as dredgers are able to sell their entire catch, regardless of the size of the oysters, it will be useless to expect any improvement in the beds. Young oysters of a very small growth can be disposed of almost as promptly as larger ones, and while this is the case it need not be expected that dredgers are going to have foresight enough to see the wisdom of throwing all small oysters back on the bars. During the past season the supply of oysters was often insufficient to meet the demand, and the steamed trade was compelled to suspend work for a considerable length of time on account of a scarcity of oysters, all that were received being quickly taken by the raw men at prices which would be unprofitable for steaming.

Baltimore, the great oyster market of the United States, annually packs more oysters than any other city in the world. It is the great center of the packing trade, surpassing in that particular all other cities, and yearly handling more oysters than all the other packing points of Maryland and Virginia combined. During the season extending from September 1, 1879, to May 15, 1880, the number of vessels loaded with oysters arriving at Baltimore was 9,543 (or a daily average of 37 for the 257 days), bringing 7,252,972 bushels, which would make the average cargo 760 bushels. In addition to the amount brought by sail vessels, there were 25,000 bushels received by steamers and consigned directly to hotels and restaurants, making a total of 7,277,972 bushels, of which there were packed raw, 3,769,353 bushels; hermetically sealed, 2,689,939 bushels; and used for city consumption, 818,680 bushels.

Engaged in oyster-packing in Baltimore there are forty-five firms, with a capital of $2,338,300; their business houses and grounds having an estimated value of $1,360,966. During the summer these firms are generally engaged in fruit packing, and their capital and buildings are thus in active use during the entire year.

These firms employ 4,167 males and 2,460 females—total, 6,627; and during the season of 1879–'80 paid to them in wages $602,427. The total number of bushels of oysters packed was

6,459,292, which required 25,546,780 tin cans and 929,614 wooden cases. The value of the oysters packed, including shucking, cans, &c., was $3,517,349. For the tin cans $794,919 was paid, and for the wooden cases $102,622.

Next to Baltimore, Crisfield is the most important packing point in the State. Had the oyster-beds in the vicinity of Crisfield not been so greatly depleted, I think the trade at that city would have increased much more rapidly than it has. Crisfield is literally built upon oysters, or rather oyster shells, almost the entire space now occupied by the business part of the city having been under water. The shells from the packing-houses have been utilized to make new ground, and gradually the city has pushed out nearly half a mile into the bay. At the present time some of the houses are built on piles, and are entirely surrounded by water, having no means of communication with the land except by boats.

From the books of the ninety-eight oyster-packing firms of Maryland, the following table has been compiled, showing the amount of business done at each city from September 1, 1879, to May 1, 1880:

Statistics of oyster-packing in Maryland for the season of 1879–'80.

	Firms engaged in packing.	Capital employed.	Estimated value of buildings occupied.	Males employed.	Females employed.	Wages paid.	Bushels packed, raw.	Value of oysters packed, raw.
Baltimore	45	$2,338,300	$1,360,966	4,167	2,460	$602,427	3,769,358	$2,272,740
Crisfield	16	39,650	23,800	678	.....	65,481	427,270	165,800
Cambridge	8	20,300	10,000	385	.....	28,757	205,410	76,658
Annapolis	8	59,600	17,500	315	.....	26,482	156,703	69,555
Oxford	7	7,000	5,760	156	.....	23,258	108,960	39,986
Saint Michael's	4	4,500	3,000	91	.....	4,987	37,788	14,053
Sundry small places in Somerset Co	10	23,000	15,000	387	.....	26,387	224,817	86,945
Total	98	2,492,350	1,436,026	6,179	2,460	777,779	4,930,301	2,725,737

	Bushels steamed and hermetically sealed.	Value of oysters steamed and sealed.	Total bushels of oysters.	Total value of oysters packed.	Tin cans required.	Cost price of tin cans.	Wooden cases required.	Cost price of cases.
Baltimore	2,689,939	$1,244,609	6,459,292	$3,517,349	25,546,780	$794,919	929,614	$102,622
Crisfield	.....	.....	427,270	165,800	.....	.....	.....	3,576
Cambridge	13,100	11,320	218,510	87,978	.....	.....	.....	5,840
Annapolis	20,152	12,183	176,855	81,738	.....	.....	.....	11,097
Oxford	.....	.....	108,960	39,986	.....	.....	.....	1,257
Saint Michael's	.....	.....	37,788	14,053	.....	.....	.....	2,530
Sundry small places in Somerset Co	.....	.....	224,817	86,944	.....	.....	.....	1,890
Total	2,723,191	1,268,112	7,653,492	3,993,848	25,546,780	794,919	929,614	128,812

Baltimore is the only place where tin cans and wooden cases are used to any extent, shipments from other cities being made almost exclusively in bulk—in barrels, half-barrels, and kegs.

As shown by the table, there are 6,179 males and 2,460 females employed in oyster-shucking in Maryland. During the season they received as wages $777,779, this being an average of only $90.06. Very few of the shuckers are regularly at work, and while in one week an expert hand may make from $8 to $15, during the next week he may be idle. Of the 6,179 males, nearly all of whom are employed in the raw trade, about three-fourths are negroes, the majority of them being comparatively steady workmen, while the whites are more generally disposed to be idle and intemperate. The few whites in the business are generally of a very low class of society. Within the past year a few females have essayed to shuck raw oysters, but their number is still very small,

and will probably so continue, owing to the nature of the work. The 2,460 females are all employed in the steam oyster-houses of Baltimore. They are mostly white girls, of from sixteen to twenty-five years of age, the proportion of older ones, as well as of colored, being small. These girls are almost without exception of foreign birth or parentage, the largest proportion being of Bohemian origin, with Irish probably coming next. Few American girls, however poor, will consent to engage in this occupation, as in it both sexes must mingle indiscriminately, without regard to color, class, or condition. Owing to the thorough steaming, the oysters are very easily opened and the amount of physical labor required is comparatively light; but during busy seasons the work begins about daybreak and lasts until dark, and is of course exceedingly fatiguing. An industrious hand can make from 75 cents to $1 a day, but from the great irregularity in their work they are probably not engaged over one-half of the time.

Considering the class of people employed in the packing-houses, I do not think it safe to estimate more than an average of two individuals dependent upon the wages of each shucker, at which rate there are in Maryland 17,278 people dependent upon oyster-shucking.

There are about two hundred and twenty-five men composing the ninety-five oyster-packing firms of the State. The large majority of them are of Northern birth, and many of them, especially those in Crisfield and the smaller packing towns, reside in Maryland only during the oyster season, returning every spring to their Northern homes. More oyster packers have come from Connecticut than from all other States combined. Mr. C. S. Maltby and Mr. A. Field, who respectively established the raw and the steam trade, were both originally from Connecticut, and both are still living, the former in active business. There are about 1,125 individuals forming the families of the oyster packers.

During May, June, July, and August the packers of Baltimore are engaged in canning fruits and vegetables, and the same girls who in winter shuck oysters, in summer pare peaches and other fruits. The male shuckers of Baltimore, as well as those of the cities in lower Maryland, having no regular employment in summer, work at whatever odd jobs may be found.

The manufacture of cans and cases, quite an important industry in Baltimore, is so largely dependent upon oyster-packing, that an effort has been made to obtain some statistics pertaining to it, although the exact figures will appear in the census of manufacturing industries. About $250,000 is invested in the business, which gives employment to four hundred men (on oyster cans), whose wages for eight months amount to about $100,000. This estimate is based on the number of cans used, as shown by the returns from the packing-houses, the workmen being paid so much per 100 cans. It was very difficult to obtain any satisfactory statistics regarding the number of ship-carpenters occupied in building and repairing oyster vessels, but from an extensive correspondence with ship-builders in various parts of the State, I think it will be placing the estimate too low rather than too high to say that there are three hundred workmen, including carpenters and sail-makers, with yearly wages amounting to $156,000.

As can-makers, ship-yard workmen, &c., we then have 700 men, with about 3,500 people dependent upon them, receiving $256,000 in wages. It was found impossible to obtain the number of people engaged in the retail trade of Baltimore and other cities, as any statistics gathered from restaurants and hotels would be delusive, since they are not engaged exclusively in handling oysters. Under the circumstances, the best estimates that can be made may be deduced from calculations based upon the local consumption in the cities. In Baltimore the city trade is monopolized by a number of commission houses, which handle all the oysters taken for local use, with the exception of the receipts by steamers. From the books of these firms it was ascertained that the sales of oysters from September 1, 1879, to May 1, 1880, for consumption in the city and suburbs,

amounted to 793,680 bushels. Add to this 25,000 bushels received by steamers, and the total retail trade is found to be 818,680 bushels. The average price paid for shucking raw oysters is 15 cents a gallon; these being all of fine quality will open a gallon to a bushel, and hence the amount paid for opening 818,680 bushels would be $122,802. Estimating the average amount made by the shuckers at $6 a week, or $192 for the season, it is seen that there are 640 men steadily employed for nearly eight months of the year in opening oysters for local consumption in Baltimore. There is, in addition to these, a large number of men who sell oysters around the streets; others who rent a cellar room and sell from there; some engaged in driving oyster carts, and a few employed only during the oyster season in restaurants as extra help. As near as can be discovered, the number of these may be placed at 500, with wages and earnings amounting to $96,000. Of these 1,140 men about 800 are negroes.

The local consumption of towns on the bay is about 200,000 bushels a season, the shucking of which pays $30,000 to 150 men. Estimating an average of five to a family, these 1,290 men who are engaged in shucking and selling oysters for local consumption throughout the State represent an aggregate of 6,450 individuals. Knowing the consumption per capita of Baltimore and suburbs, and calculating that the inhabitants of the tide-water counties consume proportionately at least twice as many, it is easy to obtain an approximate idea of the total number of oysters annually consumed in the State, and not found in the returns from the packers. Of course the interior counties are not considered here, as they receive oysters from the packers which have already been noted. The estimate that the tide-water counties consume locally twice as many as Baltimore in proportion to the number of inhabitants, is based upon careful inquiry among well-informed persons. On this estimate, taking the population as returned by the present census, there are about 875,000 bushels annually consumed in the counties bordering on the bay, in addition to the 200,000 bushels consumed in the towns on the bay. These oysters are generally opened by the families who eat them, and hence there is no expense for shucking.

In some of the lower counties of the State oysters often pass current as money, and in one town there is a weekly paper (subscription price $1), about fifty of the subscribers to which annually pay in oysters. As the editor thus receives from 100 to 125 bushels of oysters a season, all of which are used in his own family, I readily believe his assertion that he "was very fond of oysters."

Summing up the total of all engaged in the oyster trade we have:

Occupation.	Number engaged.	Wages and earnings of same.	Estimated number of persons supported.
Dredgers	5,600	$916,300	54,992
Tongers	5,148	1,158,240	
Scrapers	2,200	297,000	
Runners	800	166,400	
Employés of packing-houses	8,639	777,779	17,278
Can-makers and ship-yard workmen	700	256,000	3,500
Preparing for local consumption	1,290	248,802	6,450
	24,377	3,820,521	82,220
Individual packers	225	.....	1,125
Total	24,602	.....	83,345

In the above enumeration no account has been taken of the number of owners of the dredge, the scrape, and the running boats, as any attempt to obtain such would be futile, since not even the names of the boats can be ascertained. If it were possible to gather this information it would swell the above figures to much larger proportions. From the $1,860,000, the present estimated

value of these 1,450 boats (excluding canoes), there must be a yearly profit of at least several hundred thousand dollars. Some of the boats are owned by packers, others by the captains, and the rest are distributed among all classes of society and almost all professions and occupations. When the number of these is taken into account, it will more than counterbalance any overestimates, if such there be, in regard to the number of persons dependent upon the oyster trade of the State.

Seaford, Del., situated on the Nanticoke River, a tributary of the Chesapeake Bay, has quite an extensive packing trade, and, as all the oysters are carried from Maryland waters, it was considered advisable to include in this report the statistics of the trade at that city. Mr. D. L. Rawlins, of Seaford, informs me that the oyster-packing business at Seaford was started by Platt & Mallory (of Fair Haven) in the fall of 1859. Hemingways, Rowe, and other eastern packers, came in 1863 and 1864. They put nearly all their oysters in small tin cans, which they shipped in cases holding about 52 cans each, a good proportion being sent to Fair Haven, Conn., to be reshipped from there. The business not proving as profitable as was expected, by 1867 nearly all the original packers had sold out and left, since which time a fluctuating amount of business has been kept up by various successive parties with alternating failure and success. No cans are used now, nearly all shipments being made in bulk.

There are at Seaford seven oyster-packing firms, having an aggregate capital of $14,600 and occupying buildings estimated to be worth $28,500. From September 1, 1879, to May 1, 1880, 184,500 bushels of oysters were packed raw, giving employment to 170 males and 45 females, the wages of both for the season amounting to $14,230. The estimated value of the oysters, after being shucked and packed, was $71,350. When shucked oysters are shipped in bulk, the package (barrel or half-barrel) is returned after being emptied, and then refilled. On this account only 1,400 packages, costing $1,000, were bought by Seaford packers during the season of 1879–'80. About 400 persons are dependent upon the oyster trade of Seaford. The local consumption added to the packing gives a total of 200,000 bushels handled at Seaford.

General summary of the whole trade in Maryland.

	Capital invested, real and personal.	Number of persons employed.
In packing	$3,928,376	8,639
In oyster catching	2,042,500	13,748
In can making, &c	250,000	700
In local trade	*25,000	1,290
Total	6,245,876	24,377

* Estimated.

Quantity of oysters caught in Maryland during 1879–'80, *and the disposition made.*

Disposition made.	Bushels.
Packed in the State of Maryland	*6,653,492
Shipped out of the State	2,021,840
Local consumption in Baltimore	818,680
Local consumption in other cities of the State	200,000
Local consumption in the counties	875,000
Total	10,569,012

* The total number of bushels packed in the State was 7,653,492, but 1,000,000 bushels came from Virginia.

PART XI.

VIRGINIA AND ITS FISHERIES.

By MARSHALL McDONALD.

ANALYSIS.

A.—General Review of the Fisheries of the State:
160. Statistics of the commercial fisheries.
161. Statistics of the sea fisheries, exclusive of the menhaden and oyster interests.
B.—Description of the Fisheries by Counties:
162. Princess Anne, Norfolk, and Elizabeth City Counties.
163. York, Gloucester, and Mathews Counties.
164. Middlesex, Lancaster, and Northumberland Counties.
165. Northampton and Accomac Counties.
C.—Review of the Oyster Industry:
166. The oyster industry of Virginia.

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PART XI.

VIRGINIA AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERIES OF THE STATE.

160. STATISTICS OF THE COMMERCIAL FISHERIES.

THE VARIOUS FISHERY INTERESTS.—Virginia comes seventh in the list of fish-producing States. The oyster, menhaden, and shad fisheries are the three branches in which the citizens are most extensively interested. In the first-named fishery this State ranks second only to Maryland, having 16,315 persons employed, with products valued at $2,218,376. The menhaden fisheries are of recent origin, but they have developed with remarkable rapidity. In 1880 the fleet numbered one hundred and two sail, and the oil, scrap, and compost produced sold for $303,829; 88,213,800 pounds of menhaden were utilized in this way. The river fisheries are also important, furnishing employment to 2,641 persons. Over 3,000,000 pounds of shad and nearly 7,000,000 pounds of alewives, with many other river species, were taken, the whole having a value of $272,828.

STATISTICAL RECAPITULATION FOR 1880.—In the accompanying statements will be found a statistical recapitulation of the fisheries of the State:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	16,051
Shoremen	628
Factory hands	2,185
Total	18,864

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (15,578.93 tons)	1,446	$571,000
Boats	6,618	292,720
Pound-nets	185	98,390
Fykes, pots, and baskets	100	900
Gill-nets	3,532	35,220
Purse-seines	80	24,000
Drag-seines	73	46,970
Minor apparatus, including outfit	.....	355,283
Factories and other shore property	.....	489,636
Additional cash capital	.....	1,914,119
Total capital	.....	3,828,238

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	158, 874, 609	$3, 124, 444
Sea fisheries.		
Bluefish	1, 546, 417	36, 023
Clams (hard)	363, 820	18, 555
Crabs	2, 139, 200	32, 088
Menhaden	88, 213, 800	303, 829
Mullet	20, 000	800
Oysters	47, 861, 240	2, 218, 376
Spotted sea trout	369, 000	9, 930
Squeteague	1, 107, 000	19, 860
Terrapin	165, 600	18, 550
All other species	4, 336, 468	193, 605
Total sea products	146, 122, 545	2, 851, 616
River fisheries.		
Alewives	6, 925, 413	76, 300
Shad	3, 171, 958	134, 496
Sturgeon	411, 558	6, 973
All other species	2, 243, 140	55, 059
Total river products	12, 752, 064	272, 828

161. STATISTICS OF THE SEA FISHERIES, EXCLUSIVE OF THE MENHADEN AND OYSTER INTERESTS.

STATISTICAL RECAPITULATION FOR 1880.—The salt-water fisheries of the State, if we exclude the menhaden and oyster interests, which are very important, are confined chiefly to the capture of fish in nets, seines, and pounds along the bay shores and in the estuaries along the ocean shore. Clams, terrapin, and other species are taken in considerable numbers in many localities.

The following statements show the extent of the salt-water fisheries of the State for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1, 411
Shoremen	20
Factory hands	318
Total	1, 749

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (172.90 tons)	17	$13, 750
Boats	1, 279	41, 752
Pound-nets	152	89, 240
Fykes, pots, and baskets	100	900
Gill-nets	2, 345	8, 640
Drag-seines	44	16, 598
Minor apparatus, including outfit	.....	15, 066
Factories and other shore property	.....	12, 150
Cash capital	.....	45, 000
Total capital	.....	243, 096

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	1,546,417	$36,023
Clams (hard)	363,820	18,555
Crabs	2,139,200	32,088
Mullet	20,000	800
Spotted sea trout	369,000	9,930
Squeteague	1,107,000	19,860
Terrapin	165,600	18,550
All other species	4,336,468	193,605
Total	10,047,505	329,411

B.—DESCRIPTION OF THE FISHERIES BY COUNTIES.

162. PRINCESS ANNE, NORFOLK, AND ELIZABETH CITY COUNTIES.

Princess Anne County was formed in 1669 from Norfolk. It is 30 miles long, with a mean breadth of 20 miles. It lies on the Atlantic Ocean, with Chesapeake Bay on the north, Norfolk County on the west, and North Carolina on the south. The surface is level, and the land generally good. On account of the mildness of the climate and the fertility of the soil, the people devote themselves principally to truck-farming, obtaining a ready market for their products in Baltimore and Norfolk. The watershed of the county drains to the south into Currituck Sound, on the west into Elizabeth River, and on the east into Lynn Haven Bay. The extensive coast-line of the county and the fresh-water swamps of the interior furnish abundant facilities for the development of important fishing industries. The greater profit to be derived from the cultivation of the soil, however, attracts to it all but a very small part of the population. On Straight Beach, which extends from Cape Henry to the North Carolina line, several seines are regularly fished by gangs of men from Norfolk. The product of these fisheries is carried in carts overland to Norfolk, and either sold to hucksters or hawked about the streets.

FISHERIES OF BAY SHORE AND SEASIDE IN PRINCESS ANNE AND NORFOLK COUNTIES.—From Sewell's Point, around Willoughby Point, to Cape Henry south, are two pounds and a number of haul-seines engaged in the spot fishing. Gray trout, salmon trout and tailors are also taken in considerable numbers, but spot constitute four-fifths of the catch and the motive of the fishing. The construction of the pounds presents nothing peculiar, but the mode of fishing the haul-seines is unique, so far as my observation has extended. The movement of the fish is up the beach in the spring of the year and down in the fall, without reference to the set of the currents. Again, the seine can only be hauled on the slack of the tide. It is put out on one slack and hauled on the next, and it is consequently anchored out during one tide. A single anchor at the end is all that is necessary when the tide bellies the seine. When the tide is against the back of the seine intermediate anchors are placed to keep the seine in position. The anchors are attached to the cork-line and the bottom-line is very heavily leaded to prevent shifting. In fishing the seine, the sea end is first landed so as to inclose the fish, and is then beached as in the ordinary haul-seines. These seines are fished spring and fall; the fall fishing ending after the first big storm in October. These seines and outfits cost from $500 to $700, and average a crew of ten men and a captain.

Below is a statistical summary of these fisheries in part based upon estimates, but the exact data are given wherever they were accessible:

	Names of parties fishing in 1879.	Designation of fishing apparatus.	Catch.			Value of fish taken.	Value of fishing equipments.
			Spot.	Trout, tailors.	Mixed fish.		
			Bushels.	*Bushels.*	*Bushels.*		
1	Miles Taylor (Bushels Bluff)	Seine	150	250	.....	$675	$500
2	McWhorter	Pound	.....	150	150	375	700
3	Griffith (Willoughby Spit)	do	.....	.....	300	300	800
4	Taylor, W. E. (Signal St. Haul)	Seine	200	250	50	675	600
5	Leggett & Parkinson	do	400	100	.....	1,200	700
6	Fisher & Williams	do	1,000	300	200	3,000	700
7	Major Bradford (Sand Hills)	do	900	400	.....	2,400	800
8	George Smith (Pleasure House)	do	1,100	400	100	2,900	800
9	Spring Haul; Stump Haul; Charles E. Barton	One seine	2,000	1,200	.....	6,000	800
10	Inlet Haul; Josiah Garrison; Swamp Haul	One seine	1,067	300	.....	2,584	800
11	Ch. Point Haul (Josiah Garrison)	Seine	600	132	.....	1,127	600
	The Herbert Hauls	do	600	200	.....	1,500	500
12	Whitehurst & Godfrey (Cape Point)	do	500	300	.....	1,450	600
13	Straight Beach	Three seines	900	500	.....	2,509	1,500
			9,417	4,482	800	26,686	10,400

The seines average a crew of ten men, and one captain or foreman. The pounds are fished by one man and a boy. The menhaden and other offal fish, which are taken in large quantities both by seines and pounds, are not included in the above estimates. They are either sold on the beach for 15 cents a bushel or carted to the compost heap. The quantity of these may be safely estimated at 600 bushels for each seine and pound, or 7,800 bushels for the whole; and at 15 cents per bushel, $1,170, which is to be added to the above total.

The principal fish caught are the spot (*Liostomus xanthurus*) and the gray and salmon trout, all of which find a market in Norfolk. Menhaden, which are caught in considerable quantities in both seines and pounds, are carried out on the land and composted for fertilizers.

The number of men employed in the fisheries is one hundred and thirty-two; total capital invested, $13,198. The product of the fisheries is 644,340 pounds of fish, having a value of $17,735.

The waters of Lynn Haven Bay abound in hogfish, croakers, trout, and sheepshead, the pursuit of which gives occupation to a number of hook-and-line fishermen from Norfolk and Elizabeth City Counties. The bay is also a favorite resort for pleasure seekers passing the summer in the vicinity of Hampton Roads. Oyster planting is the most important fishing interest of the county. It is pursued in Lynn Haven River and its coves to the fullest extent possible.

NORFOLK COUNTY.—Norfolk County was formed in 1691 from Lower Norfolk. It lies on Hampton Roads between Nansemond and Princess Anne Counties and extends to the north line. It is 24 miles long, with a mean width of 19 miles. The surface is nearly level; soil sandy, with clay subsoil. Early vegetables for the Northern markets are raised in enormous quantities and bring a large amount of money into the county. In the southwestern part lies the Dismal Swamp, which, with Elizabeth River and its branches, furnishes ample drainage. On the bay shore, from Willoughby Point to Norfolk, a number of pounds and haul-seines are fished. The oysters of Elizabeth River and its branches, and those of Craney Island Flats, furnish occupation to a considerable number of

tongers. From the Elizabeth River and its branches, as well as from Nansemond, are taken during the fall and winter season very considerable quantities of rock and perch, which go to supply the local demand in Norfolk. To a much greater extent than in Princess Anne County the male population of Norfolk County (including the city of Norfolk) are engaged in fishing. Three thousand two hundred and seventy persons are engaged either in the hook-and-line fisheries, the seine fisheries, or the oyster fisheries, including those who find occupation in the carrying trade incident to the fish and trucking industries. The capital invested in boats, vessels, apparatus, &c., is $270,000. In Tanner's Creek and the Eastern Branch of Elizabeth River there are natural oyster beds, though excessive tonging has greatly reduced their yield. In both cases, however, planting is largely resorted to, and as a consequence the yield of cultivated oysters is beginning to amount to a very respectable figure. The city of Norfolk is the principal seaboard town of Virginia. Its population, including its suburbs, is 33,422. We quote from the work "A Hand-book of Virginia, by the State commissioner of agriculture," published in 1881:

"Norfolk, a port of entry, and the principal shipping and seaport town in Virginia, is 220 miles from the base of the Blue Ridge Mountains, and almost within hearing of the deep-toned roar of the Atlantic Ocean. Its unsurpassed harbor, which admits vessels of the largest size, and its close proximity to the ocean and Chesapeake Bay, make it the best shipping port for Virginia, North Carolina, and for a large portion of the great West and Southwest. It is the eastern terminus of the Norfolk and Western Railroad, which has connections with lines extending to the Mississippi, and will be in union with the Texas Pacific when that great thoroughfare is completed. The Seaboard and Roanoke Railroad, the Norfolk, Elizabeth City and Edenton Railroad, now building; and the Albemarle and Chesapeake Canal, the Dismal Swamp Canal, all terminate at Norfolk. Numerous steamboat lines connect Norfolk with New York, Baltimore, Richmond, &c., and the cities of Europe. The export trade of Norfolk in 1865 was only $11,538. It has gone on to increase until, in 1876, it was $7,825,112. In 1865 Norfolk exported no cotton; in 1866 there were exported 733 bales, and in 1876 106,421 bales were exported. The exports of cotton in 1876 and 1877 and since prove that Norfolk ranks as the *second* cotton port on the Atlantic coast. The coastwise trade for Norfolk and Portsmouth (the trade of these cities is usually considered as one) aggregated in 1876, entered and cleared, 2,178,781 tons, and in the bitter month of December, when all the ports of the North were obstructed with ice, we had 160,959 tonnage in coastwise trade. These interesting facts are collected from the Norfolk Landmark. We have before us an interesting *résumé* of the trade of Norfolk, published in a special edition of the Norfolk Virginian, and courteously furnished us by Mr. Glennan, the editor. The export trade of Norfolk for 1880 is an increase of $4,300,000 over that of 1878. The general wholesale trade is about $12,000,000, making a total trade of $38,000,000. The export of cotton alone was $13,787,209; that of cattle and sheep, $104,750. The lumber business is large and is estimated at $1,698,000. The number of foreign vessels entering the port in 1880 was forty-five, with a tonnage of 45,159; the number cleared for foreign ports was one hundred and eleven, with a tonnage of 114,579."

Ever since colonial times Norfolk has been the center of a large coasting trade. The close connection that it now has with Baltimore and other more northern cities gives a powerful impulse to the trucking business in the surrounding counties as far down the coast as New Berne, N. C., all the products of which gravitate to Norfolk, whence they are sent by railroad and steamer to the northern cities. The establishment of through railroad connections with the South has of late years made it a principal point also for shipping cotton. As to the fishing trade, it is the natural center of the fishing industries of all the lower Chesapeake, and the entrepot for the

fish taken in the pound-nets of the eastern shore, and of the very extensive pound-net fisheries that cluster around New Point, Va. The spot seine fisheries of the bay shore, the fresh-water fisheries of the bays and swamps that lie around the head of Currituck Sound and Elizabeth River, and the large shad and herring fisheries of the Albemarle, Pamlico, and Croatan Sounds all send their products to the same place. Among the principal dealers in Norfolk engaged in this business are O. E. Maltby & Co., and Howard Brothers. The fish caught on the eastern shore and those coming from New Point reach Norfolk by sailing vessels. The product of the spot seines of the bay shore go by carts across the country, while the great fisheries of the Albemarle and Croatan utilize the Seaboard and Roanoke Railroad, the Albemarle and Chesapeake Canal, and the Dismal Swamp Canal for the same purpose. Norfolk is also becoming a formidable rival with Baltimore in the oyster-packing industry, and it is probable that when she possesses direct and prompt connection with the West she will equal, if not outstrip, the latter city. At present the oysters shucked in Norfolk go almost exclusively to the Northern and Northeastern States. They are obtained, as a rule, from James River and its creeks and coves, and from the Rappahannock River. A small proportion of the supply is also obtained from the Broadwater on the ocean side of the eastern shore. The planting in the Nansemond, James, and Lynn Haven Rivers contribute a considerable proportion of the fancy stock which goes north in the shell to supply the restaurants.

ELIZABETH CITY COUNTY.—Elizabeth City County occupies the southern extremity of a narrow peninsula lying between the York and James Rivers. It fronts on Hampton Roads and the Chesapeake Bay, and is intersected by numerous salt-water creeks. The surface is level and the soil fertile; some of it is highly so. The population in 1880 was 10,792, an increase of 25 per cent. in 10 years. "Trucks" are considerably raised. The following is a statistical summary of the fisheries and the industries dependent upon them:

Men employed in the canning of crabs	226
Men employed in the alewife fishery	130
Men employed in the oyster fishery	550
Men employed in the hook-and-line fishery	200
Total number employed in the fisheries	1,106
Money value of crab-canning	$16,800
Money value of menhaden fishery (oil and scrap)	31,620
Money value of hook-and-line-fishery	7,500
Product of oyster industry (in bushels):	
From the rocks	317,000
From plants	30,000
Total number of bushels produced	347,000
Money value of the oyster fisheries	$69,400
Money value of diamond-back terrapins	1,400

RECAPITULATION.

Value of crab-canning	$16,800
Value of menhaden fisheries	31,620
Value of hook-and-line fisheries	7,500
Value of oyster fisheries	69,400
Value of terrapin fisheries	1,400
Total value of products of fisheries in Elizabeth City County	126,320

Hampton is the county-seat, and the only settlement of any size in the county. It is distinctively a fishing village, more than one-half of the population deriving their living from industries connected with the water. The large crab-canning firms of McMenamin & Co., and T. T. Bryce

give employment to a considerable number of men, women, and boys. The men and boys are employed in catching the crabs, and the women and children work in the factory. Back of Old Point, at the mouth of Back River, is the large menhaden factory of Darling & Smithers, probably the most extensive on Chesapeake Bay. It gives employment on the water or in the factory to one hundred and thirty men. The value of the annual product is $31,620.

Quite a number of diamond-back terrapins are taken in the swamps and rivers; they find a market at Old Point and Norfolk, or they are reshipped thence to Baltimore. The fish caught by hook and line are consumed mainly at the pleasure resorts lying around Hampton Roads, though some go to Norfolk. The section of the country termed the Poquosin is inhabited by a people who subsist entirely from the water. They are famous for the production of the canoe (locally known as kunners), a sailing craft hollowed out of logs and specially adapted to the mode of fishing pursued by these people. Oysters are planted quite extensively in Back River, Hampton Creek, and in Hampton Roads. Hampton Bar formerly yielded, from natural oyster-rocks, many thousand bushels of oysters, which had a great reputation in the restaurants, but the beds have now become practically exhausted. Twenty-five years ago two men with a boat could procure 30 or 40 bushels in a day. Now they could scarcely procure one or two.

163. YORK, GLOUCESTER, AND MATHEWS COUNTIES.

YORK COUNTY.—York County, which is 30 miles long and 5 wide, lies on Chesapeake Bay and York River. The surface is level and the soil sandy and moderately fertile. The country is drained by numerous creeks and coves, which abound in oysters, fish, and fowl. The population in 1880 was 7,351, of which 35 are regularly engaged in fishing and 604 in oystering. The product of the river and shore fisheries is 534,000 pounds, having a value of $22,592. The value of the oyster fisheries cannot be given, as the men of the county prosecute their work in the James and Rappahannock Rivers, and some even go as far as the Potomac. York River, which bounds the northern edge of the county, was once famous for its oyster-beds, but now these are practically exhausted. Planting to a considerable extent is pursued in this river, and the product now foots up to from 200,000 to 300,000 bushels annually, which find a market principally in Boston. The product of the fisheries in York County find their way to Yorktown and the neighboring landing of Gloucester Point, whence they are shipped by steamer to Baltimore and the northern markets.

GLOUCESTER COUNTY.—Gloucester County lies on the Chesapeake Bay and York River. The surface is level and the soil productive. It is 30 miles long and about 10 miles wide, and is deeply penetrated by salt-water creeks which drain into Mobjack Bay and York River. The population in 1880 was 11,678. The numerous creeks of the county formerly abounded in fish and oysters, but overfishing and the spoliation of the oyster beds have exhausted them to such an extent that it is no longer profitable to work them. The principal fishing interest is pound-net fishing for shad and Spanish mackerel, but large quantities of bluefish or tailors are also caught. The accompanying tables show the catch and value of the pound-net fisheries from York River to Piankatank River.

The number of men engaged in the fisheries proper in Gloucester County is eighty-seven; in the oyster fisheries, six hundred and forty-two. The capital invested is $18,600.

MATHEWS COUNTY.—Mathews County is a peninsula connected with the mainland by a narrow neck of land. It lies between the Piankatank River and Mobjack Bay. Its surface is dead level; the soil is light and sandy, but some is quite fertile. The population in 1880 was 7,507. The number of men employed in the river and shore fisheries is one hundred and seventy; number engaged in the oyster fisheries, six hundred and eighty.

At New Point is the guano factory of O. E. Maltby & Co., which gives employment in fishing

or in the factory work to fifty men. From the 6,000,000 menhaden annually handled are produced about 12,000 gallons of oil and 400 tons of guano. The capital invested in buildings and fixtures is about $10,000; in vessels and outfitting $4,800. Horn Harbor and Milford Haven, deep indentations in the coast, furnish extensive planting grounds for oysters as well as a safe harbor to a large number of tongers who work on the oyster beds of the Piankatank and Rappahannock.

The pound-net fisheries of York River and Mobjack Bay and the bay shore from New Point to the Piankatank are prosecuted in common by the citizens of York, Gloucester, and Mathews Counties. The following tables give the statistics of these fisheries for 1880:

TOO'S POINT POUNDS.

PERSONNEL AND EQUIPMENT.

Number of pounds.	Value.	Value of boats.	Number of men engaged in—	
			Fishing.	Carrying.
16	$9,600	$2,620	32	3

CATCH FOR 1879-'80.

Designation of fish.	Number.	Pounds.	Bushels.	Average price per pound.	Aggregate value.
				Cents.	
Shad	42,112	147,392	.....	5½	$8,106 56
Spanish mackerel	64,000	96,000	.....	12	11,520 00
The herrings (*C. vernalis* and *æstivalis*)	240,000	.....	.....	.....	1,440 00
Jacks (*C. mediocris*)	21,000	42,000	.....	1½	630 00
Bluefish	48,000	24,000	.....	3	720 00
Sheepshead	2,400	12,000	.....	6	720 00
Sturgeon	160	12,800	.....	2	256 00
Miscellaneous fish not named, chiefly trout	.....	80,000	.....	2	1,600 00
Offal fish, used for manure	.....	.....	16,000	.....	1,600 00
Total value	.....	.....	.....	.....	26,582 56

SUMMARY.

Men engaged in Too's Point fishery	35
Capital invested	$12,200 00
Aggregate annual return for these fisheries	26,582 56

YORK SPIT POUNDS.

PERSONNEL AND EQUIPMENT.

Number of pounds.	Value.	Value of boats.	Number of men engaged in—	
			Fishing.	Carrying.
31	$18,600	$4,875	78	9

CATCH FOR 1879-'80.

Designation of fish.	Number.	Pounds.	Bushels.	Average price per pound.	Aggregate value.
				Cents.	
Shad	80,592	282,072	.....	5½	$15,513 96
Spanish mackerel	248,000	372,000	.....	12	44,640 00
The herrings (*C. æstivalis* and *vernalis*)	775,000	.....	.....	.....	4,650 00
Jacks (*C. mediocris*)	40,000	80,000	.....	1½	1,200 00
Bluefish "tailors"	93,000	139,500	.....	3	5,185 00
Sheepshead	4,650	23,250	.....	6	1,395 00
Sturgeon	310	23,250	.....	2	465 00
Miscellaneous fish, chiefly trout	.....	155,000	.....	2	3,100 00
Offal fish, used for manure	.....	.....	31,000	.....	3,100 00
Total value	.....	.....	.....	.....	79,248 96

MOBJACK BAY POUNDS.

PERSONNEL AND EQUIPMENT.

Number of pounds.	Value.	Value of boats.	Number of men engaged in—	
			Fishing.	Carrying.
41	$16,400	$6,150	82	9

CATCH FOR 1879-'80.

Designation of fish.	Number.	Pounds.	Bushels.	Average price per pound.	Aggregate value.
				Cents.	
Shad	100,700	387,450	.....	5½	$21,309 75
Spanish mackerel	123,000	184,500	.....	12	22,140 00
The river herrings (*C. vernalis* and *æstivalis*)	492,000	.....	.....	.....	2,952 00
Jacks (*C. mediocris*)	90,200	180,000	.....	1½	1,353 00
Bluefish "tailors"	123,000	174,500	.....	3	5,235 00
Sheepshead	6,150	30,750	.....	6	1,845 00
Sturgeon	410	30,750	.....	2	615 00
Miscellaneous fish, chiefly trout	.....	205,000	.....	2	4,100 00
Offal fish, used for manure	.....	.....	41,000	.....	4,100 00
Total value	.....	.....	.....	.....	63,649 75

SUMMARY.

Men engaged in the pound-net fisheries of Mobjack Bay	91
Capital invested	$22,550 00
Aggregate return of these fisheries for 1880	63,649 75

POUNDS OF THE BAY SHORE FROM NEW POINT TO THE PIANKATANK RIVER.

PERSONNEL AND EQUIPMENT.

Number of pounds.	Value.	Value of boats.	Number of men engaged in—	
			Fishing.	Carrying.
35	$21,000	$4,000	70	9

CATCH FOR 1879-'80.

Designation of fish.	Number.	Pounds.	Bushels.	Average price per pound.	Aggregate value.
				Cents.	
Shad	70,000	245,000	.....	5½	$13,475 00
Spanish mackerel	105,000	157,500	.....	12	18,900 00
The river herrings (*C. vernalis* and *æstivalis*)	675,000	.....	.....	.....	4,050 00
Jacks (*C. mediocris*)	49,000	98,000	.....	1½	1,470 00
Bluefish "tailors"	52,500	78,750	.....	3	2,362 00
Sheepshead	.....	.....	.....	.....	.....
Sturgeon	300	22,500	.....	2	450 00
Miscellaneous fish, chiefly trout	.....	87,500	.....	3	2,625 00
Offal fish, used for manure	.....	.....	31,500	.....	3,150 00
Total value	.....	.....	.....	.....	46,472 00

SUMMARY.

Men engaged in the pound-net fisheries from New Point to Piankatank River	79
Capital invested	$25,000
Aggregate returns for these fisheries for 1880	46,472

164. MIDDLESEX, LANCASTER, AND NORTHUMBERLAND COUNTIES.

MIDDLESEX COUNTY.—Middlesex County covers all the narrow peninsula lying between the Rappahannock and the Piankatank Rivers. It is 30 miles in length, with a mean breadth of about 5 miles. The surface is mostly level; the soil varies from sandy loam to stiff clay, and is very productive of corn, wheat, &c. The population in 1880 was 6,252. The Piankatank, which forms the southern boundary of the county, was formerly the seat of very productive fisheries, and the bed of the river was filled with natural deposits of oysters, but the introduction of pound-nets has almost destroyed the former, while excessive tonging and unlawful dredging has ruined the oyster beds. To some extent, however, the yield has been restored by plantings. The pound-nets extend all the way from the mouth of the Piankatank to Stingray Point. There are also a number of them in the Rappahannock, the larger proportion being on the north shore, as experience shows that the greater run of fish is on that side. The oyster beds of the Rappahannock give employment to a considerable number of tongers, and the numerous creeks and coves that drain into both the Rappahannock and Piankatank are filled to their utmost capacity with planted oysters.

The following summary will be of interest: Number of men engaged in the river and shore fisheries, 52; annual product river and shore fisheries, 165,000 pounds, chiefly shad, valued at $4,470. The number of men engaged in the oyster fisheries is 998; capital invested, $13,000. The product and value of the oyster fisheries cannot be given for the county separately. The menhaden fisheries give employment to 46 men, and have $15,000 invested in boats and fixtures. The product is 10,000,000 fish annually. For the conversion of these into oil and guano there are several kettle factories between the mouth of the Piankatank and the Rappahannock. The guano product in these kettle factories goes almost entirely to supply the local demand; but the process of manipulation is so imperfect that a very inferior article is produced.

LANCASTER COUNTY.—Lancaster County lies on the north bank of the Rappahannock River and has the Chesapeake Bay for a portion of its eastern boundary. The surface is mostly level. The soil, which is a sandy loam, is naturally unproductive, by liberal applications of fish chum is made to yield very fine crops. The county is drained by many creeks. The Moratico, Deep, Mud, Carter's, and Musquito Creeks, and the Corrotoma River are tributaries of the Rappahannock; while the Antipoisen, Tabb's, Dwyer's, Indian, and Little Bay are tributaries of Chesapeake Bay. They all furnish favorable planting grounds for oysters, and are stocked to their fullest capacity. As might be expected, a large proportion of the people engage in occupations connected with the water. Out of a total population of 6,145, there are 42 in the river and shore fisheries, 1,040 in the oyster fisheries, and 46 in the menhaden fisheries. The total product of the river and shore fisheries is 166,000 pounds, having a value of $3,528; that of the menhaden fisheries is 1,000 tons of fertilizers and 18,000 gallons of oil, possessing a value of $23,200. Most of the menhaden are taken in purse-nets fished by sailing vessels; there were seven menhaden factories in operation in 1880, the largest being that of Bussels & Co., situated in Carter's Creek.

NORTHUMBERLAND COUNTY.—Northumberland County is one of the five counties constituting the "Northern Neck" of Virginia, and has the Potomac River and Chesapeake Bay for its eastern boundary. It is 30 miles long and about 12 miles wide. The surface is mostly level, and the soil on the streams is a sandy loam, with clay subsoil, and is well adapted to wheat. As the county has no large fresh-water streams there is a total absence of shad fisheries, but quite a number of salt-water species, such as trout, tailors, rock, and perch, are taken in some of the many salt-water creeks that indent the coast line of the county. These fish, which are captured in small haul-seines, pounds, or gill-nets, are either consumed in the vicinity or find their way to

market by the tri-weekly line from Baltimore, which touches at several places in the county. This county contains more menhaden factories (and of larger size) than any other county on the Chesapeake. The creeks and coves along the bay shore were formerly filled with natural beds of oysters, but excessive tonging has everywhere diminished, and in many places exterminated, the supply. Where, however, the conditions of the bottom render it practicable artificial planting has been resorted to, and the product is now on the increase. The main fishing industry of the people, and that which yields the largest returns, is the menhaden fishery. The catch is converted into oil and guano by some of the numerous factories in the county, and the guano is shipped to places where it is manufactured into artificial fertilizers.

The number of people engaged in the river and shore fisheries is 70, the number engaged in the menhaden fisheries 243, and in the oyster fisheries 528. Of those given as being engaged in the oyster industries, very few pursue their work in the waters adjacent to the county. On the contrary, many of them go with their canoes and outfit to the Rappahannock and Potomac, and spend the winter there in oystering, returning in the spring to plant their small farms; for almost all of them combine the two occupations of farmer and fisherman.

165. NORTHAMPTON AND ACCOMAC COUNTIES.

The Eastern Shore of Virginia, comprising the counties of Northampton and Accomac, is a very low and fertile peninsula, about 55 miles long by 8 to 15 miles wide. It lies to the south of Maryland, with the ocean on the east and the Chesapeake on the west. Its population in 1880 was 33,197. Fully nine-tenths of the inhabitants are native-born on the peninsula. Onancock, a place of a few hundred inhabitants, is the largest town on the peninsula. The region is largely an agricultural one, and the people own small patches of land, and devote their attention largely to raising produce for the Northern markets, the principal crops being early potatoes, seed potatoes, and corn.

In addition to its agricultural interests, the region bears a peculiar relation to the salt water, and many of the inhabitants, having no interest in the land, are largely dependent upon the fisheries for a livelihood, while a considerable percentage of the farmers give more or less attention to fishing, oystering, and clamming at periods of the year when their crops do not require their attention. The peninsula, owing to its peculiar shape, has an extensive coast line, and its surface is so low and flat, that the tides and currents of the ocean have cut into it on either side, until we find no less than twelve creeks on the Eastern and seventeen on the Western Shore, each breaking up into a number of secondary ones, which communicate freely with each other, forming a complete net-work of tide channels, many of which are navigable for several miles by the small flat-bottomed vessels of the region. The tide channels extending through the northern and central portion communicate with a large bay on the south, thus forming a continuous inside passage for small boats from Cape Charles northward through Maryland to within a few miles of Cape Henry. The backbone of the peninsula is, therefore, a narrow ridge, only 3 to 5 miles wide, lying about midway between the ocean and the bay, and extending northward to the upper boundary of the State. Between this ridge and the ocean are a number of sandy or swampy islands, separated from the mainland at high tide by sheets of water of considerable extent. As the tide recedes large flats are exposed, and at low ebb the waters are reduced to mere creeks, bordered by immense grassy swamps. The Western Shore is somewhat different, for the higher lands occasionally extend to the Chesapeake, while the shores of some of the larger creeks are sufficiently elevated to admit of a scattered population. Such of the inhabitants as are engaged in farming occupy the arable lands formed by the central strip already mentioned, while others extensively engaged in fishing are usually scattered along the banks of the larger creeks or live in the vicinity of the bay shore. All,

however, are within easy reach of salt water, and the majority, even of the farmers, own small boats for catching a supply of fish for their own use.

The large flats and shoals in different parts of these two counties abound in oysters, clams, crabs, and terrapin, while the mouths of the creeks and the outer shoals are the feeding and spawning grounds of large numbers of fish, the supply being practicably inexhaustible. Were it not for the lack of a convenient market and the absence of suitable means of transportation, the fishing business would doubtless assume important proportions. As it is, the fisheries throughout the greater portion of the region are confined to supplying the local trade, and many of those who would follow the business regularly can fish only one or two days in the week, as they would overstock the market should they go out oftener. These, together with the farmers, often own small seines, and fish exclusively for several weeks in the fall, salting their catch for home use or for sale to people in the vicinity. In the neighborhood of the steamboat landings and about the southern end of the peninsula, where the fish can be sent to market by sailing vessels, the fishing is more extensive, and a considerable number of men follow the business regularly during the greater part of the summer; all of them, together with many of the farmers, engaging in the oyster fisheries as soon as the weather is sufficiently cold to warrant the shipment of their catch. These continue regularly in the work during the entire winter and well into the following spring, many of them deriving a large part of their income from this source.

The clam and terrapin fisheries, and such others as are not dependent upon a convenient market, have been quite extensively developed, and the fishing is prosecuted with considerable vigor, the catch being retained until such time as an opportunity presents itself for selling or shipping. About 2,300 dozen terrapins, valued at nearly $10,000, are taken annually, while over 8,000,000 of quahaugs, equal to 27,500 bushels, netting the fishermen $11,500, are shipped or eaten, in addition to over 1,000,000 clams purchased by parties at Capeville, to be canned and shipped to the Western States. Formerly the clamming interest was even more extensive than at present, and a considerable fleet of vessels came regularly to Hog and Cobb's Islands to purchase cargoes, which they carried to Philadelphia and New York. The vessels still visit the region, but the number is somewhat reduced, and many clams are carried in small boats to Franklin City, whence they are shipped by rail.

The fisheries proper of the region are chiefly confined to the bay shore, the fishing being most extensive about the mouths of the numerous creeks and near the southern extremity of the peninsula. Many of the fishermen use hand-lines, others seines, and within the last few years purse-nets and gill-nets have been very successfully employed. The hand-line fishermen catch sheepshead (*Diplodus probatocephalus*), trout (*Cynoscion maculatum*), spot (*Liostomus xanthurus*), mullet or merhead (*Menticirrus* sp.), and a few bluefish (*Pomatomus saltatrix*), all along the shores from May to November. The greater part of their catch is sold fresh in the vicinity of their homes, many of them fishing for a few hours in the early morning and spending the rest of the day in peddling their catch. At certain seasons they engage more extensively in the work, salting considerable quantities for winter use. There are about three hundred men engaged in the hand-line fishing for about five months in the year, with four hundred others who fish and clam occasionally during the same season. The total hand-line catch is valued at about $39,250.

Gill-nets were formerly much used in the spring shad fisheries of the eastern shore of Virginia, and they were also employed to a limited extent in the fall by the farmers for the capture of spot and other of the smaller species, to be salted for their own tables. Leaving out the shad fisheries, the business was of little importance until quite recently, when it became known that the better class of fishes, including Spanish mackerel (*Scomberomorus maculatus*), sheepshead, porgee (*Parephippus*

faber), bluefish or tailors, and trout could readily be taken in this way. Gill-nets were first introduced for the capture of mackerel about 1878, since which time they have been generally adopted in certain localities. At present they are extensively used between Hungar's Creek and the Maryland line from May until November, with the exception of about five or six weeks in midsummer. The men often go singly, though more frequently two fish together. The boats for this work are worth about $35 apiece, each being provided with three to five nets. The nets have a mesh measuring 3¼ inches, are about 25 fathoms long and 30 meshes deep, and cost from $5 to $7. They are set along the main shore and on both sides of Tangier Island, in from 6 to 14 feet of water. Formerly the fishing was prosecuted only at night, but within the last year it has been found that the mackerel will gill in the day time, and the Tangier fishermen often set their nets in the afternoon. There are about two hundred gill-net fishermen on the peninsula during five months of the year, and landing fish valued at $25,000, the greater part of which are shipped by steamer to Norfolk and Baltimore.

The first pound-net was introduced into the region by Messrs. Snediker & Warren in the spring of 1877. This apparatus was found to be peculiarly adapted to the eastern shore, and a large profit was derived from its use. Others soon engaged in the work, and there are now fourteen pounds between Hungar's Creek and Cape Charles, a distance of 15 or 20 miles. There are three others at Tangier Island, situated only a few miles below the northern boundary of the State. The pound-nets in the first-named region are necessarily very large and strong, on account of their exposed position. They cost about $1,000 each, and during an average season take about $4,200 worth of marketable fish, catching, in addition, about 500 barrels of menhaden and other non-edible species, which are usually thrown away. The principal species taken are mackerel, bluefish, and trout, though at times large catches of sheepshead and porgies are reported, and numerous other species are often taken in limited quantities. The seventeen pounds require the service of sixty-four men, who receive about $18 per month, the value of the catch for 1879 amounting to $57,000. The law forbids the use of pound-nets prior to the 25th of June, and requires that they be taken up by the 1st of October. The fishermen seriously object to this law, as it prevents their fishing in the early spring and in the fall, when the catch would be very large.

Haul-seines have been extensively used for many years, and prior to the war the greater part of the catch was taken in them. At that time shad were very abundant in the region, and large hauls were made during the spring and early summer. Of late, however, the shad visit the shores in much smaller numbers, and seine fishing has proportionately decreased. In the summer of 1879 there were only twelve seines, employing eighty-five men, fished along this shore. The value of the fish taken amounted to about $16,000.

One other industry promises to become quite important, namely, the menhaden fishery. The first oil and guano factory in Virginia was built near Cape Charles by Gallup & Kenniston in 1866 or 1867, but owing to its exposed location it was abandoned, and the business was for a time discontinued. A few years later the work was revived on the western shore of the bay, and in 1875 Capt. L. Crockett, of Tangier Island, built a factory for utilizing the menhaden that were peculiarly abundant in the vicinity. In 1878 another factory was built at the same place. In 1879 several other establishments were located along the shore, and in the spring of 1880 there were seven factories in the region, six of them using kettles for cooking the fish, while one was provided with the more modern steam apparatus.

C.—REVIEW OF THE OYSTER INDUSTRY.

By Richard H. Edmonds.

166. THE OYSTER INTERESTS OF VIRGINIA.

Dredging and tonging.—The waters of Virginia being in many places separated from those of Maryland by imaginary lines only, it is not to be expected that the conditions of the oyster trade and the class of people dependent upon it should show any very material difference in the two States. Different laws have of course exerted an influence upon some features of the trade, but the essential and most important fact in regard to the trade in both States is the same—that the oystermen are generally poor and illiterate, often intemperate and reckless.

Dredging on natural rocks was abolished in Virginia in 1879, and is only allowed at present on private beds; few, however, avail themselves of this privilege. In some parts of the State where planting is extensively conducted there are a few dredge-boats; but they meet with considerable opposition, as it is very generally believed by planters who do not dredge that the dredgers do not confine their operations to their own beds. This belief is probably correct. The beds are staked off with poles, sometimes 50 to 100 yards apart, and the dredgers sailing over one bed can scarcely, even if so disposed, keep from crossing the line which separates adjoining beds. The law entirely abolishing dredging on natural rocks was undoubtedly a mistake, since there are many localities in the State where, rightly restricted, it would prove very advantageous to the beds; while there are other places where the water is so deep that tonging cannot be carried on, and the beds are thus lying idle, of no value to the State or to any individual. The advantages as well as the disadvantages of dredging having been discussed in the report upon the oyster trade of Maryland, it is not necessary to refer to it here. The same course will be pursued with regard to other branches of the trade: it has not been thought necessary in the report on Virginia to repeat the discussion of subjects previously elaborated in the Maryland report.

The tonging interests of Virginia are far more extensive than the same interests in Maryland, and differ slightly in a few other respects, the most important of which is, that the proportion of negroes in the trade is greater in the former State than in the latter.

Previous to the late war the oystermen of Virginia were composed of negroes working for their masters, and of a very rough class of whites; but at the close of the war the demand for oysters was very great, and high prices were paid, and many who had been reduced from wealth to poverty were glad to avail themselves of the chance to make a support by oystering, which was at that time a very profitable employment. The four years of war, during which the oysters had almost a complete rest in many parts of the State, gave them a chance for development, and when the trade revived the beds were well stocked with large, finely-flavored oysters. Men from nearly all occupations, representing all classes of society, eagerly entered the business, and soon there were hundreds of oystermen where formerly there had been but a dozen or so. Many of the most extensive farmers in the tide-water counties found that the conditions of labor had so greatly changed that to make a living it was necessary for them to devote all spare time to the oyster trade. This is still done to a considerable extent by those whose farms border on some salt-water creek or river, but the great bulk of the trade is in the hands of a rougher class, and in certain parts of the State it is almost monopolized by negroes. A very noticeable fact in connection with the tonging interests of Virginia and Maryland, and especially of the former State, is the almost

total absence of foreigners. Among the 8,860 tongers of Virginia there are, according to the statements of the county clerks, only about ten who are not Americans. These ten comprise an equal number of Germans and Irish. The entire trade may be said to be virtually in the hands of native Virginians, since there are probably not 300 tongers in the whole State who were not born and raised there. Such is not, however, the case in the other branches of the trade. As in Maryland, all oysters caught by tongers are sold to runners, and the majority of these are owned in other States and manned principally by Northern men. The life of an ordinary tonger presents few attractions to induce strangers to enter this business. The work is very laborious, the remuneration only fair, and the injury to health from exposure is so great that few ever reach old age. The death-rate among oystermen, as compared with other trades, is, from all that I can learn, very great.

As stated elsewhere, there are no records kept in Virginia of the number of boats engaged in the trade, and it was a very difficult matter to obtain any reliable information upon this subject. After traveling through the tide-water counties and gaining as near an estimate as possible, I then sent out a large number of circulars to the officials, and also to one or more prominent oystermen of each county, requesting their aid in the work, and desiring them to give me their estimates as to the number of canoes in their respective counties. Many of these gentlemen went to considerable trouble to work up the matter, and by their aid I was enabled to correct some of my own figures, and I am now able to present reliable figures, showing the number of canoes in each county engaged in the oyster trade and the number of men working on them. In addition to this I have succeeded in obtaining the number of schooners and sloops used for running oysters to market. It is difficult to divide these latter according to the counties in which they are owned, but I think the figures as given in the following table will be found very near correct. The number credited to Norfolk County appears somewhat large, but the figures are furnished officially by Mr. Rusha Denise, county clerk. The majority of these boats hailing from Norfolk County are owned in the cities of Norfolk and Portsmouth. Over three-fourths of them are quite small, being under 10 tons register, while there are very few of the other fourth that will register as high as 15 tons.

Table showing the number of canoes and larger vessels, and the number of men on each, by counties.

Counties.	Number of canoes and skiffs.	Men employed on canoes and skiffs.	Number of larger vessels.	Men employed on larger vessels.	Total number of men employed.
Accomac	545	925	282	1,176	2,101
Elizabeth City	170	510	40	160	670
Essex	150	400	6	24	424
Gloucester	410	530	28	112	642
Isle of Wight	58	250	22	88	338
Lancaster	400	900	35	140	1,040
Mathews	450	900	20	80	980
Middlesex	475	950	12	48	998
Nansemond	80	240	39	225	465
Norfolk	235	470	700	2,800	3,270
Northampton	350	700	38	144	844
Northumberland	281	420	27	108	528
Princess Anne	100	130	.....	.....	130
Richmond	200	400	20	80	480
Warwick	50	80	15	60	140
York	250	500	26	104	604
Westmoreland	275	550	5	20	570
King William	2	5	2	7	12
Total	4,481	8,860	1,317	5,376	14,236

Of the total number of tongmen there are 5,906 colored and 2,954 whites, while of those employed on the larger vessels only 1,792 are colored. The total number of each race engaged in the trade is, of whites, 6,538 and of colored 7,698.

Tonging in Virginia is probably equally as profitable as in Maryland, but there is more time wasted by the tongmen of the former State than by those of the latter. This is explained by the fact that the proportion of negroes is larger in Virginia than in Maryland, and these people are more generally inclined to be indolent than the whites. There were many cases last winter where tongmen made as high as $500 during the season, but their number is comparatively small when the total number of those engaged in this occupation is taken into account. A close estimate of the average amount made during a season by each tonger would give $200, or $25 less than the average amount made in Maryland. Calculating on this estimate, it will be seen that the earnings of the tongmen of Virginia will yearly aggregate about $1,772,000. Those employed on the running vessels receive during an oyster season of eight months $1,022,172, including their board.

The canoes used in Virginia are much smaller and less costly than those in Maryland—their average value being about $50. At this rate their total value at present is $224,050. The larger vessels, exclusive of those owned in Norfolk County, average about 16.13 tons; but when the large number owned in the latter county is considered, the average is considerably reduced and amounts to only about 10 tons—making the total 13,170 tons. The aggregate value of these vessels is about $790,200, and the amount of money annually expended in repairing them is in the neighborhood of $125,000.

A large part of the running trade in Virginia is conducted by boats owned in Maryland and in northern cities; but as the statistics of these have already appeared in the Maryland report, it is needless to repeat them here.

PACKING.—The packing trade of Virginia is of much later origin than that of Maryland. About the year 1859 a Captain Fitzgerald opened an oyster-packing establishment in Norfolk; but the war coming on, in a few years the business was greatly hampered and restricted, and it was not until 1865 that the trade gave any evidence of ever becoming very extensive. As the transportation facilities of the city increased, and the ill effects of the war began to die out, the oyster trade showed a very marked improvement, and during the last few years it has developed very rapidly. In Norfolk, as in Baltimore and other cities of Maryland, the trade is largely in the hands of northern men; one difference, however, being quite noticeable, and that is, that whereas in Maryland the packers are principally natives of Connecticut, in Norfolk they are nearly all either New York or Boston men. The enterprise and capital of these gentlemen has largely developed this business, which now forms one of the most important branches of Norfolk's trade. The increase in the packing trade of Norfolk has been instrumental in decreasing the shipments of oysters in shell by sail vessels from the bay to New York and Boston, as these two cities receive by means of the Old Dominion Line and the Merchants' and Miners' Transportation Company's lines the great bulk of Norfolk oysters. This important change in the course of trade has been very beneficial to Norfolk, as the shucking and handling of the oysters give employment to a large number of workmen. The trade of Norfolk has, however, been greatly restricted by the scarcity of oysters. During the early spring months of 1880 packers were unable to fill orders on account of the inability to obtain the oysters. During one of my visits to that city I found that for several weeks the entire receipts had been less than could easily have been used by any one of the large houses. Had it not been for this scarcity, which was felt to some extent during a large part of the season, it is quite probable that the packing trade would have consumed several hundred thousand bushels more of oysters. The trade of Norfolk is almost exclusively in raw oysters—there

having been only 3,000 gallons of steamed oysters packed during the entire season. Shipments are made in bulk, in barrels; and although, as previously stated, the largest part of the trade is with New York and Boston, there are considerable shipments to all points of the North and West.

Although Baltimore is pre-eminently the great packing center of the bay, it is nevertheless true that, considering the amount of capital invested in the business, Norfolk handles proportionately a much larger trade than the former city. The number of shuckers employed and their wages are in about the same proportion in the two cities. In Norfolk the buildings are generally very plain, often mere frame structures, while in Baltimore many of the packing houses are among the finest buildings devoted to trade in the city. The packing houses of Norfolk are not, as a general thing, used during summer for fruit-packing, as is the case in Baltimore. The number of oysters packed at Norfolk during the season of 1879–'80 was much larger than the combined totals of all packing points in Maryland, excluding Baltimore. The exact figures are as follows:

Place.	Raw oysters.
	Bushels.
Crisfield, Md	427, 270
Cambridge, Md	205, 410
Annapolis, Md	156, 703
Oxford, Md	108, 960
Saint Michael's, Md	37, 788
Sundry small places, Maryland	224, 817
Total	1, 160, 948
Norfolk, Va	1, 370, 855
Difference in favor of Norfolk	209, 907

Outside of Norfolk the packing of raw oysters in Virginia is very light. At several places a little business is done, but too small to be noted separately, since where there is only one packer in a town it would divulge his individual business to publish statistics of that town. At Hampton and at two places on the Rappahannock River quite an extensive trade in steamed or cove oysters is conducted. The word cove, as applied to oysters, has two entirely distinct meanings. When used by tongers it refers to large oysters caught in the small coves tributary to all creeks and rivers, while with packers and others it means oysters which have been steamed and hermetically sealed.

The following table shows the packing trade of Virginia for the season of 1879–'80:

	Norfolk.	Other places.	Total.
Number of firms	13	12	25
Capital invested	$96, 350	$23, 000	$119, 350
Estimated value of buildings and grounds occupied	$138, 500	$29, 000	$167, 500
Average number of hands employed	1, 027	501	1, 528
Wages of same	$154, 584	$46, 367	$200, 951
Number of bushels packed raw	1, 370, 855	58, 275	1, 429, 130
Value of same	$589, 127	$22, 020	$611, 147
Number of bushels steamed	3, 000	190, 000	193, 000
Value of same	$1, 500	$119, 400	$120, 900
Total number of bushels packed	1, 373, 855	248, 275	1, 622, 130
Value of same	$585, 273	$141, 420	$726, 693
Number of tin cans used	91, 000	620, 000	711, 000
Value of same	$3, 615	$18, 500	$22, 115
Number of wooden cases, barrels, &c., used	16, 871	1, 000	17, 871
Value of same	$11, 119	$1, 939	$13, 058

In Norfolk there are very few females employed in the oyster-packing houses, but of the 501 shuckers in other parts of the State 244 are females.

The number of people engaged exclusively in handling oysters for local consumption in the cities of Virginia is about 300 (nearly all colored), whose wages will aggregate about $57,600 a season. About 200 white men, with wages amounting to $83,200 a year, are employed in building and repairing oyster vessels, making cases, &c.

Summing up the foregoing statistics, we have the following tabular statement:

	Capital invested, real and personal.	Number of employés.	Wages and earnings of employés.	Estimated number of people dependent upon the trade, calculating 4 to each worker.
Packing	$286, 850	1, 528	$200, 951	.....
Tonging	224, 050	8, 860	1, 772, 000	.....
Running	790, 200	5, 376	1, 022, 172	.....
Local trade	10, 000	300	57, 600	.....
Building oyster vessels, &c	50, 000	200	83, 200	.....
Total	1, 361, 100	16, 264	3, 135, 923	65, 056

The shipments of oysters in shell from Virginia to Northern markets are still very large, although this trade is decreasing, as it is becoming more profitable to open the oysters at Norfolk and forward them by steamer. I endeavored to obtain the number of bushels carried north from May 31, 1879, to May 31, 1880, and I found that, while the number was very great, it by no means equaled the expectations of many large dealers. The fact is, as previously stated, many oystermen have a most exaggerated idea of the extent of the trade, believing it to be far greater than it really is. The following statistics have been compiled with great care, and will, I think, be found about correct:

Shipments of oysters in shell from Virginia for year ending May 31, 1880.

Destination.	For planting.	For immediate use.	Total.
New York	.....	.....	650, 000
Philadelphia and Delaware Bay	215, 820	223, 940	439, 760
Boston	5, 000	90, 000	95, 000
Providence and Providence River	180, 000	50, 000	230, 000
Fair Haven	133, 000	150, 000	283, 000
Portland, &c	9, 000	75, 000	84, 000
Washington	.....	317, 317	317, 317
Maryland	.....	1, 000, 000	1, 000, 000
By rail and steamers	.....	216, 113	216, 113
Total	.....	.....	3, 315, 190

The number of bushels of oysters caught in the State during the year, and the disposition made of them, may be summarized as follows:

Packed in the State	1, 622, 130
Shipped out of the State in shell	3, 315, 190
Used for local consumption in the cities of the State	275, 000
Used for local consumption in the small towns and the counties of the State	1, 625, 000
Total	6, 837, 320

The average value of these oysters from first hands would be about 27 cents a bushel.

GENERAL SUMMARY.—The grand totals of the trade of the Chesapeake Bay are as follows:

Capital invested—	Maryland.	Virginia.	Total.
In packing	$3,928,376	$286,850	$4,215,226
In boats	2,042,500	1,014,250	3,056,750
In can-making, ship-building, &c	250,000	50,000	300,000
In local trade	25,000	10,000	35,000
Total	6,245,876	1,361,100	7,606,976
At Seaford, Del.:			
Invested in packing	.....	.....	43,100
Total for Chesapeake Bay	.....	.....	7,650,076

Number of bushels of oysters caught and the disposition made of them.

	Maryland.	Virginia.	Total.
Number caught	10,569,012	6,837,320	17,406,332
Packed	7,653,492	1,622,130	.....
Shipped in shell	2,021,840	3,315,190	.....
Local consumption	1,893,680	1,900,000	.....
Total	11,569,012	6,837,320	.....
Less number brought from Virginia	1,000,000	.....	.....
Total	10,569,012	6,837,320	17,406,332

Number of people engaged in the trade and their earnings and wages.

	Number.			Earnings and wages.		
	Maryland.	Virginia.	Total.	Maryland.	Virginia.	Total.
Employés of packing houses	8,639	1,528	10,167	$777,779	$200,951	$978,730
On oyster boats	13,798	14,236	28,034	2,537,940	2,794,172	5,332,112
All others	1,990	500	2,490	504,802	140,800	645,602
Total	24,427	16,264	40,691	3,820,521	3,135,923	6,956,444

The total value of all oysters caught in the bay, as sold from first hands, is about $4,000,000. The product of the packing houses, which are, of course, classed as manufacturing industries, was valued at $4,610,995 for the year ending May 31, 1880.

PLANTING.—The natural beds of the Chesapeake Bay are so very extensive and productive that they have hitherto been able to stand the immense drain annually made upon them, and thus the necessity for cultivating oysters has never been forcibly impressed upon the oystermen of either Maryland or Virginia, although in the latter State this branch of the business is gradually attracting increased attention. In Maryland there are comparatively few planters. The time is rapidly coming when, to supply the constantly increasing demand, it will be absolutely necessary for the oystermen to engage in the cultivation of oysters. The beds are being depleted, and it is yearly becoming more difficult to obtain oysters enough to meet the wants of packers. Fine oysters especially are getting very scarce, and it is often impossible to obtain them at any price. One of the largest packers of Baltimore was compelled, during the winter of 1879–'80, to employ an agent in New York to purchase fine oysters for orders which could not be filled in the former city. About 1,000,000 oysters were bought by the agent and shipped from New York to the points from which the orders came.

The natural advantages for cultivating oysters afforded by the Chesapeake, with the innumerable creeks and rivulets tributary to it, are probably not surpassed in the world. The trade is but in its first stage of development. It can, and eventually will, be increased many fold. With proper attention paid to cultivation the bay may be made to furnish an inexhaustible supply of oysters. Where the trade now gives employment to one workman it should in the future give still more remunerative employment to at least a dozen. The capacity for increase is practically unlimited, and the demand is yearly increasing. The sooner the oystermen are forced, by the exhaustion of the natural beds, to engage in planting, the better it will be for all concerned, as the trade will then enter a healthier and more prosperous condition. There are many difficulties in the way, however, which should receive the most thorough scientific investigation.

The selection of the best planting-grounds, the causes of success or failure, the reason for the fact that sometimes for several consecutive years the oysters of an entire river may be very poor, and hence unsalable, and then suddenly, in one season, attain unusual excellence, are questions of absorbing interest, but little understood by the oystermen. The influence of salt or fresh water, according as the rainfall may be great or small, the tides and the winds, may all be studied with great pecuniary benefit to those concerned in the oyster trade. A statement made by one of the most experienced oystermen of Virginia, and confirmed by my own investigations, is to the effect that tongers rarely, if ever, accumulate money by their own labors unless they engage in planting. It is very true that planting is by no means always profitable. Its results are as uncertain as the cultivation of land, if not more so; but it is still, in the long run, far more profitable than tonging from natural rocks. It offers almost the only possible hope to the tonger of ever acquiring even a moderate competence. The work of Professor Brooks, of the Johns Hopkins University, in attempting the artificial propagation of oysters, has not yet progressed far enough to demonstrate the practicability of restocking the bay with an unlimited number of oysters by this means; but after all he has accomplished, it is safe to believe that he will continue the work until he has met with complete success. Planting will then prove still more profitable, as it will always be possible to obtain an abundance of oysters to be used as plants, which is not now the case. Chincoteague Bay, covering perhaps about the finest planting grounds in the world, has a very extensive business in this branch of the trade. The whole bay is staked off in small plats, which are always salable should the owner desire to retire from the business of planting. Oysters are bought in the Chesapeake Bay at prices ranging from ten to twenty cents per bushel, carried by vessels to Chincoteague and there planted, and allowed to remain undisturbed for two or three years. Sometimes they will remain very poor for several successive seasons, and at times it happens that the entire bed will be found on examination to be dead. The winter of 1879–'80 was the most profitable one that Chincoteague Bay has known for many years. The oysters were large, fat, and finely flavored, while for several preceding years they had been poor and almost entirely unsalable, and the trade in consequence had been very unprofitable. Chincoteague oysters are shipped almost exclusively to New York and Philadelphia, and during good seasons command high prices. From September 1, 1879, to May 15, 1880, the shipments from the bay amounted to 318,113 bushels, of which 166,113 bushels passed over the Worcester Railroad and 152,000 bushels were shipped in sail-vessels. Of those shipped over the Worcester road, 71,184 bushels were taken directly from the bay; while 94,929 bushels were taken from small creeks on the Maryland shore, where they had been transplanted and allowed to stay for a day for the purpose of fattening. It is a fact well known to oystermen that when an oyster is taken from salt water and placed in fresh, it will in two tides be bloated up very much; and thus, having the appearance of being fat, it commands a large price. If allowed to remain in fresh water longer than a day it soon becomes

sick and dies. This bloating process is often tried with very successful results, but has never proved to be as important as was supposed when it first became generally known. A few years ago it was tried by the packers of Baltimore, and, for a time, aroused great expectations; but at present it meets with little favor among them. A few of them have persisted in their efforts, but with indifferent success. To succeed well, the oyster must be taken from very salt water and placed in fresh. In the Chesapeake Bay the water is in many parts merely brackish, and it is supposed that on this account the oyster does not improve much upon a change to fresh water.

During the season of 1879–'80 Chincoteague oysters were in active demand at high prices, the average for the winter being not less than 60 cents per bushel, and in the latter part of May 90 cents was readily obtained. A feature of the Chincoteague trade is that all oysters are sold by the thousand, and not by the bushel, as in other parts of Maryland and Virginia. This custom has been adopted in conformity to the uses of Northern markets.

Capt. Barney Jones, probably the most experienced oysterman on the York River, and who for years has handled such quantities of oysters as to have acquired the title of "Oyster King," states that from his experience he is convinced that continued planting will in five or six years exhaust the fattening powers of oyster grounds, just as the fertility of any soil will be destroyed by attempting to produce the same crop for several consecutive years. This belief is said to be erroneous by Capt. Isaac M. Bussells, of Carter's Creek, Virginia, who has been engaged in the oyster trade, either in the North or on the Rappahannock River, since very early in life. He bases his statement upon the fact that in Connecticut there are certain oyster-grounds on which, during the past thirty years, oysters have never failed to fatten, and also upon his belief that oysters get their food from the water, and not from the ground. Captain Bussells has devoted considerable time to the study of oysters, and his convictions are the result of many years of experience in conducting a very heavy trade in all branches of the business.

It often occurs that oysters when caught will have green gills, and hence the name, now so common, of green-gill oysters. Up to a few years ago, I am informed, these oysters were unsalable, as by many persons they were considered poisonous. An oyster planter of Northampton County, Virginia, finding that for several years his oysters were green gills, determined to try to overcome the opposition to them. Whenever he or any of his workmen visited any city, they would go into different saloons and call for green-gill oysters, refusing to take any others. After a few visits to restaurants he succeeded in exciting some curiosity as to what was considered a very strange desire. He then explained that the popular belief was entirely wrong, and that green-gill oysters were perfectly safe, and were always fat, and stated that the green color was caused by a certain weed which is sometimes found at the bottom of the bay and its tributaries, and on which the oysters feed. In a short time no distinction was made against green-gill oysters, and in cities where known they are as much in demand as the ordinary oyster.

On the Rappahannock, the James, and the York Rivers planting is now being conducted quite extensively, although by no means on as large a scale as the advantages and likelihood of success would warrant. Fears are very generally expressed that in a few years the oyster-beds of these rivers will be exhausted if the present rate of shipments continues. That these fears are not groundless may be seen from the result of over-oystering in several of the creeks near the Rappahannock. From 1865 to 1871, during which time I was living in Virginia, the beds of Indian, Dividing, and Dymer's Creeks were well stocked with very fine oysters, the catching of which gave profitable employment to a large number of men. At the present time oysters are so scarce in these creeks that it is impossible to obtain even enough for planting. A few of the oystermen still eke out a poor living, but many have been compelled to give up the business entirely. The

laws of Virginia upon planting are so often changed that they tend to discourage this important industry. If an oysterman rents from the State a certain extent of planting ground, he is never sure that he will be able to keep possession of it, and, of course, should it pass out of his hands, he loses on account of having to sell his oysters before they fatten, or transfer them to some other ground. During the last session of the Virginia legislature it was proposed to sell all planting grounds belonging to the State; and so long as this subject remains unsettled it would certainly be unwise for oystermen to rent and plant on State grounds. The vacillating and changeable policy hitherto pursued by the legislature in its treatment of the oyster question, if continued, will certainly result in incalculable loss to the oyster interests of Virginia.

In planting oysters in Maryland and Virginia, the plants are merely thrown broadcast over the ground, and then allowed to take care of themselves. This system is so far different from the course pursued in Europe that, merely to show the contrast, I append an extract from a letter lately received from Mr. George Walker, United States consul-general at Paris, upon oyster culture at Arcachon, France:

"The oyster production takes place each year, from May 15 to July 15. During this interval each cultivator disposes upon the concession accorded to him—*i. e.*, upon what is called his *park*—a certain number of tiles, called *collectors*, plastered or covered with a mortar composed of sand and lime. These tiles are inclosed in wooden cages, so constructed as to prevent the access of fish, which, without this precaution, would cause great damage to the young oysters. Then begins the formation upon the submerged tiles of small brown spots, which slowly become transformed into the shell-fish. In the month of January of the following year the shells usually attain a diameter of from 1 to 3 centimeters.

"At this period the cultivators proceed to the operation of *détrocage* which consists in detaching the oysters from the tiles. This operation is rendered easy by reason of the plaster covering, which, by the way, prevents deterioration in the shells. The *détrocage* lasts generally until April. This operation terminated, the young oysters are disposed in square basins or pools, scooped out in the sand in the same *park*. These basins are called *claires*, and serve to keep the oysters under the water at low tide, to prevent them from drying. Here they remain until attaining a diameter of 5 to 7 centimeters, when they are ready for market. To reach this final stage they remain in the *claires* usually from sixteen to eighteen months. A portion of the Arcachon oysters are then sent to La Tremblade, near Marennes, where they are placed in special *claires* to become what are known as green oysters (*huitres vertes*). The remaining portion is sent directly to domestic markets or exported to England, which country absorbs at least 36,000,000 per annum."

From other sources I have learned that oyster farming in France is steadily on the increase, and that there are now 36,933 oyster-cultivating establishments, owned by 40,686 persons. Perhaps in future years the cultivation of oysters in the Chesapeake Bay will be conducted with the same care as in France, and then the trade will be of incalculable benefit to Maryland and Virginia.

The following letter from Mr. J. W. Hipkins, of Milton, oyster-inspector of Richmond County, Virginia, is of such an interesting character that I take the liberty of giving it in full:

"In front of this village there is a line of oyster rocks, in length about 2 miles, half mile in breadth, called Sycamore Drain Rocks, famous for hundreds of years for the superior quality of oysters, much esteemed for restaurant purposes in all the large markets. Fifteen years ago, to the boat of two hands, with ordinary oyster tongs, 20 tubs per day could be taken; at this time 4 tubs per day is about the average catch. These oysters are round, single, hard shell, and rarely poor. They command here from 60 cents to $1 per tub. If we could have a law enacted giving

a respite of four years to these rocks, they would be restored to their status of 1865. Probably the most destructive enemy to the young oyster, while the shell is comparatively soft, is the drum fish. They come up in large schools, and are also destructive to the soft-shell planted oysters of full size.

"There is a peculiarity attending the oyster in this section which has never been explained. (Can you give us an elucidation?) Probably once in a period of ten years the gills of the oysters are marked by a distinct green color, which remains with them nearly or quite a year. This change, I think, is general in this locality; yet I think the quality of the oyster is not in the least impaired by this discoloration. After heavy rains in the mountains, the water coming down from the Upper Rappahannock and Rapidan, being of a red color and thick, has a very bad effect on the oysters of the large rocks; it makes them sick, as the oystermen say, and they lose much of their muscular power, with their mouths open, constantly ejecting the offensive water. Many die after one of these heavy freshets."

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PART XII.

NORTH CAROLINA AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General review of the fishery interests of the State:
167. Geography of the coast.
168. Statistics of the commercial fisheries.
169. Statistics of the sea fisheries, exclusive of the oyster interests.
B.—The more important fishery districts:
170. The fisheries of Currituck Sound.
171. The fisheries of Albemarle Sound.
172. The fisheries of Roanoke Island.
173. The fisheries of Pamlico Sound.
174. The fisheries of New Berne.
175. The fisheries of Beaufort and Morehead City.
176. The fisheries of Wilmington and vicinity.
177. History of the menhaden fisheries of North Carolina.
178. The winter bluefish fishery off the North Carolina coast.

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PART XII.

NORTH CAROLINA AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE

167. GEOGRAPHY OF THE COAST.

GENERAL DESCRIPTION.—The coast of North Carolina, which is about 300 miles in length, resembles somewhat in its general characteristics certain portions of New Jersey. Its outer shore in the northern and central portions is simply a bar of sand separating the waters of the ocean from those of an enormous inland sound system. This bar is constantly changing in form and shape under the action of winds and waves, and within the memory of many of the residents a number of new inlets have "cut out," while others have been completely closed. At the present time there are but six openings through this bar between the Virginia line and Cape Lookout, all of them being shoal and barred on either side so that vessels of small size only can enter. The region is thus practically cut off from direct communication with the ocean, though it is connected with the Chesapeake by means of canals. In the central portion of the State the inland sounds are much smaller, most of them being shoal and narrow lagoons running parallel with the coast. Farther south we find a wide belt of low, marshy islands, separated by numerous tide channels and salt-water creeks. The outer bars, or "banks," as they are locally called, average about half a mile in breadth, and with the exception of a few isolated spots where shrubs and trees occur they are bald ridges of drifting sand, almost destitute of vegetation. Owing to this fact they have few inhabitants, these living in small isolated communities and depending largely upon the water for their support. The mainland bordering the coast region is, for the most part, low and swampy, the scattered population living in the more elevated portions, where the land is well adapted for farming. A few live in the vicinity of the wooded tracts, and during a portion of the year devote their attention to lumbering interests, cutting and shipping large quantities of pine timber. There are few settlements of any size along the shore, the only ones of importance within the limits of the State being Wilmington, New Berne, Beaufort, and Morehead City, the last two being separated from each other only by a shallow bay scarcely a mile in breadth.

The fisheries of the region are quite important, as every one living near the water catches fish enough for family use, while many salt considerable quantities to be shipped to other portions of the State in exchange for corn. Within the last few years a trade has been developed in fresh fish; shad, mullet, and trout being sent to Baltimore and Norfolk from Wilmington, Beaufort, and

the larger settlements on Albemarle Sound. Each portion of the coast has fishing interests peculiar to itself, and as the fisheries of the different sounds are so unlike each other, it is thought desirable to describe each section separately.

168. STATISTICS OF THE COMMERCIAL FISHERIES.

THE DIFFERENT FISHERIES.—The large rivers and brackish sounds of North Carolina are visited annually by immense quantities of shad and alewives (commonly called herring), and in spring and early summer the fishing is extensive in many portions of the State. The principal fisheries, however, are near the junction of the Roanoke and Chowan Rivers, at the head of Albemarle Sound, and in the Neuse and Tar Rivers. In the alewife fisheries the State ranks first on the list, with 15,520,000 pounds, netting the fishermen $142,784. The quantity of shad taken in 1880 was 3,221,263 pounds, being a little below the Maryland catch, but the price realized is so much greater that the value of the catch is more than double that for the Maryland fishery. Its sea fisheries, when compared with those of the more northern States, are of little importance, though in the bays and sounds between Beaufort and Wilmington many follow fishing for a livelihood and secure annually large quantities of the various species. The mullet fisheries of the State are second only to those of Florida. In 1880 the catch of mullet amounted to 3,368,000 pounds, valued at $80,500. The oyster industry is confined almost wholly to the Neuse River, Beaufort, and Wilmington. In 1880, according to Mr. Ingersoll, it gave employment to 1,020 men; the invested capital was $68,500, and the value of native oysters produced was $60,000.

STATISTICAL RECAPITULATION.—A detailed statistical review of the North Carolina fisheries will be found in the following statements:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	4,729
Number of shoremen	520
Number of factory hands	25
Total	5,274

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (1,457.90 tons)	95	$39,000
Boats	2,714	123,175
Pound-nets	117	30,800
Fykes, pots, and baskets	230	1,150
Gill-nets	18,796	43,290
Dip-nets and cast-nets	522	1,594
Drag-seines	835	95,982
Minor apparatus, including outfit		52,620
Factories and other shore property		99,100
Additional cash capital		19,850
Total capital		506,561

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Values.
Grand total for fishery products	32, 249, 488	$845, 695
Sea fisheries.		
Bluefish	600, 000	12, 000
Clams (hard)	309, 600	15, 575
Crabs	11, 200	450
Mullet	3, 368, 000	80, 500
Oysters	1, 190, 000	60, 000
Shrimp	63, 000	4, 500
Spotted sea-trout	950, 000	23, 000
Squeteague	170, 000	2, 550
Terrapin	123, 000	10, 850
All other species	4, 572, 500	71, 320
Total sea products	11, 357, 300	280, 745
River fisheries.		
Alewives	15, 520, 000	142, 784
Shad	3, 221, 263	329, 569
Sturgeon	436, 900	18, 094
All other species	1, 714, 025	74, 503
Total river products	20, 892, 188	564, 950

169. STATISTICS OF THE SEA FISHERIES EXCLUSIVE OF THE OYSTER INTERESTS.

In the following statements the statistics of all of the fresh-water fisheries are neglected, and the figures relate only to the salt-water fisheries, exclusive of the oyster industry. The statements have been carefully compiled from notes made during interviews with many of the more intelligent fishermen and dealers in the various localities, and the figures are thought to be sufficiently accurate for all purposes for which they are intended. We are under obligations to the fish dealers of Wilmington, Beaufort, and New Berne for information and assistance which have made it possible to give to the public a general account of the fisheries of each district.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1, 707
Shoremen	118
Factory hands	25
Total	1, 850

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (117.90 tons)	4	$11, 600
Boats	1, 110	56, 500
Pound-nets	8	1, 800
Fykes, pots, and baskets	230	1, 150
Gill-nets	850	13, 250
Purse-seines	1	400
Drag-seines	536	22, 200
Dip-nets and cast-nets	100	550
Minor apparatus, including outfit	.....	17, 900
Factories, and other shore property	.....	27, 600
Cash capital	.....	19, 850
Total	.....	172, 800

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	600,000	$12,000
Clams (hard)	309,600	15,575
Crabs	11,200	450
Mullet	3,368,000	80,500
Shrimp	63,000	4,500
Spotted sea trout	950,000	23,000
Squeteague	170,000	2,550
Terrapin	123,000	10,850
All other species	4,572,500	71,320
Total	10,167,300	220,745

B.—THE MORE IMPORTANT FISHERY DISTRICTS.

170. THE FISHERIES OF CURRITUCK SOUND.

A BRIEF DESCRIPTION OF THE REGION.—Currituck Sound is a shoal body of water beginning near the northern boundary of the State, and extending about 40 miles southward in a direction nearly parallel with the coast. It has an average width of 3 or 4 miles, and is separated from the sea by a belt of low sand-hills less than a mile in breadth. Formerly it communicated freely with the ocean through a large inlet, and, the water being salt, it was a favorite resort for the various species of marine fishes common to this portion of the coast; but the inlet has been closed for many years, and the water has gradually freshened until now only the fresh water and anadromous fishes occur. Chub (*M. pallidus*) and perch (*R. americanus*) are particularly abundant in these waters, while other species, including rock (*Roccus lineatus*) and "herring" (*Clupea vernalis* and *C. æstivalis*), are found at certain seasons. The region is also visited each winter by enormous numbers of wild fowl, including ducks and geese of several species, and it is one of the most popular resorts of the entire coast for the sportsmen of the larger cities.

THE FISHERIES.—The country has a scattered population depending largely on farming, gunning, and fishing. It is quite isolated, and up to 1869 had no regular communication with any of the larger cities. At that time a steamboat line was established between Poplar Branch and Norfolk for the purpose of carrying the game and fish that might be taken. Prior to that date a few fish had been carried to market in wagons, but the distance was so great that not many were caught beyond those needed for local supply. With good shipping facilities the business at once assumed important proportions, and the steamer often carried 15,000 pounds of chub and perch at a single trip. The fishery reached its height about 1872, when, according to Captain Walker, nearly 1,000,000 pounds of these species were taken, the bulk of the catch being shipped to the Norfolk market. In 1875 the catch had fallen off one-third, and in the winter of 1879–'80 it reached only 350,000 pounds of chub and 83,000 pounds of perch, from the sale of which the fishermen realized about $13,000.

The fishing begins in October and continues till the following April. The fish are taken chiefly in small drag-seines. These are fished in the grassy bays both along the shore and at a considerable distance from it. In fishing the men remain constantly in their boats. After properly stowing the seine in the stern they proceed to the fishing grounds, and, when a suitable locality is reached, a pole to which one end of the seine is attached is imbedded in the mud of the bottom, after which the seine is "shot" in the form of a circle in order to surround and retain the fish.

When the ends have been brought together the men begin "hauling in" one of them, and they continue their work till the circle has become very small and the fish are brought together in a limited space. The seine with its fish is then quickly lifted into the stern of the boat. In warm weather this method would be hardly practicable, for in hauling the lead-line is frequently raised several feet above the bottom, and the fish have an excellent opportunity to escape; but the fishing occurs chiefly in winter when the water is cold; at this time the fish are so sluggish that they make little effort to escape. The fishing is not confined to any particular region, but extends over the entire sound, and even as far south as Kitty Hawk Bay, a few miles above Roanoke Island. In the winter of 1879–'80 there were two hundred and eighty men with one hundred and forty boats and a like number of seines engaged in this fishery.

171. THE FISHERIES OF ALBEMARLE SOUND.

THE FISHING WHOLLY FOR FRESH-WATER AND ANADROMOUS SPECIES.—Albemarle Sound, a sheet of water 50 miles long by 7 to 10 miles wide is the center of the shad, herring, and rock fisheries of the State. Its only communication with the sea is through Oregon Inlet, situated some distance below Roanoke Island. The water of the sound, under ordinary circumstances, is fresh, but during seasons of extreme drought it becomes more or less brackish, especially in its lower part.

The fishing is confined wholly to the capture of shad, herring, rock, and perch. Formerly haul-seines were almost exclusively used; as the fishery increased in importance these were made larger and larger, until, at the present time, they average 2,000 to 2,500 yards in length, being among the largest in the country. Within the past three or four years small steamboats have been introduced into the fishery for the purpose of "laying out" the seines, and horse and steam power are frequently employed in hauling them to the shore. In 1870 the first pound-nets were introduced into the region by Mr. J. P. Hetterick, of Huron, Ohio. They have proved very successful in this fishery, and are not only coming into general favor, but seem destined to revolutionize the fisheries of the Albemarle. Stationary gill-nets, or stake-nets, are also extensively used in the lower part of the sound; and, according to Col. M. McDonald, the first drift-nets were introduced into the region in 1880.

A large part of the shad, rock, and perch are shipped in ice to New York, Philadelphia, and Baltimore; but so many herring are taken, that no market can be found for them fresh, and nearly all are salted.

A detailed account of the fisheries of this region will be given by Colonel McDonald in the chapter on the shad and alewife fisheries.

172. THE FISHERIES OF ROANOKE ISLAND.

Roanoke Island, lying between Albemarle and Currituck Sounds on the north, and Pamlico Sound on the south, has a population of about 1,100, largely dependent upon farming and fishing. Capt. J. W. Etheridge estimates that fully three-fourths of the total earnings of these people come from the water. Probably 225 men are extensively engaged in fishing, while the others fish occasionally for local use.

THE FISHERIES OF THE REGION.—The principal fishing is for shad (*Clupea sapidissima*), herring (*Clupea vernalis* and *C. æstivalis*), and rock (*Roccus lineatus*), in spring; for mullet (*Mugil albula*), hogfish (*Diabasis* sp.), spot (*Liostomus xanthurus*), and terrapin, in summer; and for bluefish (*Pomatomus saltatrix*), rock, and terrapin in the fall and early winter. Oysters and quahaugs are also gathered for local use and for sale in the interior.

The shad arrive about the middle of February, when fully one hundred men begin fishing with stake-nets; a little later the others seek employment at the various seining beaches of the region. One seine is owned on the island, and three others are fished on the opposite side of the channel. After the shad season is over, many of the islanders fish for other species, exchanging their catch for corn with the people of the mainland. Early in September quite a number go to Oregon Inlet to fish for mullet; and a little later they turn their attention to the capture of bluefish.

THE PURSE-SEINE USED IN THE CAPTURE OF ROCK.—So far as we can learn, Roanoke Island is the only place on the entire coast where the purse-seine has been used for catching rock. This method was first employed by Mr. Samuel Terry, of Rhode Island, in 1873. He came regularly to the region each fall for three or four years with a purse-seine, and succeeded in taking large numbers of rock, which he sent to the Northern markets. It is reported that during the first season the catch was so large that only the largest fish were marketed, the others being used as a dressing for the land. Though remarkably abundant for a time, the fish were soon caught up, and the business was abandoned.

HISTORY OF THE ROANOKE ISLAND TERRAPIN FISHERY AND A DESCRIPTION OF THE METHODS OF CAPTURE.—Roanoke Island has an important terrapin fishery, and, with the exception of Beaufort, it is the only place in the United States where dredges and traps are extensively used in the capture of the species. Until 1849 the fishing was wholly for local supply, as the fishermen were not aware of the market value of the terrapin. About that time Capt. J. B. Etheridge caught 4,150 during the months of February and March. These he sold in Norfolk and Baltimore for $750. The news spread rapidly, and many at once engaged in the fishery, prosecuting the business to such an extent as to nearly exterminate the species.

The terrapin-dredge was invented about 1845, by Mr. William Midgett, of Roanoke Island. It is arranged on the plan of an oyster-dredge, being simply an iron bar 36 to 40 inches long provided with stout iron teeth. Either end of the bar is fastened to the base of an iron ring. The rings are connected at the top by a thick bar of wood. To this frame a large-mesh net, or bag, of netting 3 or 4 feet in length is attached. The dredges are used chiefly in the fall and winter, when the terrapin are "bedded" in the mud. A vessel or boat takes from one to three of these in tow, and drags them back and forth along the bottom where the terrapin are thought to be abundant.

The trap is a cylinder of netting somewhat resembling a New Jersey lobster-pot, having a funnel-shaped opening at either end. After being baited with fish, it is fastened to a stake at the surface of the water, or placed on the flats where a portion of the upper part is exposed. It is used only in summer when the fish are moving about in search of food.

The method of hunting terrapin with dogs is also peculiar to this region. The dogs are trained to track them from the water-line to the place where their eggs are deposited during the breeding season, or to follow their trail through the marshes in summer.

There is also a large terrapin pound on the island, in which the experiment of raising terrapin from the egg to a marketable size is being tried. This pound is an inclosure of several acres, through which a tide-stream passes. It also includes a salt marsh where the terrapin may "bed" in winter, and a bank of sand in which their eggs may be deposited. At present the experiment has not progressed far enough to warrant an opinion as to its practical value.

173. THE FISHERIES OF PAMLICO SOUND.

THE GEOGRAPHY OF THE REGION.—Pamlico Sound is an irregular sheet of water, 60 miles long by 15 to 25 miles broad. Barring Long Island Sound, it is the largest salt-water sound between Maine and Florida. It is nearly surrounded by land, being separated from the ocean by

a long and narrow strip of sand known as "The Banks." It communicates with the sea through several narrow openings that have been cut through the bar by the waves and currents. The water varies greatly in saltness in different localities. In the vicinity of the inlets it is as salt as that of the ocean, but in portions more remote it is usually quite fresh. During certain seasons of the year a large part of it becomes brackish. It may, however, be considered as a sheet of salt water, with a fauna similar to that of the adjoining sea-coast.

On the west the land is low and marshy, and the settlements are small and widely separated. The fishing of this region, with the exception of that in Croatan Sound and in the larger rivers for shad, is limited to the capture of a few mullet (*M. albula* and *braziliensis*), spot (*L. xanthurus*), and hogfish (*Diabasis* sp.), for family use.

"THE BANKS" AND THEIR INHABITANTS.—The land along the eastern side, locally known as "The Banks," is for the most part a ridge of low and barren sand hills, with only here and there a small "hummock" or wooded district, having a thin layer of vegetable mold. It is separated from the mainland by distances varying from 3 to 30 miles, and is quite cut off from communication with the outside world. Formerly this region was the home of a class of wreckers, who lived chiefly by plunder, but owing to the establishment of light-houses and life-saving stations along the shore, the number of wrecks has been greatly diminished, and the people have been obliged to turn their attention to fishing, clamming, and oystering. Most of the men own boats and nets, while others have small vessels for trading with the inhabitants of the mainland. Those who are unable to own a fishing outfit usually share that of a neighbor, giving him a part of the catch as an equivalent.

THE VARIOUS FISHERIES OF THE REGION.—The fishing is not extensive, and there are no large seines or pounds requiring the labor of any considerable number of men. The people do not fish with any regularity, many of them going out only during the height of the season, or when necessity compels. The region is so far removed from any market, that, with the exception of the bluefish taken in winter, all the fish are salted. The catch is usually taken to the mainland and exchanged with the inhabitants along the larger rivers for corn or other produce. Barter is the common method of trade, and many a man with a large family has less than $50 in money during the entire year.

In January, parties having vessels or large boats are engaged in gathering oysters and clams, which they exchange with the people of the mainland for corn, at the rate of a bushel of oysters to a bushel of ears of corn. This business continues till April, when nearly all turn their attention to their small garden patches, where they raise such vegetables as are needed for their family use. The summer fishing is quite small, and only for local supply. A few of the vessel owners engage in a traffic called "shelling" at this season. This consists in the gathering of small oysters, which are sold for fertilizing purposes at from 3 to 5 cents a bushel. Early in September the fishing becomes quite extensive, and all of the fishermen are soon engaged in the capture of hogfish, spot, mullet, trout (*Cynoscion regale*), and small bluefish, for salting. Gill-nets and seines, 75 to 125 yards in length, are used in this fishery. When a good fishing ground is reached, several of the fishermen work together setting their nets in the form of a circle around a school of fish. The size of the circle is then gradually reduced until the fish are confined in a small area, after which they are driven into the nets by the fishermen, who wade or row about inside of the circle, keeping up a continual splashing with the oars. When seines are used, several are often tied together, so as to give a greater length; and in fishing for mullet a second line of them is often drawn behind the first, to catch the fish that jump over the inner net in their efforts to escape. The catch in this

fishery averages about 10 to 15 barrels of salted fish to the man. Early in November nearly all resort to the ocean shore for bluefish, where they are usually engaged till Christmas.

THE QUAHAUG INTERESTS, INCLUDING THE CANNERY AT OCRACOKE INLET.—In addition to the above, there is an extensive fishery for clams or quahaugs to supply the clam cannery of Maltby & Edwards at Ocracoke Inlet. This cannery was located at Elizabeth City in 1876, but on account of the distance to which the clams must be carried it was removed to its present site the following season. It is the most southern of the three American canneries engaged in the packing of quahaugs. A large business has been done yearly since its establishment. During the season of 1879 forty fishermen and laborers were regularly employed in catching and packing the clams, and fifty others fished occasionally for the cannery. In addition to the clam business, a few turtle, crabs, and Spanish mackerel (*Scomberomorus maculatus*) were put up by way of experiment.

THE EXTENT OF THE TERRAPIN FISHERY.—The trade in terrapin is not very extensive, though a good many are found along the western shore and a few are picked up on "The Banks." The bulk of the catch is taken by farmers and others for their own tables, and comparatively few are shipped. Parties at New Berne, on the Neuse River, buy and ship a few, and one or two merchants of the smaller settlements do a limited business in the same line. At Sladesville there is a small pound for keeping the terrapin during the summer months, or until the price is sufficiently high to warrant their shipment to the Northern markets. The total catch, including that of Roanoke Island, is 4,000 "heifers", 4,000 counts, and 9,000 "bulls", valued at $3,250.

THE SHRIMP FISHERY.—Shrimp are often quite abundant in some localities, especially in the southern part of the sound and at the mouth of the Neuse River. The seine fishermen have sometimes taken 20 to 30 bushels at a haul while fishing for trout or mullet. There is no market for the species in the region, as the dealers have not yet learned how to prepare them for shipment. Very few are eaten by the fishermen or other residents, and no one has yet learned their value.

174. THE FISHERIES OF NEW BERNE.

NO PROFESSIONAL FISHERMEN AT NEW BERNE PRIOR TO 1840.—The city of New Berne, situated on the south bank of the Neuse River, 20 miles above its mouth, is a settlement of 6,000 inhabitants. Its location on one of the largest rivers of the State, within a few miles of the salt water, with excellent shipping facilities by rail and boat, gives it an advantage in the fisheries over any other settlement in the region. Prior to 1840 it had no professional fishermen, and the supply of fish, consisting chiefly of perch and "robins," was taken in small gill-nets called "fly-tails." About this time Capt. Isaac Lewis removed to New Berne from Beaufort, to engage in the river fisheries. He introduced the drag-net into the locality, and was the only professional fisherman of the town for several years.

THE ORIGIN OF THE SHAD FISHERIES.—In 1844, according to Captain Lewis, gill-nets were first used for the capture of shad at New Berne, and then for the first time was this species extensively taken. In 1846 haul-seines were introduced by Richard Felton, a fisherman from Albemarle Sound. The first vessel was used in 1858. At present, there are two small vessels acting simply as "tenders" for the seine fishermen at the mouth of the river.

At the present time New Berne has one of the most important shad fisheries in the State, and most of her fishermen engage regularly in the work during the fishing season. At other times many are employed in taking herring (*Clupea vernalis* and *C. æstivalis*), gizzard shad (*Dorosoma cepedianum*), rock, red-fins (*Perca americana*), robins (*Centrarchus* sp.), welchmen (*Micropterus pallidus*), catfish (*Amiurus* sp.), and gars (*Lepidosteus osseus*), all along the river bank.

THE FISHING FOR MARINE SPECIES OF LITTLE IMPORTANCE.—At times the fishermen visit the salt water of the sound with seines, and catch bluefish, mullet, trout, spot, and sheepshead; but there is no regular salt-water fishing, and, according to Mr. C. F. Watson, the yearly catch of marine species does not exceed 100,000 bunches, or 300,000 pounds, valued at $5,000.

A description of the river fisheries of the place will be found in the chapter on the shad fisheries of North Carolina.

THE WHOLESALE FISH TRADE OF NEW BERNE.—As a fish market, New Berne ranks among the most important in the State, and, if credited with the fish shipped from Beaufort by firms having branch houses in that city, it stands at the head of the list. There are six firms, each doing an extensive business in the shipment of fresh and salt water fishes, oysters, and clams. Formerly the trade was small and confined to the immediate locality, but within the last ten years, owing to the energy of the dealers, it has increased fourfold. Many fish are now sent to all of the larger cities of the Southeastern States, except Florida, and in addition a large number are consigned to the principal dealers of New York, Philadelphia, and Baltimore. The supply of salt-water fish comes chiefly by rail from Beaufort and Morehead City, where several of the dealers have branch houses for buying and packing. A few of the oysters are obtained from this source also, but the greater part come direct from "The Banks" by vessel.

New Berne has also a trade in salt-water terrapin and "loggerhead turtles" (*Chelydra*), and in 1879 shipped about 280 dozen terrapin that were taken in Pamlico Sound. The shipping of turtles began about 1873, and has gradually increased until in the fall of 1879 fully 8,000 pounds were sent to the Northern markets. Most of the turtles are gathered in the rivers and creeks during the months of September and October.

THE RETAIL FISH TRADE.—The retail fish trade of New Berne is controlled wholly by negroes. There are eight fish-stalls in the market at the dock, and four or five men and boys peddle fish about the streets. Probably no city on the coast is so peculiar in its retail trade as New Berne. The coarsest species are not only seen in the markets, but they make up the bulk of the sales. The gar (*L. osseus*), not seen by us in any other market in the country, is one of the principal food-fishes here, where it is highly prized by the negroes. The other important species are catfish, eels, sturgeon, gizzard-shad, herring, perch, robins, and welchmen. Any surplus of fresh fish at times of over-supply is salted and dried or smoked, and it is not uncommon to see even catfish and other of the coarser species that have been prepared in this way exposed for sale in the market-stalls.

175. THE FISHERIES OF BEAUFORT AND MOREHEAD CITY.

THE GEOGRAPHY OF THE REGION.—Lying to the southward of Pamlico Sound, and communicating freely with it, is a long and narrow sheet of water, running parallel with the coast for a distance of 50 miles. It varies in breadth from 1 to 6 miles, and on account of its shoalness is navigable for vessels of small size only. It communicates with the ocean through Beaufort and Bear Inlets, the former being situated near its center, and the latter at its southern extremity. The portion lying to the north of Beaufort Inlet is known as Core Sound, and that to the south as Bogue Sound. The land on the east is merely a continuation of the sandy banks that occur farther north, and, with the exception of a small portion in the vicinity of Beaufort, it has almost no inhabitants. Carteret County, which forms the western shore, is very irregular in shape. It is long and narrow, reaching from the Neuse River, on the north, to Bear Inlet, on the south, and extending but a short distance into the interior. Its shores are so frequently interrupted by bays, rivers, and creeks, and the whole country is so cut up by water-channels, that wagons are almost wholly

dispensed with, and the communication between different sections is carried on by means of boats. Indeed, such is the peculiar relation of land to water, that, according to Sheriff J. D. Davis, one can go in a boat to within a mile of any house in the county.

The principal settlements are Beaufort and Morehead City. These are situated on opposite sides of Newport River, just abreast of Beaufort Inlet, with a population of 1,600 and 400, respectively.

THE INHABITANTS LARGELY DEPENDENT UPON THE FISHERIES.—Fully three-fourths of the people of the county are largely dependent upon fishing and oystering. For many years large quantities of mullet, trout, hogfish, and spot have been annually salted for shipment to the interior. Prior to 1858, when the railroad was completed to Morehead City, the fish were salted and carried in vessels to Norfolk, or to various points on Pamlico and Albemarle Sounds, where they were exchanged for corn; but now many are sent by rail to the markets of the interior.

THE SHIPPING OF FRESH FISH IN ICE.—Up to 1870 no fresh fish were shipped, and at that time only an occasional box was sent out in midwinter to some of the larger cities of the State. In 1874 the iced-fish trade was inaugurated by Mr. George N. Ives, of New Haven, Conn. Mr. Ives came to Beaufort to engage in the oyster trade, but finding that fresh fish of excellent quality could be readily obtained, he decided to establish a business in this line. From that date this branch of the business has grown very rapidly, and though most of the larger dealers have found it convenient to locate in New Berne, the fish are usually packed and shipped direct from the station at Morehead City. During the year ending May 30, 1880, there were 250,000 bunches of fresh fish, equal to 892,000 pounds, netting the fishermen $25,500, either shipped from or consumed in Carteret County. Of these, 90,000 bunches were trout (*Cynoscion maculatum*), 40,000 were mullet (*Mugil albula* and *M. braziliensis*), 20,000 were bluefish (*Pomatomus saltatrix*), 5,000 were sea-mullet (*Menticirrus alburnus*). The remaining 100,000 bunches included red drum (*Sciæna ocellata*), spot (*Liostomus xanthurus*), star-fish (probably a species of *Trachynotus*), Spanish mackerel (*Scomberomorus maculatus*), and other species. There are five firms engaged in the fish trade at Beaufort, and four additional at Morehead City. These occupy property worth $3,000, require a capital of $5,000, and furnish employment to thirty men and boys for eight months of the year. The shipping season lasts from the middle of August to the middle of December and from the 20th of January to the 1st of May.

EXTENSIVE SHIPMENTS OF SALT FISH.—The combined salt-fish trade of Beaufort and Morehead City is more extensive than that of any other city on the Southern coast. These places handle nearly all of the fish put up by the fishermen living between Ocracoke Inlet, on the north, and New River, on the south. The trade is confined to no one class, but is open to general competition, so that the regular fish dealers, the merchants, and many of the citizens buy and ship a considerable quantity, while thirty-three vessels, ranging from 5 to 20 tons each, are engaged in carrying salt fish to the various river towns and to Norfolk to exchange for corn.

THE BARRELS USED FOR PACKING THE FISH.—Formerly the fish were salted in almost any barrel, keg, or kit that would hold pickle, and there was no uniformity in the size of the package. To overcome this difficulty, the State legislature, in 1879, passed a law requiring the fish barrel to have a stave 25 inches long and a head 13 inches in diameter. This regulation barrel, which is quite generally, though not universally adopted, is calculated to hold 100 pounds.

The difficulty, however, is that the law does not state how many pounds it shall contain, and people inclined to dishonesty, by packing the fish with the backbone toward the center, can make a barrel seem full when it contains but 85 or 90 pounds; when the fish are carefully packed with the backbones outward the barrel will hold about 110 pounds.

KINDS OF FISH SALTED.—The principal species salted, arranged in the order of their importance, are mullet, spot, hogfish, trout, bluefish, drum, Spanish mackerel, and sheepshead. Mullet are by far the most important species on the list, and, including all that were eaten, shipped, and carted into the country, there were not less than 13,000 barrels salted by the fishermen of this district. These net the fishermen about $3 per barrel. The total quantity of other fish salted is about 3,000 barrels.

The trade in salt fish is largely with the eastern portion of North Carolina, though a few find their way to other parts of the State and to South Carolina and Virginia.

THE SALT FISH USUALLY EXCHANGED FOR CORN.—During former years the fishermen depended wholly upon small vessels to carry the catch to market, and it became customary for the captains to exchange the fish with the farmers of the river towns for corn. This practice grew almost universal, and the fishermen thus laid in their "bread" each fall as regularly as the ice merchant of the North cuts and houses his stock of ice for the following summer. The same practice is still quite common, even though it frequently results to the disadvantage of the fishermen, who argue, and with considerable force, that if they sold for money they would spend it for other things, and come to want for bread before the close of the winter.

DIFFERENT SPECIES TAKEN AT DIFFERENT SEASONS.—About the 20th of January many of the fishermen of Beaufort and vicinity go to the Neuse, Tar, and Cape Fear Rivers and to Albemarle Sound to fish for shad and herring. By the 1st of February one hundred others resort to the outer beach to engage in the shore whale fisheries, which continue till the 20th of April or the 1st of May. The remainder are engaged in oystering and clamming. Early in March the salmon-trout (*C. maculatum*) appear and are captured with drag-nets. This fishery lasts till the middle of May, when the drag-nets are laid aside and those owning drop-nets begin fishing for mullet, hogfish, and spot for salting. Others catch a few terrapin and crabs, and the remainder seek employment on the shore. About the middle of August the mullet seines are "set in," and most of the fishermen, with a good many farmers, are employed in the capture of mullet till the 1st of November, while others continue to fish with drop-nets and drag-nets for mullet, trout, hogfish, and spot till the middle of December. At this time the fish become scarce in the sounds, and most of the fishermen turn their attention to oystering and clamming, while others go to Cape Lookout and fish along the outer shore with seines for red drum, which are quite abundant at this season. Those living at a distance from the markets are engaged, to a greater or less extent, in farming. They fish but little during the early summer. When the mullet arrive in August, however, they engage extensively in their capture, and after the season is over they turn their attention to oystering and clamming till time for the spring trout fishing.

A DESCRIPTION OF THE MULLET FISHERIES.—The mullet fisheries of this region are very important, and the fishermen of Carteret County put up more salt mullet than those of all the other counties of the State combined. In fact the shipments of salted mullet from this region exceed the total shipments from all other portions of the Atlantic coast. The small mullet first appear in June, the number gradually increasing till August. At this time they begin to gather in schools, but no tendency toward migration is noticeable till the middle of the month. They then move slowly southward, and the schools follow one after another, the size of the fish constantly increasing until the middle of September, when the old or roe mullet arrive. The largest of them are said to weigh from 4 to 5 pounds and to measure from 24 to 26 inches. These gradually work southward, and at the approach of the first cold storm usually disappear. A school of smaller individuals called "frost" or "winter" mullet follow in their wake, and by the 1st of January the greater part have left the region, though a few may be taken at any time till the following spring.

In the early summer a few are taken in drag-nets, but the fishermen soon lay these aside and provide themselves with gill-nets, locally known as drop-nets, those of larger mesh being used as the fish increase in size. The mullet are surrounded by these nets, four or five of them often being set together in the form of a circle, after which the fish are driven into them by splashing.

This method of fishing continues till the middle of August, when the fish start south. The fishermen then take their large seines and boats, and, after providing themselves with salt and barrels, start for the Banks, where they build small shanties, one for sleeping and cooking, and another for storing the fish. Schools of mullet follow each other in rapid succession through the sound or along the outer shore, and large hauls are often made. The fishing begins about the middle of August and continues till November. In the fall of 1879 there were thirty-seven crews, averaging fifteen to twenty men each, engaged in the mullet fisheries of the region with haul-seines, in addition to a large number that fished with drag-nets and gill-nets at different points. The catch averaged about 300 barrels of salted fish to the seine.

THE FISHERY FOR SALMON TROUT.—Next to the mullet the salmon trout is the most important fish of the region, and Carteret County has the largest fishery for this species also of any county on the Atlantic seaboard. Trout are present in the waters of the sound during the entire year, but they are most abundant in the spring and fall. They are taken most extensively in the deeper channels of the sounds, though large hauls are occasionally made along the outer shore. The fishing begins about the middle of March and continues till late in May, when the fish are thought to retire into the cooler water of the ocean. In September they are again quite abundant in the sounds, and many of the fishermen fish for them in preference to the mullet that are also very plenty. The fall fishing lasts till late in December.

THE DRAG-NET AS USED IN THE TROUT FISHERY.—The fish are taken chiefly in seines locally known as "drag-nets," though a few are caught in gill-nets in the fall. Drag-nets seem to have originated with the fishermen of this region about the beginning of the present century, and they are now in use only in the northern portion of North Carolina. These nets are 80 to 110 yards in length, of 3-inch mesh, and about 12 feet deep. The method of hauling known as "footin' 'er up" is quite different from that employed with the ordinary seine. Two men go in a boat, and after reaching a shoal bank on the edge of the main channel with 2 to 4 feet of water, one of the fishermen jumps overboard and holds one end of the net, while the other "shoots" the seine in the form of a semicircle so as to include as much of the channel as possible. When the net is out he brings a line to the shoal, and jumping into the water draws the net and boat toward his companion, who in turn is advancing toward him. They soon meet, and, after firmly pressing the staff of one end into the bottom, begin hauling in on the line, and later on the net, care being taken to have it constantly against the staff. When the area inclosed by the net has been sufficiently reduced, the captain takes his position beside the staff and passes the lead-line under his left foot, thus keeping it close to the ground, as he continues to haul it in; the other man is pulling in the cork-line at the same time. The fish are thus gradually brought together at the end of the net, and by a quick movement they are lifted from the water and thrown into the boat.

AVERAGE DAILY CATCH OF TROUT.—The catch varies considerably from day to day. The wind is said to have considerable influence on the movements of the fish, and porpoise drive them about from place to place. At one time the trout may be abundant near the inlets, and the next day a school of porpoise may enter and drive them to the shoal waters at the farther end of the sound. Thus a man may fish a number of days without catching a trout, and again he may catch several hundred or even a thousand at a single haul. The average catch is fifty to sixty fish daily to the net.

THE DIFFERENT MARKETS FOR TROUT.—The trout average 1½ pounds each, and find a ready sale at 2 to 4 cents apiece in Beaufort or Morehead City. The fishermen living at a distance from the market are obliged to salt their catch, while fish taken at the southern end of Bogue Sound and at New River go fresh to Wilmington. When the supply is large the surplus of those purchased by the dealers is salted; but it is difficult to overstock the market, as there is an outlet for a large quantity in Baltimore, which is the best trout market in the country. The shipments to this port are so large at times that, according to the dealers, the transportation companies have been obliged to limit the daily shipment to 40 barrels.

THE VALUE OF TROUT SOUNDS.—The sound of the trout is very valuable, and at the present time not less than 4,500 pounds are handled annually in this locality, which is the only district south of Delaware where fish sounds are extensively saved. Prior to 1872 there was no market for them in the region, and none were saved beyond the few that were gathered by the fishermen's wives for use in their kitchens. None of the residents of the region knew that they were even a salable article. In the spring of 1872 Mr. D. Bell, of Morehead City, having learned that fish sounds were saved in the North, decided to ship a few by way of experiment. Those sent, though not properly cleaned, netted him nearly a dollar a pound. On learning their value, he at once went through the county and contracted with the fishermen for the sounds of the trout taken by them at 15 cents a pound. Competition soon brought them up to 25 and later to 75 cents. From this date to the present day all of the fishermen have saved the sounds when salting their fish.

THE INVENTION OF THE TROUT SOUNDER.—In 1878 the fresh-fish trade had grown to such proportions that a large part of the trout were shipped "round" in ice, and the value of the sounds was lost to the dealers. This led Mr. Bell to consider the question of removing the sound without opening the fish. Accordingly he soon invented a simple apparatus, by means of which he could draw it out through the gill-opening without injuring the looks or sale of the fish. The instrument is called a "sounder." It consists simply of a thin piece of wood 6 or 7 inches long and three-fourths of an inch wide, to which a small wire hook is attached. The stick is inserted at the gill-opening and passed along the backbone to detach the sound from the body. When it has been loosened the sound is easily drawn out through the same opening by means of the wire hook. At the present time all of the trout are "sounded" before shipment. Boys are usually employed for this work, and many of them have become so expert that they can sound forty fish in a minute. The sounder is at present used only at Beaufort, Morehead City, and New Berne. The fishermen of Wilmington, the next most important trout market on the coast, have never used it. The general use of the sounder throughout the State would result in an annual saving of many thousands of dollars to its people.

THE INTRODUCTION OF POUND-NETS INTO THE REGION.—The first pound-net was introduced into Core Sound in the spring of 1879, by Mr. Harrison, of New York, who was employed by Messrs. Lamphier & Haff, of that city. It was located about 6 miles north of Beaufort, but the fishermen of the region, with a characteristic dislike for any new method of fishing, especially by a non-resident, cut it to pieces before it had been fairly tested. In the fall of the same year Mr. D. Bell, of Morehead City, put one up in Bogue Sound, and another was added the following spring; but it is said that the trout, the species for which they were intended, did not enter them, and though abundant in the waters, but one individual was secured. Later they were taken up and removed to the Neuse River, where they were successfully used for herring and shad. So far as we know, this is the most southern point on the coast where pound-nets have ever been successfully used, though there was an unsuccessful attempt to introduce them into the shad fisheries of Florida, probably by men who did not fully understand setting and fishing them.

WHALE AND PORPOISE FISHING FROM THE SHORE.—The oldest residents of Beaufort state that the whale and porpoise fisheries of that region began prior to their earliest recollections. There seems never to have been any extensive fishery, and, with the exception of two vessels (the Daniel Webster and the Seychelle, of 24.15 and 47.07 tons, respectively), it has been prosecuted only from small open boats, manned by fishermen living along the shore. The Daniel Webster came to Beaufort in the winter of 1874–'75, with a crew from Provincetown, Mass., but after three months' cruising she returned to the North, having taken nothing. The Seychelle came in the winter of 1878–'79, but was lost in the summer of 1879, before taking a whale.

The shore whalers resort to the outer beach with their boats and other apparatus about the 1st of February, and after building a camp for cooking and sleeping, they establish a "crow's-nest" or lookout station on one of the highest sand hills, where some of their number are stationed to watch for the whales that follow the shore in their migrations toward the north. The season lasts till the 1st of May. A camp usually consists of three boat crews, of six men each, and while waiting for whales some of the men fish with seines for such fish as happen to be moving along the shore. A lookout is kept constantly in the crow's-nest, and when a whale comes in sight the signal is given and the boats start in pursuit. When the whale is overtaken the harpoon is plunged into it. A wooden drag is usually attached to the iron by means of a short line. This is at once thrown out, and the animal is allowed to "have its run." Harassed by the drag, the whale soon turns to fight, when the boats quickly overtake it, and one of the gunners shoots it with an explosive cartridge. When the creature has been killed it is towed to the shore, where it is cut up and the blubber tried out.

The number of men engaged in the whale fishery varies from year to year. Formerly there were two to three camps of about eighteen men each. In 1879 there were four camps, with a total of seventy-two men. Five whales were taken during the season, the products of which sold for $4,000. In 1880 there were one hundred and eight men stationed between Cape Hatteras and Bear Inlet, which mark the limits of this fishery, but the season being unusually open, most of the whales had passed before the fishermen arrived. One small whale was taken, from which the fishermen realized $408.46.

The stretch of coast above referred to is also a favorite "run" for porpoise (*Phocæna americana*), and often immense herds of them may be seen moving along within a few rods of the shore. During a visit to the region in April, 1880, they were very abundant. Droves of 50 to 100 of them were frequently seen together, and the fishermen assure us that they were even more numerous earlier in the season. As early as 1810 parties engaged in the porpoise fishery, and from one to three crews followed it quite regularly each winter up to 1860, when the fishery was discontinued. The fish were taken in heavy seines, about 800 yards long. These, on account of their weight and bulk, were in sections of 200 yards each. They were shot simultaneously from four boats, the ends being securely fastened after they had been brought together. The seine was then hauled in as far as convenient, after which the porpoise were landed with a smaller and stouter seine. The crews usually numbered from fifteen to eighteen men, and the fishing season lasted from late in December till the following April. The average catch was about 400 or 500 porpoise to the seine, each yielding 5 to 6 gallons.

There is a growing disposition on the part of the people of the region to resume this fishery, and were it not for the expense of "fitting out" (which, according to their statements, would be about $400), many would doubtless engage in the work. There seems no reason why this fishery should not be very profitable to any who would engage in it; on the contrary, there is reason to believe that, if properly managed, it would be more remunerative than almost any other fishery on

the Southern coast. In order to lessen the cost of outfit, guns similar to those used by the Passamaquoddy Indians in the porpoise fisheries of Eastport might be introduced with advantage, or, better still, the fishermen might be provided with both guns and seines.

So far as we have been able to ascertain, no one has yet attempted to combine shore whaling and porpoising. These might be combined with little inconvenience and doubtless with excellent results. The men engaged in whaling are obliged to remain constantly on the shore where the porpoise are most abundant, and there are days and weeks together when no whales are seen. At such times the fishermen, with the exception of one or two who should be kept on the lookout for whales, could devote their attention to the capture of porpoise, and when a whale came in sight they could at once leave off porpoising and start in pursuit.

NOVEL METHODS EMPLOYED IN THE CAPTURE OF TURTLE AND TERRAPIN.—Prior to the war no terrapin were shipped from the district, and the local demand was very light. The fishery was then confined to the capture of a limited number for family use by the fishermen. Recently an extensive business has sprung up and many terrapin are now taken annually and sold to the resident dealers, who confine them in large pounds until it is found desirable to send them to market. They are usually bought from the fishermen at a nominal price during the summer and kept till the market advances in the fall. The catch in 1879, if we include those consumed in the locality, amounted to 1,200 dozen, netting the fishermen $3,500. In winter they are chiefly taken by means of dredges, though we are told that the marshes are occasionally burned, and the terrapin feeling the warmth are induced to leave their bedding places in the hope that spring has come. In summer they are gathered by boys and men who wade through the marshes and paddle about in the shallow water in search of them. They are also hunted with dogs that are trained to follow their trail from the water to their breeding places in the sand.

Loggerhead and hawk-billed turtles are also present in small numbers in the sounds during the summer months. A few are taken and sold in the State at 50 cents to $2 each, but the demand is very limited. Formerly they were caught with spears, but, as they must be kept alive for the market and the wound inflicted by the spear frequently caused death, Capt. Joshua Lewis conceived the idea of diving for them, and this mode of capture is now quite common in this vicinity.

THE CRAB FISHERIES.—Crabs are very abundant in Core and Bogue Sounds. They occur in such numbers in the waters about Beaufort as to be a serious annoyance to the fishermen. There is little sale for them, however, beyond the few tubs that are sent to the larger cities of the State. Both hard and soft shelled crabs are eaten, and a few are occasionally shipped, the latter sometimes being sent to the Northern markets. The crab trade of the region is, however, in its infancy, though it is destined to become an important branch of the fishing interests. In 1879 the total value of those eaten and shipped amounted to about $450.

THE SHIPMENT OF QUAHAUGS.—Beaufort is the most southern point on the coast where quahaugs are extensively taken for shipment. It is said that they occur here in great abundance, and that a man can rake from 3 to 10 bushels at a tide. The local price is 20 to 25 cents a bushel. The clamming season lasts from November to April. The quantity shipped depends wholly on the severity of the winter. During cold seasons, when the bays and sounds farther north are covered with ice, many are shipped by steamer and rail to New York and Philadelphia, but during open winters, when clamming can be carried on in New Jersey, Beaufort, owing to the distance from the markets and the high freights, then abandons the trade. The winter of 1879–'80 was an unusually mild one and few were shipped. The average year's catch amounts to 5,000 or 6,000 barrels.

SCALLOPS TAKEN IN LIMITED QUANTITIES.—Just opposite Morehead City, in the waters of Bogue Sound is a large scallop bed. The species has been taken for local supply from this region for many years, and small quantities have been shipped north from time to time. The business reached its height in the winter of 1876–'77, when over a thousand gallons are said to have been shipped, a few going as far north as New York. Since that date the fishing has been wholly for local supply, the price realized by the fishermen being from 40 to 60 cents a gallon. It is said that one can readily secure from 5 to 7 bushels of them at a tide, and that the average yield is 5 or 6 quarts of meats to the bushel.

176. THE FISHERIES OF WILMINGTON AND VICINITY.

WILMINGTON AS A COMMERCIAL CENTER.—Wilmington, the principal seaport town of North Carolina, is situated on the fresh water of the Cape Fear River, about 30 miles above its mouth. It has long been prominent as a market for naval stores, and as a shipping point for the produce of the surrounding country, including cotton, rice, and peanuts. Its trade in lumber is of considerable importance. The city has a population of 17,000, the larger part being negroes.

WILMINGTON'S RELATION TO THE FISHERIES.—Wilmington's relation to the fisheries differs considerably from that of any other city on the coast. Its location on the fresh water at a considerable distance from the sea renders a vessel fleet impracticable, and its distance by land from the nearest salt-water bays is too great to warrant its people in engaging in the capture of marine species. The fisheries of the city are therefore confined wholly to the capture of shad, herring, sturgeon, and a number of fresh-water species in the river. But the fact that Wilmington has no men engaged in the salt-water fisheries does not prevent it from being a market for marine species. On the contrary, it receives fish, oysters, clams, and shrimp from the inhabitants along the coast for 30 to 40 miles in either direction.

A DESCRIPTION OF THE FISHING DISTRICTS TRIBUTARY TO WILMINGTON.—While the city is nearly 30 miles from the mouth of the river, the shore-line curves inward, so that a few miles north of the cape the salt water is but 7 to 9 miles distant. As in other localities, the coast is bordered by a marshy belt, which is separated from the ocean by a ridge of sand, and there are a large number of inland sounds communicating with each other through diffusely branching tide-creeks. These creeks and sounds extend for miles along either side of the cape, being larger and more numerous on the north than on the south. There are no villages of any size in the vicinity of these sounds, but the higher ridges overlooking them are thickly settled by a class of people who divide their time between the water and the land. At certain seasons, when the fishing is poor, they devote their entire attention to farming, and again, when fish are abundant and the weather is suitable for marketing the catch, they spend most of their time in fishing. At a distance from the city the fishing is most extensive during the winter months, as the catch can be sent to market fresh at this season only. Many fish are also taken in the fall and spring for salting. In the nearer bays the business is prosecuted to a greater or less extent throughout the entire year.

THE EXTENT OF THE FISHERIES.—Prior to 1870 the fishing was confined largely to the capture of mullet from August to December, and the bulk of the catch was salted in barrels, there being at this time no market for fresh fish. Within the past few years, however, Wilmington has developed a large trade in both fresh and salt fish, and the fisheries of the region have gradually increased until in 1879 there were four hundred and forty men, with seventy additional teamsters, engaged in some branch of the fisheries, exclusive of those engaged in the capture of shad, herring, and other fresh-water species, and those in the oyster fisheries.

The fish are usually taken in seines 150 to 200 yards long, in the various creeks and lagoons

above described. The spring fishing begins about the 1st of March, and a greater part of the small seines engage in the capture of trout (*C. maculatum* and *C. regale*), skip-jacks (*P. saltatrix*), thorny-backs, mullet (*M. albula* and *M. braziliensis*), croakers (*Micropogon undulatus*), jimmies (*Liostomus xanthurus*), and fat-backs (*B. tyrannus*), till June, when the water becomes so warm that most of the fish leave the sounds. In June and July there is little fishing in the bays. About the middle of August the mullet make their appearance, remaining in considerable numbers till December. During this season the fishing is at its height, and all of the small seines, with one hundred and fifty additional gill-nets, are employed in their capture in the bays and sounds, while larger seines are fished along the outer shore. Salmon-trout are also abundant at this season, and many are taken by the mullet fishermen. In some localities the trout remain longer than the mullet, and many, especially those living at New River, engage regularly in their capture. Next to the mullet the trout is the principal food-fish of the district.

ARRANGEMENTS FOR MARKETING THE CATCH.—The absence of water communication between Wilmington and the sounds renders it necessary to cart the fish overland. Accordingly, each crew of seiners must have a "marketman," who will be ready with his horse and cart at any time to carry the fish to Wilmington and to sell them to the best advantage, either at wholesale or retail, as he may think proper. For his services he generally receives from 20 to 25 per cent. of the gross sales. There are no less than seventy carts and drivers employed in this way during a greater part of the year, and when the fishing is at its height one hundred and twenty-five fish-carts may often be seen in market at one time. The captain of the "gang" sometimes owns a horse and cart, in which case he usually acts as marketman; but he must furnish a driver, as all of the crew are expected to hold themselves in readiness to haul the seine at any moment; and while one lot is being marketed they are frequently catching another.

THE SUMMER LINE FISHERY ALONG THE OUTER SHORE.—During the summer season, when the seines are laid up, quite a number of the fishermen go to the blackfish banks, several miles from the shore, and fish for blackfish (*Serranus atrarius*), grunts (*Diabasis chrysopterus* and *D. formosus*), and pig-fish (*Pomadasys fulvomaculatus*), for two or three months. It seems from their statements that the fishing banks lying along the South Carolina coast are prolonged as irregular patches and small ridges as far north as New River, and fish are reported all along the southern portion of the State. From three to six men go in a boat, starting at or before daylight, and going 1 to 13 miles from the shore. On reaching the ground, one man is employed in holding the boat in place with the oars, while the others fish, as it is a common belief among these fishermen that they would frighten the fish away by anchoring. On account of this peculiar notion the catch is considerably less than it would otherwise be, for the time of one man must be taken in steadying the boat against the wind and tide.

THE VESSEL FISHERY OF WILMINGTON.—Prior to 1860, Captain Watson, of Wilmington, owned a small smack, and visited the various fishing banks along the outer shore, selling his catch in Wilmington. From that date there were no vessels fishing for this market till the fall of 1879, when the schooner William Tell, of Atlantic City, N. J., came to Smithville, a small settlement at the mouth of the river, and began fishing on the outlying banks for blackfish and trout. She landed her fish at Smithville, and shipped them to Wilmington by steamer. The captain reports fish very plenty as far north as New River, and thinks the business could be made profitable if well followed.

THE LOCAL AND SHIPPING TRADE IN FRESH FISH.—All of the fish taken by the fishermen of the district, with the exception of a few that are salted for family use, are sold in Wilmington. No license is required of the producer for the privilege of retailing his catch. As a result, each market-

man usually backs his cart into line at the market, and disposes of his entire load a bunch or two at a time. In this way he realizes considerably more than he would by selling directly to the dealers. The city trade is thus largely controlled by the producers, and the dealers must confine themselves to a wholesale shipping business, and, when there is a local demand for the catch, it is difficult for them to get their supply at reasonable rates. There are but two firms engaged regularly in the trade, and these, with a few others who buy at intervals during the height of the mullet and trout season, control the shipping trade of the city, which, if the anadromous and fresh-water fishes are omitted, amounted in 1879 to about 60,000 bunches.

THE TRADE IN SALT FISH.—Wilmington has long been an important market for salt fish, and, next to Beaufort, it has the largest trade in salt mullet of any city on the Atlantic coast. The business reached its height about 1871, when, according to Messrs. Hall & Pearsall, 6,000 barrels were handled by the dealers. On account of a growing demand for fresh fish the trade has gradually declined, and for the past eight years has averaged only 4,000 barrels annually, while in 1879 there were but 2,800 barrels of mullet and 200 barrels of other fish brought to the city. The trade is controlled by the wholesale and retail grocers, who get their supply from the fishermen living between Bear Inlet and Little River. Over one-half of the catch comes from New River. The price realized by the fishermen ranges from $1.50 to $4.50, according to the season and size of the fish. A fair average would be $2.50 to $3.25 for packages of 100 pounds.

The city has also a small trade in salt and dried mullet roes. According to Hall & Pearsall, 6,000 dozen were handled in 1871, and 2,000 dozen in 1879; but the average annual trade does not exceed 1,500 dozen. Two-thirds of the entire quantity are brought to market in pickle and sold at 40 to 50 cents per dozen; the remainder are dry-salted and bring a trifle more.

THE TERRAPIN TRADE.—According to Mr. W. B. Davis the terrapin taken in the vicinity of Wilmington are quite small, and not more than one in twenty is large enough for a "count." It seems that no terrapin were shipped prior to 1875, when a steamboat captain began buying for the New York market. In 1878 a party living on Wrightsville Sound began buying and shipping to the Northern market. In 1879 about 500 dozen were shipped, and as many more were consumed locally.

THE SHRIMP FISHERIES.—Shrimp and prawn are said to be very abundant in the sounds and bays near Wilmington from the middle of May till October, though comparatively few are taken. Up to 1872, when the first shrimp-seine was introduced, the catch was wholly with skim-nets, and not over 100 bushels were marketed yearly. From this date the business rapidly increased, and in two or three years eight seines were fished in the locality, the catch being sold in Wilmington at 10 to 25 cents a quart. No shrimp were shipped at this time, and the market was so often overstocked that the business became unprofitable and a number were obliged to turn their attention to other fishing. The first shipment of shrimp from Wilmington, according to Mr. Davis, was in 1878; since that time a trade with the neighboring cities has sprung up that seems destined to become very important. At present (1880) there are four shrimp-seines owned by the fishermen of Middle Sound, each landing about 500 bushels during the season. In addition to these, fifty men are engaged in the fishery with either cast-nets or skim-nets during the height of the season, catching about 60 bushels to the man. Only the largest are saved, and of over 5,000 bushels taken less than half are marketed. The shrimp are usually boiled by the fishermen, after which they are brought to market where they are retailed at 10 cents a quart or sold to the dealers at about $2 a bushel. The sales for 1879 reached about 1,800 bushels, valued at $4,500.

STATISTICS OF THE FRESH AND SALT WATER FISHERIES TRIBUTARY TO WILMINGTON.—The catch of salt-water species for the district lying between New and Little Rivers was 595,000

bunches or 1,950,000 pounds of fresh fish; 3,730 barrels of salt fish; 1,800 bushels of shrimp; 1,200 dozen terrapin; 2,000 barrels of clams, and 2,000 dozen mullet-roes; the total value of these sea-products was about $82,000. According to Colonel McDonald the fresh-water products were as follows: 5,250 sturgeon in number, equal to 262,500 pounds of dressed fish, valued at $15,750; 45,500 shad, valued at $13,650; 12,000 pounds of rock, worth $720, and 25,000 pounds of mixed fish, valued at $1,000. The above figures make the fisheries of the region worth $113,120.

177. HISTORY OF THE MENHADEN FISHERIES OF NORTH CAROLINA.

CAN THE MENHADEN FISHERIES BE MADE PROFITABLE IN NORTH CAROLINA?—North Carolina is practically the southern limit of the menhaden fisheries of the Atlantic coast. An attempt was made to establish an oil and guano factory at Charleston, S. C., a few years since, but the plan was abandoned after the first day's fishing on account of the abundance of sharks in the water. Several attempts have been made to locate factories on the North Carolina coast, and some parties have prosecuted the business with varying success for several years. Thus far, however, no one has succeeded in making it profitable. It is, therefore, an open question whether this fishery can be successfully prosecuted in the State. The chief difficulties are the abundance of sharks along the shore and the shoalness of the various inlets, which will not admit a menhaden steamer of ordinary draught without risk of loss. Again, the currents at the inlets are so strong that sail vessels are often unable to enter them when the tide is unfavorable, and they are thus frequently delayed so long that the fish spoil before they reach the factory. Menhaden are quite abundant in the inner sounds, but the water is usually so shoal as to interfere seriously with the use of purse-seines, and the fish are so scattered that only a few barrels can be taken at a haul.

THE FIRST MENHADEN OIL AND GUANO FACTORY IN NORTH CAROLINA BUILT IN 1865.—It is said that the first oil and guano factory in the State was built on Harper's Island, in Core Sound, in 1865. It was supplied with kettles, and hand-presses were used for pressing the fish that were taken in gill-nets. Later a steam boiler was secured, and both haul and purse-seines were used in the fishery. The business was continued at this point till 1873, when the apparatus, valued at $3,000, was removed to Cape Lookout as a more desirable location, but the machinery was never set up and the business was discontinued.

THE ESTABLISHMENT OF THE EXCELSIOR OIL AND GUANO COMPANY IN 1866, AND THE DIFFICULTIES ENCOUNTERED.—A large factory was built about 1866 by a stock company from Rhode Island, known as the Excelsior Oil and Guano Company. We are indebted to Mr. S. H. Gray, the business manager of the company, for the following facts. The idea originated with some of the soldiers of the Northern army that were stationed in the region during the war. These gave glowing accounts of the abundance of fish in the North Carolina sounds, and a party of capitalists, having satisfied themselves from personal observation of the truth of the statements, formed a company with a capital of $50,000, and built a factory at Portsmouth, near Ocracoke Inlet. The factory was supplied with modern apparatus for cooking and pressing the fish, and had experienced northern fishermen to handle the seines. The menhaden were soon found to be less plenty than had been expected. The average school contained less than 25 barrels, and the largest haul of the season was only 125 barrels. It was also found that under the influence of the hot summer weather the fish would begin to decompose in a few hours, so that the fishing was limited to 25 miles on either side of the factory. Another difficulty was that "outside fishing" could not be prosecuted on account of the shoalness of the water at the inlets, and the frequency of sudden storms, which might come up during the hours of low water, when the vessels could not enter. Again, the fish taken in the sounds were found to be very poor, and, according to Mr. Gray, the average yield of oil was only 2 quarts to the barrel, and the largest did not exceed 8 quarts. At the close of the

third year, when it had been thoroughly tested, the business was abandoned, with a loss of the original capital and $25,000 additional. Mr. Gray gives it as his opinion that it would be impossible to make the menhaden fisheries profitable along this coast.

CHURCH BROTHERS' FACTORY AT OREGON INLET.—The next factory was built at Oregon Inlet by Church Brothers of Rhode Island, who later associated with themselves Mr. J. W. Etheridge, of Roanoke Island, North Carolina. According to Mr. Etheridge, this factory was built about 1870, and, after running two seasons, it was closed on account of the strong current that prevented the vessels from passing in and out of the inlet. The first season a menhaden steamer, the Seven Brothers, was used, and the following year the fishing was prosecuted by means of small sail vessels.

A FACTORY BUILT AT CAPE FEAR IN 1871 BY THE NEVASSA OIL AND GUANO COMPANY OF WILMINGTON.—In 1871 the Nevassa Guano Company, of Wilmington, established a menhaden fishery at the mouth of the Cape Fear River, for the purpose of supplying their factory with fish-scrap, to be used in the manufacture of fertilizers. They had two vessels that were provided with purse-seines, and two carry-away boats; but, after two seasons, the business was abandoned with a loss of $8,000 to $10,000. The president of the company says that the principal obstacles in the way of success were the scarcity of fish, and the limited amount of oil to be obtained from them. Not over 500 barrels of fish were taken in any one week, and the average yield of oil was but three pints to the barrel.

RECENT EXPERIMENTS BY CAPTAIN CAIN.—In 1878 Capt. I. Cain, of Roanoke Island, made some experiments that satisfied him that the menhaden fishery could be carried on with profit. Accordingly, in the spring of 1879, he provided himself with kettles and presses, and fitted out a small vessel to engage in the fishery, but the fish did not enter the sounds in sufficient numbers to warrant him in beginning the work. The present season (1880) he intends to purchase a steam boiler and hydraulic presses for engaging extensively in the business.

178. THE WINTER BLUEFISH FISHERY OFF THE NORTH CAROLINA COAST.

THE BLUEFISH VISIT THE SHORE TO FEED UPON THE SHAD, MENHADEN, AND OTHER SPECIES.—The winter bluefish fishing of North Carolina is confined to that portion of the coast lying between Ocracoke Inlet and Cape Henry, the bulk of the fish being taken between Cape Hatteras and Currituck Sound. The fish seem to be drawn to the shore by the large schools of shad, herring, menhaden, and other species that visit the different sounds during the summer months. The coast has but few inlets, and these are often widely separated from each other, while the water for miles to seaward is so shoal that the fish have little chance to escape, and fall an easy prey to their pursuers. At those seasons of the year when the fish are approaching or leaving the inlets—namely, in the spring and fall—the bluefish are said to gather in immense numbers to feed upon them, and the presence of a school of fish of almost any of these species is a strong indication that the bluefish are not far distant. In the fall the menhaden that have been feeding in the sounds during the summer months are gradually driven to the outer shore by the decreasing temperature of the water; here they remain in considerable numbers for several weeks before leaving for their winter quarters. At this time the large bluefish gather for the feast, and remain until the school on which they are feeding is completely destroyed, or till the fish leave for the deeper water. When the shad, herring, and menhaden return in the spring the bluefish are said to be still among them. When feeding they are often so greedy as to strew the water with fragments of the fishes that they have mutilated, and to even redden their path with the blood of their victims. They occasionally surround their prey and drive them into the surf, where many are caught by the waves and thrown upon the shore. During a visit to the region in May, 1880, the fishermen reported finding many

shad lying upon the beach where they had been driven by their pursuers, and bluefish were said to be abundant in the water.

THE FIRST LARGE BLUEFISH TAKEN IN 1842.—It seems that little was known of the presence of large bluefish in the locality prior to 1842, though small ones had often been seen and taken in the sounds. At this time Mr. Adam Etheridge, of Roanoke Island, saw and captured a school of 350 of them near New Inlet with a haul-seine. These fish averaged 12 to 15 pounds apiece. A few were taken from time to time from that date, but no extensive business was done till 1849, when Capt. J. B. Etheridge made a seine of heavy twine expressly for bluefish, and in 1850 he claims to have landed between 4,000 and 5,000 large fish at a single haul. In 1852 there were three bluefish seines in the locality. This method of capture has continued to the present day, though gill-nets are now more extensively used, as they are thought to be far preferable to seines. The first gill-net was introduced by Mr. Midgett, of Roanoke Island, in 1853, and from that date their number has gradually increased.

NORTHERN VESSELS FIRST VISITED THE REGION IN 1866.—As nearly as can be ascertained, no vessels engaged in this fishery prior to 1866; but at the close of the war the Northern fishing vessels began to visit the locality with nets and boats, carrying their catch in ice to the Northern markets. They also bought a large part of the fish taken by the residents, and within a few years the business assumed important proportions. The fishery reached its height between 1870 and 1876, when, according to Mr. J. W. Etheridge, fully one hundred crews, averaging five men each, fished along the shore between Hatteras Inlet and Cape Henry. At this time about twelve sail of Northern vessels came yearly to the region to catch and buy; while local dealers bought extensively for shipment to the Northern markets. For the past three years few fish have been taken, and the vessel fleet has been greatly reduced. In the fall of 1879 not a single vessel visited the region.

The boat fisheries have also been reduced to seventy crews of five persons each, making a total of three hundred and fifty men. Many of these are parties employed at the various life-saving stations along the shore. Such are permitted to fish within the limits of their respective districts. They fish only occasionally or at times when the fish are unusually abundant.

THE EXTENT AND METHODS OF THE FISHERY.—The fishing begins about the 1st of November and continues till Christmas, when the bluefish follow the menhaden into deeper water. During the fishing season the men remain constantly on the shore and those not employed in the life-saving service build small shanties for cooking and sleeping. Two crews, or ten men, usually occupy a camp together. Each crew is provided with a boat and two or three nets. The nets are 100 yards in length, with a mesh varying from 4 to 6 inches, and have an average depth of fifty meshes. They are set on the bottom at a distance of one quarter to four miles from the shore, and the mesh is so large that the small fish pass easily through them, while the bluefish are "gilled" in attempting to follow. The catch varies considerably from year to year and also from day to day during the season. At times very few fish will be seen, and again they will be so plenty that a crew may secure a large part of their season's catch in two or three days. In 1850, as has already been stated, between 4,000 and 5,000 fish, averaging 12 pounds each, were landed at a single haul of the seine, and on December 28, 1874, the crew of one boat took 1,700 in three gill-nets. During the height of the fishing an average catch was 3,000 to 4,000 fish of 10 to 12 pounds' weight to the boat each season. In 1879 bluefish were more plenty than in either 1877 or '78, but they were so small that many passed through the meshes of the nets; and the average of those taken did not exceed 6 pounds. The total catch for 1879, according to Capt. J. W. Etheridge and others, was about 40,000 fish, valued at $6,000.

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PART XIII.

THE FISHERIES OF SOUTH CAROLINA AND GEORGIA.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of the Fisheries of South Carolina and Georgia:
179. Description of the more important fishery interests.
B.—The Fisheries of South Carolina:
180. Statistical recapitulation.
181. Georgetown and its fishery interests.
182. Charleston and its fishery interests.
183. The fisheries of Beaufort and Port Royal.
C.—The Fisheries of Georgia:
184. Statistical recapitulation.
185. Savannah and its fishery interests.
186. Brunswick and its fishery interests.

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PART XIII.

THE FISHERIES OF SOUTH CAROLINA AND GEORGIA.

A.—GENERAL REVIEW OF THE FISHERIES OF SOUTH CAROLINA AND GEORGIA.

179. DESCRIPTION OF THE MORE IMPORTANT FISHERY INTERESTS.

DESCRIPTION OF THE COAST.—The States of South Carolina and Georgia, with a coast-line of 250 miles, are bordered by a belt of rich grassy swamp-land separating the ocean from the higher ground of the interior. This belt, comprising the famous Sea Island region, extends almost without interruption along the entire coast of both States. It varies in breadth from 5 to 30 miles, and is broken up into an almost innumerable number of islands, separated from each other by a vast network of channels or tide-creeks varying from a few feet to a mile or more in width. These channels communicate freely with each other to form a continuous inland passage. In fact the tide-creeks are everywhere so numerous along this portion of the coast that a small boat can readily pass from the lower part of North Carolina to Florida without once venturing outside. Many of the channels are deep enough to be navigable by shoal-draught steamers for a considerable distance, but they are often too narrow and crooked to admit of the extensive use of sail vessels.

The general evenness of the shore is interrupted at short intervals by large bays and sounds. These vary greatly in size, some being simple indentations of the coast without any tributaries of importance; others are formed by the expansion of a single stream at the point where it empties into the sea, while still others receive the waters of several of the more important rivers of the State. The mouth of each sound is obstructed by a bar, but in most cases the currents have cut out channels deep enough to admit the ordinary coasting or fishing vessel of the region. In this manner excellent harbors are provided where the trading-vessels and fishing-smacks may find safe anchorage during stormy weather.

Some of the islands are so low and damp as to be nearly worthless. Others are dry, and have a soil that is remarkably rich, and well adapted to the growth of cotton. Prior to the war the larger islands, especially those in the southern portion of the district, were extensively cultivated by wealthy planters, and a large number of their slaves were kept in the region; but since obtaining their freedom many of the negroes have removed to the higher lands of the interior, and some portions of the coast appear quite deserted, though in other localities a good many blacks and a few whites still remain. On the South Carolina coast the only places of importance are Georgetown, Charleston, and Beaufort; while in Georgia, Savannah and Brunswick are the only sea ports of over five hundred inhabitants.

THESE SHORES A FAVORITE SPAWNING AND FEEDING GROUND FOR VARIOUS FISHES.—The waters of the district, like those of Florida, abound in fish of various kinds during the entire year, and the sounds and their river tributaries are the spawning and feeding grounds of a large number of edible species. The salt-water creeks along the shore abound in shrimp, and the extensive marshes and muddy bays are the homes of large numbers of terrapin.

THE OUTLYING CORAL BANK AN IMPORTANT FISHING GROUND.—At a distance of 10 to 20 miles from the shore, in from 10 to 18 fathoms of water, we find an irregular coral bank extending along the entire coast. It is broken up into patches several miles in extent; these are separated from each other by broad areas of sand. The patches are covered with various species of corals and sponges common to more southern latitudes, and among them are large numbers of mollusks and articulates. The abundance of food on the banks, together with the shelter afforded by the corals, make them the favorite feeding grounds of immense schools of fish, chief among which is the blackfish (*S. atrarius*), from which the banks derive their name. They have long been visited by the smack fishermen of New England, who come south each winter to engage in the capture of blackfish to supply the Charleston and Savannah markets. At present the smack fisheries of the district are confined almost wholly to Charleston, and they will be treated more fully under the fisheries of that city.

THE BOAT FISHERIES.—The shore fisheries of the district are very limited. They are confined largely to the vicinity of Charleston and Savannah, where a market is found for the catch. There are a few other points, also, where Northern fishermen, together with those from Charleston and Savannah, engage extensively in the capture of shad and sturgeon (*Acipenser sturio*), shipping their catch either by water or rail to these markets or through them to the larger cities of the North. In addition to the above many of the inhabitants of the more isolated regions depend largely on the water for their food, and most of them have small boats in which they visit the larger creeks with hook-and-line or cast-nets to catch a supply of fish for their own tables, as well as for those of their neighbors. Few fish, if any, are salted by these people, even for home use, but at certain seasons, when some particular species is unusually abundant, some of the men fish more extensively for several weeks, sending their catch to market.

KINDS OF FISH TAKEN.—The principal species taken along the shore are mullet (*Mugil albula* and *M. braziliensis*), spotted trout (*Cynoscion maculatum*), yellow-finned trout (*Cynoscion regale*), whiting (*Menticirrus alburnus*), croakers (*Micropogon undulatus*), bass (*Sciæna ocellata*), drum (*Pogonias chromis*), blackfish (*Serranus atrarius*), sheepshead (*Diplodus probatocephalus*), porgies (*Stenotomus chrysops* and *Pagellus* sp.), bluefish (*Pomatomus saltatrix*), shad (*Clupea sapidissima*), and sturgeon (*Acipenser sturio*).

THE STURGEON FISHERY.—According to Colonel McDonald, who has given special attention to the subject, the sturgeon fisheries are prosecuted in many of the larger rivers of South Carolina and Georgia by both Northern and resident fishermen. The fishing begins on the Satilla River, in southern Georgia, about the middle of February, and extends northward as the season advances, closing at Georgetown, S. C., about the 1st of May. The sharp-nose sturgeon (*Acipenser sturio*) is the common species of the locality. These fish average 150 pounds each. They are taken wholly in gill-nets of 12-inch mesh, 80 to 150 fathoms in length. The men live in camps on the river bank, and when fish become scarce in one stream they move to another. The principal sturgeon rivers are the Satilla, Altamaha, Ogeechee, Savannah, and Combahee, in Georgia, and the Edisto and Waccamaw in South Carolina. The outfits are usually owned by capitalists who hire their crews at from $25 to $40 per month. An outfit for three men, including net and boat, costs about $130. An average catch for the season is 100 fish to the net in Georgia and 125 to 200 in

South Carolina. The fish are sent either to Savannah or Charleston, where they are dressed and packed for shipment to New York and Philadelphia. In some localities the roe is saved and prepared for market under the name of caviare.

Four Savannah firms were interested in the sturgeon fisheries of Georgia in 1880, and 109 men with 48 nets were engaged in the capture of the species. The catch amounted to 4,800 sturgeon in number, or 312,000 pounds of dressed fish, having a local value of $21,840; 42,000 pounds of roe, worth $2,940, were also saved. In South Carolina there were 44 men, with 21 nets, engaged in this fishery; these marketed 3,825 sturgeon in number, equal to 229,500 pounds of dressed fish, and 38,250 pounds of caviare, valued at $13,770.

The shad fisheries of this district are quite extensive. A detailed account of them will be found under the shad fisheries. The catch is marketed wholly in Charleston and Savannah.

THE TERRAPIN FISHERIES.—Just when and where the terrapin fisheries of this district were inaugurated we have been unable to learn, but prior to the rebellion a large number of men engaged regularly in the fishery, and several thousand dozen were shipped annually to the Northern markets, the fishermen receiving an average of $6 per dozen for their catch. It is said that the fishery was at its height, both as to number of men employed and capital invested, in 1860. At that time a few Northern fishermen visited the region in small sloops, and parties from Charleston and Savannah had vessels and boats for the same purpose. During the war the fishery was wholly discontinued, but in 1866 it was again pushed with a good deal of vigor, and from 5,000 to 6,000 dozen terrapin were caught between April and November. One vessel with six men landed 870 dozen.

Terrapin have been and are still quite abundant in most of the sounds and tide-creeks of the district, but are said to be most numerous in Bull's Bay, and in Saint Helena and Saint Andrew's Sounds. They are usually caught in haul-seines 60 to 90 fathoms long, and 18 to 20 feet deep. The vessel, with a crew of three to six men and one or two boats and seines, enters the larger sounds, and the fishermen visit the little creeks in their bateaux in search of the terrapin. On entering a stream they often pound on the gunwale of the boat, and if terrapin are present they are said to rise to the surface to learn the occasion of the noise. If none are seen the net is seldom set; but if plenty, one staff of the seine is stuck in the mud of the bottom and the net is thrown out in the form of a circle, after which it is rapidly hauled into the boat. This method is locally known as "bucking." When the surroundings are suitable the net is often hauled upon the shore. The fishing season usually lasts from the time the terrapin make their appearance in April till the middle of October, when they bed in the mud for the winter. Occasionally these winter beds are discovered and whole colonies are captured. Bucking was formerly the principal method employed in the capture of the species, but as the fisheries have declined a method known as "torching" has been extensively adopted by the negroes of the locality, who visit the sandy beaches at night with large fire-brands, and catch the terrapin as they crawl out on the sand to deposit their eggs.

For the past ten years this fishery has been on the decline, owing largely to the lack of a suitable market and to a growing scarcity of terrapin. At present no one follows this fishery during the entire year, but a number engage in it for a few weeks when the terrapin can be most easily secured, after which they seek other employment.

The price now paid by the terrapin dealers varies from 10 to 35 cents each for "counts," with a proportionate reduction for smaller sizes down to 5 inches. "Bulls" measuring less than 5 inches have little value, and are usually not considered marketable.

In 1879 there were thirty-seven men, with sixteen nets, engaged in this fishery, in addition to the "torchers;" and the total catch was about 1,200 dozen, having a local value of $3,600.

THE BULK OF THE FISHING NEAR THE LARGER CITIES.—The fisheries are confined chiefly to the vicinity of the larger settlements. A description of the fisheries of the principal cities, including Georgetown, Charleston, and Beaufort, in South Carolina, and Savannah and Brunswick, in Georgia, will therefore include everything of importance connected with the fisheries of both States.

B.—THE FISHERIES OF SOUTH CAROLINA.

180. STATISTICAL RECAPITULATION.

South Carolina comes twentieth in the list of fish-producing States, with 1,005 fishermen and products valued at $212,482. This State is, however, noted for its shrimp fisheries, which are more extensive than those of any other State, and nearly equal to those of all other States combined. In 1880 the fishermen secured 18,000 bushels, valued at $37,500. The principal sea fisheries are about Charleston, where several hundred negroes, with an occasional Spaniard, are engaged in fishing with hand-lines from vessels and small boats to supply the city with whiting, blackfish, and other species. A limited fishery occurs in the sounds about Beaufort, from which point a few fish are shipped to the interior cities. Beyond the places mentioned no sea fishing of importance occurs, though there is more or less fishing for local supply along all portions of the coast. About 400,000 pounds of alewives, 207,600 pounds of shad, and 261,250 pounds of sturgeon, with considerable quantities of other species, were taken by the river fishermen, the largest fisheries being on the Edisto River and in the tributaries of Winyah Bay.

The extent of the commercial fishery interests of the State are fully shown in the annexed statements:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	964
Shoremen	41
Total	1,005

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (337.32 tons)	22	$15,000
Boats	501	9,790
Pound-nets and hack-traps	10	800
Fykes, pots, and baskets	20	100
Gill-nets	66	3,415
Dip-nets and cast-nets	440	2,565
Drag-seines	44	2,725
Minor apparatus, including outfit		16,380
Factories and other shore property		11,550
Additional cash capital		3,950
Total capital		66,275

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	6,143,250	$212,482
Sea fisheries.		
Bluefish	200,000	4,000
Clams (hard)	48,000	3,300
Crabs	42,000	750
Mullet	232,000	7,210
Oysters	350,000	20,000
Shrimp	630,000	37,500
Spotted sea-trout	180,000	4,500
Squeteague	290,000	5,800
Terrapin	23,400	1,950
All other species	3,104,000	88,115
Total sea products	5,099,400	173,125
River fisheries.		
Alewives	400,000	9,000
Shad	207,600	12,432
Sturgeon, including caviare	261,250	15,675
All other species	175,000	2,250
Total river products	1,043,850	39,357

The statistics of the sea-fisheries of South Carolina are shown in the following statements:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	629
Shoremen	24
Total	653

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (157.32 tons)	10	$10,900
Boats	237	4,250
Fykes, pots, and baskets	20	100
Gill-nets	10	250
Drag-seines	43	2,650
Dip-nets and cast-nets	310	2,175
Minor apparatus, including outfit	.....	10,900
Factories and other shore property	.....	7,000
Cash capital	.....	3,950
Total capital	.....	42,175

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	200,000	$4,000
Clams (hard)	48,000	3,300
Crabs	42,000	750
Mullet	232,000	7,210
Shrimp	630,000	37,500
Spotted sea-trout	180,000	4,500
Squeteague	290,000	5,800
Terrapin	23,400	1,950
All other species	3,104,000	88,115
Total	4,749,400	153,125

181. GEORGETOWN AND ITS FISHERIES.

Georgetown is a village of 1,200 inhabitants, situated at the head of Winyah Bay, about 50 miles northeast of Charleston. It is located in the midst of a large rice-growing section, and has also a large trade in lumber. It has no railroad communication with the interior, and sail-vessels are largely depended upon for the transportation of heavy materials to and from the place. A small steamer makes weekly trips between Georgetown and Charleston, this being its only regular communication with the outside world.

Its fisheries, owing to the poor shipping facilities, are largely of a local nature, except in the spring, when fishermen come from the North to engage in the shad and sturgeon fisheries. According to Colonel McDonald, thirty-nine men, with fifteen nets, are engaged in the former, and thirty-two men, with sixteen nets, in the latter fishery, between the last of January and the 1st of May. Of these, forty are from the North, and the remainder are chiefly resident negroes, who are hired to assist them during the season. The shad are mostly consumed in Charleston, and the sturgeon are shipped by way of Charleston to Philadelphia and New York.

The only shipment of salt-water fishes is during the fall and winter months, when mullet and trout are taken in large quantities; after supplying the local demand the remainder are sent to Charleston. The number shipped in this way varies considerably from year to year, but averages about 5,000 bunches of mullet and 500 to 800 bunches of mixed fish. The total catch for 1879, exclusive of shad and sturgeon, is estimated at 12,000 strings of mullet and 5,000 bunches of mixed fish, valued at $2,500.

182. CHARLESTON AND ITS FISHERY INTERESTS.

CHARLESTON AS A COMMERCIAL CENTER.—Charleston, the metropolis of South Carolina, occupies a peninsula bounded by the Cooper and Ashley Rivers. It has a spacious harbor, with sufficient water at low tide to admit all vessels of light and medium draught, while those of larger size can enter with safety during the hours of high water. It has, therefore, a prominent place among the seaports of the country, and ranks as the third commercial city of the South. It was settled by the English in 1679. In 1800 its population was about 19,000; in 1850, 43,000; and in 1870, despite the disastrous effects of the war, it had increased to 49,000. The chief business of the city is the exportation of cotton, rice, and naval stores, together with the manufacture and shipment of fertilizers from the celebrated phosphate beds of the locality.

THE CHARLESTON FISHERIES IN ANTE-BELLUM DAYS.—The fisheries of Charleston are now more important than those of any other city between Sandy Hook and Key West, and, barring Atlantic City, it is the only place between New Jersey and Florida that has a vessel fleet engaged regularly in the food-fish fisheries throughout the year. For many years prior to the rebellion the fisheries were controlled largely by Northern fishermen, together with Spaniards, free negroes, and a few others who bought their time from their masters. At that time the vessel fisheries were very extensive, and a greater part of the supply was landed by the smacks. In 1860, according to Mr. J. S. Terry, the oldest fish dealer of the city, there were about fifteen New England smacks engaged in fishing for the Charleston market during the winter months. These came South in the early fall and remained till the middle or last of May. They engaged chiefly in the capture of blackfish (*Serranus atrarius*) and landed enormous quantities, it being not an uncommon sight to see 100,000 in the cars of the dealers at one time. At this time Charleston had a large shipping trade, supplying the entire region, including Savannah, with the greater part of their fish during the winter months. Very few fish were shipped in summer, and after the smacks

went North the city was supplied by the few small boats of the place, while in some cases slaves were detailed to supply the tables of their masters.

CHANGES IN THE EXTENT AND METHODS OF THE FISHERIES DURING THE PAST TWENTY YEARS.—The fisheries of Charleston at present are quite different from those just described. With the completion of the Florida railroads extensive fisheries have been established in that State, and its fishermen are now supplying a large part of the country formerly dependent on Charleston. This competition has had its effect upon the fisheries of Charleston, and has tended toward a great reduction of the fishery interests of the place. Other causes, however, have more than counteracted the injurious effects of competition, and the fisheries of to-day are more extensive than those of the past.

The emancipation proclamation threw a large class of people upon their own resources, and the first impulse of freedom led many to forsake their old masters and plantation life, and to seek employment in the city. With their natural love for boating and fishing many of them drifted into the fisheries as a desirable way of obtaining a livelihood. Finding their earnings equal to those of any other class, and the work usually lighter, the number of fishermen has gradually increased until in 1880 there were nearly 600 people either catching or handling fish during some portion of the year, with about 1,700 people depending upon them for support. Of this entire number, 94 per cent. are negroes, about 4 per cent. are Spaniards, and only 2 per cent. are Americans.

The demand for fish has greatly increased, for many of the negroes who cannot afford the luxury of a meat dinner, live largely on the cheaper grades of fish as giving the greatest bulk for the least money. New markets in other sections have also been opened up, and Charleston is now supplying many of the villages of North and South Carolina and Georgia with their fish; while a few are sent to the markets of the north. The result of the change above mentioned is that Charleston is no longer dependent upon the northern fishermen, but is supplied chiefly by her own citizens; and instead of the fifteen northern smacks of 1860, there is now but one, with ten additional owned in Charleston, seven of which fish during the entire year, and the others fish occasionally while acting as harbor pilot boats.

THE VESSEL FISHERIES OF CHARLESTON.—The smacks vary in size from 10 to 30 tons, and in value from $300 to $2,000. They are manned and officered exclusively by negroes and Spaniards, carrying from four to six men each. They fish wholly for blackfish (*S. atrarius*), though a few porgies (*Stenotomus chrysops* and *Pagellus* sp), jacks (*Seriola carolinensis?*), red-snappers (*Lutjanus Blackfordii*), bastard-snappers (*Sparus pagrus*), grunts (*Diabasis chrysopterus* and *D. formosus*), bream (*Sargus Holbrookii*), squirrel-fish (*Diplectrum fasciculare*), and hake (*Phycis Earllii*), are taken. They make Charleston their headquarters, and remain in harbor during the stormy weather. The grounds visited are the coral banks, 10 to 18 miles from the shore, extending to Bull's Bay on the north, and to Saint Helena Sound on the south. They are usually absent from four to six days on a trip, and when sudden storms arise they often put into the nearest harbor for shelter.

The fish are taken wholly with hand-lines from the vessel's deck. One man usually tends two lines with four to eight hooks each, the lead being placed at the extreme end several feet below the hooks to prevent them from becoming entangled in the coral of the bottom.

The catch varies greatly from day to day and from year to year, and is claimed to be less than formerly, though we find no good reason for believing that such is the case.

In January, 1858, the smack Connecticut, of Noank, Conn., took 3,200 blackfish in a single day; and in the winter of 1872–'73, the Althea Franklin, Capt. B. F. Baker, of the same port, landed 45,000 "count" blackfish, equal to 50,000 individuals, beside 5,000 other fish, between October 1 and April 15. At present the catch averages 30,000 fish yearly for each smack, and the

stock is usually about $2,000, though a vessel fishing regularly when the weather is suitable will do considerably better, and there are occasional catches equaling those of former years.

The fish are brought alive to the city where they are transferred to the cars of the dealers. The price realized by the fishermen is 6 cents apiece for those weighing 8 ounces and upwards; smaller fish are counted 3 for 2, or 2 for 1.

THE BOAT FISHERIES.—The boat fisheries of Charleston have gradually grown in importance until at the present time several hundred men engage regularly in the business during the spring, summer, and fall. In winter many of the fishermen, finding the weather stormy and the hook-and-line fish at a considerable distance from the shore, seek employment as stevedores or laborers on the cotton wharves of the city, this being the busy season of the year. During December and January the boat fisheries are prosecuted only by the seine fishermen, who visit the numerous hauling beaches along the banks of the rivers and in the numerous tide-creeks, from 10 to 30 miles on either side of the city, catching trout, small mullet, bass, and numerous other species.

Early in January the shad fishermen begin their preparations for fishing on the Edisto, Pedee, Santee, and Ashapoo Rivers, and by the last of the month they are actively engaged in the work. The fisheries continue in this condition until the middle of April, when the whiting (*Menticirrus alburnus*) reach the shore. The work on the wharves is now nearly over, and the men, after repairing their fishing lines and putting their boats in order, are again off for the fishing grounds. When the shad fishermen return late in April they at once lay aside their seines and nets and join in the hand-line fishery. The line fishing continues till late in November.

The fishing is wholly from small open sail-boats, which carry from two to seven men each. One man usually owns the boat, and the others pay from 10 to 20 cents a day for the privilege of sharing it. In spring the boats fish along the outer shore within a few miles of the harbor, so that they can run in when a storm comes suddenly upon them. During the summer months the fishermen become more bold, and many of them resort to the inner blackfish banks, 10 to 15 miles from land, for porgies, grunts, bastard snappers, and blackfish, while others remain on the inshore grounds catching summer trout, skipjacks, croakers, and whiting. Each fisherman keeps his fish separate, and during the homeward passage strings them into bunches of 3 to 5 pounds each, and on arriving at the wharf he sells them from the boat to dealers or peddlers at 8 to 30 cents a bunch, according to the kind and the condition of the market. No one is allowed to retail his fish at the landing. The average catch is from 12 to 20 bunches to the man, and the price realized from their sale averages between $2 and $3.50 daily.

THE MULLET FISHERY.—In September the "fat mullet" arrive, and the seine fishermen lay aside their lines and repair to the outer shores of Sullivan's and Long Islands with drag-seines. The roe mullet arrive in October, and a few of the fishermen continue in the fishery till they again disappear; but the majority return and fish with hook and line for whiting, that are quite plenty from this date till the 10th of December. Large numbers of mullet are often taken during the season. In 1859 it is said that 4,200 bunches, equal to 18,000 fish, were taken at one haul of the seine on the beach at Sullivan's Island, and in 1868, 3,000 bunches, or 13,000 fish, were taken at a single haul in the same locality. In 1879 there were seventy-two men, with twelve seines, engaged in this fishery. The largest single haul was 1,100 bunches, or 5,000 mullet; and the average catch for the season was about 2,500 strings to the net. The fish were sold fresh in Charleston at an average of 12 cents a bunch, only an occasional barrel being salted for family use.

Early in December the weather becomes stormy, and the whiting leave the shore. The fishermen owning seines then engage in the capture of trout and other species in the creeks, while the remainder work on the wharves till the following April.

THE SHRIMP FISHERY.—Another fishery of peculiar importance at Charleston is that for shrimp and prawn. The fishing had not fairly begun at the time of our visit to Charleston, and we are indebted to Messrs. C. C. Leslie, J. S. Terry, and others for the information concerning it. Shrimp are taken in any of the rivers and creeks from the 1st of April till the middle of November. In April they seem to occur only in particular localities, and six seines, with crews of six men each, are employed in their capture during the two or three hours of low water at night, the lucky boats often securing 10 to 20 bushels, while the less fortunate ones return with only 4 or 5. Early in May, when the shrimp become more plenty, the seines are laid aside, and their owners, with many others, provide themselves with cast-nets and engage regularly in the business. The fishing soon reaches its height, when it is said that one hundred and twenty men and boys, with sixty boats, are regularly employed in the capture of the species. During June and July the daily catch often exceeds 100 plates, of about 1 quart each, to the boat, and the average for the season is not less than 60 to 75 plates per day.

All of the shrimp taken during the first of the season find a ready sale at about 50 cents a plate to the hook-and-line fishermen of the city, who use them as bait in the shore fisheries. During seasons of scarcity they sometimes sell as high as 2 cents each, or nearly $1 per plate. The fishermen prefer shrimp to any other bait, and think them almost indispensable to their success. Each man buys from 1 to 2 plates daily, according to the fishing that he expects. As they become more plenty the price declines to 25, then to 15, and later to 10 cents; the average retail market price is 15 cents, and from the boats 8 to 10 cents.

In addition to the men catching shrimp, a large number are engaged in vending them through the streets of the city. Taking these into account, the shrimp fisheries of Charleston, according to the most reliable estimates, give employment to two hundred people during seven months of the year; and the shrimp taken have a value of fully $35,000 at first hands, and their retail value is nearly $60,000. Of the entire catch, all but a few hundred bushels are used in the city.

AN UNSUCCESSFUL ATTEMPT TO ESTABLISH A MENHADEN FISHERY AT CHARLESTON.—We are informed by Capt. Samuel Corker and others that menhaden (*Brevoortia tyrannus*) are often very abundant in the Charleston waters. About the 1st of April these fish make their appearance in large schools a few miles from the shore, and continue to increase in numbers for several weeks. Later they gradually disappear, and in midsummer are much less plenty. They are again abundant in the fall, at which time they enter the numerous bays and tide-creeks along the shore, where they are said to remain till late in December.

Captain Corker, who is one of the most enterprising colored fishermen of the South, was for several years employed in the menhaden fisheries of Long Island Sound, where he became thoroughly acquainted with the methods of fishing and the work in the factory. Returning to Charleston in 1876, he decided to engage in the menhaden fisheries after the manner of the Northern fishermen. Accordingly he secured the necessary outfit, including schooner, purse-seines, kettles, and presses, and when all was in readiness started for the fishing grounds. He soon had a school of about 200 barrels of fish inclosed in his seine, but before he could dip them out the sharks gathered for the feast, biting and tearing the netting in their efforts to get at the menhaden, until nothing remained but the cork and lead-lines. The sharks gained the day, for, taking up the remnant of his seine, Captain Corker returned to the shore and gave up the business. This attempt is noteworthy as being the most southern point where the purse-seine has been used, and indeed the only point south of Wilmington, N. C., where an attempt has been made to catch the menhaden for their oil.

THE RETAIL FISH TRADE OF CHARLESTON.—Prior to the war there was but one firm in

Charleston that did an extensive business in fresh fish, and the trade was largely controlled by peddlers, who vended them through the streets. At the present time there are five firms that do a regular business. These rent stalls in the market, where they do a retail business, and have packing-houses where they box and ice their fish for shipment. Other parties occasionally rent stalls for a day or two, and sell fish, crabs, or shrimp; but the market trade is largely controlled by the five firms. A few cod (*Gadus morrhua*), haddock (*Melanogrammus æglefinus*), and halibut (*Hippoglossus americanus*) are brought from the North during the winter months by one of the firms, and red snappers and other species are occasionally brought from Savannah; but aside from these the market is supplied wholly by the Charleston fishermen. The fish dealers of the city, however, control but a small part of the retail trade, for the bulk of the catch is taken directly to the consumer by negroes, who go about the city with trays of fish and shrimp upon their heads.

About the beginning of the present century the city government passed a law imposing a tax of one cent on each and every bunch of fish sold by peddlers, and considerable money was gathered into the treasury from this source. But as the trade increased a disposition to dishonesty became noticeable; this was carried to such an extent as to seriously affect the city's revenue from this source. In 1878 the law was repealed and another was enacted requiring each vender to pay a license of $1 a month for the privilege of selling within the city limits. This law is often evaded and already, according to the clerk of the market, many are peddling fish without a license. For the month of April, 1878, before the old law was repealed, the books of the market officials showed eighty-nine different parties engaged in selling fish during some part of the month, though some names appeared only two or three times. In April, 1879, there were but thirty-three licenses granted. From a conversation with the above officer we are led to believe that this business is not decreasing, as the books would indicate, but that many are selling without a license, and that fully fifty men are now largely dependent on this business for a livelihood, while, at times, the number is doubtless considerably larger. No license is required for the sale of shrimp and crabs, and as a result this business has been greatly overdone, there being frequently over one hundred people engaged in peddling them through the streets.

CHARLESTON AS A DISTRIBUTING CENTER.—The shipping trade, as has been said, is controlled wholly by the five market firms. Those doing the largest business are J. S. Terry & Co. and C. C. Leslie. The business is confined chiefly to the larger cities of North and South Carolina, though a few fish are sent to Georgia, Tennessee, and Kentucky. A few shad and bass are sent North each season, but in 1879 the quantity was unusually small. The shipping season is from September to May, the extreme heat preventing any trade with the country during the summer months. According to Mr. C. C. Leslie, the shipments from Charleston during the season of 1879–'80 were about 80,000 bunches of "string fish," 7,000 to 8,000 shad, 230,000 pounds of dressed sturgeon, and 38,000 pounds of sturgeon roe. The sturgeon and sturgeon roe are simply repacked in Charleston on their way from the sturgeon camps on Winyah Bay and the Edisto River to the New York and Philadelphia markets.

183. THE FISHERIES OF BEAUFORT AND PORT ROYAL.

ADVANTAGES OF LOCATION.—Beaufort, a village of one thousand five hundred inhabitants, is situated on a river of the same name, a few miles above the point where it empties into Port Royal Bay. It has long been noted as a summer resort, and many of the people of the interior spend several months of each year in this locality. The village has a small trade in lumber and is the commercial center of a large agricultural section.

About 4 miles below Beaufort is Port Royal, a village of three hundred inhabitants, situated

on a branch of the Beaufort River at the head of navigation for large vessels. It has an excellent location as a shipping point; and though 20 miles from the bar, it has the deepest water of any harbor between Chesapeake Bay and Southern Florida, and seems destined to become one of the leading seaports of the South.

THE EXTENT OF THE FISHERIES.—The fisheries of the region are of little importance except for drum (*P. chromis*), though the location is good and fish are reported very plenty. At Beaufort there seems to be no organized fishery, and it is often quite difficult to get a supply for local consumption. Six men calling themselves fishermen fish with more or less regularity, while others go out occasionally for pleasure and profit. Two crews come to the region from Charleston in the spring to secure fish and shrimp; but they usually send the bulk of their catch to Charleston for a market.

At Port Royal two seines are owned and fished along the river banks in the spring and fall; and twenty to twenty-five men from the vicinity are engaged in taking shrimp and prawn with cast-nets. Part of the catch is sold locally at Beaufort and Port Royal and to the fleet of naval vessels stationed there, but the greater part are sold to the "train hands" who peddle them out along the line of the railroad.

THE MORE IMPORTANT FOOD-FISHES OF THE LOCALITY.—The principal species taken are drum (*P. chromis*), mullet (*M. albula* and *M. braziliensis*), whiting (*M. alburnus*), trout (*C. maculatum*), bass (*S. ocellata*), sheepshead (*D. probatocephalus*), blackfish (*S. atrarius*), and croaker (*M. undulatus*).

DRUM FISHING IN BROAD RIVER.—Probably no portion of the Atlantic coast is visited by such large schools of drum as Port Royal Sound and Broad River, and the drum fisheries of this section are more extensive than those of any other locality in the United States. The fish receives its name from the peculiar drumming sound which it makes during the breeding season; at all other times it is said to be mute. Broad River has long been a favorite spawning ground for this species, and thither the fish resort in immense schools each spring. They are said to arrive early in March and are soon very abundant on all of the hard clayey and rocky spots in the river for a distance of 20 miles from its mouth, where they are taken in considerable numbers till the middle of May. If present at other seasons they are seldom caught with a hook.

The drum taken in this section are quite large, the smallest individuals seldom weighing less than 25 pounds, while the average weight is fully 55 pounds. The largest specimen of which there is any authentic record was taken by one of the crew of the United States steamship New Hampshire, in the spring of 1880. It weighed 108 pounds as it came from the water.

Prior to the war many of the planters of the interior came to Beaufort each spring to enjoy the sport of drum fishing. They often brought their negroes along to catch a supply for plantation use. Many were taken in this way. In curing, the fish were first "slivered," after which they were dry-salted for future use. Few, if any, were shipped fresh to the larger markets. Since the war the fishery has passed largely into the hands of the negroes, who bring most of their fish fresh to Beaufort and sell them to the dealers or residents of the village at from 25 cents to $1 apiece. A few are occasionally salted by the fishermen. The principal fishing grounds are in Broad River, between Paris Island and Skull Creek.

The fishing is wholly with hand-lines in 20 to 25 feet of water. It begins early in March, when many of the negroes from Beaufort, Port Royal, and the various islands engage in the fishery from small bateaux, while a few larger craft come from Savannah. Soon the fishery is at its height, and from seventy-five to one hundred boats, with one to six men each, are engaged to a greater or less extent. Some fish only a few days, while others fish constantly, when the weather will permit,

from the arrival of the fish to the close of the season, which usually lasts about eight weeks. A fair estimate would be about one hundred and twenty men, with fifty boats, engaged regularly during the entire season. The catch will average about four or five fish a week to the man, or one for each fishing day. This, it must be remembered, is an *average* catch, for instances have occurred within a few months where ten to twenty good-sized drum were taken in two or three hours by an expert fisherman, while again several days may pass without a fish being secured. The total catch for the season of 1880 was 3,850 fish, or about 211,000 pounds, valued at $2,700. Three-fourths of the catch goes to Beaufort, one-fifth to Savannah, and the remainder to Port Royal and the islands along the shore. About 700 drum are shipped from Beaufort, the greater part going to Charleston.

HON. WILLIAM ELLIOTT'S ACCOUNT OF THE DRUM FISHERY.—Since the above was written our attention has been called to the admirable little book entitled *Carolina Sports*, by Hon. William Elliott, in which the drum fisheries of Broad River are described. Though the volume was not published till 1859, portions of it—the chapter on the drum fisheries among others—were written long before, some of them appearing in one or more of the leading periodicals as early as 1837. As the fishery as it existed at that time is shown in detail, it will be found of considerable interest historically. I reproduce here a greater part of the article:

"In the month of April they [drum] abound on the seacoast of South Carolina, and great numbers penetrate our inlets for the purpose of depositing their spawn. The large bay or sound known on the maps as 'Port Royal Harbor,' but locally as 'Broad River,' is their chosen place of resort, and constitutes the best fishing station. If you ask me *why* they give the preference to this particular spot, I answer you—conjecturally—because, while it is the deepest and most capacious bay along our whole southern coast, it is at the same time the saltest, there being no important streams from the interior emptying themselves into it and neutralizing the properties of the sea water.

* * * * * * *

"It is the largest scale fish in America. It measures ordinarily 3 feet in length, and weighs from 30 to 40 pounds. It is beautifully marked on the sides by broad, dark transverse stripes, alternating with silver, or else exhibits a uniform bright gold color, which fades, soon after it is taken, into the hues already described. I give the medium weight and size of the fish, not the extreme. I have taken one which measured 4 feet 6 inches in length, and weighed 85 pounds. Out of 20 taken by me on a particular day during the present season (April) there were 3 weighing from 65 to 70 pounds each. The smaller sized fish are excellent for table use—their roes, especially, are a great delicacy; the larger are only valuable when salted and cured like codfish, from which, when dressed, they are scarcely distinguishable in flavor. The planters of this vicinity are skillful fishermen, and much devoted to the sport. They succeeded in taking during the last season at least 12,000 of these fish; and when I add, that except the small number consumed in their families, the remainder were salted and distributed among their slaves, not in lieu of, but in addition to their ordinary subsistence, you will perceive that this is a case wherein the love of sport and the practice of charity, are singularly coincident.

"And now for the manner of taking them.

"The sportsman must provide himself with a substantial boat impelled both by oars and sail, and with at least 15 fathoms of rope to his grapnel. His line must be 30 fathoms, and furnished with two pounds of lead, distributed in movable sinkers which draw up or let down, according to the strength of the tide. He must lay in a good stock of crabs, clams, and prawn, for bait; and having launched his boat on the bosom of this beautiful bay, and come to anchor in about five or six fathoms of water, on gravelly or rocky bottom, he has done everything which can be considered as prerequisite to a successful fishing. Having baited your hook with either or with a mixture

of these different baits (the prawn, though thirty years ago unknown as a bait for drum, are decidedly the best), let out your line until it keeps the bottom, and stand prepared for a bite. The unpacticed sportsman who supposes that their bite will be in proportion to their size and strength, will draw up many a naked hook before he draws a fish. They approach cautiously, and almost as if they expected a snare. As soon as you feel him certainly at your hook, jerk with your utmost strength, and draw quickly upon him until you have fixed the hook in his jaws. The instant he feels the smart he dashes off with all his force; and this is the critical moment, for if you resist him too forcibly, he breaks your tackle or tears out your hook, and if you give him slack line, he darts toward you, and shakes the hook out of his mouth. A just medium, as Sterne says, prevents all conclusions. *In medio tutissimus ibis.* You must give him play, keeping your line tight, yet not overstrained; preserving an equable pressure; managing your line with one hand, and keeping the other in reserve, either to draw in rapidly when the run is toward you or to regulate the velocity when the run is against you, and severe. By degrees the efforts of the fish relax, and he is drawn to the surface. At the sight of the sun he makes a final effort to escape, and plunges till he has reached the bottom. The fatal hook still adheres to his jaws, and when he reappears exhausted on the surface of the water, it is only to turn on his back and resign himself to his fate. A barbed iron, fastened to a wooden staff, is then struck into him and you lift your prize into the boat. Generally speaking, you are occupied five minutes in taking a fish; but if the tide be strong, and the fish large, your sport may last fifteen.

"There is great uncertainty attending this sport; the patience of the fisherman may be severely tested. Sometimes you have the mortification to hear them drumming beneath your boat, while they stubbornly refuse to be taken, rejecting untasted the most tempting baits you can offer; at other times they are in better humor. As a general rule, with five lines in your boat, you may count on 15 or 20 fish as the result of a day's sport. Occasionally, you have memorable luck: 63 were taken during the present season, by a boat with seven lines, and I once knew a boat with ten lines to take as many as 96. The best success I have met with personally was to take 40 to three lines; 18 fish fell to my share of the sport; my two oarsmen took the remainder. Thirty fish were all that the boat could conveniently contain; her gunwale was but a few inches above the water, and we slung the 10 (which were *de trop*) alongside by a rope.

* * * * * * *

"I love all sports whether by flood or field, and have engaged in many an animating scene of sylvan and aquatic amusement, but I have found none, devil-fishing alone excepted, possessed of so absorbing an interest as successful drum fishing. Imagine yourself afloat on our beautiful bay, the ocean before you, the islands encircling you, and a fleet of forty or fifty fishing boats (their white awnings glistening in the sun) riding sociably around. Suddenly a school of fish strike at some particular boat; second is engaged; the direction of the school is indicated; the boats out of the run of the fish draw up their anchors and place themselves rapidly alongside, or in the rear of the successful boats, and soon they participate in the sport. And now, two, three, a dozen, nay, twenty boats, are engaged; in some boats 3 at a time are drawn alongside; the fish dart across each other; the lines are entangled; the water foams with the lashing of their tails, and the fisherman scarce knows, while they flounder on the surface, which fish belongs to his own hook, which to his neighbors; the barb is dashed hurriedly and at random into the yet struggling fish, and each one is burning with anxiety to secure his fish and return to the sport before the favorable moment has passed. The interest is intense. Isaac Walton knew nothing like this. If he had, he must have disdained all smaller fry, and have abandoned the impaling of minnows and the enticement of trout, to indulge in the superior pleasure of drum fishing."*

* Carolina Sports. W. Elliott, pp. 123–129.

SEINE FISHING IN THE LOCALITY BY THE CREW OF A NORTHERN VESSEL.—In addition to the local fisheries, a Northern fishing smack came to Port Royal in 1877 to seine fish for shipment to the Northern markets, but after a year's fishing at various points between Charleston and Fernandina the business was abandoned by the crew, who pronounced it a failure financially.

A NEW BEDFORD WHALER VISITS THE REGION.—A whaling vessel, the Charles W. Morse, Captain Hazard, of New Bedford, came to this region in the fall of 1878, to cruise along the shore, making her headquarters at Port Royal. Meeting with good success, she returned the following season and was again fairly successful. Whales are said to be now more plenty along the coast of South Carolina and Georgia than they have been for many years.

C.—THE FISHERIES OF GEORGIA.

184. STATISTICAL RECAPITULATION.

The sea fisheries of Georgia are as yet almost wholly undeveloped, and the State comes, next to Eastern Florida, lowest on the list of the Atlantic bordering States. Immense quantities of edible fish of various species gather in the numerous sounds and bays, and along the outer shore, but comparatively few are taken, and the people are largely dependent upon the fishermen of Western Florida for their supply. In 1880 the value of all sea products, exclusive of oysters, was only $19,225. The oysters taken were valued at $35,000, making the total value of the sea products $54,225. The river fisheries are more fully developed, and the Savannah, Ogeechee, and Altamaha each yield considerable quantities of fresh-water and anadromous species. The principal fish taken are shad and sturgeon; of the former 252,000 pounds and of the latter 354,000 pounds were caught in 1880.

The following statements show in detail the extent of the fishery interests of the State for the year 1880:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	809
Number of shoremen	90
Total	899

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (12 tons)	1	$450
Boats	358	15,425
Pound-nets and hack-traps	110	1,650
Fykes, pots, and baskets	90	650
Gill-nets	251	9,120
Dip-nets and cast-nets	127	685
Drag-seines	17	800
Minor apparatus, including outfit		5,540
Factories and other shore property		32,750
Additional cash capital		11,700
Total capital		78,770

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	2, 272, 500	$119, 993
Sea fisheries.		
Bluefish	5, 000	100
Clams (hard)	24, 000	1, 650
Crabs	7, 200	125
Mullet	106, 000	4, 100
Oysters	490, 000	35, 000
Shrimp	56, 000	4, 000
Spotted sea-trout	90, 000	1, 800
Squeteague	32, 000	480
Terrapin	19, 800	1, 650
All other species	152, 000	5, 320
Total sea products	982, 000	54, 225
River fisheries.		
Alewives	125, 000	3, 750
Shad	252, 000	17, 941
Sturgeon	354, 000	24, 780
All other species	559, 500	19, 297
Total river products	1, 290, 500	65, 768

The following statements give the statistics of the salt-water fisheries of Georgia, exclusive of the oyster industry:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	121
Shoremen	40
Total	161

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	66	$2, 250
Fykes, pots, and baskets	50	250
Gill-nets	40	800
Drag-seines	17	800
Dip-nets and cast-nets	115	625
Minor apparatus, including outfit	.....	200
Factories and other shore property	.....	27, 000
Cash capital	.....	11, 700
Total capital	.....	43, 625

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	5, 000	$100
Clams (hard)	24, 000	1, 650
Crabs	7, 200	125
Mullet	106, 000	4, 100
Shrimp	56, 000	4, 000
Spotted sea-trout	90, 000	1, 800
Squeteague	32, 000	480
Terrapin	19, 800	1, 650
All other species	152, 000	5, 320
Total	492, 000	19, 225

185. SAVANNAH AND ITS FISHERY INTERESTS.

SAVANNAH AS A COMMERCIAL CENTER.—Savannah, the metropolis and only important commercial city on the Georgia coast, is located on the south bank of the Savannah River, about 20 miles from the sea. It was settled by General Oglethorpe in 1733 and incorporated as a city in 1789. In 1850 it had a population of 15,300, and in 1870 of 28,200. Since that time it has grown very rapidly, and has now come to be one of the principal seaports of the South, ranking third in the United States in the exportation of cotton, and doing considerable business in the shipment of lumber and naval stores.

SAVANNAH AS A FISHING TOWN.—The city has a peculiar relation to the fisheries, for its large trade with the interior, together with its excellent shipping facilities by either land or water, make it an important point for the fresh-fish trade, while its distance from the sea renders the capture of ocean species a laborious, though we may safely say, not an unprofitable employment.

THE VESSEL FISHERIES OF SAVANNAH.—One or more smacks have been employed in fishing for the Savannah market from time to time, but as the water in the vicinity of the city is fresh it is found impossible to keep the fish in cars. The nearest salt water is five miles from the city by land and considerably farther by water, and the inconvenience and expense of keeping the fish at so great a distance render the smack-fisheries unprofitable. Occasionally smacks have fished on the various banks between Charleston and Fernandina, running their fish direct to the city and transferring them at once from the vessel's well to the ice-boxes of the dealers. In 1879 there was one vessel, the Lillian, of Noank, Conn., fishing for the Savannah market. She caught her fish at Indian River Inlet, Florida, with a haul-seine, and carried them to market in ice.

THE EXTENT OF THE COAST FISHERIES.—The boat fisheries of Savannah are very limited. They are confined largely to the fresh-water and anadromous species, though the sounds along the shore are well filled with excellent food-fishes. Formerly several crews from Charleston came regularly to the region with seines and gill-nets, and fished for the Savannah market, meeting with excellent success; but nothing has been done in this line for several years.

The only coast fishing at the present time is by parties living on some of the shore islands, and by fishermen from the city, who visit the sounds occasionally for the purpose of fishing. The business is, however, of little importance.

THE SHRIMP FISHERIES.—Shrimp are abundant in the waters along the shore, and, during the height of the season, twenty to twenty-five men go to Saint Catherine and Osabaw Sounds, where they camp for several weeks for the purpose of engaging in the fishery. They carry a complete outfit, including seines, cast-nets, boats, and kettles for cooking the shrimp. After cooking and drying the catch of the day, one boat is detailed to carry it to market. The price paid by the Savannah dealers varies from $5 to $1.50 per bushel according to circumstances, $2.50 being a fair average. During the summer of 1879 about 1,400 bushels, valued at $2,500, were landed; but the catch could easily have been increased to many times that quantity had there been a market for them. Of those taken part are sold locally, others go to the interior cities, and the remainder are packed in crates and sent to the Northern markets.

THE LOCAL FRESH-WATER FISHERIES.—The fresh-water fishing is with hook-and-line and trawl in the Savannah River, for 10 miles on either side of the city, and in the Ogeechee River. The bulk of the catch is catfish and rock, though a few fresh-water trout (*Micropterus pallidus*), sun trout (*Chænobryttus gulosus*), spotted trout (*Pomoxys nigromaculatus*), jacks (*Esox americanus*), and several species of bream are taken.

THE SHAD FISHERIES OF GEORGIA.—Savannah has long been an important center for the

shad fisheries, and as early as 1834, according to Captain Larkin, a number of Connecticut fishermen came to the region with gill-nets and took shad for shipment in sail vessels to the North. When the first line of steamers between Savannah and New York was started, the fishing assumed important proportions, and it continued to increase till about 1870, when it reached its height. Since that date it has gradually declined, though at the present time a number of Northerners, with others from the locality, fish regularly in the Savannah, Ogeechee, and Altamaha Rivers, a greater part of the catch going to Savannah. Many of the nets and boats are owned by the city dealers. According to Colonel McDonald the catch for 1879 was 17,500 white shad (*C. sapidissima*) and 7,500 "hicks" (*Clupea mediocris*) for the Savannah; 15,000 white shad and 7,400 hicks for the Ogeechee; and 3,750 white shad and 3,750 hicks for the Altamaha. A detailed account will be given in the chapter on the shad fisheries.

THE WHOLESALE AND RETAIL FISH TRADE OF SAVANNAH.—Savannah, on account of its location, is more important as a distributing center for the Georgia and Florida catch than as a fishing town. Formerly the supply was obtained almost wholly from Charleston, but with the opening of Florida by the railroads large fisheries were established in that State, and Savannah was the natural market for the catch. At the present time the supply comes largely from the rivers of the State, and from various localities in Florida, the principal ones being Cedar Keys, Saint Mark's, and the Saint John's and Indian Rivers.

The principal species of the market are shad, sturgeon, catfish, red-snappers, groupers (*Epinephelus morio* and *E. Drummond-Hayi*), mullet, sheepshead, spotted trout, and crevalle (*Caranx pisquetus*).

There are three firms extensively engaged in the shipment of all kinds of fresh fish, with two others that handle sturgeon exclusively. Some of the marketmen also ship a few barrels to different parts of the State. Formerly no fresh fish, with the exception of shad, were sent beyond the limits of the State, but the trade has gradually increased until Savannah has come to be the largest fish market of the South Atlantic States, and now sends a few fish as far west as Chicago and Saint Louis, while many go to Kentucky, Tennessee, and South Carolina. Owing to the warm weather the business is continued only from October to the middle of May, and few if any fish are sent out in summer.

THE CITY TRADE.—The city retail trade is largely under the control of the marketmen. Ten parties, including the three large dealers, rent stalls and keep a full assortment of both fresh and salt-water species. Several of the smaller firms get their supply direct from Florida and from the fishermen of the locality; but the majority depend wholly upon the wholesale dealers for their salt-water fish. There are also a few negroes who make a business of vending fish through the streets. The number varies considerably according to the season. The average is about nine or ten for the year.

The peculiar feature of the market is the large number of catfish consumed. Saturday is known as catfish day, and many of the local fishermen, who devote their attention to the capture of the species with line, trawl, or trap, keep their catch in cars till Saturday, marketing them on that day only. The catfish are sold chiefly to the negroes, who usually buy them in preference to any other species, both on account of their cheapness and flavor. Fifteen hundred to 2,000 bunches are sometimes sold in a day, and it is estimated that not less than 30,000 bunches are sold yearly, at an average of 15 cents a bunch.

A few hard crabs and clams are sold by negroes from little stands in other parts of the market, but, according to Mr. George Witte, the business is very limited, and the clam trade of Savannah does not exceed 150 to 200 bushels yearly.

STATISTICS OF THE SAVANNAH MARKET IN 1879.—In 1879 the fish-dealers of Savannah handled about 45,000 shad from the various fisheries of the Saint John's, Ogeechee, and Savannah Rivers. In addition, they received 50,000 pounds of red-snappers, 65,000 mullet, and 700,000 pounds of mixed fish from different parts of Florida; and 120,000 strings of mixed fish, 1,400 bushels of shrimp, and 400 dozen terrapin from the coast and rivers of Georgia. According to Colonel McDonald, the amount of sturgeon handled in Savannah during the same season was 312,000 pounds of dressed fish and 42,000 pounds of roe, valued at $24,800. About one-half of the shad were sent to New York, Philadelphia, and Baltimore; and one-fourth of the remainder to the principal cities of Illinois, Indiana, Kentucky, and Tennessee. The sturgeon, red-snappers, terrapin, and about one-third of the shrimp go to New York and Philadelphia. The remainder of the catch is sold to the city trade, or sent to the larger cities of Georgia and South Carolina.

186. BRUNSWICK AND ITS FISHERY INTERESTS.

Brunswick is a town of two thousand inhabitants, on one of the branches of Turtle River, about 12 miles from the mouth of Saint Simon's Sound. It has railroad communication with the interior, and the weekly steamers between Savannah and Fernandina touch at its wharves. It has the best shipping facilities of any town on this portion of the coast; its principal trade being in lumber, while cotton and naval stores are handled in considerable quantities.

The waters of the harbor and adjoining river abound in fish and oysters, but no fishing of importance is done. Three gill-nets are fished for trout and other species, between October and May, and the negroes of the vicinity go out occasionally with hand-lines, bringing their catch to Brunswick. In addition, the negroes for miles on either side, especially those of Cumberland Island, catch a good many fish, and, when the price will warrant, they often send them to Brunswick for a market; but the price is usually so low that the fishing is not followed with any regularity. The catch is sold for local consumption or to the railroad men who peddle it out at the various stations along the line of the road.

FISHING AT DARIEN AND SAINT SIMON'S.—The settlement of Darien on the north and of Saint Simon's on the south of Brunswick have also extensive lumber interests, and a large fleet of vessels come regularly to these points and remain for weeks at a time while securing their cargoes. These purchase their supply of fish from the negroes of the locality, and a small business has sprung up in this way. There is also a shad fishery on the Altamaha, near Darien, but the catch is quite small and few are shipped.

WHALING FROM BRUNSWICK BY MASSACHUSETTS VESSELS.—Formerly, and for a number of years, a portion of the New Bedford and Provincetown whaling fleet, while cruising on the "Bahama Grounds" during the fall and winter, made a practice of running into Fernandina, Fla., to ship their cargoes of oil and bone instead of taking the time to carry them home. While in this vicinity they frequently sighted whales and occasionally succeeded in taking some of them. The yellow fever at Fernandina several years ago caused some of the vessels to change their landing place to Brunswick. In the winter of 1875–'76 the schooner Golden Eagle, after landing her cargo, remained in this region to cruise for whales, making Brunswick her headquarters for over two months. During this time she secured one whale. The next year two vessels came to cruise in the same locality and met with fair success. Others followed, and in the winter of 1879–'80 five whalers made Brunswick their headquarters while cruising along the shore, and up to March 1 they had taken five whales, yielding 226 barrels of oil and 2,750 pounds of bone, all of which was shipped to the Massachusetts whaling ports.

PART XIV.

EASTERN FLORIDA AND ITS FISHERIES.

By R. EDWARD EARLL.

ANALYSIS.

A.—General Review of the Fisheries:
187. Topography of the region.
188. Statistical recapitulation.
B.—The Principal Fishery Districts Described:
189. Fernandina and its fisheries.
190. Saint Augustine and its fisheries.
191. The fisheries of Mosquito Lagoon.
192. The fisheries of Indian River.
193. The various fishery centers of the Saint John's River.

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PART XIV.

EASTERN FLORIDA AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERIES.

187. TOPOGRAPHY OF THE REGION.

GENERAL CHARACTERISTICS.—Florida, the southernmost State of the Union, has an area of 59,268 square miles. It is a peninsula of sand and shells, 400 miles long, separating the waters of the Atlantic from those of the Gulf of Mexico. It is for the most part a sandy waste, with a level surface gradually rising toward the center where it attains a height of several hundred feet. The evenness of the surface is occasionally interrupted by low ridges of sand running parallel to each other. These are often separated by immense shoal water lakes, rivers, or swamps, covering hundreds or even thousands of square miles, while the surface of the higher lands is everywhere dotted with land-locked lakes and ponds of smaller size. In its southern portion the land is particularly low and becomes simply a large grassy swamp, known as the Everglades, which is wholly submerged during a considerable portion of the year. Continuing southward the peninsula is broken into an almost innumerable number of sandy islands and coral reefs, some of them quite small and others of considerable size.

The peculiar shape and position of the peninsula gives to Florida a more extensive sea coast than that of any other State; on the Atlantic there are over 450 miles of coast line and there are fully 650 on the gulf, making a total of 1,100 miles. This distance, though enormous, is vastly increased by the numerous salt-water lagoons and bays along the shore.

DESCRIPTION OF EASTERN FLORIDA.—The eastern portion of the State, which is the one at present under consideration, is a remarkably level section, rising but a few feet above the sea. The land is composed wholly of sand and broken shells, covered here and there by a thin layer of vegetable mold. The higher ridges of the region are covered with a scattered growth of pine, while the intervening depressions, which are submerged to a depth of from a few inches to several feet, support a rank growth of various swamp grasses, or are covered with dense thickets of cypress, palmetto, magnolia, and ash. Even in the higher pine lands one finds a great number of land-locked ponds and lakes varying from a few rods to several miles in extent.

Along the ocean shore the current has thrown up low sandy bars for nearly the entire length of the State; and behind these are shallow lagoons or arms of the sea, with here and there an opening to the ocean. These lagoons, called by the inhabitants rivers, are often broad sheets of salt or brackish water, extending continuously for many miles along the coast, and with but few interruptions along the entire eastern shore of the State. They usually connect with the ocean by means of shallow inlets, which are separated from each other by a considerable distance; these,

although very shallow, are often navigable by boats and shoal-draught vessels for their entire length. In the still water of these lagoons many of the salt-water species find an agreeable change from the rougher water outside, some coming in to spawn, while others are led to enter the inlets in pursuit of food. During the winter months immense quantities of fish may be found in these places, but in summer the water becomes so warm that most of them are driven out into the sea.

The saltness of the water varies greatly, being wholly dependent upon the amount of rainfall in the locality. During seasons of continued drought the lagoons are fed from the ocean, when they become very salt. During the rainy seasons, however, they are often quite fresh, except at and near the inlets. It is said that in 1863 Indian River was even salter than the ocean, and salt-works were established on its banks; but during our visit, in the fall of 1880, after two rainy seasons, the water at Titusville was so fresh that we failed to detect any brackish flavor, and the animals of the region drank it freely. The freshening of the water has a decided influence on its fauna. The oysters of an entire bay are at times wholly destroyed, while the fish are driven to the inlets, where the water is always more or less salt. An excellent opportunity is thus given for extensive fisheries, as immense quantities of fish can readily be taken with suitable apparatus.

THE SAINT JOHN'S RIVER.—Just beyond these salt or brackish lagoons of the shore, at a distance varying from 10 to 30 miles, lies the Saint John's River. It is fed by thousands of square miles of shoal grassy swamps, in which the river takes its rise. It is a sluggish stream, extending through nearly 3° of latitude, and by means of its numerous and intricate windings the water is carried about 400 miles before it reaches the sea. It is navigable by small inland steamers for fully 350 miles. In its central portion the river often expands into small lakes several miles in extent, and as suddenly contracts into a mere creek only a few rods wide. In its lower third it is merely a succession of shallow lakes, from 2 to 15 miles in breadth. It is said that the river has but 4 feet of fall during its entire course. For this reason the current is usually quite sluggish, and the ocean tide extends to Lake George, situated 158 miles from the sea, while the water is usually brackish for a considerable distance beyond Jacksonville.

188. STATISTICAL RECAPITULATION.

The fisheries of Eastern Florida are so different from those of that portion of the State bordered by the Gulf of Mexico that it has been thought desirable to treat them separately. If the entire State be considered, Florida takes the fifteenth place on the list, having, in 1880, 2,480 fishermen, producing $636,378 worth of fishery products. The principal fisheries are at Key West, where a fleet of twenty-one vessels is employed in the capture of groupers and red snappers for the Havana market. The sponge fisheries of the United States are confined exclusively to the west coast of Florida, where, according to Mr. Silas Stearns, special agent in charge of the fisheries of the Gulf States, one hundred sail of vessel are engaged in the business, the value of the sponges taken in 1880 amounting to $200,750. The mullet fisheries also are of peculiar importance, the catch for the Gulf coast of the State, according to Mr. Stearns, being over four times that of Eastern Florida. The catch for the entire State in 1880 reached 3,494,333 pounds, valued at $123,508. Nearly half of the mullet taken in the United States are caught in Florida waters.

Along the Atlantic coast the fishing is chiefly with hook and line or cast-nets for local supply, though in the Indian River 88,250 pounds of green turtle, valued at $6,000, were taken, the majority being shipped to the Northern markets. The shad fisheries of the Saint John's River, though of recent origin, are quite extensive, 251,700 pounds, worth $20,136, being taken in 1880. A full statistical account of the fisheries of Eastern Florida is given in the following statements:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	348
Number of shoremen	20
Total	368

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	315	$12,950
Fykes, pots, and baskets	40	200
Gill-nets	172	11,915
Dip-nets and cast-nets	271	1,229
Drag-seines	16	1,060
Minor apparatus, including outfit		3,700
Factories and other shore property		9,000
Additional cash capital		3,500
Total capital		43,554

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	2,286,750	$78,408
Sea fisheries.		
Bluefish	25,000	500
Clams (hard)	4,800	330
Mullet	663,000	20,787
Oysters	140,000	5,000
Shrimp	71,750	3,500
Spotted sea-trout	100,000	2,000
Squeteague	15,000	225
Terrapin	3,000	200
All other species	596,750	13,530
Total sea products	1,619,300	46,072
River fisheries.		
Alewives	10,000	200
Shad	251,700	20,136
Sturgeon	3,000	150
All other species	402,750	11,850
Total river products	667,450	32,336

THE SEA FISHERIES.—In the following statements is given a summary of the salt-water fishery interests of this portion of the State, exclusive of the oyster industry:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	223
Shoremen	15
Total	238

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	245	$8,650
Fykes, pots, and baskets	40	200
Gill-nets	93	3,955
Drag-seines	12	460
Dip-nets and cast-nets	231	1,029
Minor apparatus, including outfit		2,200
Factories and other shore property		7,800
Cash capital		3,500
Total capital		27,794

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Bluefish	25,000	$500
Clams	4,800	330
Mullet	663,000	20,787
Shrimp	71,750	3,500
Spotted sea-trout	100,000	2,000
Squeteague	15,000	225
Terrapin	3,000	200
All other species	596,750	13,530
Total	1,479,300	41,072

B.—THE PRINCIPAL FISHERY DISTRICTS DESCRIBED.

189. FERNANDINA AND ITS FISHERIES.

THE FISHERIES OF FERNANDINA.—Fernandina, the principal coast town of Eastern Florida, is situated on the west shore of Amelia Island, and has about 3,000 inhabitants. It was settled by the Spaniards in 1632, and still has a large Spanish population. Its harbor is one of the largest and among the best in the South. The fisheries of the place are of little importance for other than local supply, and the fishermen use only the cast-net and hook and line in the capture of the different species. They fish wholly from small boats in the harbor and river, seldom crossing the bar to fish along the outer shore.

There are about twenty-five men in the two settlements, or the upper and lower towns as they are called, who depend largely on the water for a livelihood, with twenty others who fish occasionally during the winter months.

In addition to the boat fisheries of the place, several Northern vessels occasionally visit the region, and fish along the outer shore between Savannah and Saint Augustine, selling their catch in Jacksonville and Savannah, or shipping it to the Northern markets. These usually make their headquarters at Fernandina. In the winter of 1879–'80 there were three smacks engaged in this fishery for a few weeks, but the business was soon discontinued, not from any scarcity of fish, as we are told, but from the lack of any suitable market and the want of energy on the part of the crews. One of the smacks is said to have stocked $472 between the 7th and 27th of January. There are excellent fishing banks a few miles outside of the harbor, extending along the coast for miles in either direction. Parties from Jacksonville and Fernandina occasionally resort to these banks in vessels or steamers for pleasure-fishing, and bring in large numbers of blackfish and

red-snappers, but, aside from the fishing by Northern smacks already mentioned, there is no "outside fishing" for profit.

QUANTITIES OF FISH AND OTHER SEA-PRODUCTS TAKEN BY THE FERNANDINA FISHERMEN.—Not over 25 green turtle are caught in a season. These are taken with cast-nets in the river, their average weight being about 10 pounds. Loggerheads and hawkbills are very abundant, but no use is made of them. According to Capt. T. E. Fisher, shrimp and prawn are abundant in the harbor directly opposite the city during the entire year, and a man can readily secure 3 or 4 bushels with a small cast-net on any pleasant night. The catch, which is not less than 450 bushels, is boiled and dried for shipment to New York, Philadelphia, and Savannah.

In the winter of 1879–'80 the fishermen for the first time became interested in the sturgeon fisheries. They have just established a camp on the Saint Mary's River, at Tampa Bluffs, where two nets are fished regularly. The catch is brought to the village, where the fish are iced for shipment to New York.

During the winter of 1879–'80, according to Captain Fisher, 3,000 strings of fish were shipped to Atlanta and Macon, in Georgia, and about 1,000 red-snappers, 40 groupers, and 3,000 bass were sent to other markets along the coast.

THE PRINCIPAL FOOD-FISH AT FERNANDINA.—The principal species taken in the river are mullet (*Mugil albula* and *M. braziliensis*), trout (*Cynoscion maculatum*), blackfish (*Serranus atrarius*), drum (*Pogonias chromis*), bass (*Sciæna ocellata*), sheepshead (*Diplodus probatocephalus*), croakers (*Micropogon undulatus*), flounders (*Pseudorhombus dentatus*), yellow-tails (*Bairdiella chrysura*), sailor's choice (*Lagodon?*), and eels (*Anguilla vulgaris*). On the outer banks all of the species common to the region are abundant.

190. SAINT AUGUSTINE AND ITS FISHERIES.

EARLY SETTLEMENT OF SAINT AUGUSTINE.—Saint Augustine, a city of 2,600 inhabitants, was founded by the Spaniards in 1565. It occupies a portion of a peninsula, formed by the Saint Sebastian and Matanzas Rivers, lying nearly opposite Saint Augustine Inlet. Its harbor is simply a portion of the Matanzas River separated from the sea by a long and narrow strip of land known as Anastasia Island. Though the inlet has 10 to 13 feet of water, no steamers run regularly to the city, and the vessel fleet of the place consists simply of a few pleasure yachts owned by Northern gentlemen, who spend their winters in the South. Thousands of people visit Saint Augustine each winter, both on account of its historic interest and its delightful climate, and it is fast coming to be the Saratoga of the South.

THE PRIMITIVE CONDITION OF THE FISHERIES.—Saint Augustine boasts the oldest fisheries in the United States, if not on the Western Continent, for the colonists who came over in 1565 must have drawn largely on the water for their food, and it is not improbable that the introduction of the Spanish cast-net, which is still in use in the locality, could be traced to this colony. The fisheries, like the town, have remained stationary for many years, and we still find them under the control of the Spaniards, who paddle about in their log canoes or dug-outs, throwing their primitive cast-nets over the heads of the fish. The men have become very expert in the use of these nets, and readily secure more fish than can be sold fresh. They seem satisfied to fish only for the home market, and it never occurs to them to catch an additional quantity for salting or shipping. The favorite fishing grounds are about Matanzas Inlet, 17 miles distant, and in winter the bulk of the fish are taken in that locality; but in summer, and to a certain extent at other seasons, many are taken at various points along the river bank. There is no fishing for profit along the outer shore,

and many fishermen never cross the bar. When Matanzas Inlet is visited only three trips are made in a week, but when fishing nearer home it is customary to go out oftener. After securing as many fish as can be sold the fishermen start for home, and by daybreak each has his catch spread out upon his stall in the market. As the customers arrive they make their own selections of such fish as they desire. These are at once strung in bunches of 4 to 6 pounds each, the average price being only 10 to 15 cents a string, while the hotels are supplied at an average of $1.50 per bushel.

EXTENT OF THE FISHERIES AT SAINT AUGUSTINE.—There were ten men, with five boats, engaged regularly in the fisheries during the winter of 1879–'80, and the average daily catch was about 50 strings to a boat. In addition to the regular fishermen a few negroes go out occasionally, selling their catch in the same manner as the others. As the season advances the visitors return to their homes in the North, and the demand becomes so much lighter that some of the fishermen naturally turn their attention to other work, and a few engage in the capture of turtle or shrimp.

THE GREEN-TURTLE FISHERIES.—The green turtle make their appearance in the waters of Saint Augustine Harbor in May and remain till November; they are most plenty during the months of July, August, and September. During this season two gill-nets are set for them in the waters opposite the city. It is said that in 1878 about 700 turtle, weighing 16,000 pounds, were taken, and 350, weighing 8,000 pounds, were caught in 1879. The turtle here are smaller than those farther south, averaging only 20 to 25 pounds apiece. They are usually sold at once to the residents of the city at from 15 cents to $1.50 each. For the past two or three years a few have been penned and saved for the winter trade, when they bring about 10 cents per pound.

THE SHRIMP FISHERIES.—Shrimp and prawn are abundant during the summer months on the various mud flats in the locality. Three men are engaged regularly in this work, catching their supply chiefly during the hours of low water at night. The yearly catch is about 600 bushels, valued at $700. The shrimp are sold locally. At the beginning of the season the price is 10 cents per quart, but it soon drops to 5 cents, or 3 quarts for a dime; and when the season is well advanced they sometimes sell for 15 cents a peck. None are shipped, and not more than 20 bushels are dried.

191. THE FISHERIES OF MOSQUITO LAGOON.

Lying to the southward of Saint Augustine is another lagoon, some 60 miles in length, connecting with the ocean through a small inlet. This opening, known as Mosquito Inlet, and situated about midway from either end of the lagoon, is so shoal that even vessels of small size can seldom enter. The northern arm of the lagoon is known as Halifax River, and the appropriate name of Mosquito Lagoon has been applied to the southern one. Until recently the country was almost uninhabited, and there are now but four or five settlements in the region, all of which are very small and unimportant.

The waters abound in fish of various kinds, and mullet are said to be remarkably abundant. Owing, however, to the lack of transportation, the fisheries are little developed, the only products shipped from the locality in 1879 being 150 green turtle, a few barrels of salt mullet, and 300 or 400 dried mullet roes. The fishing is wholly by means of cast-nets, each farmer going to the vicinity of the inlet in November or December to secure his yearly supply of mullet, which he salts and packs for family use. Seven men are engaged in the green-turtle fishery with gill-nets for about two months. The catch in the winter of 1879–'80 was about 200 turtle, equal to 7,000 pounds, valued at $770. These were sent to New York and Philadelphia through Jacksonville parties.

192. THE FISHERIES OF INDIAN RIVER.

BRIEF DESCRIPTION OF THE INDIAN RIVER COUNTRY.—Indian River, lying just south of Mosquito Lagoon, and connecting with it by means of an artificial canal, is a sheet of water 150 miles in length. It has two inlets in its lower portion, the first known as Indian River Inlet and the second as Jupiter Inlet. These are obstructed by shifting sand-bars, where the water varies in depth from year to year. The inlets are at present too shoal to admit the ordinary coasting vessels, and in 1879 even the smaller fishing vessels could not enter.

The section is quite isolated from the outside world. It is cut off from the ocean by the shoalness of the water, and has communication with Jacksonville by means of small river steamers during only a portion of the year. Until 1865 the country was little better than a wilderness, and at present there are but six post-offices along the entire shore, some of the settlements having only five or six families, while the largest have but fifty.

THE GREEN TURTLE FISHERIES.—The first fishing in the region was for green turtles (*Chelonia mydas*). This began at Indian River Inlet prior to the war, the catch being exchanged for merchandise with the coasting and Government vessels that visited the locality. Turtles are more abundant at this point than at any other on the Atlantic coast. They are said to be present in the river during the greater part of the year, but it is only in winter that the absence of saw-fish (*Pristis antiquorum*) and several of the larger species of sharks will warrant the fishermen in engaging in their capture. They are taken in nets similar to the ordinary gill-nets, though necessarily of heavier material. These have 11-inch mesh and are set directly across the channel, the turtle being entangled in them while moving back and forth. The fishing begins early in September and lasts until late in December. The best catch was made in 1878, when eight men caught 1,600 turtle. In 1879 sixteen men caught 1,400 in number, weighing about 75,000 pounds, and netting the fishermen $8,000. Of late the catch is being shipped to the Northern markets through Jacksonville agents, and the price realized, after deducting expenses of transportation and commission, averages about 11 cents per pound. The largest turtle taken in Indian River, according to the fishermen, weighed 275 pounds, but the average for those taken in 1879 was only 50 or 60 pounds.

UNSUCCESSFUL ATTEMPT TO ESTABLISH A CANNERY AT THE INLET.—The first fishing business of importance in this locality was in 1866, when a company was formed in New York for the purpose of establishing a cannery on Indian River for putting up turtles, fish, and oysters. It was also the intention to run fish in ice from this point to New York by means of a steamer. The steamer was properly equipped and sent to this region, but was wrecked in crossing the bar on her arrival, and, after two seasons of poor management, the business was abandoned.

EXTENT OF THE FISHERIES OF THE REGION.—From the date of the failure of the New York enterprise to 1878 there was little fishing at Indian River. At that time, however, the smack Lillian, of Noank, came to the inlet with seines and boats, and began fishing for the Savannah market. Pens, in which the fish could be kept alive during the absence of the smack, were built in the water, and a crew of men were stationed on the shore to seine the fish. Another crew remained on board the smack to "run" the catch to market. When the vessel could not enter the inlet the fish were towed out in cars and placed in her well. In 1879 another vessel accompanied the Lillian to the inlet, but she soon abandoned the fishery and returned to the North. This season the smack had but one crew, and was anchored off the shore in charge of the cook, while the captain and men went inside to seine the fish. On account of the lack of time no attempt was made to keep the fish, and they were usually packed in ice for the trip. The fishery has been very profitable, and there has usually been no difficulty in securing a load in two or three days.

Aside from the vessel and turtle fisheries already mentioned, there are no fisheries of importance, and the fishing is wholly for family use, each man securing his own supply. Mullet and other species are occasionally salted by the farmers for home use, but they have such crude ideas of the proper methods of curing fish that they are seldom able to keep them for any length of time. Their poor success has caused many to believe that fish cannot be saved with salt in that climate. It is, indeed, a prevalent idea all along the coast south of Charleston, S. C., that the salting of fish in pickle is only an experiment at best, and almost no one thinks of salting any beyond those for use on their own tables; for this reason, though many edible species, including the mullet, sheepshead, and trout, are abundant, the fisheries are of little financial importance to the people of this region.

193. THE VARIOUS FISHING CENTERS OF THE SAINT JOHN'S RIVER.

DESCRIPTION OF THE FISHERIES OF THE SAINT JOHN'S RIVER.—Fishing in the Saint John's is confined largely to the capture of shad (*C. sapidissima*), mullet (*M. albula* and *M. braziliensis*), and trout (*C. maculatum*), though many other species are taken for both pleasure and profit in various localities. The banks of the stream are, as a rule, low and swampy, and the fishing is therefore confined to the few higher areas, where small settlements usually occur. Only eight or ten of these are large enough to merit the unpretentious title of village, while but two are towns of any note. The principal fishing centers on the river are Mayport, New Berlin, Jacksonville, Palatka, Lake George, Lake Monroe, and Lake Harney. The fishing interests of these places will be described separately.

MAYPORT.—Mayport is a village of about one hundred and thirty inhabitants, at the mouth of the river. It is settled largely by people of Spanish descent, and has few attractions other than those due to location. The principal business during the summer months is fishing, and nearly all are more or less dependent upon it for a livelihood. Mayport boasts the oldest shad fisheries in Florida, and was the only place in the State prior to the rebellion where this fishery was prosecuted. The shad were first taken at this point in 1858 by Capt. Charles Waterhouse, of Saybrook, Conn., who had fished regularly in the Savannah River for several years. Owing to the scarcity of fish at this particular time he decided to try the Saint John's, whither he proceeded with two nets. From the first the fishery proved very profitable, and it has been continuously prosecuted to the present time, with the exception of the "war period." In 1879 there were fourteen shad-nets, two mullet-nets, three haul-seines, and five trout-nets. The total value of the fishery products for 1879, at local rates, was $7,320. The shad are now taken in gill-nets from the last of November to the 1st of April, and the entire catch goes to the fish dealers of Savannah, who own an interest in the nets.

The bulk of the mullet are taken with haul-seines between the 10th of August and the middle of December, when they are passing out of the river. Three-fourths of the catch goes to Savannah and the remainder to Jacksonville.

The trout fishing is with gill-nets in April and May, the catch going largely to Jacksonville.

There is also a limited amount of "stop-fishing" in summer. This consists simply in stopping the mouth of a creek or lagoon with netting at high water to prevent the fish from escaping, and in taking them out of the deeper holes at low water by means of cast-nets.

NEW BERLIN.—The little village of New Berlin, locally known as "Yellow Bluffs," is situated on the Saint John's River, about 9 miles above its mouth, and is, next to Jacksonville, the largest fishing town in East Florida. It was settled largely by fishermen from Connecticut, who came to this point with gill-nets in 1866 to engage in the shad fisheries during the winter months. It has,

therefore, next to Mayport, the oldest shad fisheries in the State. The town has at present a population of about one hundred and fifty, all of whom are largely dependent on the fisheries during a greater part of the year. Many of these are Northern fishermen, who spend their winters in Florida and return to Connecticut in the spring to engage in the shad fisheries of that State.

In 1866 there were four nets at New Berlin; in 1876 the number had increased to fourteen, and in 1878 to forty. In 1879 there were only thirty-five shad-nets, and at the present time (1880) there are thirty shad, twelve mullet, and five trout-nets owned in the village. The total value of the catch for 1880, at local prices, was about $10,770. Two-thirds of the shad and three-fourths of the mullet go to Savannah, and the balance of the catch, including trout and mixed fish, goes to Jacksonville, or the larger cities of Georgia and South Carolina.

JACKSONVILLE.—Jacksonville, the largest city of Florida, was laid out as a village in honor of Andrew Jackson in 1822. When half a century old it contained less than 1,500 inhabitants, but within the last few years it has come to be the commercial center of the State, and has at present a population of 12,000. It is situated on the right bank of the Saint John's River, about 25 miles above its mouth, and has fair rail and water connections with all parts of the country.

Prior to 1868, according to Messrs. Melton & Tait, the fishing at Jacksonville was chiefly with hook and line for local use. Two or three drag-seines were also fished for mullet during the season, and the catch was salted for exportation to the West Indies. At that time shad-nets were introduced into the locality, and from that date the fisheries gradually increased, until, in 1879, there were one hundred and twenty men either catching or handling fish during some portion of the year. There were forty shad, thirty mullet, and three bass nets, with seven haul-seines and a dozen or more shrimp-nets, owned in the city. The catch, according to the most reliable estimates, amounted to 43,000 shad, 146,000 mullet, 6,300 bass, 37,000 strings of mixed fish, and 800 bushels of shrimp, having a total value of $23,000.

The shad fishing begins early in December and lasts till the following April, when about thirty fishermen leave for the North to engage in the fisheries of the Connecticut and other rivers. The remainder, mostly colored, fish with hook and line or cast-net, or work on shore until June, when the mullet arrive in sufficient numbers to warrant them in engaging in the fishery. This fishery is prosecuted to a limited extent from this date, but the height of the season is between August and December. Mullet are usually present in small numbers during the entire year.

Bass-nets are fished from December to May, the favorite grounds being Doctor's Lake, about 20 miles above the city. The bass taken average about 10 pounds in weight. The haul-seines are fished in all the little creeks and bays along the river, for 10 or 12 miles on either side of the city.

The principal species of the Jacksonville market are mullet (*Mugil albula* and *M. braziliensis*), shad (*Clupea sapidissima*), trout (*Cynoscion maculatum*), bass (*Sciæna ocellata*), croakers (*Micropogon undulatus*), sheepshead (*Diplodus probatocephalus*), drum (*Pogonias chromis*), sailor's choice (applied to numerous species, but more particularly to *Lagodon rhomboides*), flounders (*Pseudorhombus dentatus*), yellow-tails (*Bairdiella chrysura*), and whiting (*Menticirrus alburnus*), together with fresh-water trout (*Micropterus pallidus*), and bream and perch of various kinds.

Three-fourths of the shad and half of the mullet and bass are shipped, and the remainder are consumed locally. Of those shipped, a few shad and bass go to the Northern markets, but the greater part are sent to the interior of Georgia and South Carolina.

PALATKA.—Palatka, the only village of any importance on the Saint John's above Jacksonville, is situated about 100 miles from the mouth of the river, in the midst of a large fruit-growing section. It is the center of steamboat navigation for the upper Saint John's and Ocklawaha

Rivers. The village is near a narrow portion of the river, locally known as "The Devil's Elbow," which is one of the best points for the capture of shad and mullet in this part of the State.

The first fishing of importance at this place was by Capt. C. B. Smith, of Connecticut, in the winter of 1871–'72. He was remarkably successful, and shipped large numbers of shad to the Northern markets, and also sent a considerable number of mullet to Jacksonville. From that date he came yearly to Palatka with an increased number of men, and it is said that during the season of 1874–'75 he caught 55,000 shad with six nets. Up to 1876 he had the fishing all to himself, but at this time the inhabitants, seeing the value of the fishery, made preparations to take part in it. In the season of 1879–'80 there were ten nets, with twenty men, engaged exclusively in the shad fisheries, landing about 12,000 fish. There is considerable fishing with hook and line for fresh-water trout, and several tons are brought to Palatka for market each winter. Mullet are very abundant during the greater part of the year, and especially so between July and September, though little attention is paid to their capture, and almost none are shipped.

WELAKA AND LAKE GEORGE.—Welaka is a small river landing, with two stores, in the heart of a fruit-growing region, 25 miles above Palatka. It is situated on a narrow part of the river, a few miles below the point where it expands to form Little Lake George. This is a shoal-water lake, 4 miles wide by 7 long. A few miles farther up the stream is Lake George, the prettiest and clearest sheet of water on the entire river. This lake is 12 miles wide by 16 to 20 miles long, and abounds in fish of various species, being seemingly the summer home of large numbers of mullet. There are several salt springs in various parts of the lake, and the fishermen claim that many of the mullet spawn there instead of taking the long trip to the sea.

Between Welaka and Lake George there is a limited fishery for shad, mullet, and "foul-fish," employing twelve men during a portion of the year; but the fishing, with the exception of that during the shad season, is very irregular, and the chief aim is to catch "foul-fish" (including catfish, gizzard-shad, and gar-fish, and other worthless species), which are sold as a fertilizer at $8 a ton. The fishing for mullet and foul-fish is not confined to any particular locality, the nets being set either in the lake or river; but the shad are principally taken in the narrower places along the stream.

In 1879 there were three shad-nets, six mullet-nets, and one haul-seine fished in this section. The catch was about 4,500 shad, 20,000 mullet, and 600 barrels of foul-fish, the whole having a value of $1,800.

Probably no point on the Saint John's River affords better facilities for an extensive mullet fishery than Lake George. Fish of large size are reported to be remarkably abundant during the entire year, and it is said that they can be taken in any quantity desired. At present, as has been stated, there are but six small nets, and these are fished only occasionally, a few mullet being sent fresh to Palatka, the others being consumed locally. The distance from a suitable market might interfere with any extensive shipping of fresh mullet, but it seems probable that any party familiar with the proper methods of salting and curing fish could establish a very profitable business in the salting and shipping of mullet to other States, especially to those of North and South Carolina.

LAKE MONROE.—Lake Monroe, a sheet of water 5 miles wide by 10 long, is simply another expansion of the Saint John's River, 240 miles above its mouth. On the banks of this lake are the settlements of Melonville, Sanford, and Enterprise, all villages of small size, although among the largest in this portion of the State. They are coming into favor as winter resorts, and several good hotels have been recently built.

The first fishery of importance in this region was in 1874, when parties from Palatka established a shad fishery on the bar at the upper end of the lake, salting their catch or shipping it to

Jacksonville and Palatka in ice. This fishery has been occasionally prosecuted by Northern fishermen since that time, and during the winter of 1879 one seine was fished regularly on the bar, the catch, which amounted to 2,500 shad, being sold to the hotels in the locality. The fishing season lasts from the 1st of December to the middle of April. Another seine and two or three gill-nets are owned in the region, but the fishing is very irregular and mostly for family use.

LAKE HARNEY.—Lake Harney, about 265 miles above the mouth of the Saint John's, is the highest point on the river where the fisheries have been prosecuted, and even here the fishing has been very limited. The lake, which is only 5 or 6 miles in diameter, is so shoal that a common seine will scrape the bottom in almost every part. It was first visited four or five years ago by Palatka parties, who were successful in taking a large number of shad and mullet, which they salted and shipped to Jacksonville.

In the winter of 1879–'80 two crews came from Jacksonville, with seines and other necessary apparatus, to catch fish for shipment in ice to that market; but after three or four weeks they gave up the work, owing to the unusually high water which covered the surrounding country and allowed the fish to escape into the grass of the swamps. The catch amounted to almost nothing, though under ordinary circumstances the lake is said to be an excellent location for a fishery.

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PART XV.

FISHERIES OF THE GULF OF MEXICO.

By SILAS STEARNS.

ANALYSIS.

A.—General Review of the Fisheries of the Gulf States:
194. Extent of the fisheries.
B.—The Fishery Interests of Western Florida:
195. Statistical recapitulation.
196. The fisheries of Key West.
197. The fisheries of Monroe, Manitee, and Hillsboro' Counties.
198. The fisheries of Hernando and Marion Counties.
199. The fisheries of Cedar Keys.
200. The fisheries of Lafayette, Taylor, and Jefferson Counties.
201. The fisheries of Wakulla County.
202. The fisheries of Appalachicola.
203. The fisheries of Saint Andrew's Bay.
204. The fisheries of Pensacola.
C.—The Fishery Interests of Alabama.
205. Statistical recapitulation.
206. The fisheries of Mobile and vicinity.
D.—The Fishery Interests of Mississippi:
207. Statistical recapitulation.
208. General description of the fisheries.
E.—The Fishery Interests of Louisiana:
209. Statistical recapitulation.
210. The fisheries of New Orleans and other places.
F.—The Fishery Interests of Texas:
211. Statistical recapitulation.
212. General description of the fisheries.
213. Professor Jordan's account of the fisheries of Galveston and vicinity.

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PART XV.

FISHERIES OF THE GULF OF MEXICO.

A.—GENERAL REVIEW OF THE FISHERIES OF THE GULF STATES.

194. EXTENT OF THE FISHERIES.

INTRODUCTORY REMARKS ON THE FISHERIES AND FISHERY RESOURCES OF THE GULF COAST.—Almost a third part of the entire coast of the United States, excluding the Territory of Alaska, borders on the Gulf of Mexico, the waters of which, under the benign influences of a tropical sun, teem with an almost endless variety of animal life. Nowhere do the rich Southern fauna find a more genial habitat, and in few localities could man levy upon the sea a heavier tribute of delicious fish and mollusks to supply his table. But, strange as it may appear, the fisheries of these 1,550 nautical miles of coast line fall short in value of those of the single State of New York by $450,000; and the States of Massachusetts, Oregon, and Maine have fisheries, respectively, five times, four times, and thrice as great as those of the entire American coast of the Gulf.

Among the Gulf-bordering States, Florida holds the first rank, the people of its western shores taking marine products to the value of $426,527. To Western Florida the entire sponge fishery of the United States is confined, and over $200,000 per annum accrue to her citizens from this source alone. This State also excels all others in the extent and value of its mullet fisheries, while Louisiana holds the same pre-eminence with respect to the shrimp, of which species Texas also obtains a goodly share.

Returning again to the Gulf coast as a whole, it will be observed that the principal products are oysters, sponges, groupers, mullet, shrimp, and red-snappers. These are named in the order of their monetary importance, the value of the oysters taken exceeding by over 35 per cent. that of any other species obtained by the Gulf fishermen, although very insignificant when compared with the production of the oyster industries of many of the Atlantic States.

It is to be hoped that the inhabitants of these shores will soon awaken to a realization of the store of wealth which beneficent nature brings to their very feet; if they do not, others will step in before them and bear away the first-fruits, for these well-nigh limitless sources of material prosperity cannot much longer remain unnoticed. When there shall be a fuller knowledge of the importance of these resources and better facilities of transportation have arisen, the fisheries of the American side of the Gulf of Mexico will take an enormous stride and compete even with those of enterprising New England.

STATISTICAL RECAPITULATION.—The following statements give the statistics of these fisheries for the year 1880, and on the subsequent pages will be found a detailed account of their present condition:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	4,382
Shoremen	749
Total	5,131

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (3,009.86 tons)	197	$308,051
Boats	1,252	50,173
Other apparatus, including outfits		52,823
Canneries and other shore property		134,537
Total		545,584

Detailed statement of the quantities and values of products.

Products specified.	Pounds taken.	Value to fishermen.
Bluefish	44,250	$885
Crabs	324,000	8,100
Crawfish	24,000	800
Green turtle	234,000	9,120
Groupers	1,764,000	141,120
Mullet	2,217,750	*a* 108,421
Oysters	4,051,075	313,200
Pompano	14,212	1,421
Red snappers	1,483,293	66,757
Shrimp	1,171,500	69,300
Sponges	207,000	200,750
All other species	12,026,130	307,670
Total	23,561,210	1,227,544

a Including 13,325 dozen roes, worth $5,867.

B.—THE FISHERY INTERESTS OF WESTERN FLORIDA.

195. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,936
Shoremen	176
Total	2,112

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (2,152.97 tons)	124	$272,645
Boats	743	15,558
Other apparatus, including outfit		21,823
Canneries and other shore property		52,537
Total		362,563

Detailed statement of the quantities and values of the products.

Products specified.	Pounds taken.	Value to fishermen.
Bluefish	44,250	$885
Green turtle	180,000	7,200
Groupers	1,764,000	141,120
Mullet	2,028,250	*a* 102,721
Oysters	410,200	10,950
Pompano	14,212	1,421
Red snappers	223,293	8,932
Sponges	207,000	200,750
All other species	3,505,130	90,840
Total	8,376,335	564,819

a Including 13,325 dozen roes, worth $5,867.

196. THE FISHERIES OF KEY WEST.

ADVANTAGES OF KEY WEST FOR A FISHING STATION.—That Key West should be an important fishing community is quite natural from its geographical position. It is a coral-limestone island, situated far from the mainland, almost entirely surrounded by reefs of coral which afford shelter for myriads of fishes and their food, and its proximity to the water of the Gulf Stream causes a congenial temperature for most of the southern forms of marine life. Key West is equally convenient to the fishing-grounds in winter, when fish are likely to be away from the coast and near the edge of the Gulf Stream, and in summer when the fish are near the shore. The larger fish, living at or near the bottom, can always find harbor and food among the reefs; and the smaller ones are equally well situated in the still shoal water between this key and those to the immediate east. The fishing grounds for smacks in search of large fish, such as the grouper and red snapper, are chiefly north of Key West and the Florida reef, along the mainland shores, and about the western end of the reef, in the vicinity of the Tortugas. The vessels engaged in the sponge fishery find grounds among the reefs eastward from Key West to Cape Florida and off the Florida coast from Anclote Keys north to Saint Mark's, and the fishing grounds for the smaller fish lie near and around Key West. Key West derives great advantages from being convenient to the large markets of Havana and New York. The former is only a fourteen hours' sail and the latter is directly and frequently communicated with by steamships.

DESCRIPTION OF FISHING VESSELS.—The Key West market fishery is carried on by a fleet of vessels and boats which fish on the coral reefs at the edge of the Gulf Stream, usually at a distance of 5, sometimes 10 miles from Key West.

With the exception of two vessels sloop-rigged, all the larger smacks engaged in the fishery from the port of Key West, are schooner-rigged. These smacks may be divided into two classes: those built in Connecticut, and those built at Key West in imitation of New England fishing vessels. The Key-West-built vessels are considered much more durable than those which come from New England, which, however, they resemble in general appearance. The various kinds of wood obtained in the South are regarded as being much better adapted for use in the construction of vessels for Southern waters—being less liable to decay—than those from which the New England vessels are made. The arrangement of the wells in these smacks is the same as that followed in the boats engaged in the New York market fisheries. A Key-West built vessel of 40 tons costs about $10,000.

LAY.—With the exception of two vessels, the crews of the smacks fish on shares. The owner of the vessel receives 40 per cent. of the gross proceeds of the catch, and out of that he pays 40 per

cent. of all bills for port charges, food, and apparatus, the last two being furnished by the owner previous to the sailing of the vessel. The crew receives the remaining 60 per cent. of the gross proceeds, from which they pay 60 per cent. of all the bills for port charges, food, and apparatus, dividing the remainder among themselves. The captain, in addition to his share, receives from the owner 5 per cent. of the total paid to the owner, or, in other words, 2 per cent. of the gross stock of the voyage. Some shippers, instead of receiving this 5 per cent., are paid by the owner a certain amount per month, generally about $15.

BOATS IN MARKET FISHERY.—The boats used in the Key West market fishery are, with few exceptions, built upon one model and adopt a uniform style of rig; that of the sloop. The mast is placed well forward so that the jib, which is a small sail, can be furled during heavy winds without affecting the management of the boat. The mainsail, which has no gaff, runs up to a point at the masthead, and is of the shape known as "leg-of-mutton sail." The foot of the mainsail is cut convexly,* and is fastened to the boom only at the extreme ends, leaving the "roach" to hang below the boom. It is thought that a sail cut in this manner conduces to the greater speed of the vessel. In rough weather the jib is not used, and is of but little consequence at any time.

In all there are about forty boats, manned by seventy-five men. The average length is about twenty-four feet, with a width of eight or nine feet and a depth of four or five feet.

All of these boats are provided with wells. This provision is absolutely necessary in hot climes in order that the fish may be brought alive to market. They are built very sharp on the bottom, with large draught, so that the hull may be submerged to such a depth as to afford a supply of water in the well sufficient for the preservation of the fish. These boats have but little shear; they are made with raking stems and sterns and a deep keel. They draw more water aft than forward. The interior of the boat is divided into three compartments. In the bow is a cabin or "cuddy," in which dry clothes and spare gear are kept. The entrance to this cabin is through a small hatch just aft the mast. Next comes the well, occupying about one-fifth of the entire length of the boat. Last in order is the "cockpit," which is of the same width as the well, extending to within a few feet of the stern.

As a rule these boats present but a rude appearance and furnish little evidence of fine workmanship. They are very strong and seaworthy, and answer admirably their purpose. They are purely Bermudian or Bahamian in type, and many of them have been brought over on the decks of vessels from the Bermudas, and some few have sailed across to Key West from the Bahamas.

These boats are employed in the fisheries throughout the year. The men fish in them at a distance of from one to four miles from shore with hand-lines. The fish caught represent all the common species of these waters. The average value of each day's catch for the whole year is $1 for each man. Of course, on some days one man will take enough fish to realize from the sale of them as much as $20. During several weeks in the year the fishing is extremely irregular on account of rough weather.

The proceeds of the catch are divided into a certain number of shares, one of which belongs to each fisherman, one share being given to the owner of the boat. There is no distinction in the share of the captain and that of any one of the crew.

SEINES.—There are three seines in use at Key West throughout the year. Their average length is 45 fathoms and depth 12 feet, with a mesh of 1 to 1¼ inches. From four to six men are required to haul a seine of these dimensions. The catch includes all the common species, of which, on an average, half a barrel to the seine is taken each day. The yearly average catch for each seine amounts to 150 barrels, worth $1,500.

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*A sail whose foot is thus shaped is called by the sailors a "roaching sail."

PRODUCTS.—The fleet of boats comes home at night and lies at the wharf until morning, when the sale of fish takes place.

The species most esteemed for its food qualities is the "grunt," next to which comes the "small snapper," of which there are several kinds; groupers, and moonfish. All palatable fish sell readily. The prices obtained vary greatly, being high when fish are scarce and low when plentiful. The average price per pound is about 5 cents. Turtles brought to this market in the shell are sold for 4 cents a pound. This price varies but little.

The favorite baits are crawfish and conchs. The crawfish is preferred to all others and is found in the crevices among the rocks or on the sand-flats about Key West. Conchs are found on the shoals about Key West or on the reefs outside. Sometimes, when the fishermen have used up all their bait, they dive to the bottom, frequently 5 fathoms deep, and bring up conchs. While the fishermen are engaged in fishing they often scatter broken crawfish, by which method they attract the fish to the surface. All unmerchantable fish are thrown back into the water. Great quantities of kingfish are taken at certain times—generally most abundant during "northers"—by trolling lines as the boat sails. A good day's catch is 100 small fish or 25 kingfish. Sometimes, however, more than twice that number are taken.

DISPOSITION OF CATCH.—The object of this boat fishery is to supply the people of Key West with fresh fish, which are sold alive at the wharves from the boats. When an unusually large amount has been taken into the market a portion of the catch is bought by the fishing smacks and taken to Havana, where they are disposed of. As soon as the fish are sold, which is usually the case by 9 o'clock in the morning, the fleet of boats starts in different directions for the reefs of coral which extend along the edge of the Gulf Stream. Sometimes these boats go ten miles from Key West to fish, but usually not over four miles. When they reach suitable fishing grounds they anchor and commence work.

"BAITING UP."—Here, as also at the Bahama Islands, a curious method is adopted for the purpose of insuring a good supply of fish at any given spot. This is called by the fishermen "baiting up," and is performed thus: A large supply of crawfish, having been collected by the fishermen, is mashed up into a pulpy mass called "chum," which is then placed in ordinary gunny-bags and carried to the selected spot where the bag is placed in the water. The bait in one bag will last several days, oozing out but slowly, and thus attract the fish. When the fishermen come back to this spot, four or five days later, they usually find a plentiful supply of fish in good condition.

HAVANA MARKET.—It has been already stated that the larger class of smacks take fish to Havana. At that port there is a great variation in the price paid for fish, ranging from 4 to 20 cents a pound. The original price was 50 cents apiece for all groupers and snappers weighing over 5 pounds, those of less weight counting two for one. From 1850 to 1860, 12, 15, and 20 cents a pound were paid, but the trade was crippled during the war and never regained its former standard. After the war the price fell as low as 4 cents a pound. The period during which this low price was paid was of but short duration. The fishermen refused to carry their catch there unless the value was increased, in consequence of which the Cubans agreed to take all that could be brought for 8 cents a pound. For a few months, during 1874, the price rose to 12 cents a pound, after which it fell to the old price, 8 cents, at which it still remains.

There are no duties on the fish carried alive to that port, but the port charges and other expenses average nearly $100 a trip for each smack.

197. THE FISHERIES OF MONROE, MANITEE, AND HILLSBORO' COUNTIES.

TOPOGRAPHY OF THE REGION.—The extreme southwestern coast of Florida is an almost uninhabited section, seldom visited and but little explored. Viewed from the sea the coast appears high and the coast-line seems to be without a break, but upon closer examination the coast-line proves to be cut up into countless numbers of small, low, mangrove-covered islands. In most places the country is broken up into this form by shoal lagoons for a distance of 5, 10, and even 20 miles inland. The seaward sides of these islands generally have narrow beaches of white sand, overgrown with sedge, according to the degree of their exposure to the waves. The Gulf waters touching this coast are extremely shoal, being only 10 or 12 feet deep at about an equal number of miles from the land. The soil is generally good, the climate almost unexcelled, and fish and game abound, but settlers find the constant presence of tormenting insects and the extreme seclusion unbearable. Higher up the coast the waters of the Gulf become deeper, the islands larger and higher, and are formed of sand which is blown into exposed places, where it forms into dunes. The upper portions of the bays along the coast preserve the shallowness of the water and the small size of the islands noticed above as occurring off the coast of Monroe County. In these shoal waters are found, as will be seen in the history of the fisheries, immense schools of mullet, the shoal water affording almost inexhaustible feeding grounds which are exceptionally free from predaceous fishes. Between Charlotte Harbor and Sarasota Bay the coast is bold, with a broad sand-beach, and is covered with a thick growth of tall pines. At Palmasola and Sarasota Bays the shores are higher and drier than at any point farther south, and are heavily wooded with palmettos and mangroves on the islands and with pines on the mainland. The outer sides of the islands are sandy and hilly. Outside of the channel the waters are rather shoal. The Little and Big Sarasota Bays are connected with each other, and, by means of Palmasola Bay, also join Tampa Bay. On the shores of these bays many fruit-growers from the West and North have settled.

FISHERIES OF CHARLOTTE HARBOR.

FISHING STATIONS OF CHARLOTTE HARBOR.—In Monroe County there are no fishing stations worthy of notice. The first four on the coast and on the islands off Manitee County are: Captiva, on Captiva Island; two at the north end of Lacosta Island, near Boca Grande, carried on by Spaniards, and one at the northern end of Gasparilla Island. These fisheries are all carried on in Charlotte Harbor. They are engaged in supplying the Cuban market, and the methods of fishing, style of buildings, mode of curing the fish, &c., are much the same as at the Sarasota Bay fisheries, concerning which all details will be given, and from which a correct idea may be easily formed of the arrangements and methods followed out at the Charlotte Harbor fisheries, when no differences are specially noted.

The profits of the fishing at these four stations have been diminished both by the political troubles in Cuba and by the glutting of the Cuban markets. The stations are all occupied every year, but seldom by the same parties. The Gasparilla fishery is an exception; this one is carried on by Beacon Brothers, and managed by Captain Beacon. The money made by the fishermen is less than in former years, when both fish and roes were worth more; yet, even with the present prices the men do well, if the business is properly managed. The trade with Cuba is now more extensive than formerly, more parties being interested in the work. It was reported that Spaniards had come from Cuba and fished in the bays under the Spanish flag. This was false. Sometimes, however, Cuban smacks fished off the coast, but were quickly prohibited by the revenue officers.

Captain Beacon thinks that the supply of mullet has in no way diminished, and that they are as plentiful as they have ever been. Many experiments have been made at these stations, resulting very often in failure. The men engaged there of course profit by the accumulated experience gained by the exertions of others. The buildings are now of a more permanent character, and, if possession can be obtained of the islands or ground which the stations occupy, this trade will probably increase and assume an important shape.

CHARLOTTE HARBOR FISHING BOATS.—There is a peculiarity in the Charlotte Harbor boats. They are built so as to carry a large load in very shallow water. They resemble, in some respects, the lap-streak boats of Maine. In fact they are a kind of lap-streak boat, having planks of cedar or white pine, knees and timbers rather large and of oak, and fastened with galvanized iron. Their usual length is 24 feet, and their width 8 feet. In shape they are somewhat awkward, being full at bow and stern, flat-bottomed, stem and stern raking, and quarters overhanging. They are, however, able boats, and well adapted for the work. Besides carrying a large seine and six men, they will carry 65 tubs of mullet. While fishing they are rowed by two or four men, the captain standing in the bow to guide with a pole. These boats are made to order in New York, and cost $150. There are not over a dozen on this coast, and these are continually changing hands. Each of these four fisheries has two boats and two seines.

CAPTIVA FISHING STATION.—At the Captiva fishing station, managed by Captain Pierce, of Key West, are thirty fishermen. All of them are "Conchs," natives of the Bahamas, or Americans. The seines are 120 and 100 fathoms long, and each is 18 feet deep. The stretch of mesh is 2½ inches. During 1879, 3,000 quintals of salted mullet and 225 quintals of dried mullet roe were sent from the Captiva fishery to Cuba.

FISHING STATIONS ON LACOSTA ISLAND.—At Lacosta fishery No. 1 are twenty-six fishermen, all Spaniards from Cuba or Key West, excepting one American. José Sega is the captain. The two seines at this place are each 100 fathoms long, and 24 and 18 feet deep, respectively. The stretch of mesh is about 2 inches. In 1879 1,500 quintals of salted mullet and 120 quintals of mullet roe were sent to Cuba from this station.

At Lacosta fishery No. 2 are twenty-four men, all Spaniards, excepting one American, as at No. 1. Captain Papy commands the station. The two seines used here are 100 fathoms and 75 fathoms long, and 16 and 12 feet deep, respectively. From this place 2,100 quintals of salt mullet and 250 quintals of mullet roe were shipped to Cuba in 1879.

GASPARILLA FISHING STATION.—At the Gasparilla fishery, managed by Captain Beacon, are thirty fishermen, either Conchs or Americans from Key West. The Conchs here, as elsewhere, are very ignorant, and are the drudges and laughing-stock of the others.

From Gasparilla, in 1879, 2,500 quintals of salted mullet and 200 quintals of mullet roe were shipped to Cuba. In 1877, 2,400 quintals of salted mullet and 175 quintals of dried roe were shipped, and in 1878, 2,600 quintals of salted mullet and 300 quintals of dried roe.

The seines here are 80 and 60 fathoms long, and 24 and 18 feet deep, respectively. The stretch of mesh is about the same as that of the others already mentioned.

SEINES.—The seines above referred to, and varying considerably in size, require from four to twelve men each to handle them. The fishing is carried on from the middle of August to the middle of January, and the variety chiefly taken is mullet. Ten to twenty thousand fishes are frequently taken at a haul. More are often surrounded by the seine than can be hauled out. There is no bag or pocket to these seines, and therefore they are hauled out on the beach.

LAY.—The "lay" arrangement at the Gasparilla fishery differs from that at the other three fisheries. At the first-named fishery all the gear and the carrying vessel belong to one company,

the Beacon Brothers. This company, having provided the outfit, receives 35 per cent. of the catch and pays 35 per cent. of all the bills. The other 65 per cent. is divided equally among the two captains and the crew, who pay the remaining 65 per cent. of the bills. At the other three, the two Spanish fisheries on Lacosta Island and the Captiva fisheries, their vessels are hired, and this arrangement is in practice. The bills are paid from the total proceeds and the remainder is divided thus: Vessel, 20 per cent.; fishery, 15 per cent.; and crew, 65 per cent. The crews in either case receive the same.

DISPOSITION OF CATCH.—The prices obtained in Cuba for the fish are: Salted mullet, 3½ cents and 4 cents a pound; dried mullet roe, 3½ cents, 4 cents, and 4½ cents a pound. The duties on the fish and roes amount to $1.40 on the quintal. The markets to which shipments are made are Havana, Matanzas, Cardenas, and Sagua la Grande.

FISH-CURING.—The curing of the fish is thus effected: On one side of the table are the "splitters," ten in number; on the other side are seven men arranged as follows: The second and third men from either end remove the gills and entrails; they are the "gillers." The end men scrape the black lining from the inside, and the fourth or middle man is an expert, who takes out the spawn; he is called the "spawner." Five of the splitters, as they finish splitting the fish, throw them in a pile to the gillers, who do their work and turn the fish with spawn over to the spawner, and those without spawn to the scraper. As soon as the spawn is removed, the fish go to the scraper and by him are finished with, so far as dressing them is concerned. The fish are now thrown into a trough of salt water and allowed to remain in soak until they are all split, when they are removed to be salted and packed away. The salting process is described below in the paragraphs on the Sarasota fisheries.

The roes, noticed by the writer at the Spanish fisheries in process of being dried, were maggoty, but the fishermen seemed to think they were all right, remarking that that condition was "nothing unusual." At the other two fisheries the roes were in excellent condition, clean and sweet. Their fish and roes were superior to those at the Spanish fisheries. The process of drying roes at these four fisheries was the same as that adopted at the Sarasota fisheries, and which is described below in detail.

FISHERIES OF SARASOTA BAY.

FISHING STATIONS OF SARASOTA BAY—The next group of fisheries are those of Sarasota Bay, comprising Hunter's Point fishery, Roberts fishery, and Sarasota fishery. The first named is on the dividing line between Sarasota and Palmasola Bays. The buildings there are owned by Sweetzer & Thomson.

At Hunter's Point are eighteen fishermen. Many are natives of the Bahamas, and are called here, as also at Key West, "Conchs"; the rest are Americans. The men employed in carrying to market the fish which the regular fishermen catch are counted as belonging to the fishery gangs, and receive either a share of the catch or wages.

SEINES AT HUNTER'S POINT.—At Hunter's Point fishery there are two seines in use. One of them is 100 fathoms long and 16 feet deep, with a 2-inch mesh, requiring eight men to handle it. The other is 75 fathoms long, 12 feet deep, and has a mesh of 1¼ inches stretch. Four men handle this net. These seines are used in October, November, December, and January. Mullet is the fish most largely taken. In 1879, 10,000 pounds were caught at a haul. The catch is frequently so large that the fish cannot all be saved. In one instance the fish carried away the seine from the men.

HUNTER'S POINT FISHING BOATS.—The boats used in this fishery are larger and of a better

build than those of the average size. They are of two sizes, the larger ones used by the men while handling the seines, and the smaller ones serving as tenders to the former. The seine-boats are 26 feet long and 7 or 8 feet wide. They are built as flat as possible on the bottom, but retain the form of a round-bottom boat. The bow in these boats is very sharp; the stern wide and overhanging on the quarter. The wood of which they are made is strong, but light. Their carrying capacity is very great, and they are well adapted for their work. The smaller boats are about 16 feet long.

HUNTER'S POINT CAST-NETS.—Of the two kinds of cast-nets—the "bag" and the "bail"—so generally used on the west and southwest coasts of Florida, the "bail" net is in more general use at Hunter's Point and at all other fisheries mentioned in this section. This net is circular in shape, with a diameter of 12 or 14 feet. Leads are strung at equal distances around its edge, and in the center is a horn ring, through which a cord may play. From the end of this cord (which is the hand-line), and inside of the net, radiate ten or twelve smaller cords or bails, which are all fastened to the lead-line at regular distances. This style of net is always free from tangles. When it is to be thrown, it is lifted by the center, the leads thereby coming together and giving the net a cylindrical appearance. The hand-line and a portion of the net is gathered in the left hand, the lead-line being held in the teeth and the majority of the leads in the right hand. In launching, both hands are swung from the left side to the right; at the same time a quick turn is given to the body in the same direction. If the net is well thrown it will strike the water flat at a distance of 12 or 15 feet from the "caster." As soon as the leads reach the bottom the net is hauled in by jerks on the hand-line, this having been retained in the hand of the fisherman. There is no trouble in hauling up this kind of cast-net, as there is in the case of the bag-net, which will be described in speaking of the fisheries where that type is in favorite use. In the case of the "bail" net, the net has only to be raised by the horn ring when the leads have sunk, and with it is raised whatever may be caught. The cast-net is used only in shoal water. Its value ranges from $5 to $15, dependent upon size of mesh, material used, &c. The average size of mesh is 1 inch, and cotton twine of nine threads is preferred.

BUILDINGS, ETC., AT HUNTER'S POINT FISHERY.—The Hunter's Point fishery, one of the most important on the coast, is prosecuted with a special view to supplying the Cuban markets. The arrangements are very complete. The building where the fish are cured and stowed is about 30 feet long by 12 feet wide, and is built out from the shore on piling. There are two other rooms: One, built of boards, is used as a kitchen and dining-room and dwelling for the captain's family; the other, a palmetto-thatched shanty, is used by the men as a sleeping apartment. Among the apparatus owned here are seine-reels, frames on which to dry mullet-roe, and machinery for hauling up the boats from the water.

The buildings at all the fishing places on this coast resemble each other, with the exception that at different places their relative positions and sizes may be changed.

Flocks of turkey-buzzards hover about these buildings and feast on the decomposed fish-refuse when carried out into the woods or back of the ranch.

MULLET.—The fishermen at Hunter's Point were found to be obliging and ready to give all the information they possessed. Their knowledge of the habits of the mullet appeared somewhat limited, only three or four months being passed by the men at the fishery. Their captain was then absent in Key West.

The present abundance of mullet is considered equal to that in former years, the 1879 catch being considered larger than for four or five years past. When leaping from the water in great numbers, they make a noise like the sound of thunder; this continues day and night.

LAY.—At this fishery, as at all others engaged in supplying the Cuban markets, the "lay"

arrangement is as follows, subject to slight variations: After all bills have been paid, duties, tonnage, fees, provision bills, salt-bills, &c., the owners of the fishery apparatus receive 15 per cent., the owners of the vessels employed in taking the fish thence to Cuba, 20 per cent., and of what is left, each fisherman receives one share; the boys, if any, are allowed only half a share. The captain receives a share and a half. The general complaint is that there is no money to be made in the business and that the fishermen always come out in debt. The vessel's expenses are quite heavy and are paid from the common stock; but undoubtedly more profit is realized by the vessel than by any of the men engaged in the fishery or the owner or owners of the apparatus. The continued political troubles in Cuba have injured these fisheries, for the Cubans have no money, and so, to save themselves from being worsted, imposed heavy duties on all imports.

CUBAN MARKET.—The market prices in Cuba are as follows: Salt fish, 4 cents a pound, or $4 a quintal. This price has not varied for several years, but is not more than two-thirds of what it was six years ago and before that time. Mullet roe, dried in Cuba, 50 cents a dozen. This price has not varied for the last six years. The duty on salt fish imported into the Cuban markets is $1.40 a quintal. The principal markets are Havana, Matanzas and Cardenas, and occasionally Sagua la Grande. Some of the dealers buy fish by the vessel load upon arrival. An average load for a fish-carrying vessel is 300 to 400 quintals.

METHOD OF CURING MULLET-ROES.—The mullet-roes are thus cured: Having been collected from the fish in a vat with a weak solution of brine over them, and allowed thus to remain over night, the roes are taken out the next morning and carefully spread on boards in the sun. After one day's exposure other boards are laid on the roe. They are now between boards and in a shape which will admit of rapid handling in case of rain. If the sun is shining brightly and there is a good breeze, a week will suffice for the roes to become dry and thoroughly pressed. Afterwards they are handled in baskets, tubs, &c., and are sent to market *en masse*. There is a greater demand for mullet-roe in Cuba than Florida. If a spawning fish is bruised or otherwise injured in the seine the roe is worthless, turning a dark-red color. Again, if too much salt is put upon a spawning fish at first, the sac cracks and the eggs are burned out on being exposed to sun and pressure. Rain is injurious to mullet-roes, hence the threat of a shower causes much uneasiness in a drying camp.

KENCH-CURING OF MULLET.—The method of curing mullet, known as the "kench-curing," and referred to in the section on the Charlotte Harbor fisheries, is practiced at Hunter's Point fishery, Roberts's fishery, and Sarasota fishery. The treatment of the fish at any of these places is thus described: The fish, when taken from the boat, are carried to the cleaning-house and piled on the floor near the cleaning-table. There are two, four, or six splitters, who first take the fish in hand and split them from nose to tail through the back. These men shove them along to others who "score" or cut them along the backbone, removing gills and entrails. Other men are ready to give them the finishing touch by scraping out the black stomach-lining. They then pass the fish to the salting-table, where they are rubbed with Liverpool salt, after which their insides are filled with it and closed up, leaving the natural shape of the fish. There are others, men or boys, employed in packing the fish away as soon as they are salted. They are packed in regular order, heads out, in one corner of the house, and, when the pile becomes large, present a most peculiar appearance, resembling a work of masonry more than anything else. On the occasion of a big haul, especially, is great life and activity displayed at a fishery, all hands, and as much help as can be temporarily secured from the surrounding country, being kept busy until the fish are all packed away. At such times the cleaning is first performed, then the salting, unless the haul be enormous, in which case a large number, instead of all, are cleaned before any salting is done. By

reason of the difficulty encountered in procuring all the help necessary in case of an exceedingly large catch, thousands of fish are often wasted, one-fifth, perhaps, containing spawn. Before going to sleep, 50 barrels, however, are often cleaned and packed away after the boats have returned from the day's fishing. The first fish, thus carefully put up, are in a first-class condition for any market. It is only in the warmest weather of August and September that the mullet are known to rust or turn red.

A peculiar feature in the Cuban markets is that the people prefer to buy fish with their heads on. At the fisheries where the fish are treated in this way no barreling or brine-salting is done.

ROBERTS'S FISHERY.—Roberts's fishery is situated on Sarasota Bay, at Big Sarasota Pass. It is managed by Mr. Roberts, of Key West, who supplies the Cuban markets. At Roberts's fishery about half the twenty-two fishermen are Conchs, the others come from Key West, and are mostly of American birth. As at Hunter's Point, the men on the carrying-vessels are regarded as forming part of the fishing gang.

The two seines in use at Roberts's fishery are respectively 110 and 75 fathoms in length and 16 and 10 feet in depth, with meshes respectively of 2 and 1¼ inches. The former requires eight men; the latter, four. Several hauls with the seine have proved larger than twenty-two men could split, in consequence of which large numbers were spoiled. One haul contained at least 20,000 fish.

The boats used here are similar to those in use at Hunter's Point.

The bait-net is also preferred here to the bag-net, as at Hunter's Point.

The fishing is a success, although the buildings, &c., may not be quite so conveniently arranged as at Hunter's Point. There are three houses built of poles, with palmetto-leaf thatching. In one of these buildings the fish are cleaned and stored. The second is used as a kitchen and the third for sleeping-quarters. The apparatus is practically similar to that at Hunter's Point.

SARASOTA FISHERY.—In the vicinity of the last-mentioned fishery is Sarasota fishery. This is managed by six men, Americans, all of whom are equally interested. Their fish are sold only in the home markets.

At this point there is only one seine in use. This is 75 fathoms long and 15 feet deep, with 1¼-inch mesh. The boats used are of a smaller type than those already alluded to.

Here, as at the other smaller fisheries, 30 per cent. of the proceeds is given to the fishery, and the other 70 per cent., after paying for salt, provisions, &c., is divided equally among the men.

The price of fish in the home markets is 3 or 4 cents apiece, or $6 a barrel. Mullet-roes sell for 25 cents a dozen.

FISHERIES OF PALMASOLA BAY.

FISHING STATIONS OF PALMASOLA BAY.—TYLER FISHERY.—The first fishery in Palmasola Bay, as one travels north, is called the Tyler fishery and is the smaller of the two situated on this bay. Here three men, Sharpe, Tyler, and Doane, fish entirely with cast-nets; their catches are small and their requirements correspondingly few. They fish for several months and catch quite sufficient for their own use and have a few barrels to sell. Throughout this bay there is a great deal of cast-net fishing; few, however, prove more remunerative than to supply the fishermen with food.

PICKLE-CURING OF MULLET.—At this place and Bishop's fishery, next in succession, a peculiar mode of preserving fish is practiced. The fish are split as for kench-curing, and after being washed are packed away in large barrels, dry-salted. In a few days they have made their own brine, and with some of it are finally packed away in barrels made of cypress wood and so

sent to market. Several specimens of fish thus cured were badly treated; they were haggled with knives, did not have the black stomach-lining removed, and were made more disgusting by the unclean brine. These fish are sold to inland settlers all over the State of Florida.

BISHOP'S FISHERY.—The latter of the two fisheries on Palmasola Bay is named Bishop's fishery, being managed by a man of that name. The fishermen, five in number, are all Americans.

One seine is used here; it is 60 fathoms long and 12 feet deep, with 1¼-inch mesh. Four men are required to handle it.

The only boat here is a flat-bottomed one. The conveniences for handling and curing the fish are very limited.

At this place are a couple of palmetto shanties, one of which is used as a kitchen, and the other as a sleeping apartment, in which also they clean and store the fish.

The fish put up here are barreled for home use only. The market prices are the same as at Sarasota.

FISHERY AT PALM KEY.

APPALACHICOLA FISHERY AT PALM KEY.—At the north end of Palm Key, or Anna Maria, is the Palm Key fishery, called also the Appalachicola fishery. In 1879 it was occupied by men from Appalachicola; hence the latter name. They had a shanty for storing and cleaning the fish, and a smaller one which they used as a kitchen. The men lived on board the vessel which accompanied them. In this gang were seven men; their boat and seine were much smaller than those in use at other fisheries near by.

MULLET-CURING AT PALM KEY.—Their method of curing was similar to that practiced at Appalachicola, but differs from the methods used in South Florida. As soon as cleaned, the fish having been split down the back, beheaded, and washed, they are dry-salted and packed in large pork or beef barrels, in which they are allowed to remain several days. They are then taken out and carefully packed in the white-pine barrels of Boston manufacture, furnished at Appalachicola by Mr. Murat. The brine, which has formed around the fish while in the pork barrels, is placed in a large kettle, boiled and strained until it is quite clear and pure, having been separated from the bloody and slimy matter which comes from the fish. As soon as cold, this clarified brine is poured into the box in which the fish are packed.

The Appalachicola fishermen are noted for their neatness and dispatch in handling salt-fish, and their crew at this place is no exception to the rule. In 1879 the mullet appeared to avoid the north end of Palm Key, where they usually collect in large numbers, and therefore the men had no chance to exhibit their skill and speed just referred to. In three months of that year they only put up 35 barrels of fish.

The amount of fish caught here is included in the statistics of the Appalachicola fisheries.

FISHERIES OF TAMPA BAY.

FISHERIES OF TAMPA BAY.—The shores of Tampa Bay differ but little from those of the bays lying to the south. The waters are deeper and broader, and therefore the shores more generally terminate in sandy beaches and little bluffs, where the waves and currents have acted with unusual force. There are some points where the features of the coast off Monroe County are reproduced, the shoals extending a considerable distance into the bay, the shores being cut up into small, low, mangrove islands, separated by shoal channels of water. The land is everywhere covered with a dense growth, in the dry places, of pines, oaks, palmettos, and other trees peculiar to the climate, and in the wet places, of mangroves, for the most part. About the lower part of the bay, and

touching the Gulf, are several quite large sand islands. These are flat and bear a growth of palmetto and pine trees and coarse grass. On the shore of Tampa are more people than on any other part yet mentioned. Tampa, at the head of the bay, is a thriving town, and the northeastern and southwestern ends are quite thickly settled. Only two individuals were found who caught more fish than were necessary for their own food. These were Mr. Deshong, who lives at the head of Tampa Bay, and Mr. C. S. Jones, living at Catfish Point.

MULLET-FISHING AT TAMPA BAY.—Mr. Deshong has been living on the bay for thirteen years, and has fished every season for mullet. He uses a small seine and gill-nets. In 1874 he salted 150 barrels of mullet. Fish were then very plentiful, and there was a good demand for them. In 1876 he put up 130 barrels; that year fish were not so abundant. In 1877 he packed 50 barrels; fish were scarce that year. In 1878 he also put up 50 barrels; during that year fish were a little more plentiful than in the previous year. In 1879 he only packed 28 barrels; fish were very scarce and the demand was limited. He put up his fish in cypress-wood barrels and half-barrels, and sold them to the inland settlers, either direct or through the Tampa storekeepers, at the rate of $7 a barrel.

Mr. Deshong estimates that 100 barrels of fish are annually salted about Tampa Bay. Mr. Jones's opinion is that this estimate is twice too large. In speaking of the increase or decrease in the abundance of fish in Tampa Bay, Mr. Deshong says that several species, daily under his notice, have been decreasing in numbers steadily for the last five or six years. The mullet comes under this head. He thinks that the amount of spawn wasted with the mullet that are caught influence this decrease, and that the fish are frightened off by those fishing for them. Like many other fishermen on this coast, he is confident that many kinds of fish have lately been less abundant. Under that head comes also the white perch (*Roccus americanus*).

In past years it has been the practice of Mr. Deshong every year to stop up the creeks and bayous with gill-nets and seines, thereby catching nearly every fish in them. He still tries the same expedient, but seldom succeeds in catching more than his family can eat at one meal. This sad truth is realized all over the bay.

SHARK AND PORPOISE FISHING AT TAMPA BAY.—Mr. Deshong has also been engaged in shark-fishing, and from him the following facts relative to that pursuit were learned:

The winter and spring months are the best, for then the sharks are very fat. The fishermen provide themselves with an able and stout yawl-boat, a lily-iron, lances, coils of line, and large kettles. They then start for some point where sharks are known to be abundant. The boat carries three men, two to row and one to stand in the bow and strike the fish. When a shark comes near the boat it is harpooned with the lily-iron, and the line is kept taut, lest it should be bitten off. When able to pull the fish alongside of the boat the men kill it with a lance. The sand or yellow sharks and the leopard-sharks are full of fight, and, when large, are difficult to manage. The other kinds give but little trouble.

Porpoises are often struck, and, although very powerful and tenacious of life, are easily handled and brought within reach of the lance. Mr. Deshong has caught 25 or 30, large and small, in a day, but 8 or 10 is an average day's catch. A medium-sized shark will yield 2 or 2½ gallons of oil from the liver and fat stomach coating; very large ones have been known to yield 10 gallons from the liver alone. Their bodies are not used, except to bait up others with. Mr. Deshong says that their flesh is watery, and, when allowed to dry, leaves but little bulk. Sharks kept for several days in alcohol shrivel up until nothing is left but the skin and frame. Five or six weeks in a season is about the limit of time during which this business is carried on. The average produce of oil for that period is about 300 gallons.

POUND FISHING AT TAMPA BAY.—Statements made by Mr. Jones on certain points connected with fish and fishing in Tampa Bay will now be given. He has the only pound owned on the Gulf coast. It is a small, crude affair, but does duty for cast-net and seine in providing Mr. Jones with all the fish he requires for his own consumption, and leaving some for sale. The pound is made from piles, boards, and small poles. The piles are driven as near as convenient to each other, the spaces being filled with boards, strips, or poles, this making a strong, solid wall. The "leader" is 100 yards long, running out over a sand-shoal in only 2 feet of water at ordinary tides. The "bowl" or "heart" is V-shaped, and is 20 yards across the arms and 30 yards long, and is set in water only a few inches deeper than the leader. The entrance to the heart is a foot wide, and in the outer corner of the heart is another partition and entrance leading into a small pocket where the fish are supposed to finally stop. When this pound was first set, fish would not approach it, but when the stakes had become covered under water with barnacles and oysters, the fish collected about it in considerable numbers. He states that all the common fish in the bay now enter his pound; and small red-snapper and small jew-fish have occasionally been found in the pocket. The largest catch made by him consisted of 300 mullet in one night; all of them were in the pocket. An average night's catch brings him a dozen or two fish of various kinds. Sheepshead, redfish, and salt-water trout seem to enter this pound more readily than any other fish.

Many old fishermen have stated that mullet would not enter such an arrangement, but will, when they strike the leader, turn away. It is thought that if Mr. Jones was in a position to experiment in deeper water the results would be very satisfactory. Mr. Jones does not attempt to barrel any fish, but sells them kench-salted to any who come for them. He sells annually from 2,000 to 3,000 fish, for each of which he receives about 3 cents. He also thinks, with Mr. Deshong, that many fish, and among them mullet, are yearly decreasing in numbers. He makes particular mention of the white perch, saying that they will not take the hook in Tampa Bay.

198. THE FISHERIES OF HERNANDO AND MARION COUNTIES.

TAMPA BAY TO CEDAR KEYS.—The coast between Tampa Bay and Cedar Keys is but thinly settled, there being no large towns, and is, on that account, not remarkable for its fishermen. Indeed, the native fishermen are so few and so unsuccessful in their attempts that we have confined our remarks on the fisheries of Hernando and Marion Counties to those fishermen who come there from other places for the purpose of fishing. It would be difficult from a passing glimpse to learn who they were, whence they came, or how many fish they had caught, inasmuch as gangs are constantly cruising along the coast engaged in fishing, here one week and there the next, just as the abundance of the fish may warrant. They have complete outfits for their work, sometimes living ashore in camps, but more frequently on board the vessel which brought them, which same is used in taking away their fish. The number of these gangs varies with the season. Appalachicola generally sends one or two vessels to this district; Cedar Keys one or two, with ice on board so that the fish may be preserved fresh, and Key West usually sends several with the object of salting the fish for the Cuban markets. It is here reported, as on the coast of Manitee County, that smacks from Havana under the Spanish flag sometimes fish for mullet about Anclote Keys and Boca Ceiga Bay. We could not find any such vessels or any person who is positive that the vessels in question were Spanish. The amount of fish caught and cured on this part of the coast by men from Appalachicola, Cedar Keys, and Key West, as well as the capital invested, &c., appears in the accounts for those places.

FISHING STATIONS OF BOCA CEIGA BAY.—On the coast at the south of Hernando County is

Boca Ceiga Bay, which, after leaving Tampa Bay, is the first point where fishing stations are found. The fishermen here come from Key West and sell their fish to dealers in the Havana trade. There are two stations, one at Turtle Crawl Point and the other at Pass à Goille. These are not permanently occupied; they are visited only during the mullet season in the fall. They are conducted in better style than those farther up the coast and the fish are much more neatly cured. The fall mullet at Boca Ceiga are unusually large and fine, and are far superior to those at Crystal River and vicinity or at Cedar Keys.

The statistics relative to the fishing at the two above-named places, Turtle Crawl Point and Pass à Goille, will be included with those for Key West.

CLEARWATER HARBOR.—Following the coast northward, the next indentation of any importance is Clearwater Harbor, which is a long, narrow sheet of water lying between a chain of islands and the mainland. The Gulf, outside of this harbor, becomes shallower than at Tampa Bay. Inside the harbor also the water is very shoal, the channel affording the only passage for large boats. The islands forming the sea barrier are the only ones in the harbor, and these are low and sandy, bearing a scrubby growth of palmetto and mangrove trees. The mainland is probably one of the highest points on the whole southern coast of Florida. It rises quite abruptly from the water's edge and is heavily wooded with pines, oaks, &c. The soil is good, and a great part of the land along the shore, which is quite thickly peopled, is under cultivation.

At the southern end of the harbor there is living a man named Kilgores, who is as much a professional fisherman as any on the coast. He has a house and farm, and, being located at a good point, is able to combine farming with fishing. In the mullet season he employs several men to assist him in working his seines, salting, &c., and they do much better work than is done at any of the fisheries immediately to the northward. Their nets and modes of fishing are the same as at Crystal River and vicinity, but the fish are handled more carefully during the process of curing, and are therefore far superior both to keep and eat. The fish are sold to the country people, either kench-salted, at 3 cents apiece, or are put up in barrels with brine and sold at $6 a barrel. In 1878 Mr. Kilgores put up 45 barrels of mullet. The salt used by him is procured from Tampa or Cedar Keys; he pays $2 or $2.50 a sack for it.

ANCLOTE KEYS.—The next fishing point is Anclote Keys. Behind the Keys is a favorite resort for Key West smack fishermen, spongers, turtle and "salt-fishermen," and every year one or two gangs of the last are stationed there. In 1879 there was a vessel from Appalachicola and one from Key West fishing for mullet there, but they came and went with so little ceremony that it would be difficult to learn much of their success. The Key West spongers have a series of sponge crawls, some eight or ten, at the North Anclote Bay, and the harbor is much used by smack fishermen in bad weather.

HOMOSASSA AND CHESSEHOWISKA RIVERS—On the Homosassa and the Chessehowiska Rivers no fishing, except with a few cast-nets (and that by non-professional fishermen), is done. At Bay Point a few fish are caught with cast-nets and an old seine, the total catch of both cast-nets and seine probably amounting to 25 or 30 barrels in a season. These fish are sold to farmers who come prepared to cure their own fish and sometimes also to catch them. The farmers also buy from fishing boats or vessels that chance to pass by.

CRYSTAL RIVER FISHERY.—Next in order comes the Crystal River fishery, situated on Crystal River Bay. Here two and sometimes three seines are used. The object of this fishery is to obtain a supply of fish for the country trade and for their own use, and the mode of carrying it on is similar to that at Chambers's Mill, next to be described. The fish are either carried up the

Crystal River to the inland settlers, or are exposed for sale at the fishing station, which is just at the mouth of the river. About 60 barrels of mullet are here salted annually.

CHAMBERS'S MILL FISHERY.—A few miles north of the mouth of the Crystal River, on the coast of Hernando County, is found the last fishing station before Cedar Keys is reached. This station is behind the Crystal River reef. There has been a saw-mill at this point, and the fishery is known as the Chambers's Mill fishery. It is used every season, sometimes by one party, sometimes by another.

There is in use at Chambers's Mill a seine 70 fathoms in length, handled by four or five men. Fishing is carried on there through October; seldom later, as by that time they have used up all their salt and money, or credit for provisions. The men composing the crew work for a share of the catch. The object of this fishery is the same as that of the fishery at Crystal Bay. The curing at Chambers's Mill is a second-rate operation. This place is not of much importance as a fishing station, but it is a good spot, and is annually visited. Cedar Keys men stop here for a few weeks as a rule. The average amount put up by the natives is about 25 barrels. These are sold at $5 a barrel cash, or $6 and $7 a barrel in trade.

TOPOGRAPHY OF THE REGION BETWEEN CLEARWATER HARBOR AND CEDAR KEYS.—Between Clearwater Harbor and Cedar Keys the land is low, in some places swampy, and everywhere heavily wooded. The sea between the above points is shoal, only 12 or 14 feet deep at as many miles from land. The sea bottom and several small islands near the coast are of coral lime-rock. This formation is also prominent about the rivers, entering the sea between Clearwater Harbor and Cedar Keys, for some distance inland. The coast and coast islands are covered with mangroves and sedge, but a few miles inland palmettoes, oaks, and pines take their places.

THE "BAG" CAST-NET.—Between Clearwater Harbor and Cedar Keys, as also from the Mississippi to Appalachicola Bay, the "bag" cast-net is used in preference to the "bail" cast-net described and already stated as being in use from Clearwater Harbor to Key West. Its preference is also apparent at and in the vicinity of Saint Mark's.

The "bag" cast-net is described as being a net, circular in shape, 12 or 14 feet in diameter, having leads strung on its edge at equal distances, and in the center a stout cord is attached. On the under or inner side of the net, just inside of the leads, is a series of tangling lines, which form pockets wherein the fish become fouled.

199. FISHERIES OF CEDAR KEYS.

SEINE FISHERY AT CEDAR KEYS.—Off the coast of Levy County, immediately north of Hernando County, and running parallel with the coast line, are the Cedar Keys. The fisheries carried on from these Keys are very extensive. There are two hundred and sixty professional fishermen employed throughout the greater portion of the year. The fishing, which is prosecuted in spring, summer, and winter, is called "bottom fishing," probably because nearly all the fish are taken below the surface. The methods employed differ altogether from those used in the mullet fishery. In the fisheries of the three seasons above named very little gill-netting is done. The quantity of fish caught by their use would not be sufficient to satisfy the dealers. The adoption of seines is therefore greatly urged. There are twenty-eight seines in use, averaging about 80 fathoms in length. They are about 12 feet long in the bag. The average stretch of mesh is about 2 inches. From four to six men are required to handle one seine, dependent, of course, on the size of the net and the nature of the bottom over which the net is to be dragged. These seines are used from December to May, inclusive. The fish caught are of such varieties as are usually seen in the mar-

kets. The daily catch of a seine is estimated at 233 fish, placing the annual catch at about 41,000 fish. No fish-pots or baskets are in use at this place. The webbing, out of which the seines are made, is of northern manufacture, but the lines, leads, &c., are prepared by the man who is to use the net. In the boat are four or more men, with the seine, the captain standing in the bow, watching for fish. One man is perched on the net, holding one end in his hand, and ready to jump over with it at a word from the captain. The boats have already been described.

The most common way of fishing is to set the net around holes or deep places which appear likely to contain fish. Such hauls are sometimes very productive. From the uncertainty attending this mode of fishing they are called "blind hauls." The winter fishing is almost entirely carried on in this manner, for the fish are then huddled together at the bottom, the surface water being too cold for them.

In spring schools of migratory fish appear, and at that time "blind hauls" are not made, for sufficient quantities can be caught from among the schools in clear water on the sand-flats. Gill-nets are not used extensively in the spring, but are universally employed in the fall months, when the mullet fishery is being prosecuted. As the weather becomes warmer and the demand for fish decreases, the nets and seines are laid by, one by one, until but one or two remain in use, fishing for the Cedar Keys local trade, or perhaps to supply a few neighboring towns.

Until the last six years seine fishing was considered impracticable in this vicinity, and then it was undertaken as a matter of necessity rather than of choice. There are but few places where the bottom is not more or less covered with "coon" oysters, sharp rocks, or a dense growth of weeds. The "coon" oysters are as sharp as razors, and so are the rocks in some spots. It would seem ridiculous to drag a seine over such a bottom and expect to find the net worth anything afterward. The grass and weeds are also great obstacles, for they raise the lead-line and thus give the fish a chance to escape; or, if the net is heavy enough to pull up the weeds, they would accumulate to such an extent as to render dragging an impossibility. In spite of all these difficulties seines are successfully used. Good judgment is necessary and heavy lead-lines are requisite.

GILL-NET FISHING FOR MULLET.—In the months of October, November, and December, when the roe-mullet are running, they are the only object of the fisheries, and all fishermen, excepting the oystermen, are engaged in their capture. The gill-nets, so extensively used in this fishery, were introduced by Northern men about six or eight years ago. They are of Boston or New York manufacture, and are made of light cotton twine, hard laid, six threads. There are sixty-five stationary gill-nets in use. Their average length is about 75 fathoms and depth 10 feet. The average stretch of mesh is 3 inches. They are in use for six months, from September to February, inclusive. Each boat takes charge of one net. The average daily catch of the gill-net is placed at 85 fish, and the same for the year at 17,000. Nets made of linen are considered inferior to those made of cotton, because the linen is said to rot much quicker. Many of the fishermen object to the manufacturer's plan of mounting the nets with double lines for the corks and leads, and therefore buy the material, but make the net to suit themselves. Each man, of course, has his peculiar ideas of the way in which the nets should be made, so there are always slight, but generally inconsiderable, differences in the nets of different men.

This kind of fishing is done only at flood-tide, which occurs as often in the night as in the day. At the first of the flood the boats start out; in each boat is a net and a man. The men fish in pairs, so that the schools may be the more readily surrounded, or a channel may be stopped up with greater ease and dispatch. This plan benefits both men. Sometimes there are three or four boats in company surrounding a school. In such cases, also, all are benefited, being jointly able

to catch more than they could if they were fishing separately. In some instances they miss their fish, and the loss is as general as the gain might have been. One man, Lewis, has six or seven helpers, and is very successful, catching more fish than any other united band of the same size. His men fish on shares, each receiving an equal amount at the end of each week. Another man, employing a number of helpers, is stationed at the mouth of a creek where mullet are very abundant. At high-tide, when the fish are likely to be inside, he runs a couple of gill-nets, amounting to nearly 200 fathoms, across the mouth of the creek. At low tide, when the flats are bare, excepting in the channels or holes, he drags all the imprisoned fish out with a small seine. These, together with what were gilled in the net, constitute nearly all the fish that were in the creek at the time of the setting of the nets.

The gill-nets being made of light twine are badly torn every day, especially those that are left standing a long time in the water. Large fish do much damage to the gill-nets, but crabs are the worst enemies. These climb up the nets, biting the twine as they go. A rent several feet in length is thus frequently made by them. On the shoals and reefs about the islands mullet are caught, whose movements are to an extent dependent upon the changes of the weather; at times they are most abundant offshore, at other times, most abundant inshore, and again plentiful everywhere. The boats being swift sailers, a large expanse of water may be searched in a day with the prospect of delivering the fish in a good condition at night.

DISPOSITION OF CATCH.—The fish are turned over to the dealer, who counts the mullet and weighs the "bottom fish," namely, all other marketable kinds of fish. Settlements are made every Saturday night. The fish are sold fresh, only those that remain over being salted. The demand for fresh fish is good, and the difference in the price does not pay for salting. The greater part of the salt fish which appear in the Cedar Keys market comes from more southern fisheries, the remainder being those which are salted lest they should spoil. They are packed in rough boxes and barrels and are seldom prepared with brine. Those that are shipped go to the poorer classes in the interior. For salted mullet the fishermen receive 2 or 3 cents apiece.

The fish not to be salted, after having been washed in icewater, are packed away with ice in barrels, tierces, and hogsheads. Mullet in their season are bought for so much each, small ones being counted as two for one, or three for two, as the size may be.

"Bottom fish" include the varieties known as spotted trout, sheepshead, red fish or channel bass, sailor's choice, grunts, flounders, crevallé, blackfish, and all other common food-fishes. These are bought and sold by the pound. Choice fish, such as pompano, Spanish mackerel, and bluefish, are also bought and sold by the pound, but for a somewhat higher price than the more common kinds.

The hogsheads in which the fish intended for shipment are packed will hold 500 or 600 mullet, or 700 or 800 pounds of "bottom" fish. A tierce will hold half as much as a hogshead, and a barrel half as much as a tierce. Wooden heads are put on all the packages. Shipments are made by express. Savannah is one of the principal markets; some shipments are made to all the largest towns of Georgia and Florida and to New York.

OYSTER BEDS.—Several years ago there were some very prolific oyster beds at Cedar Keys; these are considerably reduced in importance on account of their having been exposed to cold weather. About one hundred men are employed in this fishery, using fifty boats. The oysters are all sold to the fish dealers at Cedar Keys, who ship them in shell to the interior in barrels. The tongs are the only implements peculiar to the business, but need no description, being similar to those used at other places. A few pairs of cheap tongs of inferior material have been tried and

condemned. The oystermen prefer to pay a high price and obtain the best article. These are steel-toothed and cost $9 a pair.

MARKET PRICES.—The Cedar Keys market prices are: For large roe mullet, fresh, 2 cents each; salt mullet, each, 2½ cents; choice fish, 3 cents a pound; bottom fish, 2 cents a pound; turtles (elsewhere discussed) not exceeding 40 pounds, 4 cents a pound; and oysters, 50 cents a barrel. The above are the prices paid to the fishermen. The dealers' prices are now given: Large roe mullet, fresh, 4 cents apiece; salt mullet, 3 and 3½ cents apiece; choice fish, 5 and 6 cents a pound; "bottom fish," 4 cents a pound; turtles, 8, 10, 12, and 15 cents a pound; and oysters, $1 a barrel. The prices for fish four or five years ago were about one-fourth more than at present.

200. THE FISHERIES OF LA FAYETTE, TAYLOR, AND JEFFERSON COUNTIES.

MULLET-FISHING.—Along the coast of Florida between Cedar Keys and Saint Mark's there are no good harbors or large settlements; the land being low and swampy, is hardly habitable. There are a few places where fishing is carried on by men coming from the interior. No attempt is made to catch any other fish than the mullet, which, in its best season, is as plentiful here as at other places along the coast.

The men who carry on this fishery, owning the boats, nets, salt, and provisions, are the most thrifty class of planters, living inland along the rivers. They fish through October, November, and perhaps a part of December. Their object is mainly to get a good supply of fish for their own use and a few over for sale. The crews are of the poorer classes, generally white, who are quite ready to work a couple of months to secure a small supply of salt fish for their families.

The points near the river mouths, which are known to be in or near the path chosen by the spawning mullet, are the places where the fishermen pitch their camps.

Such are the fisheries of Suwannee River, Blue Creek, Finhalloway River, Enconfina River, and Ocilla River, at which last-named place are two fishing camps.

Those who use gill-nets have a certain spot for camping grounds, but fish anywhere within several miles of their camps.

For seine-fishing suitable points are selected, called "seine-yards"; at these alone do the seine-fishermen fish. These seine-yards are more fully described in the section upon the fisheries of Ocklockonee Bay. The apparatus, consisting of boats and nets, is in every way similar to that in use at Saint Mark's and vicinity, with the exception that the seines used at the fisheries, now being discussed, are smaller and made of lighter twine than those in use at Saint Mark's. The lack of means is the only reason for this difference. The methods of catching and curing the fish are also the same as at Saint Mark's.

PRODUCTS OF THE FISHERY.—The majority of the fish are subjected to the operation of kench-salting alone. Some few are packed with brine in cypress-wood barrels, the object of this being the preservation of the fish for a long time. The fish salted are roughly handled and unskillfully treated. Their appearance is other than clean and wholesome.

At one time there was quite an extensive trade in these fish; but the low price for which fresh fish can always be obtained, coupled with the slovenly manner in which the fish were sent from these points to market, has had the effect of cutting it down, so that now but few are sold.

In 1875 the catch was double that of 1878, fully one-half being sold for cash or exchanged for groceries. Since 1875 the amounts have been annually smaller. When "salted" fish are sold they bring 3 cents apiece.

The following is a fairly correct estimate of the amount of mullet caught and cured at the above named places in 1878. Probably three-fourths of the sum total were eaten by the fishermen and their families, not more than one-fourth being sold:

Place.	Barrels.
Suwannee River	35
Blue Creek	55
Finhalloway River	28
Enconfina River	56
Ocilla River	42
Ocilla Slue	21
Total	237

According to the above proportion, this would give about 59 barrels as the number sold, and the remainder, 178 barrels, as the amount consumed by the fishermen.

201. THE FISHERIES OF WAKULLA COUNTY.

SAINT MARK'S RIVER.—The principal fisheries of this county are carried on at the mouth of the Saint Mark's River. Ten miles above this point is the town of Saint Mark's, situated at the junction of two streams, which rise but a few miles above the town. These are fresh water streams, deep, pure, and clear. The average temperature of the water in the summer is about 70° Fahr. Many salt water varieties of fish have been observed at Saint Mark's, such as the sheepshead, sailor's choice, mullet, and silver gars. There are no white shad in either of these rivers.

All the fishing which is prosecuted by the fishermen of Saint Mark's is carried on at the mouth of the river which is formed by the combined streams above mentioned, and to which the name of Saint Mark's River is still preserved. At this point, *i. e.*, the mouth, the water is always salt. The shores are low and weedy here, as they also are throughout the coast-line of the entire bight, called Appalachee Bay. The water is shoal for several miles out into the bay, only 3 fathoms being found at a distance of 4 or 5 miles out directly opposite the mouth of the river. On either side the water is only half that depth, and continues so for a long way farther out. On these shoals all the fishing is done with either gill-nets or hook and line for sheepshead and sea-bass, or, as the people there call them, "blackfish."

On the west side of the mouth of Saint Mark's river are many shoal bays. Journeying westward, they are met with in the following order: Goose Creek, Purity Creek, Spring Creek, Skipper Creek, Oyster Bay, Dickinson's Bay, and Ocklockonee Bay. These are all bays of considerable size, and are, without an exception, very shoal, and therefore very difficult of navigation, except with a flat-bottomed boat. The water in these bays is quite fresh at low tide and brackish at high tide, and has a rise and fall of about three feet.

METHODS EMPLOYED AT THE SAINT MARK'S FISHERY.—The number of professional fishermen at Saint Mark's is twenty; nearly every one of them is American born, white or colored. The most profitable season at this place for fishing is the summer, for then the coast is teeming with all kinds of salt-water fishes. Immense schools of bluefish, Spanish mackerel, jackfish or jurel, and cavalli are then passing by. The fishing is carried on as long as practicable, until about the beginning of June.

During the warmer months in which fishing is done the well-boats are used with very great success. Many of the twenty boats at Saint Mark's are provided with these wells. All the boats are flat, sharp skiff-boats, from 18 to 20 feet in length and 6 in width. They are of the same model

as those built at Ocklockonee Bay, and are roughly made of pine or cypress boards. The well is simply constructed: a portion of the boat, about 4 feet of its length, 2 feet forward and 2 feet aft of midships, is tightly partitioned off from the rest of the boat from side to side. If the boat has a center-case the well is built around it, holes an inch in diameter being bored through the case as well as through the bottom in order to allow a free circulation of water. When the well is not being used boards are laid over it.

The gill-net season is divided into three parts: The mullet fishing, from September to some time in December: the bottom-fish season, thence till some time in March; and the summer season, comprising the months of April, May, June, and parts of September. There are twenty gill-nets in use, all of which are stationary; their length averages 125 yards. The average depth is 8 feet and stretch of mesh 3½ inches, or 1¾ inches from knot to knot. As above stated, they are used throughout the entire fishing season, which means, whenever fish can be profitably caught and shipped without spoiling. The principal kinds of fish usually taken in the gill-nets are mullet, sheepshead, trout, redfish, and bluefish. The average catch for each boat is estimated at 100 pounds, or 15,000 pounds per annum. No seines are owned or used at Saint Mark's.

MULLET FISHING AT SAINT MARK'S.—When the mullet are beginning to appear in schools on the coast in September, all arrangements are made by the fishermen for their capture. The outfit is simple and but little time for preparation is necessary. One man, usually the owner, goes in a boat and handles one piece of a gill-net. Fishing is done only at high tide, and the fishermen take advantage of that flow of the tide which takes place ten or twelve hours before the train comes. All start to the fishing grounds together; upon arrival they pair off. When a school is sighted in shoal water, two fishermen row so as to inclose the fish between their boats. They then row their nets out in opposite directions so that when both nets are out there is a man at each of the two points where the nets come together. The catch is equally divided. The fish are taken to town in wells or in the bottom of the boat without any other attention being paid to them than that they are covered with canvas.

In warm weather, if fishing in the daytime, the fish sometimes spoil, and in such weather it is safer to split and salt them on the fishing grounds. For that purpose knives and salt are carried. A colored man, named Thomas Ellisen, contracts for all the fish caught and agrees to receive and pay for all the fishermen bring, in whatever condition they may be, provided only that they are delivered to him at the appointed time, and, also, that the fishermen must not go out fishing sooner than twelve or fifteen hours before the train is expected. While fishing for mullet, trout and redfish are often taken; these are sold with the mullet.

WINTER FISHING.—In the winter months, such fish as redfish, trout, sheepshead, and bluefish—in fact, any fish except mullet—are here, as at other points, called bottom-fish, because they keep more closely to the bottom during those months. They are taken on the same grounds as the mullet, but the plan of fishing is somewhat different. The gill-nets are set either across a channel or around a deep hole and the fish are frightened into it by splashing the water with poles. Good catches are often made in this manner, especially of redfish and trout. In winter it is better to carry the fish dead than attempt to keep them in a well. These fish are sold at Saint Mark's to Mr. Thomas, a dealer, who ships them on ice.

OYSTER BEDS.—At Saint Mark's there are many worthless oyster reefs, and only one or two whose oysters are marketable. These profitable beds are situated about 5 miles west of Saint Mark's light-house, near Shell Point. The beds are small and the oysters of ordinary size. In this fishery there are but four men at present employed. They own two boats. The oysters are sold to saloon keepers in Tallahassee and in many of the towns of Georgia. The oyster boats are the

same as those used in gill-net fishing, except that they are a little larger and are provided with a sail. The tongs are the only peculiar piece of apparatus used by the oystermen. Two pairs in use at this place in 1879 were wooden imitations of the iron ones usually seen in the market. The handles were, of course, made of wood and were perfectly straight. On the larger and heavier end of these was bolted, at right angles, a piece of oak or other hard wood, about 2 feet long and 2 inches in width and thickness. These pieces formed the back, or jaw, and through them iron spikes were obliquely driven to form teeth. Between October 1, 1878, and April 1, 1879, 1,000 bushels of oysters, valued at 50 cents a bushel, were shipped from this place.

DISPOSITION OF PRODUCTS.—Nearly all the fish shipped from Saint Mark's in a fresh condition are put on ice. The dealers at Savannah agree to pay so much per pound for the fish and furnish ice in which to pack them before shipment. This ice is shipped by rail in hogsheads and tierces, holding from 300 to 500 pounds each. The ice is shipped three times a week, that being as often as the train runs between Saint Mark's and Tallahassee. When the train arrives at Saint Mark's it finds the fishermen and oystermen assembled with their products, which need only to be iced in order to be ready for shipment. The fresh fish from boats either with or without wells are weighed or counted and are then packed in old flour barrels with several layers of broken ice between and a quantity of ice on the top. The packages are finally covered with a gunny-bag which is nailed down securely. If, as is often the case, the ice does not arrive, the fish are split and salted on the spot, reserving a few, if the weather is cool, to be sent to Tallahassee without ice. All responsibility on the part of the fishermen ceases as soon as the fish are on board the train.

At any time when there is likely to be a call for salted fish, men are hired and the process of splitting and salting is quickly performed. In this shape they are allowed to remain until sold, when they are counted, packed in boxes 2 or 3 feet square, and shipped off. These fish, being the largest ones and carefully salted, present a very inviting appearance. The shed in which the fish are packed is the property of the railroad company and is used by the fishermen free of charge. There is but little expense attending this branch of the fish trade and it is estimated that $200 a year will cover the expense of salt, and of hiring men to do the splitting and salting.

The principal markets for the fish caught at Saint Mark's are Tallahassee, Ancilla, and Monticello, Fla., and Savannah, Ga. The greater portion of the fish goes to Savannah.

The prices obtained by the fishermen for their fish during the last three years were: For fresh fish, 3 to 4 cents a pound; and for salt fish, 5 cents a pound. Before that time the prices were as follows: Fresh fish, 2 to 2½ cents a pound; and salt fish, 3 cents a pound. The skipper aims to clear 2 cents a pound on all fish, fresh or salt. Mullet are never weighed but are counted, each fish being considered as 1 pound. In this way the purchaser in buying a large quantity gains an immense advantage. Sometimes many of the mullet thus sold in a lot weigh 4 pounds each. All other kinds are weighed and sold by the pound. The present price of oysters to the oystermen is 50 cents a barrel. The shippers receive 75 cents a barrel.

In the deep shoal bays enumerated above as lying to the west of the mouth of Saint Mark's River, the mullet fishery is the only one worthy of special consideration.

THE FISHERIES OF OCKLOCKONEE BAY.—Ocklockonee Bay is everywhere cut up with large reefs of "coon" oysters which are worthless and are an obstruction to navigation. The other bays are avoided on account of the mud flats. Fish of all kinds seem to be abundant and the section generally is believed to be a splendid one for all fish which go into fresh water to spawn, such as redfish, menhaden, cavalli, and trout. At those points where small fresh water streams enter into the bays the bottom is covered with weeds and grass and occasionally a coarse sponge may be seen. There are not a great many people living on the shores of these bays, but they are found up

the rivers and creeks where the land is rich enough to allow them to carry on a small plantation successfully. Even those whose living depends entirely on fish and sponges prefer to spend their leisure time on the banks of these little creeks and rivers.

In Ocklockonee Bay there are quite a number of men who are engaged in the sponge fishery, and also several small schooners which are in the trade and belong to parties in the neighborhood. These vessels are registered at Appalachicola or Saint Mark's and their whole business is done at those places. The men employed on these or Appalachicola vessels are numbered in the report of Saint Mark's or of Appalachicola. Those of the sponge fishermen who are engaged in the mullet fishery in its season, are the only professional fishermen who are engaged in the mullet fishery for less than its entire season; all others who fish for mullet are the farmers. These farmers are the genuine Florida "crackers" and, with but few exceptions, are a wretched lot of men. They are lazy, ignorant, and unhealthy, not having proper food, or taking proper care of their persons. In the fishing season there are about one hundred and twenty persons engaged at the various stations on these bays.

The mullet season begins in October and ends in December. During October and November gill-nets are used, and in December both gill-nets and seines. It is only at certain points that mullet are easily obtained by the use of seines. By continued experiments these spots have been decided upon. No one is allowed to fish on the ground usually occupied by another without his permission. The owner of a good fishing station either fishes there himself or rents it out to some one who will give him a share of the catch. Not more than one seine is used at one station, but the seiners often allow one or two crews with gill-nets to fish from their station for the sum of $5 per season for each net. It frequently happens that a station may not be suitable for seining but excellent for gill-netting. At Dickinson Bay there are four gill-net stations; at Ocklockonee Bay there is one seining station, which is also used by gill-netters; at Skipper Creek are two seining stations; at Spring Creek are three gill-net stations; at Purify Creek, two gill-net stations; at Shell Point, one fine seining station; and at Goose Creek are two seining stations and one gill-net station.

FISHERMEN OF OCKLOCKONEE BAY.—The fishermen live in a small, roughly made shed, occasionally provided with a chimney and fire-place, with no other floor than the dirty sand on which it is built; no table at which to eat; no bunks or other arrangements for sleeping; no dishes or any accommodations which give the slightest suggestion of comfort. These dwellings are merely a shell, in which there is a confusion of barrels of salt, barrels of fish, fishing gear, and a lot of uninviting-looking men. The fleas can be both seen and felt. The food of the men is of the poorest quality and not as abundant as they desire. They sometimes take a few raw sweet potatoes out in the boat with them as a luncheon. Such food is calculated to make them thin and unhealthy.

GILL-NET FISHING AT OCKLOCKONEE BAY.—Those fishing with gill-nets, as before stated, go to the fishing grounds first, because they can fish profitably when the seiners cannot; and they, therefore, make a much longer season than the seiners. Two men constitute a crew for a boat; each boat carries one net. At the commencement of the season the mullet are found only in small schools, feeding on the grassy shoals. All the fishing is then done at high tide, be it in the night or day. The usual method is to hem in a school so that they run against the net, and gill themselves. This is somewhat strange, for when interrupted by a seine or even a single line, they invariably jump out of the water over the obstacle. From one hundred to three hundred fish are called a good catch for one net at a tide. Sometimes, when two crews are fishing together, both nets are run around the same school of fish, each crew taking only those fish which are found in its own net.

Speaking generally, the catch is divided into thirds, one of which the owner of the boat and net draws, each of the crew taking one of the remaining two-thirds.

SEINE FISHING AT OCKLOCKONEE BAY.—The seining crews arrive at their station in October, and are then provided by the owner of the station or his representative with fishing gear, salt, and food. The whole crew, consisting of ten or twelve men, is then generally hired by the month. Only one seine is used at a station, and that is permanently arranged so as to be hauled only in front of the station. This hauling place, before alluded to in this chapter, is called a "seine-yard." In fine weather, when the fish may be expected in shoal water along their shore, the seine is kept all ready half-set in the yard. The net is set straight out from the shore until the bag is reached, and then the boat containing the other half is fastened to a buoy, which is moored there for the purpose. When a school of mullet approaches and finally comes within the radius of the seine, the seine-boat is quickly unmoored and rowed to the shore. If the haul is a success, the next operation is that of hauling the net and fish ashore. These hauls are never so large as at many other places on the coast, and from 25 to 75 barrels are considered a large catch. Many other kinds of fish are of course taken with the mullet. The valuable ones are saved for food, and such fish as sharks and alligator-gars, and porpoises are killed, and either buried or utilized for their oil, which, as manufactured at these stations, is a very inferior article.

DESCRIPTION OF APPARATUS.—A short description of the boats and nets will not be out of place. The seines are made in Boston or New York and shipped here by freight via Savannah. They are all of strong cotton twine, and are coated with tar, which is obtained from the native pines. The style of knot used, manner of mounting, and forms of floats and leads are the same as those in use on the Atlantic coast. The nets are from 100 to 120 fathoms long, and from 16 to 20 feet deep at the bag. The wings at their extremities are, of course, much shorter. One of these nets, well taken care of, will last for three or four seasons, and costs, when new, about $1.20 a fathom.

The gill-nets are also made in the North. They are of light cotton twine, generally of 12 threads, 50 fathoms long, and 8 or 10 feet deep. They have a mesh of 3 inches in length, or 1½ inches from knot to knot. They cost about 50 cents a fathom. When not in use the gill-nets are either spread out on the grass or are rolled up on large reels, which are built at the water's edge for the purpose. These reels are easily made and are the most convenient and effective arrangement that can be had for drying nets.

The boats used by both gill-netters and seiners are long, sharp, and flat-bottomed. They average 20 feet in length and about 6 in width. They are roughly built of pine or cypress boards, and are not calculated to last more than one or two seasons. They are not calked or painted, a coating of pitch taking the place of both. They cost, when new, $10 or $12.

When the mullet are running it is necessary to have a lookout stationed at a point whence the fish can be seen for a great distance. For this purpose a kind of observatory is built on the highest land near the shore and station. This building is 20 or 25 feet high and commands an excellent view of the shores for half a mile either way.

DISPOSITION OF THE CATCH.—The disposition of the fish when caught will now be treated of. The object of most of these fishermen is to provide themselves with food for the winter, and to obtain some ready money by selling what they can spare to the Georgian and interior Floridian planters, who come as regularly to the coast every year as the mullet do. When the gill-netters begin fishing none of the planters have arrived, and all fish caught in October are dry-salted and carelessly packed in old boxes or barrels for home consumption, or are held until the customers arrive. The roes in these fish are undeveloped, and are, therefore, not often saved. Soon after

this primary stage of the season the farmers begin to arrive at the fishing stations with their teams and sometimes their families. Some of them bring 25 or 50 sacks of salt to exchange for fish, or to use in preparing fresh fish themselves. Others bring country produce, and a few bring nothing but money. They all have their favorite trading stations, at the most popular of which it is said not to be uncommon to see 100 or 120 teams drawn up at a time. When a haul is made with the seine, or when a gill net crew comes in, all these people flock down to the shore and buy the fish at so much apiece, or make some arrangement for a certain number salted.

During the season there are often weeks when the mullet do not come into shoal water, and not unfrequently two weeks pass at the height of the season without any great amount of mullet being taken. Then, again, with a change of weather, they come within reach in such numbers that there is not a sufficient force of men to handle them before they have all passed, and the fishing for that season may be said to be over. It is said by several of the leading men that the supply falls short of the demand.

The fish are dressed here as at Appalachicola and Saint Andrews, hereafter to be described. None are brine-salted or shipped in tight packages. The cured fish which were examined at these places—provided that they were fair samples, and there was no reason to suppose that they were not—were far inferior to those cured at Appalachicola, where they presented a clean appearance and looked as though they were intended for food.

All the salt used here in the curing of the fish comes from Georgia by teams, or from Tallahassee. It costs the fishermen $2.50 or $2.75 a barrel, delivered at their stations. It is a fine quality of Liverpool salt. There have never been any salt works at these bays.

The catch of a seine will average 150 barrels per season at these points, and of a gill-net 20 barrels a season. It is estimated that the fish will average in value $5 a barrel. Out of the proceeds must be paid the cost of the salt, and the wages of the men and their food, for idle days as well as busy ones. Twelve to fifteen dollars a month are the usual wages paid to seiners. The results of different years vary but little.

The fish are sold mostly by the individual, or by the lot, when fresh. For fresh mullet in the "round," as it is called, 2 cents each are paid; for "dry-salted"—those which have lain several days beneath a sprinkling of salt—from 2 to 4 cents, according to size, are paid.

202. THE FISHERIES OF APPALACHICOLA.

COMPARATIVE SCARCITY OF FISH IN APPALACHICOLA BAY.—Although situated off that part of the Gulf coast which is being constantly passed by migratory fishes, and is so largely frequented by more southern species of fish, Appalachicola Bay and the adjoining waters of Saint Vincent's and Saint George's Sounds are without any abundance of the former or extensive variety of the latter. This is probably due to the freshness and muddiness of the water, for which two reasons are offered in explanation: First, the Appalachicola River, a river of considerable size formed by the junction of the Chattahoochee and the Flint Rivers, is constantly discharging its waters, fresh and muddy, into Appalachicola Bay at a point 8 miles distant from the sea; and, second, the water which flows westward through Saint George's Sound bears with it the emptyings of all the rivers in the bight extending from Saint Mark's to Cedar Keys. The freshness and thickness of the water in Appalachicola Bay can hardly be attributable to any other causes. In this bay, although it is but a poor summer resort for most of the sea fishes, some species—the greater part of which are anadromous—thrive, and at certain seasons are very abundant.

MULLET FISHERY OF APPALACHICOLA.—At Appalachicola there are one hundred and sev-

enty-five professional fishermen. There are thirteen fitters and owners, and three dealers, who, for the most part, provide the fishermen with salt for the curing of their fish.

The mullet fishery of Appalachicola claims the greater part of our attention in dwelling on the fisheries of Franklin County. In this trade no large boats or vessels are used, and only one style of small boats, and by the aid of these the seines and gill-nets are carried and set. These boats are of about the same model as the "dingy" boat used in sponge fishing, but are much larger, being often 20 or 22 feet long, with 6 or 7 feet beam. The forward part is decked over, and wash-boards on either side are run aft to the stern. This decking has, like that of many small open yachts, a high combing on its edges around the cockpit. These boats are propelled with oars and sail. The sail is of the lateen pattern, being a triangular sail arranged with a long yard and a very short and stubby mast. Rigged in this manner the boats are very fast sailers and are easily managed.

Of such boats there are ten engaged at Appalachicola in the salt-fish trade, where also they were built and are owned. The material used in their construction is much the same as that of which the "dingies" are made. When examined closely, they look rough and plainly show poor workmanship. The same may be said of all the boats and vessels made in this neighborhood. When complete, these boats are worth $100 each.

There are twelve or fifteen seines at Appalachicola, but some of them are old and unfit for use. Ten only, one for each boat, are used in the fisheries. The men who own the nets also own the boats. The seines range from 75 to 150 fathoms in length, and from 10 to 16 feet deep, with a mesh of 2, 2¼, or 2½ inches long. These nets are brought from Boston, unmounted as a rule, as the fishermen prefer to hang their lead-lines according to their fancy. When complete, the net entire costs at a rate of $1.25 a fathom. It is estimated that there are 1,000 fathoms of seine in use by Appalachicola fishermen.

Gill-nets are but little used here; not more than three are hauled by men who make a business of putting up salt fish. All the gill-nets are stationary, and are about 100 fathoms long and 6 to 10 feet deep, with a 3-inch mesh. These, also, are of Boston manufacture, and cost, when ready for use, 50 cents a fathom. One hundred fathoms are in use.

Some of the crews of fishermen are stationed at regular fisheries, while others move from place to place in the bay, putting up the fish, sometimes in camp and sometimes on the wharves in town.

There are two fisheries, occupied every year, which deserve special attention: one, owned by a man named Pickett, is at the mouth of Crooked River, on Saint George's Sound. This is the best fishing station in the vicinity, for when the fall run of mullet comes into the bay it will surely pass that point. The other is at Cat Point, a few miles east of Appalachicola; this, although a fine station some seasons, is not so reliable as Pickett's.

In September and the first part of October, the boats, seines, and other gear are overhauled and supplies of salt and barrels are procured. Then all the crews go to their camps at their respective stations in order that all shall be in readiness when the mullet come.

At the fisheries, or regular stations, eight or ten men are engaged, and at each of the others roving gangs of four or five constitute a crew.

In the latter part of October and in November the mullet are running and the fishermen are then busy. Sometimes two or three weeks are passed in waiting for the fish to come along, but if the station is a good one the fishermen do not go away nor lose confidence in the advent of the fish sooner or later. When they arrive they sometimes come in such numbers that one or two hauls constitute the catch for that season. From 20 to 150 barrels are caught at one haul of the seine, and with larger seines twice or three times that amount could be taken, for the fish often come in

schools 1 to 3 miles long and 400 to 500 yards wide. As soon as one of these large hauls is made all hands are busy cleaning and salting. The fish are first beheaded, then split down the back, scored under the backbone, and, finally, washed clean, all blood, fragments of entrails, &c., being carefully removed. They are then packed in pork barrels, kept for the purpose, with plenty of salt sprinkled over them, and are thus allowed to remain several days, after which they are taken out and nicely packed in the packages, described below, with an abundance of boiled pickle over them.

Any roe of good size found when splitting is carefully saved and packed up in pickle in quarter barrels or kits. In this way a great many barrels are put up in a season. The heads of the mullet are also saved and boiled for the oil which they contain. In 1878 two barrels of oil were obtained in this way at Pickett's fishery. It is, however, said to be of poor quality, and therefore is not valuable.

At the end of November, by which time the fall run is over, the crews carry their fish to town, and, having sold and settled up, scatter until the next season. It is seldom that any other fish are so abundant that they would sufficiently remunerate these crews were they to remain at the fisheries after the mullet season is over.

From 200 to 500 barrels of mullet are caught by one gang in a season. In 1878 the catch amounted to 300 barrels. The value of this quantity was $1,275, selling at the rate of $4.25 a barrel. As soon as the catch is turned over to the dealer a settlement is made. First of all he deducts the amount of his bill for salt and provisions, and then gives each man his share in money, or, as is usually the case, in provisions for his family. The boat and seine have an equal share with the men; therefore, if there are ten men in a crew, there must be a division of that which is left, after said deductions are made, into twelve equal parts. The men engaged in these fisheries clear from $50 to $100 in a season. Those crews which have no regular station get what they can out of the mullet run and then fish through the months of December and January for bluefish, sheepshead, redfish, &c., which they put up in the same style as mullet. In April and May one or two crews fit out for the pompano fishing, and go to Saint Joseph's Bay (a large bay 25 miles farther west) for that purpose. The pompano are salted, as are the other varieties. There is always good sale for the pompano, and the supply falls short of the demand.

FISHING SEASON.—The last of May is the extreme limit for salting fish. It is affirmed that fish cannot be prepared with salt in summer so as to remain sweet any great length of time.

In order that no mistake may be made, we here state that the same crews are not fishing throughout the entire fishing season, from October until May. Those who fish at the regular stations are through their work by the 1st of December, after which, as stated above, the men scatter and work at various occupations until the following October. The small cruising gangs, already alluded to, fish for mullet only as long as there is any chance of success, and then break up, only, perhaps, to form another crew in a few weeks, when they start after some other kind of fish that may be running at that time or may be unusually abundant in the vicinity. February and March are the poorest months for the fishermen, and very few who fish then have any success. The only kinds then found are small schools of redfish, bluefish, and sheepshead. The fishermen, of course, prefer a mild season, as then, especially if there is a prevalence of light southerly winds, all kinds of fish come into shoal water in abundance, and also the migratory kinds appear some weeks earlier in the spring. If, on the other hand, the season is stormy, the fish are, for the most part, driven into the deep waters of the sea and bay.

GILL-NETS.—The gill-nets are used by men who stop in town. They use the same kind of boat as the seiners. Two men can handle one of these gill-nets and cure all the fish which they can catch. But little can be caught in them until the water becomes cold (which condition may

be said to last from December until March), when the fish retire to the deep water or among the thick grass. The method of using a gill-net is to set it around a hole or grassy place and then, by splashing with a pole, frighten the fish into the inclosure. The catch thus effected is never large. There are only three equal divisions, however, to be made of the catch, namely, one to the owner of the boat and net and one to each of the two men; consequently, the men often make more money in this way than in seining, in which latter business so many shares must be taken out of the proceeds of the catch.

DISPOSITION OF THE CATCH.—The packages used for "putting up" the fish are of white pine, either barrels, half barrels, quarter barrels, or kits; these come by freight from Boston. Formerly cypress packages were used, but were discarded because they were not so neat or cheap as those of pine. With the freight included, these barrels, half barrels, quarter barrels, and kits cost, respectively, $1.00, 65 cents, 45 cents, and 30 cents.

In the fishing outfit salt is a very important item. To salt one barrel of fish properly, about one-third of a sack, or one bushel, is needed. This salt is bought chiefly of Mr. Murat, the principal dealer in salted fish, at the rate of $1.50 a sack. Other provision dealers supply salt to the fishermen who do business with them. When a person is fitting to go on a fishing expedition he first makes a verbal contract with his dealer to take all his fish. The dealer furnishes the packages and promises to pay so much for the fish, generally from $4 to $4.50. The fisherman buys the salt. Mr. Murat controls the bulk of the trade by furnishing in advance salt, barrels, and provisions. The fish are shipped by river to nearly all the towns and cities of Georgia and Alabama, in which States his traveling agent procures orders throughout the fishing season.

Mullet, bluefish, sheepshead, and pompano are certainly very attractive looking fish when properly prepared in pickle. They are said to be superior in flavor to the mackerel which have been in the southern markets during the past few years. Mr. Murat warranted his fish to remain sweet for a year. This business of salting has grown immensely during the last five years, having been taken up by a most enterprising set of people. It promises to become a business of much greater importance. Mr. Murat says that for the past five years the number of barrels of salt fish shipped from Appalachicola has averaged about 1,000 barrels a year, thus, at $5 a barrel he has shipped off $25,000 worth of fish in that space of time. He now receives $7 a barrel, the fish delivered on board of the boat.

As the majority of the inhabitants of Appalachicola are fishermen, to some extent, it is not to be expected that there is a very large trade in fresh fish. Those who are not occupied at all on the water find leisure to fish sufficiently to supply themselves with fish for their own consumption, when fish are very abundant. A few fish are offered for sale on the wharf every morning: sheepshead, trout, mullet, redfish, small "grass-fish," and frequently fresh-water fish from the rivers above, such as black bass, perch, bream, &c. The salt-water fish are caught during the night in cast-nets and the fresh-water fish with hook and line the day before. The sale does not exceed a barrel a day, and they sell for very little.

During the fishing season (fall and winter) one or two of those crews which are engaged in salting fish secure several hundred pounds of ice from Columbus or Chattahoochee; this ice they use to preserve such mullet, sheepshead, &c., as they intend to ship back on the boat which brings the ice. The fish thus shipped are packed in flour barrels with broken ice, and a sack is then nailed over the top. Twelve or 15 barrels are often sent to Eufala, Ala., and Bainbridge and Columbus, Ga. If the means of transportation were surer or more regular, a much larger trade of this kind would be carried on.

The fishermen receive $5 or $5.50 a barrel for all good food-fishes delivered on the steamboat, packed carefully. They clear about $3 on a barrel. Last winter, in this trade 450 barrels, worth $1,350, were packed and shipped.

THE OYSTER INDUSTRY.—This neighborhood has been highly favored with a large number of beds furnishing oysters of large size and fine flavor, which are easily procured and distributed by means of river steamers from Appalachicola, through a wide area inland. Besides a number of large reefs in Saint George and Saint Vincent Sounds and Appalachicola Bay, there are scattered all through the deeper waters a great many small beds. The depth of water here averages 7 feet, and it is brackish and full of sediment. The oysters from these beds are of superior flavor; there are few better in any part of the Gulf.

The reefs, or beds, are only an hour's sail from town; therefore the outfits or preparations for a trip need not be very great. When the tide is high the boat anchors over a bed, on which there are from 5 to 10 feet of water, and both men use tongs to bring up the oysters with. As each tong-full comes up, the worthless ones are culled out and the good ones are thrown into the hold. The tongs in use here are made of iron, some galvanized and some not, in the same shape as those used on the Chesapeake. With these tongs, on a spot where the oysters are abundant, and need but little culling, two men can put 50 barrels of good oysters into the hold in one day.

If the tide is very low, as is the case during "northers," the boat is run aground on an oyster-reef, a gangway plank is placed over the side, and the oysters are picked up by hand and carried aboard in tubs. Oystering in this manner is said to be harder and slower work than tonging them. When the boat is loaded she goes to town, and, if there be a steamboat there, the oysters are turned over to the dealer on board of her; if not, they are not delivered until one does come. The oysters sell for 50, 60, and 75 cents per barrel, all ready for shipment, that is, in barrels and covered with gunny sack at the top; but the oystermen seldom get barrels or sacks, which have to be furnished by the dealer, at the rate of 10 cents for sacks and 20 cents for barrels, leaving the oysterman but 20, 30, or 45 cents per barrel for the oysters. It sometimes happens that barrels cannot be bought for any price at Appalachicola, and immense quantities of oysters must either be thrown away or lie over until barrels can be brought from neighboring towns. There are four steamboats running on this river in the winter, two of which carry the mail; but it frequently happens that the mail is not received here for two or three weeks, and large amounts of oysters and fish have to be thrown away in consequence. A few vessel loads of oysters are taken to Saint Mark's during the winter, but it is a trade of not much consequence. The shipping season lasts from November to April.

The boats in use are all small sloops of 20 or 25 feet length, carrying each two men. Last year (1878) there were twenty of these boats engaged in the oyster fishing. With their outfit of tongs, &c., they are thought to be worth about $2,500. Between forty and fifty men are engaged in this business, out of which they make but little more than what they spend for food while earning it. If two men who are running a boat have a good contract with the dealer, good wages can easily be made; but if they have no contract they are obliged to cut the prices down in order to sell at all, and also are kept lying at the wharf about half their time. From $5 to $8 per week, therefore, is an oysterman's wages when working.

The principal dealer, at Appalachicola states, that he and other dealers there shipped up the river, during the winter of 1878–'79, 15,000 barrels. These, at the rate of 30 cents a barrel, yielded to the oystermen $4,500. In addition, owners of vessels disposed of about 2,000 barrels at Saint Mark's at 50 cents a barrel, equal to $1,000. The total value of the trade that winter, therefore, was

$5,500. It is only within five years that the trade has approached even this amount. Now it is improving, and new markets, such as Eastern Florida towns (by steamer and rail), are opening.

203. FISHERIES OF SAINT ANDREW'S BAY.

HISTORY AND EARLY CONDITION OF THE FISHERIES.—The fisheries of Washington County are twofold in their history. Both past and present, however, were, and are carried on in the waters of Saint Andrew's Bay, the capital for the prosecution of the same being furnished by parties living in or near the city of the same name. The past fisheries, dating from the year 1850 to the year 1863, which was the year of the bombardment of Saint Andrew's city, will be treated of first.

Between 1850 and 1860 Saint Andrew's was a lively, active place, containing at least 1,200 or 1,500 people. There were saw-mills in operation and shipping was carried on to an important extent. The city in summer was visited by many people from Alabama and Georgia, who, of course, circulated money in the place. There, as in nearly every seaport town, fish formed the chief article of diet. As the place became more thrifty and continued to grow in size, the demand for fish increased in proportion. At this early stage of its history a large quantity of salt fish was sold to the planters living in the interior of Alabama and Georgia, and this trade was of no little importance to the fishermen. The fishing then, as now, was done entirely with the drag-seines, which were from 50 to 75 fathoms in length, and from 6 to 12 feet deep, having a bag in the middle, at which point the seine attained its greatest depth. This net is described above on p. 550. In setting these seines sharp and flat-bottomed boats were used. Four or five men handled one seine, which was attended to from a single boat. The captain stood in the bow, guiding the boat by means of a pole and watching for signs of the approach of fish. These boats were often rowed along the bay shore, over the best fishing grounds at a venture, dragging the seine over a spot known as a good fishing ground without any fish having been seen. This was called a "blind" haul. In winter two or three barrels were considered a fair day's catch; in spring, about twice that amount, and in fall as many as the boat could carry in one or two journeys—perhaps 25 or 30 barrels.

The greater part of these fish were salted; for this purpose such fish as Spanish mackerel, jurel, pompano, trout, redfish, sheepshead, bluefish, and mullet were selected. The majority of other varieties were given away or fed to the hogs. For convenience in salting, small sheds were built. These were 15 or 20 feet square and were provided with benches on which to clean the fish; they also contained salt-bins and troughs in which to mix the pickle or soak the fish. The manner of dressing the fish was as follows: Two persons at the head of the bench cut off the heads and shoved the fish along to another pair who split them down the back and then passed the fish to others who removed the entrails, blood, &c. In this operation men, women, and boys helped. The fish were then ready for salting. The head fisherman usually performed this operation, for the amount of salt used depended largely upon his skill and care. When dry salted, the fish were allowed to remain for two or three days in that condition, after which they were taken out and packed away nicely in barrels and half barrels with plenty of pickle. Each barrel would hold certainly 200 pounds, and the fish were guaranteed to remain sweet and good for at least one year. The barrels were, and are now, made and provided by a cooper who lives near the bay and combines this work with that of farming.

The principal market for these fish was in the interior. Some of the fishermen preferred to carry the fish to market themselves, but the majority sold them at their own doors. Those who chose the former plan would start up the country with their barrels of fish loaded on an ox-cart

and stop at every town and plantation until all their fish were sold. This mode was much more profitable to the fishermen than the other, for, of course, if the buyers sent after the fish, they did not expect to pay as much for them as they would if they were delivered at their houses, and the value of the time spent in peddling the fish was not considered, for the summer months in that region were of but little practical use to the professional fisherman. When several wagons had preceded a later comer, it was frequently necessary to go as far as Columbus, Georgia, before selling all the fish. The best inland customers were planters, who bought the fish to feed to their slaves, whose diet was half bacon and half fish.

After the fish caught by a crew were sold, the division of the proceeds was made. The seine and boat drew one share, the captain two, and each of the crew one. Some men from Alabama not accustomed to fishing, but owners of a fishing outfit, would often hire by the month captain and crew to fish for them during the season. For such work there was no regular proportion paid, but the men who were hired usually managed to make more than they could have made had they been fishing on the ordinary plan. There were at least two crews of this kind here in the year 1879. Of the crews working on shares, there were only five in 1879, but when the war broke out there were many more. Some of these were not fishing for market, but in order to catch fish for their own consumption.

It was impossible to find out the exact amount of fish taken and the number of boats employed between 1850 and 1860; an estimate has been made which, owing to the care taken in forming the same, is probably not far from correct. The total number of barrels of fish salted and sold at Saint Andrew's Bay and vicinity is reckoned at 21,000. The fish included in this estimate were such as have been already named in this section, and, with the exception of pompano, were of equal value. The pompano were then much more plentiful than now, and even at the present time they form one-eighth of the total catch of fish.

Value of the Saint Andrew's fisheries for the ten years from 1850 to 1860.

Kind of fish.	Barrels.	Price per barrel.	Value.
Pompano	2,625	$10	$26,250
Mullet, &c	18,375	8	147,000
Total value			173,250

It is readily seen that the 21,000 barrels above given is in the table divided thus: One-eighth pompano and seven-eighths mixed fish.

PRESENT FISHERIES OF SAINT ANDREW'S BAY.—In the year 1863, as above stated, Saint Andrew's city was bombarded and destroyed by the Federal gun-boats, as also were the fisheries and salt-works about the bay. This event, and the continued presence of the gun-boats, stopped all fishing in this bay until after the close of the war. The fishermen still resident were without outfits; the greater part of them had heard of or experienced better fields elsewhere, and had gone away. In a few years after this the poorer classes of the inland country began to call on those living at the bay for fish, for which they paid by giving in exchange sirup, corn, sweet potatoes, &c. The new class of fishermen was formed from the people who, since the war, had come there for the purpose of farming. They found but a scanty living and were only too glad to be thus called on by those living in the interior of the country for fish. Those who were able to buy seines, did so immediately, and every spring and fall they spent two or three months in fishing, the profits of which exceeded those realized from farming for the remaining nine months of the year.

There are now some twenty-five or thirty families near the bay, out of which number about thirty-five men and boys fish during the season for a livelihood. None fish throughout the year. Among these few people many nations are represented: There is a Dane, a German, an Irishman, a Scotchman, a Spaniard, and there are also three Englishmen; the rest of them are Americans and negroes. As a class, these fishermen are a hardy set. Socially, they are very hospitable in their manner to a stranger, always entertaining him as well as their mode of living will permit. The astonishing feature is that men who have traveled, and have, therefore, seen something of the world, should settle down to lead such a lazy, shiftless sort of life. Their homes, often containing but two rooms, are the regular "Hoosier" log cabins; in these live the fishermen, their wives, and children. Life in one of these houses must be truly miserable, suggesting naught but poverty and laziness. The women, all of whom are natives and of the most ignorant class, are as intellectually inferior as they are superior energetically to the men. Considering how few advantages these women have, their conduct of the household affairs reflects great credit upon them. The children seem to be smart and intelligent until they reach maturity, at which stage they either fall into the careless habits of their fathers, or, if girls, take upon themselves the drudgeries of a mother and wife. Near the bay there is no school, but those who can afford to do so send their children to the county school at Marianna; few being able to do this, the majority of them grow up in painful ignorance. The same is the case for the most part with their religious instruction, as there are no regular services held near the bay and none of the people there profess any religion.

The fishing trade has gradually been improving since the war and has now regained its former position. The same kinds of boats, seines, &c., are used as of old and the fish are cured in the same way as they formerly were. The fresh-fish trade, however, has not amounted to much, except in 1876, when about two thousand pompano were sold to smacks belonging to Pensacola and Mobile for 8 cents apiece.

Instead of the fishermen peddling their fish through the country, as was once the custom, the planters now come to the bay and carry home a mixed load of fish and oysters.

In 1878, 555 barrels of fish valued at $3,470 were sold from the bay. In addition to this, 1,500 barrels of oysters were sold at 50 cents a barrel, making the total value of fish and oysters $4,220.

The oyster beds are scattered all over the upper parts of East, North, and West bays, and are most abundant in the deep and open water. These oysters are the favorites of the Georgia inland towns, where they chiefly find their way.

204. FISHERIES OF PENSACOLA.

FISHERMEN AND APPARATUS.—The only fishing town in Escambia County is Pensacola, the fisheries of which are of great importance. The red-snapper fishery has been elsewhere detailed and is here omitted.

The professional fishermen of Pensacola number seventy-five, and are either creoles or negroes. With them fishing is an hereditary profession. But few vessels belong to Pensacola. The smacks are of New England build and the two or three small vessels which carry ice were built at Pensacola or Mobile. The boats used by the seine fishermen are of the open yawl pattern, 22 feet long and 6 feet wide. They resemble the boats carried on large schooners and other merchant vessels. They are propelled chiefly by oars, of which two or three pairs are used. In addition, they carry small sprit-sails when long trips are to be made.

There are ten seines in use at Pensacola for one-half the year and five during the other half. Their average length is 75 fathoms, with a depth of 12 feet. The length of mesh ranges from 2 to

3 inches. Four or five men are required to manage a seine. The fish taken are pompano, bluefish, mullet, redfish, spotted trout, Spanish mackerel, sheepshead, and many other kinds of shore fishes. The average annual catch of a seine here is estimated at 1,000 barrels.

FISHING BY PILOTS.—The pilots living near the mouth of the harbor, whose daily duty it is to go to sea to look for vessels in need of pilots, own four or five open boats. They generally catch with hook and line and bring home in the evening large loads of fish. These boats are very small, not over 16 feet long, and carry a crew of four or five men. The boats are anchored on the "snapper banks," some 6 or 8 miles from Pensacola Bar. Their daily average catch is placed at 500 pounds, and this would amount (for five boats fishing two hundred days in the year) to 500,000 pounds of fish. These fish are sold at the navy-yard, or to the dealers at Pensacola.

THE SALT-FISH TRADE.—The salt fish trade at Pensacola has been of no importance since the close of the war of the rebellion. For twenty years, from 1840 to 1860, a flourishing trade of the kind was prosecuted by New England fishermen who spent the winters on the coast of Florida. They traded with the planters of Alabama and Georgia. When this trade was most prosperous, about 700 or 800 barrels of fish were annually sent inland, and, as good prices were paid, such a trade must have represented $8,000 or $10,000 per annum. *Now*, there is but one man, Captain Leonard Distin, at Choctawhatchee Inlet, who puts up salt fish. He has been in the trade from its start and is well informed on the subject. Much of the information acquired concerning the fishermen of Pensacola has been given by him. He now puts up about 50 barrels a year, receiving small prices, part of which he is forced to take in country produce. The principal kinds of fish salted are sheepshead, bluefish, pompano, redfish, mullet, sea trout, and Spanish mackerel.

FRESH-FISH DEALERS.—At Pensacola the only dealers are the Pensacola Ice Company and W. C. Vesta, the former of which is the older and larger firm, having been in the business seven or eight years. Their trade has increased year by year. This company owns a large packing-house with good arrangements for handling fish, ice-boxes capable of caring for 25,000 pounds of fish. Connected with the packing-house is the ice-house with its conveniences for handling ice.

The dealers do not keep fish on hand for a long time, not more than four or five days at any time. They pack the fish in barrels to be shipped into the interior, and in casks to go to New Orleans. For two winters the Pensacola Ice Company ran refrigerator cars, loaded with fish, to all points on the railroad as far north as Cincinnati, where they were reshipped in barrels to more distant markets, but the high rates of the railroad company brought that business to a close.

LAY ON VESSELS.—On vessels where the crew are fishing on shares, the following is the understood arrangement regarding the division of the proceeds of the catch: The vessel receives 40 per cent., 5 per cent. of which is paid by the owner to the captain. The crew receive the remaining 60 per cent. which, after store expenses, &c., have been paid, they share equally, captain and men. The owner pays dockage bill and bills for the vessel's gear. When crews are paid wages, the captain receives $75 to $100 a month; the mates, $40 to $50 each; the cook, $30; and each of the crew, $20 to $25. In this case the owners pay all bills.

LAY AMONG THE SEINE-BOAT CREWS.—In the seining boats the proceeds of the catch are divided into equal shares, the boat and seine taking one each, and each of the crew one. The seiners are never paid wages.

THE OYSTER INDUSTRY.—The oyster season here begins in September and ends in April. The banks worked (only with tongs) lie in Escambia Bay, and are scattering and very poorly stocked—not so well as formerly. The absence of shell-heaps on the adjacent shores show that the Indians did not resort to this for a supply of molluscan food to any great extent.

The boats serving here are open, flat-bottomed, roughly-made skiffs, not exceeding 24 feet in

length, cat-rigged or sloop-rigged. Two men form the crew, and consider from 5 to 12 barrels a load, satisfying themselves with one trip per week. As there are about seven boats, an averaged estimate of the season's total production would give about 2,500 bushels. The selling price being only 35 or 40 cents per bushel, the cash proceeds will hardly exceed $1,000, to be divided among about fifteen fishermen. A system of sharing is in vogue, by which the proceeds of each day's catch are divided into equal thirds between the boat and each of the two men who constitute her crew.

The catch at Pensacola often fails to supply the local demand, and additional oysters are obtained from Mobile and Saint Andrew's Bay. Nothing of consequence has been done here in oyster-culture.

STATISTICS OF THE FISHERIES.—In the Pensacola fisheries $5,300 are invested in vessels, boats, and seines. To this sum may be added $1,200, which represents the amount invested in shore apparatus.

A bunch of fish weighs from 20 to 25 pounds. These bunches were sold wholesale from 1850 to 1860 at $2 to $2.50 apiece. From 1860 to 1870 the value per bunch was $1.50 to $1.75, and from 1870 to 1880, $1.25 to $1.75. The former retail prices of salt fish, packed in brine in barrels, at Pensacola, were, per barrel: Mullet, $10; sheepshead, $10; bluefish, $12; pompano, $12; hard-tails, or jurels, $10; redfish, $10; Spanish mackerel, $12.

The present wholesale prices are $1 per bunch of 25 pounds, or, by weight, 3½ cents per pound for all fish under 7 pounds, and 25 cents apiece for all fish weighing 7 pounds and over.

The present retail prices of salt fish, packed in brine in barrels, are, per barrel: Mullet, $7; sheepshead, $7; bluefish, $8; pompano, $9; jurel, $7; redfish, $7; Spanish mackerel, $8.

The present price of oysters in the shell is $1 a barrel.

The total value of the yield of the Pensacola fisheries, from January 1, 1877, to January 1, 1878, was $23,970.84 for 555,977 pounds of fish. For the next twelve months it was $22,638.43 for 660,154 pounds of fish.

C.—THE FISHERY INTERESTS OF ALABAMA.

205. STATISTICAL RECAPITULATION.

SALT-WATER FISHERIES OF ALABAMA.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	545
Shoremen	90
Total	635

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (317.20 tons)	24	$14,585
Boats	119	10,215
Other apparatus, including outfits		7,000
Canneries and other shore property		6,400
Total		38,200

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Mullet	125,000	3,750
Oysters	731,500	44,950
Red snappers	360,000	12,825
All other species	2,325,000	57,750
Total	3,541,500	119,275

206. FISHERIES OF MOBILE AND VICINITY.

THE UNION FISHERY COMPANY.—In the year 1873 great energy was displayed by some of the citizens of Mobile City, whose object it was to form a company for the purpose of buying up and preparing for sale all kinds of fish taken along the shores and in the public waters of Alabama. Notice of this intention was given in the Montgomery Mail, under date of December 11, 1873. It reads thus:

"UTILIZING THE FISHING PRIVILEGES OF THE STATE.—A company of citizens, most of them well known and highly respected, have organized themselves, as the law directs, into a private corporation, under the name and style of 'The Union Fishery, Salt, and Manure Manufacturing Company,' for the purpose of taking and preparing for consumption and sale all kinds of fish, oysters, and other shell-fish along the shores and in the public waters of Alabama, and for the further purpose of manufacturing oil and commercial manures from said fish. They have the further purpose of manufacturing salt along or near the shores of the State by solar evaporation or otherwise. They design all of these articles for private use and for sale in the public markets. The incorporators are James W. Coleman, Francis W. Dansby, Smith D. Hale, James H. Houston, Cary G. Thomas, Robert Christian, and Daniel C. De Jarnette. The capital of the company is $2,800,000."

That the citizens of the State of Alabama were anxious that such a company should be formed, whereby the State revenue would be enlarged, is evident from the following:

"We understand that a bill has been or will be reported to the legislature, in which the rights and privileges of this company shall be defined. It is time that the State of Alabama should be drawing a considerable revenue by taxation in the shape of a royalty on her extensive fishing, salt, and fertilizing wealth. Such a company as 'The Union Fishing and Salt and Manure Manufacturing Company of Alabama' might be made, by a proper bill, a source of considerable revenue, all of which is now lost to the State, and we trust that a bill, properly guarded, such as is now sought by this company, may become a law. The State wants every dollar of tax, and all the revenue it can possibly raise, by means which will not further incumber the farming interests of the commonwealth."

LOCATION OF THE CITY.—Mobile, the only town of Alabama extensively engaged in the fisheries, is situated at the mouth of Mobile River, on Mobile Bay, 28 miles from its junction with the Gulf of Mexico.

FISHERMEN.—More than one-half of the professional fishermen of Mobile are employed in the oyster business. Forty gather oysters, and one hundred and thirty-five carry them to market. There are twenty smack fishermen and one hundred seine and gill-net fishermen. At the oyster-canning establishments one hundred and fifty men are employed.

APPARATUS AND METHODS.—The fishing smack in use in these Southern waters having been described, it is here only necessary to say that there are but two of them at Mobile, and they are of New England build.

At Mobile there are twenty stationary gill-nets, whose average length is from 30 to 50 fathoms, and depth 6 to 12 feet. The mesh of their central web measures 2 to 2¼ inches, and their outer web 12 inches. These are in use for nine months of the year, from September to May. The principal varieties caught in them are mullet, trout, redfish, sheepshead, pompano, croakers, and other bay fishes, and black bass, bream, and perch from the fresh and brackish bayous. Each boat carries from one to four of these nets, according to the size of the boat and of the nets. The average catch for one net is 100 pounds a day, that is, one basket, making the annual catch 24,000 pounds.

There are fifteen seines, averaging in length 60 to 100 fathoms, and in depth 10 to 12 feet. The average stretch of mesh is 1 to 1½ inches. Four or five men are required to each seine. These nets are used chiefly in summer when the fish are schooling. In them all kinds of bay fish are caught, but no fresh-water varieties. The average annual catch of each is 35,000 pounds.

There are two distinct fisheries, the catches of which are brought to Mobile—the open sea hook-and-line fishery and the inside net fishery. The former of these has already been detailed in the paragraphs on the fisheries of Pensacola, since the smacks fishing for the Mobile market form a part of the Pensacola fleet of fishing boats.

THE INSIDE-WATER FISHERIES.—In the inside-water fisheries an open yawl-boat, about 20 feet long, is used. The net may be seine or sections of trammel-netting. Those who use trammel or gill nets fish about the marshes at the mouth of the Alabama River. They camp anywhere along the shore, and are gone from one to six days. The result of their trip is as uncertain as is the length of the time for which they may be absent.

They work their trammel-nets thus: When a school of fish, or, more generally, a good feeding place, is found, the nets, in one, two, or three sections, are placed around the fish or the likely spot, and the fishermen beat the water inside the nets, in order to frighten the fish so that they will run against the net and become entangled. Large fish are caught by the outer web of the net, while the smaller ones are gilled or entangled in the inner web of small mesh. Trammel-nets are never dragged as seines are.

Another method of using these nets is to set three or four sections from the shore outward in a straight line, and to leave them so set for several hours. Bottom fish, such as redfish and trout, are the principal kinds taken in this way. Set-nets do not, however, work well in these waters, for as soon as a fish which has been caught in the net is dead, the alligator-gars, small sharks, and crabs, which are always present in large numbers, begin to eat it, and while doing so often cut holes in the net. Trammel fishermen usually carry cars with them. In these they keep all the uninjured fish alive.

The seine fishermen go much farther from the city than the gill-netters, for by so doing they find better places at which they can drag their seines, and probably also a greater abundance of fish. These fishermen camp along the shores from Bon Secour Bay, which is to the east of Mobile Bay, to the Chandeleur Islands, fishing at one place one week and at another the next week. Some of these men have small farms near to the fishing grounds, and thus combine fishing with farming. They display but little energy in their work, and consequently make a poor living at it. In the day-time they fish for school fish and in the night for bottom fish, doing neither when there is no supply of ice at hand or some safe mode of sending their fish to market. One or two small vessels carry fish from the camps to the city. These are not the only means whereby the men can transport their fish to market, for there are oyster-boats, smacks, and steamboats constantly passing.

DISPOSITION OF CATCH.—The kinds of fish which they catch are always sold by the basket,

holding about 125 pounds. The price per basket varies from $2 to $20—the former when fish are plentiful, and the latter price when the reverse is the case.

Most of these inside-water fishes are bought by J. F. Maybury & Co. and by F. Kuppersmith, who ship them inland. Some are also bought by the marketmen, who retail them in the Mobile market-house.

Very few of the fish which come to Mobile are iced. The market-men only ice them when they have a larger amount than can be sold off immediately or when they have a supply of snappers for shipment. At such times they pack the fish in rough boxes or in barrels and intersperse broken ice. Maybury & Co. is the only firm which has regular ice-boxes or handles any large amount of iced fish. They own boxes enough to pack away 10,000 or 15,000 pounds of fish. They also have an arrangement for freezing fish, but it does not work well in so warm a climate where in the transit the fish may thaw out; so the arrangement is seldom used. The plan of it is similar to some of the Northern freezing houses, and is as follows: In a large box made of matched boards, with charcoal-lined walls, is a zinc cylinder which is filled with finely-broken ice and salt. When fish are to be frozen they are piled around the cylinder, and the box is then shut up tight. There is no really first-class establishment for icing fish in Mobile.

LAY ON VESSELS.—The crew on a fishing smack fish on shares. They pay the provision bills and receive 60 per cent. of the proceeds of the trip. The captain, who receives an equal share with the rest of the crew, also receives from the owner or owners 10 or 15 per cent. of his or their share, which is the remaining 40 per cent. of the proceeds of the trip.

THE OYSTER BUSINESS.—About one hundred and seventy-five men are engaged in gathering and hauling oysters to market. They own sixty-two vessels and boats, and sell the oysters to the Mobile dealers. The boats are small, open, flat-bottomed, of the simplest and roughest style. The tongs are those in ordinary use. The knives for opening them are of steel, with heavy flat handles and wide, thick blades, rather more rounded than pointed at the end.

On the oyster-carrying vessels, where there are but two or three men as crew, the profits are divided as above described on the fishing smacks, excepting in a few cases where the captain is the owner and may prefer to pay his crew wages, $20 and $25 a month.

The "gatherers" of oysters are independent, selling whatever they catch at the regular rate of 10 cents a box or 40 cents a barrel.

The oysters that are brought to Mobile are obtained from natural and artificial beds in Mobile Bay. Those from the natural beds are called "reefers," which are slightly inferior in size and quality to those from the artificial beds, which are called "plants." They are obtained in a portion of the bay called the "gully"; the only place where they are naturally abundant. The planted oysters are originally obtained from the salt water, near Cat Island, between Mobile Bay and Biloxi, Miss., and are deposited in front of the oysterman's land.

The State laws provide that any settler on its bay shores shall have the right to use for oyster culture the water surface in front of his lands from low-water mark 600 yards outward.

About thirty vessel-loads, or more than 2,500 bushels, are usually planted at first on new grounds, and are allowed to remain two years before they are gathered up to be sold. The next and following times that deposits are made it is not necessary to plant as many as at first; for there are many small oysters that escape the tongs which will soon grow large enough for market.

It is calculated that in two years the small salt-water oysters will have so grown in size and so increased in numbers that there will be about twice as many as when transplanted; but this ratio can hardly be depended upon, for it often has been proved that, to realize an increase of 50 per cent., the location and circumstances must be most favorable.

Oysters as taken from salt water are in very poor condition, but in an incredibly short time, in fresh or brackish water, they become large and fat. Still there are times, when the bay is almost purely fresh, that certain injurious qualities in it (perhaps from the extensive swamps) either destroy oysters or turn them so red that they are unfit for market. Invertebrate animals are probably the cause of many oysters being killed, though the oystermen seem to be ignorant of it. Drum-fish are also very destructive.

Besides the "reefers" and "plants," there is a kind of oyster called here "sharpers," from the fact that the ends of their shells are unusually sharp. They are a natural-growth oyster of very large size (shells averaging 8 or 10 inches long) and superior flavor, that are found growing separately along the bay shores, not far from the place where "reefers" are gathered. "Sharpers" are always in demand, though there is some objection to them on account of their being so hard to open.

"Reefers" and "sharpers" are caught by men who follow no other pursuit, and who are a quite distinct class from the oyster-boatmen. They have small, flat-bottomed skiffs of the roughest description, in which they go "a-tonging," two men occupying a boat and taking turns at tonging and culling. As fast as the stock is culled it is placed in shallow, oblong boxes holding one-fourth of a barrel each, and in these measures is sold to the boatmen or carriers at the rate (during the winter of 1880–'81) of 10 cents a "box," or 40 cents a barrel. The carriers having obtained a load for their sail-boats, proceed at once to the city and deliver them to the dealer, by whom they are employed to buy or with whom they have contracts. The measure, in this transaction, is the same box as before, but the price has nearly doubled, holding all last season at 75 cents a barrel. While the gatherers are paid per measure for what they catch, the profits of the boatmen are divided among the crew by a "lay" arrangement of sharing, by which the crew pay provision bills and receive 60 per cent. of the proceeds. Of the owner's 40 per cent. remaining, the captain gets 10 or 15 per cent. additional. In a few cases the captains own their vessels, and prefer to hire their crew at $20 or $25 a month. There are only two or three men in the whole crew of an oyster-boat.

The oysters, having been deposited in a pile in the dealer's warehouse, are next taken in hand by the "openers," who are placed in a circle around the pile, each with his stool, bucket, and oyster-knife. These men are principally negroes and creoles of the worst character, who find it hard to obtain other employment. Still they are very expert at opening oysters, and often make fair wages. The knives used by them are all of steel, about 6 inches long, with heavy, flat handles, and wide, thick blades, rounded at the end. To open an oyster it is held in the left hand, lower shell down and lips outward, and the shells are quickly pried open at the hinge, the upper shell being thrust off. One more stroke severs the oyster from the lower shell, and into the bucket it goes, liquor and all. Some kinds of oysters cannot be easily opened in this way, so they are broken first on the lip edge and entered from that side with the knife. The majority of Mobile oyster openers are very quick while opening either of these ways, but are probably more practiced in the first. The shells are thrown one side in a pile, and the "openers," if left to themselves, will throw away many good, unopened oysters, in order to hasten through their barrel, if they are opening by the barrel, or to get rid of small oysters, if they are opening by the gallon; therefore it is necessary to have a man employed to watch them and prevent this waste.

When an "opener" has filled his bucket he takes it to a clerk to be emptied into a strainer, when the oysters are measured and placed to his credit.

The customary price paid for opening oysters is 35 cents per barrel, or 20 cents per gallon. At certain times of the year a barrel of oysters in shell will yield more opened oysters than at others;

for instance, in the fall hardly 2 gallons are obtained, while in the winter and spring 2 to 3 gallons are taken from one barrel.

As soon as the oysters have been opened, measured, and drained of their liquor, they are emptied into a large vat that has a strainer-like bottom and are kept cool by means of ice until needed for shipment or canning. To be shipped to any place not far inland they are usually placed in cans varying from 1 to 10 gallons, according to the order, that are not hermetically sealed, but are kept in contact with ice. To be shipped to more distant parts they are placed in square cans, containing from 1 quart to 1 gallon, and are hermetically sealed. This manner is more costly to the purchaser, but is the safer way, for oysters so put up will keep a long time.

Pickling oysters has been of some importance here, but there is very little done at it now. The method of treatment was, first, to steam the oysters, and then to place them in small, square tin cans with spiced vinegar, the cans afterward being soldered up air-tight. It is said that this business failed because of much poorly prepared goods being put on the market. In pleasant weather, when the gatherers can work and the boats can easily get to the city with large loads of oysters, the Mobile market becomes overstocked, and it is then difficult to dispose of the catch at any price; but in stormy and cool weather the market is good, for then but few boat-loads come in, partly owing to real difficulties and partly to the indolent indisposition of the oystermen to work when discomfort attaches to it.

The oysters of Mobile Bay have a high reputation for excellence. The water and soil of the bay, particularly in the eastern arm, called Bon Secour, seem especially well adapted to their growth. The planting-beds are all higher up, where the seed thrives better than below.

THE GULF OF MEXICO OYSTER COMPANY.—Early in 1880 a new concern, to be known as the Gulf of Mexico Oyster Company, began oyster canning and shipping at Mobile, for though their factory was many miles distant, at Scranton, Miss., yet the officers were in Mobile, and the business contributed to the city. About ninety to one hundred hands, of all ages and sexes, are employed. These live in a little village, which the company has built for the purpose, in the neighborhood of their factory. While this company does something in the fresh-oyster trade, their main business is in cooked and canned oysters, which are steamed and sealed in substantially the same way as at Baltimore. One specialty, however, is the putting up of canned fried oysters, after the following patented method:

From the supply vat, where they are kept cool, the oysters are taken and rolled in meal and fine cracker-dust, and then are dropped, a gallon at a time, into a large kettle of hot fat, which is a mixture of lard, tallow, and stearine, where they are allowed to fry crisp and brown. Next, while still hot, they are packed in small, flat, square tin boxes of about a quart capacity, and the unoccupied space is filled with hot fat. The opening in the top of the box is round, and has a cap to fit, which is firmly soldered down, making the box air-tight. Afterward these boxes are labeled and packed in cases, a dozen boxes in a case. It is asserted that oysters prepared in this manner sell readily in all parts of the country, and the demand is much larger than was at first expected.

The "cove oysters" of this company are simply fresh oysters hermetically sealed in cylindrical cans.

The capital stock of this company is $25,000. (Another company has recently been projected with a capital stock of $50,000.) Though the capacity of the Scranton factory is no less than 30,000 one-pound cans per day, the product at the time of my visit had been insignificant, owing to various delays in getting well under way. The company will also can shrimp, fruit, and vegetables in season, so that not all the force, capital, and fixtures can be credited to oysters alone; and, inasmuch as operations have only begun, I have not added these figures to my totals. The stock which

they receive for canning is the wild "reefer" oyster, that grows in immense profusion all along the coast of Mississippi.

STATISTICS OF THE FISHERIES.—In the fisheries of Mobile it is estimated that there are $25,500, in all, invested; $22,500 in the fisheries proper, and the other $3,000 in the oyster business.

The market prices paid to the fishermen are, for red snappers, groupers, &c., 3 or 4 cents a pound; for mullet, trout, redfish, &c., $2 to $15 per basket, equal to about 2 to 15 cents a pound. The oysters range from 75 cents to $1.75 a barrel, "reefers" selling for 75 cents a barrel; small "plants" and "sharpers," $1; plants, $1.50; selected plants, $1.75.

D.—THE FISHERIES OF MISSISSIPPI.

207. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	110
Shoremen	76
Total	186

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	58	$4,600
Other apparatus, including outfits		1,600
Canneries and other shore property		2,600
Total	58	8,800

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Mullet	1,500	$60
Oysters	175,000	10,000
All other species	612,000	12,480
Total	788,500	22,540

208. GENERAL DESCRIPTION OF THE FISHERIES.

MEN AND METHODS.—The majority of the three hundred fishermen on the coast of Mississippi are engaged in the oyster business and fish for the New Orleans market, using boats and nets belonging to that city. Sixty more are engaged in fishing and oystering for Mississippi dealers.

There is only one fish dealer in the State, and he is the station agent at Biloxi.

There are four seines owned in the State which are used by professional fishermen, and the number of trammel or gill-nets thus used is seven. The seines are used about the islands and shoals and the trammel nets in the rivers, bayous, and bay channels. Those fishing for New Orleans, Mobile, or their town market, fish chiefly with seines, and, for the most part, catch redfish, trout, mullet, sheepshead, drum, and croakers. Those fishing for the inland shippers use

trammel-nets, in which they catch fresh-water fish, such as black bass, perch, and bream. All of these are on this coast called "green-fish."

DISPOSITION OF THE CATCH.—The salt-water fishermen charge such high prices for their fish that only a very few are shipped inland from the coast. At their rates the fish cannot be shipped inland cheaply enough to compete with Pensacola prices. Such is not the case with the fresh-water catches which come from the bayous and streams. These fish are sold at so much per "hand," or "bunch," according to the quantity to be sold. The fishes are strung together with fibers of palmetto leaf into bunches containing about 5 pounds. These are usually called "hands," four of which are tied together to make the "bunch" proper. These "bunches" are sold wholesale for $1 to $3 each, according to the abundance of fish at the time. The trammel fishermen average about six of these bunches a day, and the seine fishermen about twice as many.

The season for shipping fish inland does not exceed five months out of the year, and during that time there are many days on which no fish are caught. The amount shipped to New Orleans by fishermen from that city amounted in 1879 to an average of 2 barrels a day, or about 108,000 pounds per annum. A great many fish shipped for New Orleans are landed at Biloxi, Pass Christian, and Bay Saint Louis. The fish intended for Mobile are principally landed at Pascagoula.

OYSTER FISHERIES.—There are eighten oyster boats belonging in this State and seven oyster-dealers. The supply of oysters is obtained from the natural reefs all along the marshes about the Chandeleur Islands. The oysters are very large and abundant, but are not always as good as they might be, even in the season. They have been improved by having been transplanted into brackish water near Biloxi and Pascagoula. The boats carrying oysters to market are all small, carrying a crew of two men. Here the boatmen gather the oysters, and in some cases open them for the dealer. Oystermen receive 75 cents a barrel for oysters in the shell delivered at the dealer's wharf, or else 35 cents per hundred opened. If sold to the dealer unopened the latter pays a shucker at the rate of 75 cents for opening a thousand oysters. Oysters to be shipped inland from the coast markets are opened and placed in 5 and 10-gallon baskets and sold invariably by the count. There are forty men and about eighteen boats engaged in gathering and bringing to market. The boats make two, sometimes three trips a week. At Pascagoula are two oyster-shippers; at Ocean Springs, one; at Biloxi, three; Mississippi City, one. During 1879, 18,920 gallons, at 35 cents a gallon, were shipped inland. Total value, $6,622.

E.—THE FISHERY INTERESTS OF LOUISIANA.

209. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,300
Shoremen	297
Total	1,597

Detailed statement of the capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (539.69 tons)	49	$20,821
Boats	165	4,800
Other apparatus, including outfits		18,000
Canneries and other shore property		50,000
Total		93,621

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Crabs	288,000	$7,200
Crawfish	24,000	800
Green turtle	30,000	1,200
Mullet	55,000	1,650
Oysters	2,065,000	200,000
Red-snappers	900,000	45,000
Shrimp	534,000	41,760
All other species	3,100,000	95,000
Total	6,996,000	392,610

210. THE FISHERIES OF NEW ORLEANS AND OTHER PLACES.

FISHERMEN.—There are on the coast of Louisiana three hundred and thirty-two professional fishermen, of whom one hundred and twenty-nine are engaged in the oyster business. Of the remainder, one hundred and eighty-eight ply the seine and gill-net, and the other fifteen are smack fishermen.

APPARATUS.—The seines and gill-nets are used to catch the small inside-water fishes and those of the sea that are found along the shores. In different localities they are set with different objects in view. Along the outside shores of the islands which separate Mississippi Sound from the sea, and about the Chandeleur Islands, seines of medium size are used to catch the passing shoals of bluefish, pompano, Spanish mackerel, bonito, &c., while among these islands small seines and trammel-nets are employed to catch the so-called "bottom fish"; these have already been specified. They are found at the bottom feeding among the grass and weeds. There is also the lake and bayou fishing, carried on in Lake Pontchartrain, in winter only, and in the many bays and coves in the extensive marshes of this neighborhood at such times as fish are very abundant, but on account of extremely shoal water, muddy bottom, and the numerous chances of the escape of the fish, the nets used at other places would be of little service here, and for that reason long, shallow, and lightly weighted seines are prepared, and these can be successfully dragged through such places. In some of the deeper bayous and lake channels trammel-nets are used with good results. Seines and casting-nets are used in the shrimp fishery.

The net fishermen are stationed at different points along the coast from Mobile Bay to the western extremity of the Louisiana coast. Some have their homes on islands near the fishing grounds, while the majority of them camp at various points throughout the fishing season. For the transportation of their catches they depend upon railroads, passing steamboats, and oyster-boats; occasionally they have a boat engaged for the purpose. The greater part of their fish go to market on ice; those, however, caught near home are sent without any preservative.

SHRIMP.—The shrimp fishery and canning industry are of great importance. They are described in another section of this report.

CRABS.—The mode of catching crabs is very simple; they are picked up by hand-net or scoop-net along the beaches of the outside islands, and from among the grass in the marshes. A long line, perhaps measuring 200 fathoms, is sometimes used, to which shorter lines are attached at intervals. To the end of each of these short lines is fastened a piece of bait. The long line is then stretched along the water's edge and the baited lines are thrown into the water. The crab, having caught hold of the bait with its claws, is pulled up softly and slowly and is landed by means of a dip-net.

CRAWFISH.—Crawfish are also picked up from among the sedge grass, along the lake and canal shores and on the levees. It is said that they are very plentiful at such places, and that great quantities of them can be secured without much trouble. The crawfish live in little holes in the muddy banks, and, it is reported, build a sort of chimney of mud over and around the hole.

TURTLE.—Now and then the seine fishermen catch a green turtle or a "loggerhead," which they send to market, but very few of these are caught in the year. Some few fresh-water turtles are also taken, as, for example, the "mobilian" and "soft shell" and occasionally a snapping-turtle.

THE NEW ORLEANS MARKET.—In New Orleans there are twelve markets where fresh fish are retailed. The most important of them all is the French market, for there all the fish intended for distribution among the smaller dealers are sent. The other markets are supplied from the French market, but few of them do any business. They are under the control of the city, whose property they are. The city rents the stalls at from 50 cents to $2 a day, dependent upon the situation of the market and of the stall to be rented. The city is also responsible for the cleaning of the markets after business hours. In most of the markets the fish stalls are few and in the most secluded corners. In the French market, however, more space and better advantages are given to the fishmongers. In the French market are two dealers—Bartholomew, Tallon & Co., and Felisado & Co. They each have several stands, upon which are displayed quite a large amount and variety of fish on the best market days. How and whence these fish come into the hands of these dealers will now be explained. The sea fish (red-snapper, grouper, &c.) come by rail from Pensacola and Mobile packed with ice in hogsheads. They are caught chiefly by New Orleans smackmen, who find it more profitable and satisfactory to deliver their fish in this way. The supply of these fish is kept up throughout the year, but in summer the demand is not so great, and consequently less are shipped. The small fish already specified and the smaller fresh-water fish come from different parts of the Mississippi and Louisiana coasts, where they were caught in seines and trammel-nets.

Some fish come iced in barrels and some from the nearest points by rail without ice. Railroads, steamboats, sailing vessels, and "luggers" are all media through which these fish arrive at market. Each lot comes consigned to a particular dealer, or is sent in fulfillment of a contract. Snappers are sold by the fishermen at so much for a "bunch," weighing 25 pounds; bayfish at so much a "hand," consisting of four small bunches, with an aggregate weight of about 20 pounds. Spanish mackerel, bluefish, and other choice varieties also sell by the "hand," but at a very much higher price than the common varieties command. Pompano alone are sold by the count, or so much apiece.

Many of the fish are in a very bad condition by the time they reach the market stand, and nowhere else would they be allowed to be placed on the stalls and sold, as they are day by day, to people who know nothing about fish, and therefore buy ignorantly. The small fish caught in the vicinity of the Mississippi marshes are really in very fine condition on the stalls, and are far superior to the same class of fish found on other parts of the Gulf coast. The reason, probably, is, that on the Florida coast, for instance, these small fish cannot find convenient food and are much worried

by destructive fishes, such as the shark, alligator-gar, and crevallé; they are, therefore, in a thin and poor condition for market. It seems as if some secluded spot were necessary for their attaining the greatest perfection, which they *do* find among the Mississippi marshes. Here, too, are more favorable conditions of water and better food.

Besides these salt-water fishes there are some brackish-water species—the black bass, perch, and bream—which are taken in the trammel-nets and seines in marshy bayous along with salt-water fish, with which they are shipped and sold.

Some fresh-water catfish and "buffaloes" also appear in the markets. They are chiefly caught by negroes in traps or by line up the river and its tributary streams. This is of small importance, and cannot be included as one of the regular fisheries. The few shad found in these markets come from Charleston, S. C. The demand for them is small.

The crabs are sent to market alive and in that way are sold. The marketmen pay 50 cents a basket for them; a basket is supposed to contain five dozen. Few crawfish are seen in the markets, being not thoroughly appreciated, and other fish being much more abundant. The men who gather the crawfish receive 40 cents a basketful. These crustaceans are chiefly used for soup.

Part of the fish, &c., come to the retail merchant and part to consignees who receive them at the French market for distribution among the smaller dealers. The work, on the part of the stall fishmongers, of buying stock for the day and preparing their stalls commences at midnight, so that they may be ready at an early hour for customers. Many of these stall fishmongers have no storehouses in which to keep their fish, but depend on the larger dealers, such as Bartholomew, Tallon & Co., for their daily supply. Only five dealers pretend to keep a supply of fish independent of other dealers. As a rule, fish, &c., sell for about twice as much at retail as the fishermen receive for them. The fish are not sold at retail by the pound, but at so much each. Shrimp are sold at so many handfuls for so many cents. Crabs sell by the dozen, small turtles by the piece, and large ones by the pound. Crawfish are sold in the same way as shrimp.

A very small portion of the fish sold in New Orleans is eaten by the citizens. The trade is principally with the hotels, restaurants, steamboats, and the shipping, so that, really, strangers and travelers are the chief consumers of fish at New Orleans. It seems as though those of the population who are able to buy fish care nothing for it, while, at the present prices, those who would eat fish cannot afford it.

THE OYSTER-TRADE OF NEW ORLEANS.—At New Orleans centers the most extensive oyster-trade of the Gulf of Mexico, and some of the stock sold in that city is of very high quality. There is no locality in the whole United States where the business presents so many picturesque features, and the oyster-landing at the levee is one of the most spirited and entertaining sights of the many half-foreign pictures to be got in that polyglot city.

The market is supplied with oysters from an extent of coast comprising the whole water-front of both Mississippi and Louisiana, and embracing numerous tonging-grounds. The great majority are taken from the natural and luxurious growth of the "reefs," but the transplanting and consequent improvement of oysters is being more and more engaged in. The delta of the Mississippi River forms a partition between the two classes of oysters and oyster-localities tributary to New Orleans—a distinction which is perpetuated in the city markets. The first of these divisions to be considered, is that which lies eastward of the delta, extending from Lake Borgne, Point a la Hache, and the Chandaleur Islands to Pascagoula and the end of Mississippi Sound. Though the Chandaleur Islands, and some other points, produce an oyster of good reputation, the general quality and size of the stock from this eastward portion is inferior to that from the western district. They are used for cooking chiefly, and it is this stock which is being bought by the canning com-

panies lately started in the city. The best grounds seem to be the Chandaleur Islands, Bayou Muscle, Bayou Boulfen near Mobile, and the shell-bank outside of Biloxi. "The Bayou Muscle oyster is peculiar. It is large, very black, and the shells are covered with hair and barnacles. The Boulfens are round, rich, and fat, and sell very high." The Picayune stated that thirty boats came to the city from Biloxi and along the sound, in the winter of 1879–'80, but this seems to have understated the case, for our careful inquiries registered fifty boats of 5 tons and upward, and two hundred boats of less than 5 tons, as trading along the eastern coast; many of these, however, are otherwise engaged during a portion of the year. The boats are generally small, rarely having more than two men.

Turning to the district west of the delta, we find that oysters are procured from all the marshes and bayous, nearly as far as Galveston, Texas. The Picayune, in an article during the winter 1878–'79, gives a fair account of this source of supply, as follows:

"This portion of our State seems best suited to the propagation of the best, and Bayou Chalons, Four Bayous, and Fontenelle are known only for their oysters. Yesterday a representative of the Picayune, in order to place before its readers something more definite than the confused ideas generally prevailing about our oysters, visited a number of veterans in the trade. Even among them there is still some confusion regarding the merits of certain oysters, but what was agreed upon by all was taken as the basis of what we give.

"There are engaged in the business of supplying the city about one hundred and twenty luggers, with a carrying capacity each of 75 to 100 barrels. From Barataria, which comprises Bayou Cook, Chalons, and Four Bayous, there are eight, making at least one trip a week. From the Southwest Pass, Salina, or the Salt Works below Fort Jackson, about thirty boats. From Timbalier, including Bayou Cyprian, Fontenelle, and Lake Peliot, about fifteen. These vessels, and the labor at the fishing banks, give employment to over four thousand five hundred men. * * * There has been a general impression here that Bayou Cook furnishes our best oysters, but that little water course has long since given up its natural supply, and those that are now received from there are only a few that are planted.

"Our best oysters come from Bayou Chalons, Four Bayous, Bayous Fontenelle and Cyprian, and a small supply from Lake Peliot. These rank the highest and are called the first-class. The Bayou Chalons oyster is a large, long oyster, with a clean shell; the Four Bayous are middling, round, and firm; the Bayous Fontenelle and Cyprian are small, hard, and round, and much preferred by connoisseurs. The Lake Peliot is a round oyster, very fat and salt, and on account of the hardness of its eye preferred for frying. The second-class oysters are the Timbaliers, where they are taken from the reef, not the one planted in the bay. They are in bunches and are long. In the same class are the Salinas, or those taken at the Salt Works near Fort Jackson. They are what are called the 'summer,' and by restaurateurs the 'kitchen' oyster. They cook well, but are not as rich in flavor as those of the first-class. At the Southwest Pass, proper, all the bivalves are dead now, but near there, at East Bay, they have a very good kind, with a light-colored shell and very white inside. Then there are the Great Lakes, from the vicinity of Fort Livingston, near Grand Terre. Although the supply is not very great there is always a demand far them, as they have a peculiar flavor."

METHODS OF GATHERING OYSTERS.—Most of the oysters brought to New Orleans are from naturally growing, uncultivated reefs, with which the whole coast is barricaded, and to which, in a large measure, it owes its preservation from the teeth of the ocean. These reefs are ridges of oysters, packed one above another, each generation supported on the compact and dead shells of the preceding. In general the oysters are found not singly but in great clusters, some of which

are half as large as a barrel. When gathered in this shape there is a great waste of young oysters, for those that are attached to the large ones are not separated until after the boat has left the grounds or is at town, when they are thrown away as useless. At certain stages of low water such oysters as these can be picked up by hand. In other places, ordinarily in the open bays, oysters are found in a more scattering condition, but are more readily gathered and require less culling. In most cases they are procured with oyster-tongs from the lugger, as she lies at anchor over the bed. One man uses the tongs while the other culls them; or, if there are three in the crew, two use tongs and the third culls for both.

This is the method with all the smaller boats which tong their own cargoes. They have to go far from home, and often the men do not get home once a week, or even every two weeks, and must lie exposed to many hard storms, both when at the reefs and in going back and forth the 40, 60, or 100 miles to market. The owners of the larger vessels, however, generally buy their cargoes direct of the men who live in the vicinity of the reefs, and by making more trips, having fleet vessels, can in a season make considerable money. In the summer time, those who have been prosperous sometimes take their vessels down the river about 65 miles, and pass through tortuous channels into Mississippi Sound, and lay up for the summer season in the vicinity of Biloxi, Mississippi.

There is a "lay" system in vogue in many of these boats for the distribution of profits, by which the boat and each man receives an equal share, after the bills are paid.

The number of boats bringing and catching oysters in this region is counted at two hundred and five, of which forty are of over 5 tons burden. Their business is mainly done during the winter, and in summer they are largely engaged in transporting fruit from the coast plantations to the city, though some "lie up" for repairs.

These oyster-vessels are all of one class and are known, from their Mediterranean rig, as "luggers." They are in model much like the common light-draft American center-board sloops, and vary in size from 16 to 40 feet in length, the largest measuring about 8 tons. They are further described in another section of this report.

THE OYSTERMEN.—In going to the lower coast, writes Mr. Ainsworth, the luggers run down the Mississippi generally for about 60 miles, and then through smaller outlets and bayous into Grand Lake Bayou and the various grounds on the coast. The men who are employed in this fishery, and also the sailors who own the luggers, are almost altogether Italians and Sicilians, generally of a low order. Their swarthy faces, long, curly hair, unfamiliar speech, and barbaric love of bright colors in their clothing and about their boats, give a perfectly foreign air to the markets. There is not an American style of rig seen, nor hardly a word of English spoken, in the whole gayly-painted oyster fleet of Louisiana.

OYSTER-CULTURE.—Oyster-planting amounts to very little along the coast now under view, and what is done is of the simplest character. I can form little notion of its extent or the number of planters. The reef-oysters are taken from the natural beds by tongs in June and carried up the half-fresh bayous, or inshore, where they are laid out between tides until time to sell them in the fall. This improves them somewhat, but seems to be chiefly serviceable in making them more readily accessible for market, and so saving time. The Picayune said that in 1878 4,500 men were employed in making and assisting in making such transplantings.

OYSTER MARTS IN NEW ORLEANS.—There are three separate landing places and marts for oyster-boats in New Orleans, the Old Basin, the New Basin, and the French market levee.

To the Old and New Basins (chiefly the former), in the rear of the city, reached by canals from Lake Pontchartrain, come the boats from the eastward, bringing "lake" and "reef" oysters, gen-

erally of inferior quality, and intended to be sold to the canning establishments, or to be opened for cooking purposes. The boats average smaller than those used in the river westward, and usually carry only two men. The price of the oysters—frequently measured out in quarter-barrel boxes similar to those in use in Mobile—depends upon the state of the market as governed by the supplies received from the West, and often goes down to 50 or 60 cents a barrel, at which price there is no profit, and the oystermen stop running until a rise occurs. The average price, however, is said to have been $1.50 per barrel last winter; and 65,000 barrels are said to have been the total of receipts on this side of the city. This would equal about 170,000 bushels, at 39 cents a bushel. The men who bring oysters from the eastward say they must have higher prices than formerly, on account of the growing scarcity of oysters, and the longer time it takes to get their load. Many more are oystering now than before the war.

At the levee opposite, or just below the famous old French market, is the other and greatest oyster landing place, mustering about two hundred and five boats, with six hundred and fifteen men or more in the crews. The estimate of annual receipts there at present gives 50,000 barrels, or 125,000 bushels, commonly sold at $2 to $3.50 per barrel. All of these come from westward of the delta, and being larger and finer are, as a rule, bought by the saloons and restaurants, and served to their customers on the shell.

WHARFMEN ON THE LEVEE.—A peculiar feature of the business on the levee consists of an organization of wharfmen, who form a species of close corporation to do the work of carrying the oysters from the boats to the wagon of the purchaser, who pays them 15 cents a barrel for the service. The boatman having sold his cargo, he then has no further concern; his boat being taken in charge by the carrier, who might be called a 'longshoreman, and who delivers all the oysters and sweeps the vessel and puts her in proper condition for the crew. While there is no society of these carriers, strictly speaking, they manage to make their business a close corporation, since no one is allowed to discharge a cargo of any kind from the luggers—oysters, oranges, or fruit—except one of the members of the body. There is a man who is called the foreman, who receives all the money for the carriers and who divides the proceeds equally among the different carriers, but just how this is regulated, as well as many other of the details of this quasi-organization, is kept as mysteriously secret as possible. The body is an old one and now consists of about fifty men in all, mostly Sicilians and low-grade Italians, and, as near as I can judge, the annual receipts for the carriers amount to about $35,000, levied on the oysters, oranges, melons, and various fruits. Some years ago the city designated a man to act as foreman, and he held the post for 22 years, not giving it up until his death, when he was succeeded by his son, who now has the place. The system is beginning to be felt as an unwarrantable incubus on the trade, and a monopoly which should be opposed. In consequence it doubtless will soon be broken up, and each purchaser will land his own oysters, or the boatmen deliver them to the wagons at less cost than now. The levee is leased by the city to a firm, which collects $20 a year wharfage from the luggers.

SHIPMENTS OF OYSTERS FROM NEW ORLEANS.—The shipment of oysters inland from New Orleans has hitherto been of very small account, and principally of fresh oysters. Now, however, at least two canning establishmnnts have been started in the city, which make a large item in their general preserving business of cooked and hermetically sealed oysters, prepared substantially as in Baltimore. Several brands have been put upon the market with good satisfaction, selling at $2.50 per dozen two-pound cans for first quality, and $1.80 for second, and at $1.10 for one-pound cans. About $100,000 worth of these canned oysters are said to have been put up during 1880, nearly all of which were taken by the trade of the city and immediate neighborhood.

The capital invested is, perhaps, $75,000, but is applied to shrimp, lobster, and fruit canning as well as oysters. In these establishments only about thirty male adults are employed, the openers being girls, about 100 in number, all white and chiefly German and American in nationality, who are paid from 4 to 6 cents for each kettleful, a "kettle" holding two quarts. Work is irregular, because of the difficulty of getting oysters in sufficient quantity and when needed (owing mainly to the indisposition of the oystermen to work in bad weather), and the total earnings of the openers and employés during the "oyster run" in the factories, will probably not exceed $20,000. These factories have not been long enough in progress to furnish more exact information than is here given. Their capacity is far in advance of their present product, and they anticipate a highly successful future, confident that they can secure the trade of the Lower Mississippi Valley, to the exclusion of oysters canned in northern cities.

STATISTICS.—In the fisheries of New Orleans it is estimated that $38,360 are invested. The average price here paid to the oysterman is $1.25 a barrel. The yield of the New Orleans oyster fishery for 1879 was estimated at 116,100 barrels, valued at $145,125.

F.—THE FISHERY INTERESTS OF TEXAS.

211. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	491
Shoremen	110
Total	601

Detailed statement of the capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	167	$15,000
Other apparatus, including outfits		4,400
Canneries and other shore property		23,000
Total		42,400

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Crabs	36,000	$900
Green turtle	24,000	720
Mullet	8,000	240
Oysters	669,375	47,800
Shrimp	637,500	27,540
All other species	2,484,000	51,600
Total	3,858,875	128,300

212. GENERAL DESCRIPTION OF THE FISHERIES.

FISHERMEN.—On the coast of Texas there are 290 professional fishermen. Of this number 126 are seine fishermen and 165 oystermen.

APPARATUS.—The boats used on this coast, both for fishing and oystering, are very roughly and simply built. Those used for carrying fish and oysters to market are sloop-rigged, flat-bottomed boats, decked over forward and aft, but open in the center where the cargo is stored. They are built as flat and beamy as possible in order that they may float in the very shoal water so common in all the bays on the coast of Texas. They average 24 feet in length and 8 in width, and draw but a few inches of water. It is to the decided interest of the fishermen not to allow their boats to register 5 tons, for, by so doing, they escape the duty which otherwise would be imposed by the custom-house officers. Besides these boats, the seine-fishermen have smaller boats with which they lay out their seines. They are built on the same model as the sloops and are similar to those in use on the Florida coast. These latter boats are so roughly made that they are not deemed worthy of receiving a coat of paint, and, as a substitute, a covering of coal tar is smeared over them.

There are 42 seines in use. Their average length is 100 fathoms, and their depth 5 feet, with an average mesh of 1 inch. Each seine is handled by three or four men. The nets are in use for about nine months of the year, from September to May. Redfish, sheepshead, and sea trout are chiefly caught. The annual catch of each seine is 20,000 pounds.

OYSTERMEN.—There are some oyster beds on the coast, employing, as before stated, one hundred and sixty-five men, who own fifty-five boats and sell their oysters principally at Galveston.

RELATIVE IMPORTANCE OF THE FISHERIES.—There is comparatively very little done in the fishing business on the Texan coast, and very little variety in the modes of fishing or in the variety of the fish caught. Fishing at sea with hook and line for the deep-water fishes, such as red snappers, groupers, &c., has never been attempted by Texan fishermen, although there is every reason for supposing that such an experiment would be successful, as the above named species are known to occur off the coast. Nor have the attempts at sea-beach seining been very great, partly because the same kinds of fish which can be caught there are found in greater abundance in the bay waters, and partly because the seines used in inside waters are not suitable for fishing in the surf outside. Consequently there are but few of the deep sea fish and of the migratory coast species to be found in the Texan markets. Among the common Gulf fishes wanting, the following are the most conspicuous: Pompano, which are but very rarely taken; bluefish, these are extremely rare; Spanish mackerel, taken occasionally with hook and line; red snappers, these are never brought to the markets; groupers, all kinds of this fish are unknown to the majority of the fishermen; and bonito, which are almost unknown.

APPARATUS AND METHODS.—In the vicinity of Galveston the seine-fishermen work steadily from September until May for fish, devoting the summer months to the capture of shrimp. At other points on the coast the seiners are not professional fishermen, but are farmers and men who fish for their own provision when other work is not pressing. The seines are of peculiar shape, as the water is very shoal and the bottom muddy. There are no leads or weights attached to the bottom lines of the net, as before noticed; they are set from small boats, and these act as tenders to the sloops which carry the fish to market.

A gang is absent about a week on a trip; its success is varied; sometimes 20 barrels are brought home and again only 1 or 2. Those fishing for the Houston market make daily trips.

At Indianola and Matagorda Bay are several crews of Galveston fishermen; these send their catches home twice a week by the steamers plying between those points.

Gill-nets are never used on this coast, the seine being the only contrivance that has ever proved a success. A pound net was brought to Galveston from New England and was thoroughly tested. It proved a complete failure, for the crabs, &c., destroyed the netting faster than it could be repaired. The parties who made this experiment—Messrs. Sadler and Murnur—think that a pound constructed of wire netting would pay. At present the Galveston dealers find it difficult to fill their orders received from the inland country, and the packing establishments have the same trouble.

In Galveston Bay fish are quite scarce, while at Matagorda Bay, where there are only a few fishermen and nets, they are plentiful. The negroes and boys catch some fish from the wharves with hook and line or with cast-net. These are sold about the adjacent town or village, and, if summed up, would, in the course of a year, amount to a considerable number.

The fish markets are supplied entirely by seine-fishermen, who fish in the bayous and bays. The principal kinds of fish caught are redfish, sheepshead, sea-trout, mullet, and croakers. The redfish are the most abundant and appear to be the favorite food-fish of the State. They remain in the shoal water throughout the year, and at certain seasons are in most excellent condition.

OYSTER FISHERIES.—The oyster supply at Galveston and a few other points on the western part of the coast is very good, and the oysters are of very fine quality. In the north and eastern parts of the bay the oysters are unfit for the market, being small and poor, but in the west arm of the bay they are unsurpassed.

The inferiority of the oysters in some parts is supposed to be the result of very sudden and decided changes in the character of the water; that is, from clear salt water to muddy fresh water, and *vice versa*. Until a few years ago all Galveston oysters were liable to these changes. Since the canal was cut from Brazos River to the west arm of Galveston Bay, the stream of fresh water constantly flowing into the bay has preserved at that point an equality in the character of the water which has effected a great improvement in the quality of the oysters at that point. The whole supply now comes from west bay, and there is said to be an abundance for years to come. In Matagorda Bay oysters are not found in any great abundance, excepting in the extremities farthest removed from the mouth of Colorado River, whose waters are impregnated with a yellow mud which is considered detrimental to the growth of oysters. Yet in some places quantities of fine oysters are to be found. These points are seldom visited by oystermen, there being no regular trade at the villages near by. Farther down the coast plenty of oysters may be found, but there is only in that region a small demand for them. Nothing has been done on this coast towards the cultivation of oysters.

At Galveston oysters are brought to market in small sailing vessels of 2 or 3 tons measurement. Three men accompany each boat. The oysters are gathered by means of tongs, which are the only instruments used. They are sent to the dealers in barrels. Some few are shipped inland out of the shell, in tin cans, and a few to the nearest places in the shell. The supply at this market does not meet the demand.

LAY.—Among the seine fishermen the proceeds of the catch are divided into equal shares, the seine and boat receiving one share and each man one share; there being usually four men in the crew, the proceeds are divided into five equal parts. Oystermen work on a similar "lay"; their boats, however, receive a full share, and the tongs and full outfit are furnished as a part of the boat.

STATISTICS.—It is estimated that $9,000 are invested in the fisheries, $10,000 in the oyster business, and $12,000 in packing establishments; this gives as the total sum invested $31,400.

The fishermen receive from 3 cents to 5 cents a pound for their fish, and the oystermen, on an average, $1 a barrel. Green turtles sell at 3 cents a pound, and shrimp at 25 cents a bucket. The canning of shrimp at this point is elsewhere described.

213. PROFESSOR JORDAN'S ACCOUNT OF THE FISHERIES OF GALVESTON AND VICINITY.

APPARATUS AND METHODS.—There are in Galveston about fifty boats and ten "wagons" engaged in the capture of fish and shrimp. Some of these are idle from time to time, so that an average of perhaps forty are steadily employed.

The boats are all, or nearly all, of the "Italian" style—the deck half covered. They are all cat-rigged, and range in size from about three-fourths of a ton to 1½ tons. None of them are specially adapted for rough water, and they do not venture outside the bay, except in very calm weather. There was formerly a single "lateen" or "lugger-rigged" boat here, but the style has been discarded.

The fishing is nearly all done by means of seines, and these seines are very shallow, ranging from 4 to 7 feet in depth, and probably not averaging over 5 to 5½. The net is not "paid out" from the boat in most cases, but is taken out by wading and hauled in over shallow sand-flats. As a result, only species remaining very close to shore are usually taken, and there is therefore very little variety in the markets. The boats go to various distances from 1 to 30 miles from Galveston, the best fishing grounds *now* being around the west end of the island of Galveston, nearly 30 miles from the city.

The "wagon-fishing" is chiefly done on the south coast of the island, in the surf. The wagon is used to haul the nets out from town and to bring back the fish. The nets are put out by wading in the shallow surf. Most of the fishing from the boats is done in the latter half of the night; from the wagons, in the afternoon.

Occasionally hand-fishing is done on the sand reef outside the bay, and a few red snapper, jewfish, and similar species are taken here. In the summer, Spanish mackerel are taken with hook. There are also numerous persons, chiefly negroes, who fish with hand-lines in the surf, using mullet as bait. They catch redfish (*Sciæna ocellata*), *Arius felis*, and *Menticirrus littoralis* chiefly, the redfish being always the species desired. Casting-nets (circular, with a lead-line around the outer margin) are occasionally used, but chiefly to secure mullet as bait. No gill-nets are in use. There was formerly a pound-net, but the large fish, sharks and tarpum (*Megalops*), tore it up so much that it was removed.

FISHERMEN.—About one hundred and fifty men in Galveston are employed more or less regularly as fishermen. Nearly all are of the race known here as "Dagoes," men from the Mediterranean (Genoa, Palermo, Malta, Trieste, Dalmatia, and Greece). There are two Americans, and so far as known to me, no negroes and no persons from northern Europe. Most of them work on shares for the owners of the boats and nets. In some cases, the boat takes two shares and each of the two fishermen one.

PRODUCTS.—A fair estimate of the total annual catch at Galveston is 300,000 to 350,000 pounds. A little less than half of this (150,000 pounds) is brought into the fish market in the morning and sold, wholesale and retail, at an average price of 7 cents per pound. About as much more is shipped into the interior of Texas on ice. Some 2,000 pounds a week are received on the

steamers from Indianola. Most of this is also shipped into the interior, but little coming to the Galveston market.

The fish brought to the market are placed on the stalls by the fishermen and are soon bought up at prices varying with the supply, by a number of Italians known as speculators, who sell them to the public; all left unsold at 9 o'clock a. m., being put on ice till the next day. The demand and supply are far greater on Sunday and Friday than on the other days of the week, and very small on Saturday and Monday. The species seen in market in spring are the following, given in order of their abundance:

Sciæna ocellata. Redfish of the Colorado. (Up to 38 pounds.)
Cynoscion maculatum. Speckled trout.
Mugil albula. Mullet. (Little esteemed.)
Pogonias chromis. Drum. (Cheap.)
Bairdiella punctata. Yellow-fin.
Micropogon undulatus. Croaker; ronco.
Diplodus probatocephalus. Sheepshead.
Liostomus xanthurus. Flat croaker.
Pomadasys fulvomaculatus. Pigfish.
Menticirrus alburnus. Whiting.

The above of daily occurrence.

Tylosurus longirostris. Needle-fish.
Paralichthys dentatus. Flounder. (Mostly speared.)
Arius felis. Sea-cat.
Ælurichthys marinus. Sea-kitten; blue-backed cat. (Rarely except by negroes.)
Menticirrus littoralis. Surf whiting.
Chætodipterus faber. Half-moon.
Trygon sayi. Stingaree.
Diplodus rhomboides.
Centropomus undecimalis. Robalo. (A magnificent fish when baked.)
Trichiurus lepturus. Silver eel.
Hemirhamphus unifasciatus. Smear.
Clupea chrysochloris. Skipjack.
Brevoortia patronus; and other fish little esteemed, occasionally brought in, as also sometimes different river fish.

To this list the pompano, the Spanish mackerel, the crevallé, and some species of eel are to be added in summer.

STATISTICS FOR DIFFERENT LOCALITIES.—At Indianola, on Matagorda Bay, are some seventy-five to eighty fishermen, who take about 200,000 pounds of fish yearly, nearly half of this being shipped by steamer to Galveston, the rest being consumed in Indianola or sent by rail into the interior.

At Rockport and Corpus Christi Bay some fishing is done, perhaps 50,000 pounds per year.

At Brazos Santiago, on Laguna Madre, a number of men fish for the markets of Brownsville and Matamoras, about 100,000 pounds being taken yearly.

From Brazos Santiago, the robalo (*C. undecimalis*), which is there one of the most important food-fish, is often sent by steamer, on ice, to Galveston. It reaches a weight of 20 pounds, and is justly prized.

There is no fishing of importance elsewhere on the coast of Texas.

The total catch at the various places is as follows:

Location.	Pounds.
Galveston	300,000
Indianola	200,000
Corpus Christi	50,000
Brazos Santiago	100,000
	650,000

Value, as sold by fishermen, $32,500.

There are also some 100 pounds of shrimp taken daily at Galveston. The oyster trade is also important.

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PART XVI.

THE FISHERIES OF THE PACIFIC COAST.

By DAVID STARR JORDAN.

ANALYSIS.

A.—GENERAL STATISTICS:
- 214. Extent and relative importance of the fisheries.

B.—CALIFORNIA AND ITS FISHERY INTERESTS:
- 215. Statistical recapitulation.
- 216. The fisheries of San Diego, Los Angeles, and Ventura Counties.
- 217. The fisheries of Santa Barbara and San Luis Obispo Counties.
- 218. The fisheries of Monterey, Santa Cruz, Santa Clara, and San Mateo Counties.
- 219. The fisheries of San Francisco County.
- 220. The fisheries of the sea-bordering counties between San Francisco and the northern boundary of the State.

C.—OREGON AND ITS FISHERY INTERESTS:
- 221. Statistical recapitulation.
- 222. The fisheries of the Oregon coast.

D.—WASHINGTON TERRITORY AND ITS FISHERY INTERESTS:
- 223. Statistical recapitulation.
- 224. The coast fisheries of Washington Territory.

E.—ALASKA AND ITS FISHERY INTERESTS:
- 225. Statistical recapitulation.
- 226. The fisheries of Alaska.

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PART XVI.

THE FISHERIES OF THE PACIFIC COAST.

A.—GENERAL STATISTICS.

214. EXTENT AND RELATIVE IMPORTANCE OF THE FISHERIES.

PRELIMINARY REMARKS.—The fisheries of the Pacific coast, like those of almost every part of the United States beyond the limits of New England, are still in a low degree of development. About 7,000 miles of the territory of the United States border upon the Pacific Ocean, and its northernmost arm, the Sea of Kamtchatka, but the income derived from the fisheries of this extensive tract is about $5,000,000 per annum less than the revenue which New England, with her 500 miles of coast line, draws from a similar source.

RELATIVE IMPORTANCE OF THE FISHERIES OF DIFFERENT PLACES.—The most important of the Pacific States and Territories, considering the amount of capital invested in the fisheries, is California, which is directly interested in the products of the water to the extent of nearly $1,140,000, and much of the capital which will be credited to Alaska and other places is really controlled by the citizens of that State. The California fisheries give much smaller returns, however, than those of either Oregon or Alaska.

The city of San Francisco is the metropolis of the Pacific fisheries, and almost all the products of every sort, which are not consumed locally, come hither for use or shipment.

RELATIVE IMPORTANCE OF THE FISHERIES FOR DIFFERENT SPECIES.—One of the leading fisheries of the region under consideration is that for salmon. The value of fish of this species taken in the Columbia River, where the fishery is most extensively prosecuted, is $2,728,602. The entire catch in 1880 was no less than 53,844,000 pounds, for which the fishermen received $1,054,027. Nearly 43,400,000 pounds were canned before being placed upon the market, and their worth was thus increased by $2,345,547, which, being added to the former amount gives them value in marketable condition of nearly $3,400,000 at first hands. It will be noticed that this amount is over one-third of the entire production of the west coast fisheries.

The marine salt industry, which is confined to the State of California, has products amounting to $302,000.

The returns from the whale fishery of California amount to $202,000. No whaling is done in Oregon or Washington Territory, and $500 worth of oil is the only contribution from the bulky cetacean towards the wealth of Alaska.

About $2,172,000 accrues from the fur-seal and other pinnigrades, with their neighbor, the sea-otter. The capital invested by the Alaska Commercial Company in this trade comprises nearly one-fifth of the entire amount dependent upon the fishery industries of the Pacific.

The statistics of the fisheries of the Pacific coast are detailed in the following statements:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	11,613
Shoremen	5,190
Total	16,803

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (5,463.42 tons)	56	$546,450
Boats	5,547	404,695
Other apparatus, including outfits		467,238
Cash capital and shore property		1,330,000
Total		2,748,383

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value to fishermen.
Sea-otter skins ... number	6,075	$603,750
Seal-skins ... do	155,718	1,540,912
Seal-flesh ... pounds	1,000,000	10,000
Whalebone ... do	61,000	122,000
Whale oil ... gallons	158,685	80,150
Fish ... pounds fresh	178,048,920	a 4,596,330
Crabs and other crustaceans ... pounds	2,500,000	66,358
Oysters and other mollusks		138,250
Marine salt ... pounds	60,400,000	302,000
Other products		b 25,000
Total		7,484,750

a Including enhancement in the value of salmon in process of canning, $2,345,547.

b Including fish oil, seal oil, seaweed, and eggs of sea-birds.

B.—CALIFORNIA AND ITS FISHERY INTERESTS.

215. STATISTICAL RECAPITULATION.

INTRODUCTORY REMARKS.—The fisheries of the California coast, which are to be considered in detail in the following pages, are summed up in the two tables given below. The first, which is the result of a combination of the county tables given further on, shows the coast fisheries, properly so called. They are carried on within a few miles of the shore by means of small vessels or boats too frail to face the dangers of the open sea. These are of diverse patterns, and the predominating types come from the central seats of antipodal civilizations. Side by side with the Chinese junk may be found the lateen-rigged sloop of the Mediterranean. The presence of boats of these kinds is explained by the fact, which will hereafter appear, that most of the fisher-folk are either Chinese or Europeans of the Romanic races. Italians and Portuguese are very numerous, and, if we may trust the etymology of the word, it is to the former nationality that the invention of the lateen sail, the *voile latine*, as the French plainly call it, must be credited. Those who man

these little crafts do not usually confine their operations to any particular species, but refuse nothing for which they are sure of finding a market, from the whale to the abalone.

The second table is the summation for the fisheries of the State in all their branches. It includes not only the result of the toil of the coast fishermen, but also the products of the river fisheries for salmon and the outcome of the voyages of the vessel fleets to the distant haunts of the codfish and the whale.

The salmon fishery is vigorously prosecuted in the waters of the three rivers, Sacramento, Eel, and Smith, and the products in 1880 had a value, to the fishermen, of over $180,000.

The cod is abundant in the Northern Pacific and many large vessels make annual expeditions in its quest. There are two fleets of cod-vessels, one of which fishes in the Okhotsk Sea and the other in the vicinity of the Shumagin Islands, a group at the eastern extremity of the Aleutian Archipelago. At the latter place a fishing station is established, and a vessel is kept constantly employed in carrying to San Francisco the catch of several vessels which remain in the vicinity throughout the season. Of the sixteen vessels engaged in the off-shore cod-fishery in 1880, ten fished in the Okhotsk Sea and five belonged to the Shumagin Island fleet. The other went no farther than the Cordell Banks, off the California coast. The catch amounted to nearly $200,000.

The whaling grounds in the Sea of Kamtchatka and the Arctic Ocean were visited by five vessels from the port of San Francisco. These vessels averaged 200 tons burden and had an aggregate value of $27,000. The products consisted of 116,550 gallons of oil, worth $50,440, and 61,000 pounds of whalebone, worth $122,000. Although its own fleet is quite small, San Francisco is the center of the whale fishery of the North Pacific. From this port are shipped to their destination the products of nearly every American vessel whaling in those waters; in its docks the battered hulk and broken spars, which witness the severity of northern tempests, are repaired; and by its merchants is furnished the outfit for each new cruise. Thus the position which the city occupies with regard to this fishery is much more important than the statistics would lead the reader to believe.

The seal business of the Alaska Commercial Company is omitted here, as it has been thought better to include it in the statistics of the fisheries of Alaska.

The following statements show in detail the extent of the coast fisheries of California:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,089

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels and boats	294	$33,485
Other apparatus and outfit		32,340
Total capital invested		65,825

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Food products.		
Fresh fish ..... pounds..	8,460,200	$349,171
Dried fish ..... do....	111,000	2,275
Shark fins ..... do....	6,000	300
Crawfish ..... do....	190,000	2,858
Shrimp and prawn ..... do....	1,250,000	62,500
Clams and mussels ..... number..	58,000	545
Abalone meats ..... pounds..	787,000	38,880
Other products.		
Sea otter skins ..... number..	75	3,750
Seal-skins ..... do....	2,000	10,000
Seal oil ..... gallons..	4,725	2,250
Whale oil ..... do....	47,135	20,210
Shark oil ..... do....	1,920	595
Abalone shells ..... pounds..	3,383,500	88,825
Seaweed ..... do....	277,000	170
Total	.....	582,329

The following statements show in detail the extent of the commercial fisheries of California:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	2,089
Shoremen	1,005
Total	3,094

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (5,246.80 tons)	49	$535,350
Boats	853	91,485
Other apparatus, including outfit	.....	205,840
Cash capital and shore property	.....	307,000
Total	.....	1,139,675

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value to fishermen.
Sea otter skins ..... number..	75	$3,750
Seal-skins ..... do....	2,000	10,000
Whalebone ..... pounds..	61,000	122,000
Whale oil ..... gallons..	153,685	79,650
Fish ..... pounds fresh..	24,577,920	a1,145,006
Crabs and other crustaceans ..... pounds..	2,500,000	66,358
Oysters and other mollusks	.....	128,250
Marine salt ..... pounds..	60,400,000	302,000
Other products	.....	b3,700
Total	.....	1,860,714

a Including enhancement in the value of salmon in process of canning, $394,045.
b Including fish oil, seal oil, seaweed, and eggs of sea-birds.

216. THE FISHERIES OF SAN DIEGO, LOS ANGELES, AND VENTURA COUNTIES.

SAN DIEGO COUNTY.—This county is in the extreme southern part of California. Its coast is conspicuous for bold headlands of sandstone, at the foot of which is a smooth beach extending fully half a mile into the sea. Beyond this is a stony area covered with kelp (*Macrocystis pyrifera*), stretching out irregularly about 5 miles.

All along the coast are numerous lagoons or bays of salt water, forming broad mouths to the streams entering the ocean. These bays have been washed out by the ocean and nearly, and in some cases wholly, filled up by the formation of sand-bars. One of these bays, that of San Diego, forms an excellent harbor. It is about 10 miles in length from north to south, and from 1 to 2 miles in width. Its entrance is on the north end, just south of Point Loma, and it is separated partially from the sea by a low, sandy peninsula, running in a northerly direction. San Diego Bay is shallow along its edges, deepening in the center. Between Point Loma, the termination of a rocky ridge north of San Diego, and the Point of Rocks 15 miles farther south, the coast line is concave. In the bay formed by this recess most of the outside fishing of the county is carried on.

There are no authentic accounts of the productiveness of the past fisheries of this county. There is no doubt that the number of fishes in San Diego Bay has been greatly reduced by the constant use of fine-meshed seines by the Chinamen. Large fishes of all species are becoming rare. This is especially noticeable in the case of the "bastard halibut" or flounder (*Paralichthys maculosus*). Large individuals of this species are now very seldom caught, but numbers from 2 to 6 inches long are daily taken and dried by the Chinamen. There is no reason to believe that the abundance of the outside fishes has been materially changed by fishing.

The fisheries carried on at San Diego ten years ago were more extensive than at the present time. The advent of the Chinese fishermen, who compose three-fourths of the total of fishermen in this county, and the non-construction of the Texas and Pacific Railroad to San Diego may be regarded as two causes of the decreased interest in the fisheries.

All the fishermen of this county, excepting four Americans and their employés, are Chinamen. Two Americans and assistants are employed in seal-hunting, the rest in gathering kelp, and, in their seasons, bonito and barracuda fishing. The bonito appears in August and disappears in November or December; the barracuda comes in April and leaves in October or November.

The modes of fishing peculiar to each race of fishermen are described elsewhere.

Pound, traps, weirs, and fyke-nets are not in use at San Diego, the poor state of the fish market not warranting the expenditure of much capital; nor are there any gill-nets in operation.

Statement showing the several species and amounts of each kind of fish taken in San Diego County during 1879.

Name.	Pounds.	Name.	Pounds.
Redfish	50,000	Mullet	600
Barracuda	32,000	Perch	1,500
Bonito	6,000	Bass	500
Albicore	500	Whitefish	2,000
Yellow-tail	300	Flounder	1,000
Jew-fish	1,000	Other "outside" species	600
Bluefish	1,500	Other "inside" species	1,500
Roncador	1,300	Total	113,200
Smelt	12,000		
Herring and Sardine	900		

Smelt, mullet, herring, roncadores, and flounders are taken by means of seines, and in all parts of the bay throughout the year. These fisheries are prosecuted chiefly by the Chinese. Redfish are caught with hook and line at a distance of one-half to 3 miles from the shore. Jig-fishing for bonito and barracuda, practiced by Americans only, is carried on during the summer and fall at one-half mile to 10 miles from shore.

All the fish, excepting smelt, mullet, and roncadores (which are sold fresh for home consumption), are salted and exported. The boats used were built in San Francisco, excepting some of the Chinese junks.

The whale fishery, once of importance, is now abandoned, Ballast Point having been taken possession of by the Government for the storehouses in connection with the fortification of Point Loma.

Oysters and clams occur, the former in small quantities, the latter, especially the "Razor Clam," in great abundance; and quantities of crawfish are taken by the Chinese fishermen.

The chase of the fur-seal is more extensive at San Diego than the fisheries proper. The result for 1879 was 2,000 skins, worth $10,000.

Great interest is taken by the Chinese in abalone fishing. The shells of the young of the species *Haliotis splendens* are treated with a solution of hydrochloric acid. The shells of the adult individuals of the same species and those of another species are ground down on stones by hand. Steam grinding, from the rapidity of motion, wears holes through the shells, unless the operator is extremely careful. The shells, when ground down, are varnished. During the first week of January, 1880, 10 tons of abalone shells were sold in San Francisco at $45 a ton. Their value is at times $75 a ton. From San Francisco they are shipped eastward for mantel ornaments. The meat of the abalone is salted and dried, and sold at 5 cents a pound in San Francisco. Thence much of it is shipped to China. The dried abalone is nearly half as heavy as the shell. The abalones taken in this and other southern counties of California are less eaten by worms than those taken farther north, therefore more valuable. The Americans do not eat the meat of abalones, but certain Indian tribes at some of their secular feasts consume large quantities of it. The abalone industry is combined with the redfish fishery by the Chinese.

Sea turtles are occasionally taken along the coast. Their capture is not sufficiently frequent to have established a market.

LOS ANGELES COUNTY.—Los Angeles County lies directly to the north of San Diego County. Its coast is similar, except that headlands and bays are less numerous, and there is an increase in number of level sandy stretches with small lagoons. There is no harbor of any importance on the whole coast, the only one being at Wilmington, and little better than a narrow, muddy inlet. Most of the fishing is done at a great distance from shore, the most favorite ground being in the neighborhood of Santa Catalina, a mountainous island about 20 miles from the coast. This island is 22 miles long, and from a half mile to 6 miles wide, its length being parallel with the coast line. The water about Santa Catalina is very clear, and where the most fishing is done the water is from 10 to 20 feet deep. The bottom is rocky and in places covered with kelp. On these grounds gill-nets are the commonest means of capture. In the summer trolling for bonito, albicore, barracuda, yellow-tail, &c., is followed largely. In the winter the following species are taken: Media-luna, *Girella nigricans*, *Scorpæna guttata*, rockfish, and *Hypsypops rubicundus*. At this island are some resident fishermen who salt and dry their fish and ship them to San Francisco. One of these, with his associates, fishes with seines, the others with hook and line. There are perhaps ten fishermen, altogether, on the island. More men fish in summer than in winter.

The other fishing grounds, chief among which are San Pedro, Anchorage, and the Creek, are visited by fishermen from Newport, Anaheim Landing, Wilmington, Salinas Ranch, and Santa Monica. The most important of these is Wilmington. To this port belong four lateen-rigged boats, two or three skiffs, which go to the "creek," and three Chinese junks, aggregating 6 tons, which combine hook-and-line fishing with the gathering of abalones.

At Newport the only regular fishing is that prosecuted for the capture of the oil-shark, in which fishery men from Wilmington, Westminster, and elsewhere join.

At Anaheim Landing there are five persons employed by the Lighter Company; these fish when not otherwise occupied. They catch smelt, flounders, cabrilla, surf-fish, &c., which are peddled in the neighboring towns. In a lagoon near the landing, at a certain time of the year, oil-sharks are captured.

Statement showing the amounts in pounds, of the various species caught in Los Angeles County during 1879.

Name.	Pounds.	Name.	Pounds.
Barracuda	100,000	Bonito	40,000
Media-luna	75,000	Surf-fish	15,000
Smelt	75,000	Whitefish	8,000
Redfish	40,000	Flounders	10,000
Rockfish	15,000	Flying-fish	1,000
Cabrilla	20,000	Others	75,000
Roncador	30,000	Total catch	504,000

The men employed in the salt factories at Salinas Ranch engage in fishing when time permits. Their fish are peddled in Los Angeles. The hotels and residences at Santa Monica are supplied by semi-professional fishermen. They ship occasionally to Los Angeles. The tourists and winter visitors fish here with hook and line. There are at present no pounds or weirs in this county; one is reported to have been used at Wilmington some years ago.

The Italian and French boats owned in this county carry a large mainsail and a small foresail. There is a deck of rude construction in the forward part of the boat, upon which, in lieu of a live-box, are thrown the fish. The fishermen use gill-nets in the winter and seines in summer. There is so little demand for fish that the owners of the boats are ready at almost any time to charter their boat to an excursion party. In the winter, herring and sardines are taken near the shore.

The fishermen own eight gill-nets, about 300 feet long, with a 2-inch mesh. These nets are used chiefly in the winter, when the fish swim low. Two persons can easily manage a net. The average annual catch of each boat is 25,000 pounds of fish. Twelve seines are also in use, each 500 feet by 12 feet, of 1-inch and 1½-inch mesh. Three men manage a seine. They are used chiefly in summer.

Some oyster-beds, almost valueless, occur, and a few clams and scallops are to be found. There is no regular market for them.

A whale fishery formerly existed at Portuguese land, north of Wilmington; this fishery was abandoned some five years ago on account of the difficulty of obtaining water at that place.

Sea-lions abound along the coast and are a source of considerable annoyance to the fishermen in robbing the nets of fish. They are occasionally shot for their oil.

One man is engaged in fishing for crawfish; there is no regular market or price for his catch.

About 250 tons of abalone shells are sent to San Francisco by white men residing in this county, and 150 tons by the Chinese. They sell for about $45 a ton.

The oil-shark fishery, which is confined to the lagoons, was at one time largely carried on in this county. Five years ago some 3,000 gallons of oil were made at Newport, and a large quantity at Anaheim Landing; the amount produced has lately fallen off very much. The oil is simply tried out and strained through coarse sacking.

The oil-shark (*Galeorhinus galeus*) enters the lagoon for reproductive purposes, and is taken with hook and line. Any small fish will do for bait. Large hooks are used in order to prevent small sharks and other fish from swallowing them.

The products of this fishery could be greatly increased by the use of seines, but the expense would also be increased, and lack of capital forbids the attempt.

These sharks average 4 to 4½ feet in length and weigh about 40 or 50 pounds each. They yield from two-thirds of a gallon to a gallon of oil. They breed in June, July, and August, runs taking place from May to August. In 1880 the run was a small one, only 170 having been taken at Anaheim Landing up to July 20. In 1879, 150 were taken at one haul of the seine. The fins of this shark alone are dried and sell for 12½ cents a pound.

VENTURA COUNTY.—The coast-line of Ventura County runs northeast and southeast, and consists of a narrow plain, somewhat sandy and bordered by high mountains. This county is separated from Los Angeles by the lofty ridge of the Sierra Santa Monica, which terminates in the rocky points of Duma and Conversion, and from Santa Barbara by a spur of the Santauez Range, which forms the headland of El Rincon. Through this county flows the Ventura River. This is the most southern river on the coast of California which is not alkaline at its mouth. Into no stream, therefore, to the south of this does the salmon enter. Brook trout are, however, found in the headwaters of the Los Angeles and San Luis Rey Rivers, and even in some streams in the San Jacinto Mountains, in San Diego County. There are but two coast towns in Ventura County—County—San Buenaventura and Hueneme. The fishing in each of these is unimportant.

In Hueneme there are no fishing boats and no fishermen. Occasionally some of the villagers catch a few fish from the wharf, simply to pass the time away. At Point Magu, 9 miles south of Hueneme, is a party of Chinamen, who combine the two labors of fishing and gardening. At this point is a considerable lagoon into which various sorts of fish enter. These are caught in seines. Some of the fish are peddled with the vegetables in Santa Paula, Hueneme, and San Buenaventura. The others are soaked in salt water, dried and shipped to San Francisco in the usual fashion. Near Hueneme is a lagoon from which salt is occasionally obtained.

There is now no fishing of any importance at San Buenaventura. Some few Chinese and Californians fish from the wharves, and two or three farmers at Laguna Ranch, near by, fish occasionally with a seine. The proceeds of these catches are bought up by an Italian, who sells or exchanges them for vegetables, &c. At this place there is but one professional fisherman, who has in his possession two gill-nets and one seine. The average price per pound which he receives for his fish is 6 cents, but, even at that figure, the market is very limited. There is no good market in this thinly-populated county, and the harbor is too exposed to south winds to make it a safe anchorage for small boats. Some crawfish are taken in lobster-pots and dip-nets. These crawfish are sold in Ventura for about 5 cents apiece.

Statement showing the number of fishermen, the amount of capital invested, and the quantities and values of the products of the fisheries of San Diego, Los Angeles, and Ventura Counties.

	San Diego County.	Los Angeles County.	Ventura County.	Total.
Number of fishermen	47	53	7	107
Capital.				
Vessels and boats:				
Number	22	13	2	37
Value	$9,100	$1,055	$300	$10,455
Value of other apparatus and outfit	$700	$950	$400	$2,050
Total capital invested	$9,800	$2,005	$700	$12,505
Products.				
Seal-skins:				
Number	2,000	.....	.....	2,000
Value	$10,000	.....	.....	$10,000
Fish:				
Pounds	113,200	504,000	36,000	653,200
Value	$3,396	$20,160	$1,080	$24,636
Shark-fins:				
Pounds	.....	2,000	.....	2,000
Value	.....	$100	.....	$100
Shark-oil				
Pounds	.....	1,000	.....	1,000
Value	.....	$310	.....	$310
Crawfish:				
Pounds	7,500	1,500	1,000	10,000
Value	$113	$25	$20	$158
Clams and mussels:				
Number	10,000	2,500	500	13,000
Value	$100	$25	$10	$135
Abalone meats:				
Pounds	280,000	160,000	20,000	460,000
Value	$14,000	$8,000	$1,000	$23,000
Abalone shells:				
Pounds	1,400,000	800,000	100,000	2,300,000
Value	$30,000	$18,000	$2,500	$50,500
Total value of products	$57,609	$46,620	$4,610	$108,839

217. THE FISHERIES OF SANTA BARBARA AND SAN LUIS OBISPO COUNTIES.

SANTA BARBARA COUNTY.—The land in Santa Barbara County consists of a rather fertile strip of coast, with a smooth, sandy, and, in some places, rocky beach, indented by few lagoons. On the north the county is bounded by the ragged Sierra Santa Ynez, which forms the rocky headlands of El Rincon on the east and Points Argueles and Concepcion on the west. At a distance of about 25 miles from the coast, and parallel with it, lie the rocky islands of Santa Rosa, Santa Cruz, and Anacapa, and behind these, San Nicolas, San Miguel, and Santa Barbara. At a distance of about half a mile from the shore begins a belt of kelp, which extends out perhaps a half mile farther. Between the shore and Anacapa is a small reef, which is a favorite place for trolling. The Santa Barbara Channel is remarkably well stocked with fish, and the fisheries at Santa Barbara might be very extensive if there were any market. But insignificant as the present fisheries are, the supply exceeds the demand since the decline of real estate speculations.

Santa Barbara is the most important fishing town in the county. Goleta and Carpenteria come

next in order of importance. There are a few small places in addition, where scarcely any fishing is done.

No stationary apparatus is used by the fishermen of Santa Barbara. There are about fifteen gill-nets, the greater number of them about 240 feet by 15 feet, having a 2-inch mesh. These are chiefly used in winter, when the fish stay in deep water. Among the fishermen belong three or four baskets of set lines, each with 146 hooks. They have six seines, averaging 300 feet by 12 feet, with a half-inch mesh. These are used chiefly from April to October. The best bait is crawfish flesh, and for the capture of crawfish bonito is preferred as bait; any flesh, fresh or salt, will do. Their own species makes a very good bait.

There are five small sail-boats at Santa Barbara. These are usually laid up from November until March, the winter fishing being done in smaller boats with gill-nets. In the summer they fish extensively for barracuda.

The fishing is usually carried on between Santa Barbara and Santa Cruz Island, about 25 miles from shore, and also along the shore from Carpenteria to Los Pueblos, at which point the hook-and-line fishing is said to be the best.

Carpenteria is a small farming village, 12 miles east of Santa Barbara. Its name is derived from the timber—liveoak—which was formerly very abundant there. The fisheries are of little importance. Occasionally a man fishes from the wharf or drags a seine on the beach.

Mr. A. McIntyre, of Carpenteria, is a ship's carpenter by trade, and is chiefly engaged in the building of fishing smacks. He does all the work himself, and in the past eight years has built two, besides an abalone boat, and is now at work on the third—a fishing boat of 4 tons burden. These boats are the Restless, built 1877, now belonging to the fishermen on Santa Catilina, worth $500 when new; the Virginia, built 1872, now gone to pieces, worth $1,000 when new; and the Rosita, engaged somewhere in the freight and abalone business. When such work offers, Mr. McIntyre builds houses; spending time, otherwise not engaged, in boat-building.

At Goleta, on the site of the former whale fishery, a little fishing is carried on with the seine.

The fish are taken in Santa Barbara County, (*a*) in winter, near shore, by seining; (*b*) in gill-nets, near shore; (*c*) by hook and line, in the kelp; (*d*) by gill-net, off the islands; (*e*) by trolling, in summer; (*f*) by hook and line from the wharf, in winter; (*g*) by hook and line, in summer; and (*h*) by seining, near shore, in summer. The fish caught by trolling in summer are chiefly barracuda, bonito, albicore, yellow-tail, jewfish, and sea-bass.

The following list shows the comparative importance of the several fisheries of this county:

	Pounds.
Santa Barbara	110,000
Santa Cruz Islands	50,000
Goleta	15,000
Guadaloupe	2,000
Lompoc	2,000
Carpenteria	1,000

And by species roughly as follows:

Ditrara jacksoni	15,000
Other surf-fish	20,000
Barracuda	42,000
Redfish	10,000
Bonito, albicore, &c	18,000
Smelt	8,000
Flounders	5,000
Rock-cod	3,000
Pompano, &c	10,000

The abalone fishing at Santa Barbara is important. This is discussed in the chapter on the Chinese fishermen. A few men at Santa Barbara hunt the sea-otter. It is not an extensive business. The hair-seal and sea-lion are very abundant on Anacapa and other adjacent islands. They are hunted only for their oil. Two or three species of eatable clams occur at Santa Barbara. The Californians, when hard pushed, eat these. No scallops or oysters are taken.

There are no factories of salt or fishing apparatus in this county.

Nearly all the crawfish sold in San Francisco come from Santa Barbara. About 90 tons are taken annually. A cannery for the purpose of canning crawfish was started at Santa Barbara in 1877. It failed because the managers did not understand their business thoroughly.

Fifty-one miles west of the town of Santa Barbara is Cajo Viejo, where is established the only whaling company in the county. One at Goleta in former years is now abandoned. The company at Cajo Viejo consists of twenty men in winter and eighteen in summer. Captain Anderson is the commander. From October, 1879, to February, 1880, this company captured twenty whales, yielding oil to the value of nearly $8,000. More details concerning this company will be found under the head of the whale fisheries. The fisheries of this county are of recent origin, probably not having been started earlier than 1872.

SAN LUIS OBISPO COUNTY.—The long rocky coast of this county, without islands and unbroken by bays, is not favorable for extensive fisheries. The distance from San Francisco, too, renders the shipment of fresh fish impracticable, and the local market is very limited.

At Port Harford, which is the port for San Luis Obispo, the principal town of the county, there is a fisherman who owns two skiffs and has a seine of 1-inch mesh, 300 feet long and 16 feet wide. His fish are sold in San Luis Obispo for about 6 cents a pound. The neighboring farmers are glad to exchange produce for fish for their own consumption. His summer catch exceeds his winter catch by 100 pounds. Still fishing and trolling is carried on in the summer by three of the whale fishermen in the San Luis Bay. On Pecho Rancho, 2 miles north of Port Harford, an abalone fishery is carried on by two men, and five miles farther north is another one of the same sort and size. At Port Harford also are eight persons engaged in catching and drying fish. The chief species taken by them is holeontus.

At Moro is a shallow bay with a very narrow entrance. Into this bay mullet, flounders, smelt, and surf-fishes run in considerable numbers during the spring and summer. The seine and hook and line are then vigorously plied. There is a carp pond at Moro which has been very successful.

At Cayucos there is a little hook-and-line fishing. The same may be said of San Simeon.

The gathering of abalone shells is quite an important industry in this county. It is carried on chiefly at Port Harford, San Simeon, and Cayucos. The amount gathered—meat and shells—is seen in the following statement:

Place.	Shells.	Meats.
	Pounds.	*Pounds.*
San Simeon	12,840	10,650
Port Harford	7,638	4,000
Cayucos	3,000	1,000

There are two companies of whalers in San Luis Obispo County. One of these is at San Simeon, and is commanded by Captain Clark; the other is at Whaler's Point, about half a mile north of the landing at Port Harford, and is commanded by Captain Marshall.

The first mentioned consists of twenty men, most of whom are from the Azore Islands. They are hired by Captain Clark, who owns the entire outfit. This camp has been in existence since

1865. Their outfit consists of four whale-boats, two of which are worth $150 each, and the others $175 and $200 respectively. They also have two swivel guns, made in England, and worth, when new, $200 each, and two bomb guns, made in New Haven, and worth $50 each. Their bomb lances are made in Norway, and the harpoons are manufactured by G. W. Proctor, of San Mareo. The entire outfit is worth from $1,000 to $1,500.

The other camp, at Whaler's Point, consists of twenty-one men, all of whom, save one American, are from the Azores, as are the men at the other whaling station. They own three boats of New Bedford make. The other items of their outfit are identical with those of San Simeon, the whole being worth about $1,500. This company was established in 1868 or 1869. The men belonging to both companies are discharged in summer and a new set is hired in the fall. Since 1865 whales have been scarce and shy.

Table showing the catch of whales at San Simeon since 1865.

Year.	Number.	Year.	Number.
1865	25	1873	22
1866	23	1874	16
1867	24	1875	12
1868	25	1876	7
1869	20	1877	18
1870	23	1878	3
1871	22	1879	14
1872	21	1880	13

At Whaler's Point in 1878 eleven whales were taken; in 1879, nine. The season of 1880 began very poorly.

There was a whale fishery carried on at Point Surbut some years ago, but it is now abandoned.

Statement of the fisheries of San Luis Obispo and Santa Barbara Counties, showing the number of fishermen, the amount of capital invested, and the quantities and values of the products.

	San Luis Obispo County.	Santa Barbara County.	Total.
Number of fishermen	104	69	173
Capital.			
Vessels and boats:			
Number	12	5	17
Value	$1,230	$1,400	$2,630
Value of other apparatus and outfit	$3,000	$5,950	$8,950
Total capital invested	$4,230	$7,350	$11,580
Products.			
Sea-otter skins:			
Number	.....	75	75
Value	.....	$3,750	$3,750
Seal oil:			
Barrels	.....	150	150
Value	.....	$2,250	$2,250
Whale oil:			
Gallons	18,000	17,135	35,135
Value	$7,500	$7,710	$15,210
Fish:			
Pounds	84,000	180,000	264,000
Value	$2,520	$7,200	$9,720

Statement of the fisheries of San Luis Obispo and Santa Barbara counties—Continued.

	San Luis Obispo County.	Santa Barbara County.	Total.
Crawfish:			
Pounds	.....	180,000	180,000
Value	.....	$2,700	$2,700
Abalone meats:			
Pounds	15,600	100,000	115,600
Value	$780	$5,000	$5,780
Abalone shells:			
Pounds	23,500	50,000	73,500
Value	$575	$12,500	$13,075
Sea-weed:			
Pounds	237,000	.....	237,000
Value	$150	.....	$150
Total value of products	$11,525	$41,110	$52,635

218. THE FISHERIES OF MONTEREY, SANTA CRUZ, SANTA CLARA, AND SAN MATEO COUNTIES.

MONTEREY COUNTY.—The long coast of this county stretches southward and consists of a rocky neck, similar to the coast of San Luis Obispo. There are no towns along this stretch and no harbors. The coast is shut off from the interior by a high range of mountains (Sierra Santa Lucia), running parallel with and close to the sea. No profitable fishing is possible along this region. Farther north, however, these mountains terminate in the Point Carmelo, behind which the Carmelo River flows into the Carmelo Bay, whose coves form a harbor for whaling and fishing boats. North of this bay the range of hills forming the eastern watershed of the Rio Carmelo approaches the sea, ending in two points, Cypress and Pines, which separate the small bay of Carmelo from the much larger but very similar bay of Monterey. The lower end of Monterey Bay is, then, sheltered by the Point of Pines from southern and western storms, and makes a fair harbor. It is well situated for fishing and whaling. There is now a railroad from Monterey to San Francisco, a seven hours' journey. The catch of one day is sent to San Francisco the next day. Monterey is now, next to San Francisco, the most important salt-water fishing station in California.

There is no regular fishing done at Carmelo. In the river of that name a great many trout are taken and sold in Monterey at 12½ cents a pound. In the spring salmon ascend the river and are taken by the farmers. In the summer the water in the river is low and a bar is formed across its mouth, causing many young salmon to become land-locked. These are easily caught by the farmers and whalers at Carmelo.

At Pescadero is a colony of Chinese, who settled there twelve years ago. They have twelve boats, all home-manufactured, broad, flat, and clumsy. In the fall they salt and barrel quantities of anchovy, which are used for bait the next season. Most of this bait is furnished by the colony at Soquel.

At Punta Alones, a mile and a half west of Monterey, is another Chinese settlement, somewhat larger than that at Pescadero. Both men and women catch and dress the fish. This last is performed with a heavy, hatchet-like knife. This colony has been settled seventeen years. One of

the colony is an American citizen, and speaks English well. From 200 pounds to 800 pounds of fish are shipped daily to San Francisco. They consign their fish to the Clay-street dealers. Both of the colonies now considered dry an immense quantity of abalone meats and sell the shells. At certain seasons many tons of devil-fish, squids, and other *cephaloids*, etc., are thus prepared.

In 1873, fish were very abundant at Monterey, but the bay has been overfished, and there is a great decrease in the abundance of certain species, especially the flounder. Before the completion of the Monterey railroad, which has been referred to, the fish were shipped to some point whence they were sent by stage to Salinas and on by rail to San Francisco. The excessive handling and length of time requisite for transportation were the causes of many lots being spoiled.

There is a colony of Italians and another of Portuguese. The former has five sail-boats and three skiffs. They own two hundred pieces of seine, each 240 feet long. With some they catch smelt; with some, barracuda; and with others, salmon. They have twenty gill-nets and forty bunches of set-lines. In the gill-nets are chiefly caught rockfish, blue-cod, and rock-trout. With the set-lines the red rock is taken in deeper water. This mode of fishing is chiefly practiced by the Portuguese and Chinese.

The Portuguese colony have the same number of boats as that settled by Italians. Most of their fishing, as above suggested, is done with set-lines; hence the species most commonly taken by them is the red rockfish. The price per pound for this fish, cleaned, is 6 cents. Most of the others obtain only 3 and 4 cents per pound.

The common bait is the flesh of *Hypsurus caryi*, which is caught around the wharves in a dip-net baited with crushed crab.

At Moss Landing, two miles from Castroville, there are one or two fishermen with a boat. The fish caught are sold in Castroville or shipped to San Francisco.

Monthly shipments of fish to San Francisco from Monterey from February 1, 1879, *to February* 1, 1880.

Month.	Pounds.	Month.	Pounds.
February	18,075	October	6,011
March	23,388	November	31,450
April	18,659	December	31,600
May	17,852	January	7,904
June	17,416	Gross weight	264,831
July	36,873	Boxes, weight	44,135
August	26,303	Net weight	220,696
September	29,300		

These figures are from the books of Wells, Fargo & Co. The above total represents about one-fourth of the total catch for the county. Two-thirds are rockfish.

In Monterey County are two whaling companies—one at Carmelo, the other at Monterey. Captain Mariano commands the former. This company owns three boats. In 1879 they took one finback, three humpback, and three gray whales. There are a great many fine whales on this part of the coast, but the sea is so rough in winter that for months the men dare not venture out.

The company at Monterey is commanded by Captain Verissimo. It was started in 1855. In 1879 fourteen whales and two basking sharks were captured. Three boats belong to this company.

At Monterey various sorts of crabs are abundant. They are never shipped, and seldom eaten.

At the Point of Pines mussels abound on the rocks exposed to the sea. Five sacks were sent to San Francisco in 1879. At present they are not worth gathering.

Crawfish are not met with north of Point Concepcion.

SANTA CRUZ COUNTY.—This county lies along the north shore of the bay of Monterey. Its beach is, for the most part, sandy or shaly, and running parallel with and north of the beach are bluffs of considerable height; these in some places are extended as ledges or reefs under the sea. About the reefs most of the gill-net and hook-and-line fishing is done. There is no harbor along the coast of the county. During the prevalence of northerly winds or during calm weather, a landing may be made anywhere. During the southwest winds the surf is very heavy at all points and no one ventures out in small boats. In severe storms even steamers cannot land at Santa Cruz. There are three fishing towns on this coast—Santa Cruz, Soquel, and Aptos.

At Santa Cruz are five lateen-boats, two sloop-rigged boats, some skiffs and dories. Little fishing is done in winter by the fifteen fishermen located here. They take advantage, however, of smooth, and therefore favorable, intervals. In summer, great quantities of rockfish, sea bass, and barracuda are taken and shipped to San Francisco per Wells & Fargo's Express. The Santa Cruz market, important in summer, is also supplied. There is now an entire lack at this place of abalones, seaweed, and other similar products. Very little seining is done here. Surf-fish, barracuda, etc., are taken in gill-nets, and rockfish on set-lines. In 1878, 102,733 pounds of fish were caught here, the largest catch being in September; none were taken in January, February, or March. The above number netted 85,611 pounds.

The amount of fishing done at Soquel is greater than at Santa Cruz. There are altogether about ten boats in use here. Most of the fishing is done with gill-nets, and the bulk of the catch consists of sea bass and barracuda. Sharks are very abundant here and many are taken for their oil, especially the two species *Galeorhinus* and *Alopias*. Two specimens of the great basking sharks, having become entangled in the dip-nets, were taken this year. A basking shark yields from 130 to 160 gallons of oil. Occasionally a man-eater (*Carcharodon*) is obtained. One taken a year or two ago contained a sea-lion weighing 100 pounds. Shad have become quite abundant on Soquel Reef, and most of those sent to the San Francisco market come from this place. The average profits of the fishermen are greater here than at any other place on the coast, except, perhaps, at Monterey. At Soquel there is one large gill-net, 450 feet long and 45 deep, with a 4-inch mesh.

In 1878, 61,045 pounds of fish were caught here, netting 50,871 pounds. The largest catch was in December; no fish were taken during January, February, and March.

At a point between Soquel and Aptos are about fifty fishermen. They ship their catch to San Francisco and San José, especially in summer. Fish not so shipped are dried and sent by steamer from Soquel to San Francisco.

In 1878, 80,818 pounds were caught at Aptos. These netted 67,349 pounds. The largest catch was in September; there were none taken in January, February, or March.

Thus it is seen that in 1878, 244,596 pounds were taken in Santa Cruz County, netting 233,831 pounds.

Statement of the number of pounds of fish shipped by rail and steamer from three fishing towns to San Francisco, by months, in 1879.

Month.	Santa Cruz.	Soquel.	Aptos.
	Pounds.	*Pounds.*	*Pounds.*
January	1,366	2,818	.....
February	4,261	7,031	.....
March	10,572	11,100	360
April	6,500	6,800	2,000
May	10,201	6,251	1,500
June	20,000	20,000	4,000
July	21,000	17,000	8,000
August	18,500	15,000	4,000
September	12,500	14,000	6,000
October	14,000	22,000	9,000
November	12,000	8,000	7,000
December	8,500	3,000	2,540
Total by rail	139,400	133,000	44,400
Total by steamer	40,600	.....	.....
Total shipped	180,000	133,000	44,400
By reduction:			
Net totals shipped	160,000	110,000	38,000
Net totals consumed	70,000	10,000	112,000
Total	230,000	120,000	150,000

Grand total catch equals 500,000 pounds net.

SANTA CLARA COUNTY.—The short coast line of Santa Clara County consists entirely of a shallow mud-flat at the head of San Francisco Bay. At Mayfield, the only coast town, no fishing is done.

SAN MATEO COUNTY.—The fisheries of this county are very inconsiderable. The towns along the ocean—Pescadero, San Gregorio, Purissima, and Half Moon Bay—are all too small to offer any local market, and their means of communication with the interior are so imperfect that they cannot compete with Monterey and Santa Cruz in supplying the San Francisco markets. The towns along the bay shore are small, and the shore itself is unfavorable for fishing. In supplying the San Francisco markets they could not compete with fishermen living in San Francisco, who go down the bay in their boats and return when they have a load.

On the bay side of San Mateo County there is only one town which contains any fishermen. Here a company of seven Chinamen seine in the bay and salt and dry their fish for the Chinese market of San Francisco. Both San Mateo and Redwood City are principally supplied by fish peddlers from San Francisco, who sell along the road from San Francisco to San José. Nearly all of the bay shore of this county consists of a mud-flat, bare at low water; behind this flat lies a salt-marsh. This marsh renders fishing unfavorable to the local fishermen.

At Pescadero there is only one professional fisherman. He fishes with a gill-net at the mouth of Pescadero Creek. An attempt is being made here to stock ponds with native salmon and trout. These ponds are located 3 miles up the creek. They will also be stocked with carp. These are easier to raise and bring a good price, being preferred especially by the Germans. Tourists from San Francisco fish here for salmon in its season. The run of salmon up the creek is said to have been lessened, owing to the seals, 20 or 30 of which are often observed, in spawning season, to take up a position at the mouth of the stream, almost entirely preventing the salmon from running up. Those who escape alive, when caught bear marks of the seal's teeth.

At Purissima there are no professional fishermen, but a great deal of hook-and-line fishing for

salmon is done in Purissima Creek by tourists from San Francisco, and also by inhabitants of Half Moon Bay.

In Gregorio Creek there are no professional fishermen, but some hook-and-line fishing is done at irregular seasons.

At Half Moon Bay are about ten men, who fish when they can find nothing else to do. They use hook and line and fish off the rocks.

The statistics regarding the fisheries of Monterey, Santa Cruz, and San Mateo Counties are given in the following table:

*Statement of the fisheries of Monterey, Santa Cruz, and San Mateo Counties * showing the number of fishermen, the amount of capital invested, and the quantities and values of the products.*

	Monterey County.	Santa Cruz County.	San Mateo County.	Total.
Number of fishermen	106	83	8	197
Capital.				
Vessels and boats:				
Number	44	39	3	86
Value	$2,000	$1,950	$150	$4,100
Value of other apparatus and outfit	$3,000	$1,000	$100	$4,100
Total capital invested	$5,000	$2,950	250	$8,200
Products.				
Fresh fish:				
Pounds	900,000	500,000	25,000	1,425,000
Value	$45,000	$25,000	$1,250	$71,250
Dried fish:				
Pounds	10,000	1,000	.....	11,000
Value	$250	$25	.....	$275
Shark fins:				
Pounds	.....	1,000	.....	1,000
Value	.....	$50	.....	$50
Shark oil:				
Gallons	300	600	.....	900
Value	$93	$186	.....	$279
Whale oil:				
Gallons	12,000	.....	.....	12,000
Value	$5,000	.....	.....	$5,000
Mussels:				
Number	5,000	.....	.....	5,000
Value	$10	.....	.....	$10
Abalone meats:				
Pounds	12,000	.....	.....	12,000
Value	$600	.....	.....	$600
Abalone shells:				
Pounds	60,000	.....	.....	60,000
Value	$1,500	.....	.....	$1,500
Seaweed:				
Pounds	40,000	.....	.....	40,000
Value	$20	.....	.....	$20
Total value of products	$52,473	$25,261	$1,250	$78,984

* The county of Santa Clara has no fisheries, *vide ante.*

219. THE FISHERIES OF SAN FRANCISCO COUNTY.

GENERAL STATEMENT.—Most of the fish, other than salmon and sturgeon, sold in the markets of San Francisco and neighboring cities are obtained by fishermen resident in the city of San Francisco. The salt, canned, or otherwise preserved fish used on the Pacific coast, except that consumed by the local markets or shipped directly from Astoria, pass through the hands of San Francisco firms. For fishing products generally, on the Pacific coast, the market of San Francisco is the only one of importance. Four principal modes of fishing are carried on here. (1) Ordinary fishing by means of seines, gill-nets, and hook and line in San Francisco Bay and along neighboring shores of Marin and San Mateo Counties, outside of the bay. The great majority of the San Francisco fishermen are engaged in this mode of fishing, but the profit is very small, as the bay has been almost depleted of fish. (2) The fishing with trawl-lines outside, chiefly in the neighborhood of the Farallones. This fishery is still profitable, although the fishermen go every year into deeper water, which shows that the more shallow bottoms have been overfished. The fish taken in this manner are chiefly the different species of red rockfish. (3) The "paranzella" fishing, at present the most productive of all, which is discussed below; and (4) the purse-net fishing for shrimp and small fish, pursued by the Chinese colonies.

Before presenting a discussion of each of these four modes of fishing, a short account of the boats engaged is given. Also will be added a general history of the San Francisco fishermen, each nationality having been treated separately elsewhere.

THE BOATS.—There are at present about eighty-five fishing boats in San Francisco; fifty-five are lateen-rigged boats of various sizes, but all are called large, as distinguished from small ones rigged with sprit-sails, and used only for hook-and-line fishing. The large boats pay $6 per month for wharf privileges; the small ones $1 per month, with the understanding that boats pay nothing when not working. There are about five or six large boats engaged in line fishing for rockfish. These prosecute no other fishery. During the summer, and when not too rough in winter also, they go to the Farallones. When they dare not venture so far, they fish along the coast or do nothing. The small boats never venture out so far, but in summer they often run north along the coast as far as Point Reyes, and on the south to Half Moon Bay. During the winter they rarely venture out of San Francisco Bay. Many of the boats suit their fishing to the time of the year. At present there are from twenty-five to thirty-five seines in use on the bay, most of these hauling on the Contra Costa and Alameda sides. The San Francisco fishermen constantly violate the State law concerning the size of mesh in their seines.

THE FISHERMEN.—The fishermen of San Francisco all live near the end of Vallejo street, about the Vallejo street wharf. The most of them are Italians, with some Slavonians, Greeks, Portuguese, and Spaniards. Scarcely any are Americans or of Germanic races. Few of them can read; two-thirds or more are unmarried and live in mean lodgings about the wharf and eat in the different chop-houses and other places of low grade in the neighborhood. This region has been the fishermen's quarter since about 1850; the population changing greatly each year, some shipping as seamen and others taking their places, and others leaving entirely the San Francisco fisheries. The present great depression is driving many away. Every spring a considerable number go to the Columbia River.

There are about 200 men in San Francisco who depend entirely on fishing for support, 300 or 400 others who live chiefly by fishing, and nearly 1,000 more who occasionally fish in the intervals of other jobs. About 200 fishermen own interest in the boats, the rest are hired by the trip, and are at other times waiting for a job. About 1,500 women and children are dependent on fishermen. The fishermen who have families rent rooms in the fishermen's quarter and cook for themselves.

The others board at the "Fisherman's Home," "Dalmazia Chop House," &c., paying 25 cents a meal, or $3 a week. There are many who cannot pay at all, and owe already from $20 to $150 to the coffee-house owners. The latter trust and charge accordingly. We are told that $3,000 is already due to the proprietor of the "Fisherman's Home" from fishermen whose earnings are insufficient to pay. Breakfast at the "Fisherman's Home" consists of an egg, biscuit, and wine or coffee, and is served on a long pine table unpainted.

BAY FISHING.—The fish taken in the bay are chiefly herring, surf-fish, brown rockfish, sturgeon, salmon, smelt, &c. For many years the bay has been systematically overfished with nets of such small mesh that probably the bay does not contain one-twentieth the number of fish that it did twenty years ago. One immediate result of this was that fish became scarcer in the markets of San Francisco, and the price rose accordingly. This rise has been neutralized by the bringing of fish in large quantities from Monterey and Tomales Bays, and by the inauguration of the trawl-line and "paranzella" fishing outside.

The wages now earned by the bay fishermen in San Francisco are pitifully small, very few of them earning more than the $3 per week necessary to pay their board bill. Boats which cost $400 a few years ago can now be bought for $150.

The fishermen lay most of the blame for the destruction of their business on the "paranzella" fishermen who catch and throw away great numbers of small fish, besides enough large ones to keep the markets well supplied. The small fish thrown away by these fishermen are, however, not the young of fishes on their way to enter and stock the bay, as the fishermen usually claim, but, for the most part, deep-water fishes of no economic value, which do not enter the bay.

ROCK-COD FISHING.—Six or eight lateen boats, of about 5 tons each, go out about the Farallones, Point Reyes, and elsewhere, fishing with trawl-lines for rockfish. Each boat has thirty to thirty-five bunches of these lines, of which number from five to thirty bunches are laid out at a time, each hook being baited. These are anchored to buoys.

The bait used is smelt or sardines. To prepare the smelt the head is cut off, the insides are all removed, including the dark peritoneum, the scales are all rubbed off, and the vertebral column taken out. Only the two boneless slices are considered suitable for bait. From 500 to 1,000 pounds of this bait are taken on each trip.

All the various red species are obtained in this way, *rosaceus*, *pinniger*, and *ruber* in the largest numbers. Flounders of different species, cultus cod, and also halibut are sometimes taken.

PARANZELLA FISHING.—Previous to 1876 fishermen working with seines for the San Francisco market made very good wages, occasionally running as high as $25 per night for each seine. In 1876 some of the fishermen secretly ordered a drag-net to be made, and took it out for trial without the other fishermen knowing it. The experiment was entirely successful, and the drag-nets have been used in San Francisco since. Their introduction naturally created quite a stir among the other fishermen, especially among those who had previously supplied the market with tom-cod and flounders. Threats were made to burn both drag-nets and the large boats which were used to pull them, and for several months it was necessary to keep watch over the "paranzellas." There is still a great deal of opposition to the use of these nets, fishermen complaining that by means of them so many young fishes, especially flounders, are destroyed that the fishing around San Francisco is thereby greatly injured. Fishermen tell me that they are in very general use along the shores of the Mediterranean. San Francisco is probably the only place where they have been introduced into this country.*

* "Paranzella diminutiva di Paranza. Paranza sono grosse barche, a vela latina, che a due trascinano in mare, assai lunge dalle coste, immense reti, per far grossa pesca." (Italian Dictionary.) The Spanish name for the same is *Parega*, but, although recognized, it is never used in San Francisco.

COMPANIES.—There are now two companies using these drag-nets. They used to work in opposition, but now form a sort of pool or partnership and divide the profits equally. Each company owns three boats, about five or six nets, and employs twelve or thirteen men, one of whom is constantly engaged selling the fish in the market. The stock is mostly owned by persons not themselves fishermen. It is seldom that the actual fishermen own any part of the stock. As it is, stock is divided in the most irregular manner, one man owning a net, another a boat, &c. Out of the gross profits are paid first the entire expenses, including provisions for the men and the wear of boats and nets. The remainder is divided into shares, one share to each boat, one to each actual fisherman, and a half share to each net actually in use. In the two companies, therefore, as there are six boats, two nets (in use), and twenty-five men, the net profits would be divided into thirty-two shares.

The men are mostly Italian, Greek, and Spanish. Like all other fishermen of these nationalities they are improvident, spending their money as soon as earned. But, although without money, they have plenty to eat, drink, and wear, and seem to have a good time. The captain of the boats is sometimes given one and a quarter shares.

BOATS AND NETS.—The boats are similar to those employed by Italians in other fishing, but larger. They are keeled, decked-over lateen, or, as some insist, "catalonia"-rigged, and from 6 to 9 tons burden. They are intended to be stanch enough to stand the rough winter weather outside the harbor. When new, the boats, with rigging and everything complete, cost from $700 to $1,000 each.

The nets are simply seines with short wings and very long bag. They vary from 15 to 25 fathoms in length, the bag being usually a little longer than the combined length of both wings. The wings have a mesh of about 1¼ inches; the mesh of the upper part and sides of the bag is about three-quarters of an inch, becoming larger towards the bottom. The lower side, which drags in the sand, is made of very coarse twine and has a mesh of from 2 to 4 inches. The bag has, above or on one side, a lengthwise slit of about 2 feet, this slit being knitted up while the net is dragged and afterwards opened for the fish to be scooped out. The lead and cork lines are so adjusted as to keep the net vertical in the water, with the lead line on the bottom. When being dragged the wings are 6 feet high; the bag about 8 feet high. The nets are worth from $250 to $300 each. The present value of each company's stock approximates $3,500.

FISHING GROUNDS.—For this kind of fishing it is necessary to have a smooth sandy bottom, with a convenient anchorage, affording sufficient protection from the prevalent winds. The only suitable grounds within reasonable distance of San Francisco are from Point Reyes 10 miles to the southeast. During the winter, when southerly gales may be expected, the anchoring-grounds are at Point Reyes, which affords sufficient protection from the storms. During the settled summer weather, when prevailing winds are from the northwest, a good anchorage is found near a group of small islands about 8 miles nearer San Francisco.

They fish every day but Saturday throughout the year. One boat of each company remains on the grounds all the time, and is manned by three men, or, in winter, sometimes four. The other two boats, with four men each, alternate in carrying the fish to market.

METHODS OF FISHING.—The boat that has carried the fish to market starts from San Francisco with the low tide the following morning, and reaches the anchorage sometime during the day. Nothing is done till early the next morning when, with the other boat of the same company, it proceeds to the fishing grounds. As soon as the morning breeze springs up, the net is set in the water and allowed to sink to the bottom in from 20 to 40 fathoms of water. Each boat takes a line,—but little sail is made at first,—and pulling obliquely away from each other they stretch the

net. They then go slowly ahead, letting out rope according to the strength of the breeze. When the net is well "set" on the bottom, full sail is made and the net dragged for 3 or 4 miles. The sail is then lowered and each boat pulls in one wing of the net, running the rope over a block temporarily rigged up in the stern of the boat. As soon as the bag is reached it is pulled up alongside of one boat, the slit in the bag is opened and the fish scooped out with a dip-net and ranged along the deck on each side. The marketable fish are then chosen out and sorted and the remainder thrown overboard. On Thursdays the net is dragged twice, to procure an extra supply for the Friday's market; on other days but once.

FISH CAUGHT.—Comparatively few of the fish are alive when taken from the bag, and probably none of those thrown overboard live. More than half the flounders caught are less than 8 inches in length and are thrown away. Most of these, however, are *Hippoglossoides exilis*, a small and nearly worthless species, and are adult fish. I saw very few flounders less than 6 inches long; in fact, there were but few of the very young of any species in the net.

The single catch I saw, I estimated roughly at 3 tons; their catches often far exceed this in weight. Fear of glutting the market is the only limit placed on the amount they take.

A rough estimate of the proportions in which the various kinds were caught would be: *Porichthys porosissimus*, one-third; flounders, one-third; tomcod and *Ophiodon*, one-sixth; small cottoids and chiroids, &c., one-sixth.

The drag-nets destroy and waste immense quantities of fish, doubtless amounting to several hundred tons per year. Comparatively few of these, however, are immature fish, and the greater part is composed of species unmarketable, either through small size or repulsive appearance. Their fishing cannot yet have interfered with the fishing carried on in the immediate vicinity of San Francisco, as their grounds are from 25 to 35 miles from the city. The reason that the other fishermen are so bitterly opposed to the use of these nets is that, by means of them, a few men can bring such quantities of fish to market as greatly to reduce the price, the drag-nets alone capturing more fish than all taken in the bay by other modes. The drag-nets however, do not interfere in the least with the trawl-line fishing for rockfish in deep water. Although considered as a temporary method, these nets do but little harm and have as yet probably not materially decreased the amount of fish in the vicinity of San Francisco, there is no doubt that, if continued long enough, they will do so. It is certainly the most wasteful method of fishing I know. The use of such nets should be discontinued altogether, or the nets required to be of such coarse mesh as to allow the small fish to pass through.

As soon as the "paranzellas" were introduced a large reduction took place in the price of such fish as they caught. Before their introduction tomcod sold, wholesale, for from 25 cents to 40 cents per pound, and they never reached a lower price than 8 cents per pound in the summer. *Parophrys vetulus* sometimes in the winter brought as high as 80 cents per pound, and in summer sold for from 10 cents to 15 cents per pound. Wholesale prices now never range higher in winter than 20 or 25 cents for *Parophrys*, and 8 or 10 cents for tomcod, and in summer, 4 cents per pound for the former and 3, 4, or 5 cents for the latter. Of course part of this is due to the same causes that have lowered the prices of all articles, but the greater part of the reduction was caused by the drag-nets. They have thus far been rather a blessing than otherwise to the people of San Francisco.

The following species were seen in the nets of the "paranzella" fishermen:

Hippoglossoides exilis.
Hippoglossoides jordani.
Parophrys vetulus.
Pleuronectes stellatus.
Psettichthys melanostictus.
Citharichthys sordidus.

Ophiodon elongatus.
Zaniolepis latipinnis.
Odontopyxis trispinosus.
Brachyopsis verrucosus.
Artedius megacephalus.
Artedius quadriseriatus.
Leptocottus armatus.
Hemilepidotus spinosus.
Porichthys porosissimus.
Microgadus proximus.
Lycodopsis paucidens.

CHINESE PURSE-NET FISHING.—The Chinese fishermen in San Francisco County devote their attention to catching shrimp by means of purse-nets. Some small fish (herring, tomcod, sculpins, &c.) are taken with the shrimp and afterwards salted and dried. The amount of all other fish taken excepting shrimp is, however, inconsiderable.

THE SHRIMP FISHERY.—The Chinese settlement at Bay View, in South San Francisco, consists of about twenty-four men, who, with one hundred seines and six junks in use, and five hauled up for repairs on shore, are engaged in catching shrimp, and incidentally some fish.

The seines are bag-shaped, deeper than wide, mostly about 10 by 25 feet, though some of them are larger. The mesh is 1 to 1¼ inches above, diminishing gradually to ¼ inch in the rear part or bag, which, as in all Chinese nets, is closed with a "puckering string." The boats are long, rather narrow and sharp, flat-bottomed, very thick-sided, and heavy, being built by the Chinese themselves out of redwood lumber. They range from 12 to 25 feet in length. The shrimp are, when caught, put into live-buckets made of basketware, with a covering of netting, also home-made. As elsewhere, the opening in the netting is closed by a sphincter or puckering string. These live shrimp are taken to the Vallejo-street market and sold at 5 cents per pound. Those unsold are brought back and put into boiling brine. They are then taken out and put on the ground to dry, being spread out and turned over with a sort of broom, with the broom part at an angle with the handle, like a hoe. The ground is denuded of grass, and made bare and smooth, like a croquet ground, for the purpose of drying the shrimp. When dry they are taken and crushed under large wooden pestles, and then put through a fanning mill, which separates the meat from the shells. The fanning-mill is constructed on precisely the same principle as the kind used for winnowing grain. The edible part goes where the grain should, and the thin shrimp-shells go off as chaff. The fanning-mill is built by the Chinese themselves, and is unpainted. This machine is about 8 feet long and five feet high. The pulverized meats are shipped to China or consumed in Chinatown. They are worth here 5 cents a pound. The shells are used for manure, most of them being shipped to China and sent far inland for use on the tea plantations. The shrimp shells are worth here about 25 cents per hundred weight.

Some fishes are taken in the shrimp-nets, the chief species being the catfish and the tomcod. The following species were noticed, all small individuals, excepting the sharks and rays, of which no use is made:

Leptocottus armatus.
Microgadus proximus.
Parophrys vetulus.
Pleuronectes stellatus.
Psettichthys melanostictus.
Cymatogaster aggregatus.
Stolephorus ringens.
Jelly-fish sp.
Heptranchias indicus.
Osmerus thaleichthys.
Myliobatis californicus.
Mustelus canis.
Uraptera binoculata.
Syngnathus griseolineatus.
Triacis semifasciatus.

These fishes are not taken to market, but are soaked in brine and spread on mats to dry in the sun. When dried they sell at less than 2 cents per pound, the *Leptocottus* being nearly all head. The catch on hand during my visit must have contained fully half a ton of these small fish.

Besides the fish, which are merely incidental, and the shrimp, the amount of which no estimate could be formed, many clams (*Mya* sp.?) and crabs are sent to the city market, and sold in the same way as the shrimp in the Vallejo-street market.

Another similar colony of ten Chinamen exists 2 miles farther south, and various others are farther up the bay, in San Mateo and Santa Clara Counties; still others in Marin and Contra Costa Counties. It is said that no diminution in the number of shrimp results from the continuous fishing, but the fishes are nearly exterminated in the bay.

Some prawn or large shrimp are prepared in Chinatown, and sold at 30 cents a pound, by removing the carapace and arranging them on two sticks of cane, which pass through the flesh, eight or ten on a string, arranged ladder fashion. Others are sold with the carapace and legs removed, simply as meats.

The total catch of shrimp and prawn is estimated at 30,000 pounds.

THE CRAB FISHERY.—The details of this fishery are discussed by Mr. Rathbun in another section of this report. The principal species marketed in San Francisco is the common crab (*Cancer magister*). Both the red crab (*C. productus*) and the rock crab (*C. antennarius*) are good for food, but the common crab, being the most abundant, is more largely taken. The yellow and purple shore crabs, which are of small size, are eaten only by the Chinese. The common crabs are caught along the sandy beaches on the San Francisco side of the bay, especially on the south side of the Golden Gate, between the city and the sea. They are taken in immense numbers in seines, together with many shoal-water species of fish, yet the supply seems to be undiminished. Three or four good-sized crabs sell in the market at retail for 25 cents. The annual sales are estimated at 300,000 by count, weighing on an average about one pound each, and netting the fishermen about $15,000. The large red rock crab of the Farralone Islands is sometimes marketed in San Francisco as a curiosity. These crabs were formerly sold as high as $10 each.

SAN FRANCISCO AS A MARKET.—A description of the markets of San Francisco will be found in another chapter.

A little more than half the total amount of fish brought into the San Francisco market comes from the counties of Monterey, Santa Cruz, Contra Costa, Solano, and Marin.

It is difficult to make an exact estimate, but it is probable that the total amount taken annually by fishermen living in San Francisco County does not vary far from 5,500,000 pounds.

THE SEA-TURTLE AND OTHER FISHERIES.—About 600 sea-turtles are annually brought up to San Francisco from Mexico on steamers, and occasionally on schooners. They average 175 pounds in weight apiece, and sell for about $4 each. One schooner in 1879 brought 190 sea-turtles. Part were peddled out, and the balance were sold to San Francisco dealers at 87½ cents each.

Frogs are collected by two or three Frenchmen in Marin, San Mateo, and Kern Counties, and sell for $1.75 to $4 a dozen.

The terrapins of the San Francisco market come principally from the San Joaquin Valley.

No satisfactory estimate of the abalone business can be made. Many coasting boats from San Francisco take in cargoes of them, and many men in various trades occasionally buy up a load on speculation.

There will be this year (1880) about twenty or thirty boats fishing for salmon in the bay, as soon as the season commences. Very little attention is paid to the law concerning the close season

for salmon. There can be no doubt that the law is constantly violated on the Sacramento and San Joaquin Rivers. The fish are caught and salted in large numbers. Behind the stalls in the San Francisco market salmon have been seen in process of being salted down in barrels. In 1862 and 1863 salmon often brought $1 a pound in the San Francisco market. At that time $5 was a small price for a salmon.

An exchange of food and clothing for sharks' fins is carried on by A. Crawford & Co., ship chandlers, Market street. They send their trading vessels to the Marquesas Islands. Thirty or forty cases are thus obtained in a year, 30 pounds to the case, and are sold at 20 cents a pound to Wung Chung Lung & Co., Sacramento street, near Dupont. Cleaned shark-fins from China are worth $2.25 a pound, and uncleaned from San Diego 30 cents a pound.

GATHERING THE EGGS OF SEA-BIRDS.—The Pacific Farralone Company own the Farralone Islands and owned them before the United States claimed them. The present company was formed in 1855, buying out another that was formed in 1852. The first had a charter for twenty years; in 1875 this was renewed for fifty years. Twenty years ago the supply of eggs (Murre eggs) exceeded the demand, although the demand was then very much larger than it is now, as chickens were at that date scarce, and these eggs had the whole market. From 30,000 to 40,000 dozen were sold annually in the flourishing time, but the demand has now fallen to about 10,000 dozen, and the supply does not exceed the demand.

The Murre never lays more than two eggs unless disturbed, in which case she continues laying one at a time until she has laid five or six. If not looked well after the gulls take them. These eggs have no fishy flavor when fresh, but do not bear keeping so well as hen eggs. They make good omelettes. When the secretary of the company (Goodmur) first went out to the islands in 1852 he gathered 1,000 dozen and sold them at $1 per dozen. In the early days of the company eggs sold at 75 cents per dozen. Now they sell at from 15 to 20 cents per dozen. At the What Cheer House, R. B. Woodward (one of the company) used in early times to use 9,000 dozen in the season. All the miners came to him, and he fed them on eggs in all styles. He had a contract for all the cracked eggs at half price, and when there was an unsold surplus the boys would sit up at night to crack them for him.

A DESCRIPTION OF THE SAN FRANCISCO FISHERIES AS THEY WERE IN 1875.—The history of the fisheries of California has been so short and full of changes that it is a matter of considerable interest to place on permanent record any accounts of their methods which may have been written in past years. The San Francisco Bulletin of January 12, 1875, contained a description of the fisheries of the city as they were at that time, which is here reproduced:

"There are engaged in the fish business of San Francisco at this time about one hundred boats, both large and small, although all of them are not constantly employed. Some of these boats are of about 3 tons burden, and are what is termed lateen-rigged. They are fast sailers and able to encounter quite a heavy sea. These, however, are used principally for deep-sea fishing outside the Heads, which we shall notice more fully further along. About thirty boats are engaged in the herring fishery in the bay. These boats are much smaller than those used outside, and are manned usually by two men. They are propelled through the water by oars, and carry about one-quarter the weight of the larger vessels. The herring season begins about the 1st of November and continues until the last of January. At the beginning of the season the price of herring is very high, ranging from $5 to $6 per box, the boxes holding about 80 pounds of fish. As the season advances the price declines until near the close, when the fish become very cheap. The price now is from $1 to $1.50 per box. The business is a very lucrative one while the season lasts, as the fishermen do not have far to go, and have no trouble in securing a boat-load of fish in a few hours.

"The manner of catching herring is simple. Each boat, manned by two men, though occasionally there are three in a boat, is rowed out into the deeper parts of the bay. The fishermen then cast their nets over into the water. These nets are about 240 feet long and 14 to 16 feet in width. On the upper side there are cork buoys at intervals of about 2 feet the entire length of the net, which serve to keep it floating. On the opposite side of the nets are pieces of lead, which serve to keep the net perpendicular. The herrings move in vast schools and run against the tide. When they meet the nets they experience no difficulty in running their heads through the meshes, but owing to the peculiar shape of the fish and the size of the meshes in the nets they can get no farther. To go back is equally impossible, as when they try this their gills expand. Struggle as he may, the fish is fast. After the tide has run against the nets for a certain length of time, they are hauled slowly into the boats, and in one net are frequently found enough fish to load a single craft. It is then rowed to the dock, and the fish, after being put into the boxes, are carried either to the wholesale fish market on Clay street, from whence they are distributed among the retailers, or are sold to the persons who are engaged in salting, drying, and smoking them.

"Besides the herring fishing in the bay, there are caught vast numbers of smelt, flounders, tomcod, sturgeon, shark, &c., all of which are generally relished for food, except the latter. Even the fins of the shark are eaten by Chinamen, before and after drying, and are by them esteemed a great delicacy—as much of a delicacy as a Chinaman would be to a shark. The sturgeon is unwittingly confounded with sea-bass by restaurant keepers, as many people can testify. The nationalities of those engaged in bay fishing are represented by Austrian, Italian, and Greek, of whom, perhaps, there are over one hundred constantly at work. They are a hardy, vigorous people, who despise fear, and are only perfectly at home when on the water.

"The larger boats spoken of are those engaged in deep-sea fishing, which is a very different thing from bay fishing. These boats do their work outside the Heads in the ocean, and sometimes they run as far down the coast as Santa Cruz. The boats are stanch crafts and can live in almost any sea, although they sometimes meet with a serious disaster, as we shall presently see. They are almost entirely decked over, so that they can come very near rolling over without shipping any water. On these there are from three to five men who fish with long, stout lines. These lines are from 300 to 500 feet in length. To each line is attached innumerable hooks, which are very strong. The hooks are placed about 2 feet apart, and to the end of the line is attached a heavy stone, which will sink it to the bottom. When the fishing ground is reached the boats are brought to, or, if possible, anchored, and the lines, after the hooks have all been baited, are thrown overboard. A large tin can is attached to the lines, and, when sealed tightly, serves as a good float. After a while the float will indicate to the fishermen that something is fast and the line is pulled into the boat; and it rarely happens that there is not from half a dozen to thirty or forty large fish on one line. After the fish have been unhooked the hooks are again baited and thrown overboard. When the day is good and everything is propitious, one boat's crew is kept very busy, as each one has half a dozen or more lines out at once. The fish caught outside are rock cod, California codfish, sometimes halibut, and a few other kinds.

"These outside fishermen, as they are termed, are Greeks, Spaniards, and Italians. They, too, are hardy and venturesome, and will brave old ocean in his wrath when necessary, without the slightest fear. But one fatal calamity has taken place among these fishermen in the past year. The story of the affair is related by G. Copollo, the wharfinger, and is as follows: Last season one of these boats was out on the ocean near Point de Rey, when in the afternoon a sudden squall came on and the waves ran so high that one came aboard and nearly filled the boat with water. So much was she loaded and so near sinking did she come, that the three men who were in her had

all they could do to avoid being swept overboard. The wind blew hard and chilly and the poor fellows were nearly frozen, but they held on to the boat, hoping that succor would come from some source. When it was nearly dark one of the men bade his comrades good bye, and with a groan of despair sank out of sight beneath the waves. The other two held on through that dreary night, but early in the morning another one said to the survivor, 'I cannot hold on; I, too, must go.' In telling it the survivor said, 'I was lying on my breast across the bow and saw him as he sank away far down in the clear, deep waters.' He said also that soon after his last comrade disappeared the sun came up, and as the sea had gone down the warm rays beating on his back infused warmth and life in him so that he was enabled to cling fast. About 1 o'clock the schooner Haskell came along, picked him up, and brought himself and the boat into the harbor. A rather singular part of the story is, that after being at the dock for about one month, the same boat, with the same man and two others, went again outside to the same fishing ground, and about the same place where she was picked up when water-logged. The fishermen saw a schooner bottom-side up with five or six men clinging to the keel. They immediately went to the rescue and found that it was the Haskell, the identical schooner that had saved this boat and one of the men. She had been herself capsized in a squall. Her crew were saved by the very boat that had been saved by her. This tale will probably be recalled to mind by some of our readers.

"There is another kind of fishing that has attained considerable proportions recently that should be noticed, that is the shrimp and sturgeon fishing. A short time ago the shrimp fishing was carried on by white men exclusively. There were about fifteen boats manned by thirty men who made this a specialty. Then shrimps were sold in this city for from 7 to 10 cents per pound, and those who caught them made a good living at the business. Now, however, the entire business is in the hands of the Chinamen, of whom there are as many as fifteen hundred engaged in the trade. Their manner of catching them is simple and effective. The operations of the Chinamen extend all along the bay from Mare Island to Angel Island, wherever there is a flat or level beach. They stick long poles through the water and into the bottom, to which very fine nets are attached. These nets are so fine that they will retain the smallest minnow. They are spread when the tide is at ebb, and arranged with the lead-line on the bottom. When the tide comes in and the water flows against the net it will form in the center a huge bag and prevent anything from passing through. When the water is slack the Chinamen take up the net and empty all its contents into their baskets. In this manner they make a perfect trap, which, although it catches thousands of shrimp, also destroys a vast number of minnows which would otherwise in time grow up to a proper size for food. The shrimps are then taken ashore and laid on the beach, and the shells are beaten and broken off them with sticks and separated from the meat. The meat is dried in the sun and sold to Chinese consumers in this city or sent to the interior of the State or Nevada, or wherever there are any Chinamen. The bulk of the prepared shrimps is shipped to China in sacks. Many shrimps are also sold alive to the oyster houses in this city, who, after boiling them, have them set out as lunch for their customers to nibble at while their oysters are being prepared. The shells of the shrimps are preserved by the Chinamen, and after being put into sacks are also shipped to China, where they are extensively used as a fertilizer. Under the Chinese *régime* in shrimp-catching the price has fallen from 2 to 5 cents per pound. Each Chinaman pays to the owner of his fishing ground a tax or rent of from 50 cents to $1 per month for the privilege of working them. From 700 to 800 tons of shrimps and shells are caught every year in the bay, and the greater part is sent to the Celestial Empire.

"A great many Chinamen also catch sturgeon by means of a trap that is very destructive to this species of fish and many others. They will select a flat over which the water rushes when the

tide is flowing and will so arrange their nets that the lead-line will be 2 or 3 feet from the bottom. As the water rushes in the sturgeon comes with it and when the water is slack the line is loosened and sinks to the bottom. When the water recedes the fish cannot get out, and they are either gilled in the nets or are found gasping on the ground which has been left bare by the receding waters. The Chinaman cuts open the largest sturgeons that have been thus caught just back of the head, and with a hook made for the purpose pulls out the inside nerve of the fish's backbone. It resembles in appearance, when thus taken out, a piece of macaroni, nearly a yard in length. This is dried and is also shipped to China and is regarded by Chinese epicures as a rare tit-bit. In this manner also are destroyed thousands of small fish of all kinds, which will in time have a marked effect on the supply, unless the criminal waste be checked. The Fish Commissioners are intending to procure some legislation on the subject, which will probably be all that is needed.

"A tax is paid by all the bay and ocean fishermen to the State, and a wharfinger is employed by the State to give his exclusive attention to this branch of industry. The docks of the fishermen are at the foot of Clay street. As an article of food, the fish that come to our markets are next in importance to the meats, and the trade in them gives employment directly to thousands of industrious people. The fish should be preserved as much as possible and the business so regulated that a penalty may be promptly inflicted on the Chinaman or white man who shall wantonly destroy edible fish."

THE PREJUDICE AGAINST THE CHINESE FISHERMEN OF SAN FRANCISCO ON THE PART OF THOSE EMPLOYING EUROPEAN METHODS OF FISHING.—The Chinese methods of fishing are undoubtedly extremely destructive, and have occasioned much protest among the other fishermen of the region where they are employed, as well as a general feeling of alarm among observing persons interested in the future of the fisheries. In January, 1876, the Italian Fishermen's Union, of San Francisco, addressed an open letter to State Senator Nunan, on the subject of the destruction of fish by Chinese, in which the following presentments are made:

"The Chinese *modus operandi* is as follows: They set their traps (*mandraghe*) in many portions of the bays and rivers, the poles proving obstructive and dangerous to small-sized boats and schooners, and the nets being so fine and so numerous that fish even of the smallest size are caught. In this way the Chinese are destroying very rapidly these useful members of the finny tribe. These Chinese traps swing with the tide, and the Chinese leave them in position all the year round. The *modus operandi* of the Italians and other members of the Fishermen's Union, who are Spaniards, Greeks, Slavonians, and Maltese, is to throw their drag-nets into the water and leave them there only 5 or 6 minutes. The nets used by the Chinese fishermen are as tightly woven as a mosquito net, and retain all sizes of fish, even the spawn—none escaping. The nets used by the Italians and other fishermen in the union have the apertures fifteen times as large as those used by the Chinese fishermen. The fish caught by the Chinese—those which are too small to be eaten, or not of the quality worth preservation or to be sent to China—are cast upon the beach to perish, sometimes within a couple of yards of the sea. The fish caught by the Italians and others of the Fishermen's Union are all sold in our market. The Chinese are fishing night and day, and they catch all they can, regardless of season, place, size, damage, quality, or quantity. The Italian and others of the Fishermen's Union do quite the contrary. They only catch enough fish to supply our market day by day, and when said amount is obtained they give up their daily work. The Chinese fishermen catch continually the sturgeon in an enormous quantity, for the only purpose of taking away from the fish that nerve, which is like marrow and extends horizontally down the middle of the spine from the head to the tail, and which forms the one-twentieth part of the fish. The rest is thrown on shore to rot, or to be fed to poultry. This way of proceeding on the part of the Chinese

fishermen in regard to sturgeons, as well as their system of traps and tightly-woven nets, is nothing more nor less than wanton destruction. Already the young salmon, sturgeon, and trout are becoming scarce, and unless measures are speedily taken to suppress this wholesale destruction by the Chinese a scarcity of fish may be apprehended. The Chinese fishing companies are continually sending to China an average of $12,000 worth of dried fish and shrimps per month. The Italian and other union fishermen have been fishing on the California coasts, bays, and rivers for over a quarter of a century, never giving cause for a complaint about their trade. They have adopted the same system of fishing practiced in the Mediterranean Sea, which system, above all others, insures the non-destruction of small fish. The Italians and other union fishermen have no ill-feeling against the Chinese fishermen; neither do they fear their competition. All that they desire is a less destructive system of fishing on the part of the Chinese, and a law which will compel all the fishermen to adopt a similar system of fishing."*

STATISTICS OF FISH TRADE OF SAN FRANCISCO.—The following estimate of the amount of fish sold in San Francisco for the years 1879–'80 was made with great care by Mr. Garibaldi, bookkeeper for Pardini & Silvestra, fish dealers:

Varieties.	Amounts in pounds.	Amounts in tons.	Varieties.	Amounts in pounds.	Amounts in tons.
Salmon	3,640,000	1,820	Herring	2,700,000	1,350
Sturgeon	1,658,000	829	Young codfish	16,000	8
Sea-bass	1,440,000	720	Flounders	126,000	63
Codfish	252,000	126	Soles	188,000	94
Rockfish	626,000	313	Catfish	6,000	3
Barracuda	26,000	13	Shad	600	.....
Halibut	122,000	61	Trout	36,000	18
Perch	152,000	76	Skate	38,000	19
Smelt	568,000	284	Prawn	22,000	11
Tomcod	552,000	276	Shrimp	200,000	100

Salt salmon	barrels of 200 pounds	1,300
Salt salmon	half-barrels of 100 pounds	3,200
Smoked salmon	pounds	140,000
Salt herring	half-barrels of 100 pounds	2,100
Smoked herring	boxes	25,000
Smoked halibut	pounds	12,000
Suckers, chubs, and pike		80,000

Statement of the coast fisheries of San Francisco County, showing the number of fishermen, the amount of capital invested, and the quantities and values of the products.

	San Francisco County.		San Francisco County.
Number of fishermen	391	*Products*—Continued.	
Capital.		Shark-fins:	
Vessels and boats:		Pounds	3,000
Number	90	Value	$150
Value	$11,000	Shrimp and prawn:	
Value of other apparatus and outfit	$15,000	Pounds	250,000
Total capital invested	$26,000	Value	$12,500
Products.		Abalone meats:	
Fresh fish:		Pounds	190,000
Pounds	5,500,000	Value	$9,500
Value	$220,000	Abalone shells:	
Dried fish:		Pounds	950,000
Pounds	20,000	Value	$23,750
Value	$400	Total value of products	$266,300

* San Francisco Weekly Bulletin, January 6, 1878.

220. THE FISHERIES OF THE SEA-BORDERING COUNTIES BETWEEN SAN FRANCISCO AND THE NORTHERN BOUNDARY OF THE STATE.

ALAMEDA COUNTY.—This county lies along the east shore of the Bay of San Francisco. The shore is for the most part a mud-flat, bare at low tide, and no profitable fishing is there possible. The markets of the principal towns—Oakland, Alameda, &c.—are supplied from the wholesale markets in San Francisco. There have been Chinese fishing colonies in the neighborhood of Oakland,* but there are none now in the county, and the total catch of fishermen residing in the county will not exceed 2,000 pounds per year.

The salt works in Alameda County are the most extensive on the Pacific coast. They are discussed in another section of this report.

CONTRA COSTA AND SOLANO COUNTIES.—The counties of Contra Costa, on the south, and Solano, on the north, are separated by the Sacramento River. The fisheries of both counties are considerable, comprising most of the salmon fishing of the Sacramento, both for the canneries and for the city markets. Most of the sturgeon sent to the San Francisco market also come from this region. As most of the fishing of the lower Sacramento is done by fishermen who move from place to place and have no permanent residence in either county, it will be convenient to consider these two counties together.

Both fishing towns and fisheries of these two counties will be discussed under the head of the "Salmon fishery of the Sacramento River."

SONOMA COUNTY.—The coast of Sonoma County has no bays especially suitable for fishing, and there are, so far as we know, no persons who make their entire living by this means. At Fort Ross and at Duncan's Mills are several men who fish during the summer, and who occasionally send boxes of fresh fish by rail to the San Francisco market. In the fall, salmon run in Russian River and are taken in some numbers. The total annual catch of Sonoma County cannot exceed 10,000 pounds. In the interior of the county are many carp ponds, some of which have proven very profitable.

MARIN COUNTY.—The proximity of Marin County to San Francisco affords a steady market for its fisheries, which are, therefore, of considerable importance. Nearly all the fish taken are shipped directly to San Francisco. They are placed in long wooden boxes, head up. These boxes are a foot deep, and are capable of holding from 100 to 150 pounds of fish; the average capacity is 125 pounds. Over the fish are placed large wet cloths or sacks; the object of these is to keep the fish moist. The fish are shipped to dealers in the Clay-street market. They are sold on commission, either retail or to the smaller dealers in Oakland, San José, Alameda, or other markets. Most of the fish are taken in Tomales Bay, a long and narrow inlet extending lengthwise through the county. The fish taken in this bay are chiefly the different embiotocoids and the flounders and smelt, with some black rockfish.

In this county there are seven active fishing towns, San Rafael, San Pedro, Angel Island, Bolinas, Point Reyes, Marshall's, and Hamlet.

The fisheries of San Rafael, the largest town in the county, are of but little importance, the

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* HOW THE CHINAMEN FISH.—Nearly any day Chinese fishermen may be seen catching young smelt and herring in the old ferry slips at Alameda wharf. They have very fine square nets, through which the smallest minnows cannot escape, and at each corner of the net ropes are fastened and passed through pulleys on the wharf. The nets are dropped about every twenty minutes. When hauled up, the boat is pushed out under the trap in the center of the net, which is opened and the fish dumped into the boat. Thousands of young fish are caught daily, taken away, dried, and are then ready for Celestial consumers.—*Alameda Encinal, January*, 1870.

town being placed at the head of a very shallow, muddy bay, most of which is bare at low tide. The market of this place is supplied almost entirely by San Francisco.

At the town of San Quentin there are no fisheries, the market of that place, as also in part that of San Rafael, being supplied by three Italians, who fish on the Estrero, a mile or two southwest of San Quentin, with gill-nets and seines.

Along the coast, near Point San Pedro, are two colonies of fishermen, numbering in all about one hundred, who fish chiefly for shrimp. These shrimp are sent to San Francisco. A colony formerly located north of San Quentin, toward San Rafael, is now abandoned.

The following paragraph is taken from the San Francisco Weekly Bulletin, November 7, 1873:

"The business of fishing at Point San Pedro, Marin County, is entirely in the hands of Chinamen. About two hundred and twenty-five men are employed. The Marin Journal gives information, from which the following is taken: 'The land occupied by the fishermen is owned by McNear & Brother, and leased to Richard Bullis for $1,000 a year, and by him leased to the Chinamen for $3,000. From 10 to 15 acres are occupied, the shore line serving for houses, boat-building, shipping, &c., and the side hill for drying the fish and preparing them for market. Shrimps constitute the principal catch, and of these from 20 to 30 tons per week are taken. The shrimps are dried on the hillsides, threshed *à la Chinois*, to get off the hull, winnowed through a hand-mill, and sent to market. The fish sell for 8 to 14 cents per pound in the San Francisco market at wholesale, and the hulls are shipped to China and sold for manure, where they bring $20 per ton, affording a profit over all expenses of $5. It is said to be an excellent fertilizer. Other kinds of fish are taken in great quantities, as flounders, perch, &c., and some of which are used only for dressing soil. The stakes to which the fishers attach their nets extend out into the bay a mile or more. There are thirty-two houses on the beach, and more all the time building. Two boats are now on the ways, one 40 feet long and the other 30. Nine hundred cords of wood have been used this season, which they buy in Redwood City and ship themselves to their fishing grounds. Captain Bullis makes a weekly trip to San Francisco with a cargo, the law requiring a white captain on a 40-foot craft. Point San Pedro is reached from San Rafael by a hard, smooth road, which affords an exceedingly agreeable drive of a half hour's duration, presenting several charming views of the bay and many interesting landscapes. The road skirts along San Francisco Bay for some distance, then, turning northward, leads to the shore of San Pablo Bay.'"

If the writer was anywhere near the truth in his estimate of the number of Chinese fishermen engaged at Point San Pedro, which may fairly be doubted, the extent of this fishery has undeniably decreased during the past seven years.

At Angel Island is a colony of about a dozen fishermen, who are engaged in shrimp-fishing. About Angel Island, Richardson's Island, and Saucelito the Italian fishermen from San Francisco haul their nets, but none of them, it is believed, make their home on the north shore of the bay.

The fisheries spoken of as being prosecuted at Point Reyes are, more strictly speaking, carried on all the way from Point Reyes to the Golden Gate and the Farralones, the fishermen rarely going ashore at Point Reyes. Between these points fishermen from San Francisco fish with sweep-nets and set-lines. Near the head of Drake's Bay also fishing is carried on by four men with seines and gill-nets. These catch about 50,000 pounds a year. Their catch is chiefly smelt.

At Marshall's are ten fishermen, and a mile farther south are ten more. These men, fishing principally at night, send their fish to the city on the morning train. The water here is very clear. They own altogether twelve boats, lateen-rigged, and averaging three-fourths of a ton register. The fisheries have been extensive on this (Tomales) bay since 1874. For six years previous to that date the fish were sent from Tomales Bay to San Francisco by way of Petaluma. Overfishing has

of late caused a great decrease in the abundance of the fish. In summer from 1,000 to 2,000 pounds of fish were daily shipped to Marshall's, the yearly average being 150,000 pounds.

The fisheries of Hamlet are carried on by three companies, chiefly Italians. There are altogether twelve men and six boats. The fish, of which 48 boxes a day have been shipped, are sent from Hamlet to San Francisco. A box holds about 120 pounds. When fish are plenty more are packed in a box.

Statement of monthly shipments of fish from Hamlet to San Francisco from April 1, 1879, *to April* 1, 1880.

Month.	Pounds.	Month.	Pounds.
April	8,640	November	12,000
May	7,200	December	9,600
June	5,760	January	8,640
July	9,600	February	5,160
August	17,400	March	7,200
September	21,600	Total	129,600
October	16,800		

About 90 sacks, or 7,200 pounds, of clams are shipped yearly to San Francisco from Hamlet. They are also peddled at Tomales at the rate of 50 cents a bucket.

It is to be noted, in connection with the following statement of yearly estimates for 1879, that the fish taken by boats from San Francisco are not included. It is certain that at least one-half of the fish taken by such boats are caught in the waters of Marin County.

Yearly estimate by towns for 1879.

Towns.	Pounds.	Towns.	Pounds.
San Rafael	10,000	Olema	500
San Quentin	75,000	Marshall's	150,000
Angel Island	30,000	Hamlet	129,600
Saucelito	10,000	Tomales	500
Bolinas	15,000	Total	470,600
Point Reyes	50,000		

In addition to this amount there is a large home consumption and waste of fish.

Whales occasionally come ashore at Point Reyes. Sea-lions are also abundant there, and occasionally parties from San Francisco kill them for their oil.

MENDOCINO COUNTY.—The coast of Mendocino County is rocky, without indentations or large streams. There are no fisheries of any importance anywhere within its borders, and probably no regular fishermen. The total annual catch cannot exceed 3,000 pounds.

At one time a man living at the light-house at Cape Mendocino owned a whale-boat, and in smooth weather went fishing for halibut on a reef that runs out from the cape. He sent them to Eureka to be retailed, and also shipped a few to San Francisco.

The opinion seems to obtain that there are plenty of halibut in that vicinity, but it is nearly always rough around the cape, and there is no good way of disposing of the fish when caught. It is not probable that any considerable fishing will ever be done for halibut in the vicinity of Humboldt Bay. Cape Mendocino is noted as a rough point. No fishing boat owned in Eureka could be sure of getting in and out of Humboldt Bay, because of the bar. The distance from San Francisco, about 230 miles, would render it unprofitable, in the present state of the market, for a schooner from that city to make trips to Cape Mendocino, load with fish, and return.

HUMBOLDT COUNTY.—The fisheries of Humboldt County are chiefly carried on in Humboldt Bay, about Eureka, and in Eel River. Three kinds of fish are principally taken, flounders, salmon, and sharks. Each of these industries may be taken up separately; that of the salmon, having place elsewhere, will not be described here.

Humboldt Bay is a land-locked harbor, with a narrow entrance, obstructed by a dangerous bar. Its foundation somewhat resembles that of San Diego Bay, being shut off from the open ocean by narrow sand-spits. At the beginning of the rainy season the small streams that empty into the bay pour out such quantities of fresh water as to render the entire bay brackish. Some fishermen think that this kills the fish, but there is no tangible evidence of its doing so.

The bay is evidently gradually filling up with deposits. It has now a series of mud-flats, some entirely bare, others partly so, at low water, with deep channels between them. The bottom is composed of sediment, there being no rocks excepting some ballast heaps, and on these rocks the fish are caught. The mud-flats and channels serve as spawning grounds for great numbers of flounders. This bay can be easily and rapidly exhausted of its fish, and had it a more ready market it soon would be. The history of the flounder fishing, dependent entirely on hook and line, sufficiently shows this. As it is, although the bay produces at certain seasons of the year great quantities of fish, it is lacking in variety. It is claimed that the fish are of poor quality (except the salmon), owing to the nature of the bottom.

Fishing in Humboldt Bay is good during only the fall and a portion of the winter, and in consequence there are but few resident professional fishermen. Two Americans working with a seine to supply the local market of Eureka, and during the flush season shipping to the San Francisco market, come under this head. About six or eight others living in the vicinity of Eureka fish during the salmon season and do little or nothing the remainder of the year. Probably an equal number have families and are semi-professionals, fishing during two months of the year. Quite a number of the inhabitants of Eureka fished at one time, and hold themselves in readiness to do so again should other business fail. There are but three Italian fishermen on the bay, the majority being Americans (including a few English, Irish, and Scotch). Often some of the Columbia River fishermen come here during the salmon season. Since 1857 and before, there has been a colony of Chinese fishing in the bay with nets. Last year their net was destroyed. Fishermen claim that they fished all the "sole" (*Parophrys vetulus*) out of the bay. Most of their fish were dried in the usual way and sent to San Francisco.

Flounder-fishing begins about October. Humboldt Bay used to be the spawning grounds for immense numbers of the large flounder (*Pleuronectes stellatus*). The fish were so abundant as to completely line the bottoms of the deep channels between the mud-flats, and would bite at a hook with extreme voracity.

In 1874 the first experiment was made by a young American, who caught and shipped to San Francisco from Eureka a few flounders. The "paranzella" had not then appeared. These few flounders brought a high price, retailing from 30 cents to 35 cents a pound. Finding it highly remunerative he increased his operations, keeping the fish in live-boxes until the day on which the steamer sailed for San Francisco. As many as 2 and 3 tons were sent at a time. Before long not less than one hundred people were at this work, fishing day and night, their business causing quite an excitement in Eureka. Flounders soon became a drug on the market and their retail price diminished so much as to leave for the fishermen a profit of only 2 cents a pound, instead of 12 and even more, the profit per pound before so many entered into the fishery. Another cause of small profits to the many engaged in the work was that the steamer was often unable to cross

the bar for several days, in which case the fish were liable to spoil. When this happened they were thrown overboard, proving a dead loss to the fishermen. At the present time there are not more than fifteen or twenty men engaged in fishing for flounders during the best of the season. In the winter they bring from 5 to 10 cents a pound.

Some flounders are caught weighing 10 pounds. It is possible that, owing to the small number now caught, this species will hold its own, but it can never be so abundant as it once was.

Small numbers of other varieties of flounders, such as *Parophrys* and *Citharichthys* are also caught, but *Pleuronectes stellatus* is the common flounder of Humboldt Bay.

The shovel-nosed shark (*Notorhynchus maculatus*), caught for its oil, was in the early days of Eureka, from 1858 to 1868, extensively caught in Humboldt Bay. This fish entered the bay at "bulling" season, about the middle of April, and remained until the end of August. At one time fifty or sixty men were engaged in the capture of the fish and the trying out of the oil from its liver. This oil, in the absence of coal (not then discovered), was used largely for illuminating purposes. Much was shipped to San Francisco, where it was used for oiling machinery and adulterating other oils. In one season a man made 700 gallons of oil, which he sold for the average price of $1.25 a gallon. These sharks are from 6 to 8 feet long and yield from 3 to 8 gallons of oil apiece. The females yield more oil than the males, and females with eggs yield more than at any other season.

The sharks can only be caught at highest tides, when they are taken with hook and line in the deep channels between the mud-flats, or they may be harpooned in shallow water. The best bait for sharks of this kind is salted seal. Seal meat is full of oil, which spreads out over the water's surface and attracts the shark's attention. They have been seen to follow a narrow streak of oil till they reached the line, when they instantly went down for the bait. It is thought that their sense of smell guides them.

There is now only one man engaged in this business on Humboldt Bay. He has made only 20 gallons this (1880) season. The oil is now worth only 75 cents a gallon and is used by lumber-mill owners around Eureka for lubricating-oil. No other sharks are caught here for oil. The species *Squalus acanthias* is absolutely unknown at Eureka, and *Rhinotriacis* and *Triacis*, besides being too small, furnish a very poor quality of oil.

DEL NORTE COUNTY.—In Del Norte County, California, there is no sea-fishery of any importance. There is a fall salmon fishery in Smith River, which is discussed in the chapter on the west coast salmon fishery. About 500 barrels of salmon are salted. The total annual catch of fish outside of the salmon fisheries does not exceed 3,000 pounds.

STATISTICAL RECAPITULATION.—The fisheries of the foregoing counties are fully detailed in the following table:

Statement of the fisheries of the sea-bordering counties between San Francisco and the northern boundary of the State, showing the number of fishermen, the amount of capital invested, and the quantities and values of the products.

	Alameda County.	Marin County.	Sonoma County.	Mendocino County.	Humboldt County.	Del Norte County.	Total.
Number of fishermen	2	150	3	1	10	2	168
Capital.							
Vessels and boats:							
Number		42			20	2	64
Values		$4,200			$1,000	$100	$5,300
Value of other apparatus and outfit	$20	$1,650	$50		$500	$20	$2,240
Total capital invested	$20	$5,850	$50		$1,500	$120	$7,540
Products.							
Fresh fish:							
Pounds	2,000	500,000	10,000	3,000	100,000	3,000	618,000
Value	$100	$20,000	$300	$75	$3,000	$90	$23,565
Dried fish:							
Pounds		80,000					80,000
Value		$1,600					$1,600
Shark oil:							
Gallons					20		20
Value					$6		$6
Shrimp and prawn:							
Pounds		1,000,000					1,000,000
Value		$50,000					$50,000
Clams:							
Number		40,000					40,000
Value		$400					$400
Total value of products	$100	$72,000	$300	$75	$3,006	$90	$75,571

C.—OREGON AND ITS FISHERY INTERESTS.

221. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	2,795
Shoremen	4,040
Total	6,835

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	1,360	$246,600
Other apparatus, including outfit		245,750
Cash capital and shore property		639,000
Total		1,131,350

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Salmon ..... Pounds fresh..	39, 500, 000	*a* $2, 766, 724
Seal oil ..... Gallons..	18, 000	4, 300
Other products	610, 000	10, 000
Total	.....	2, 781, 024

a Including enhancement in the value of salmon in process of canning, $1,911,422.

222. THE FISHERIES OF THE OREGON COAST.

GENERAL STATEMENT.—The fisheries of the coast counties of Oregon have as yet very little importance. The coast line is little indented by bays and is therefore in itself unfavorable for fishing. There is, moreover, no available market for any fish taken, except salted or canned salmon. The various tribes of Indians along the coast derive much of their support from fishing, but no statistics are obtainable. A single salmon cannery is now in operation in this region, at Rogue's River, and salmon are salted on some of the other streams. With these exceptions there is no systematic fishing anywhere on the coast of Oregon south of the Columbia River, the salmon fisheries of which are very important. These will be described in detail in the chapter on the "Salmon fishing and canning interests of the Pacific coast." The entire salmon catch of the coast, including that of Rogue's River, excluding the fish taken by the Indians, will not vary very far from 1,000,000 pounds. In the report of the river fisheries of the State will be found some items upon the bays and fisheries at mouths of rivers.

D.—WASHINGTON TERRITORY AND ITS FISHERY INTERESTS.

223. STATISTICAL RECAPITULATION OF THE COMMERCIAL FISHERIES.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	729
Shoremen	15
Total	744

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels	7	$11, 100
Boats	334	6, 610
Other apparatus, including outfits	.....	8, 648
Cash capital and shore property	.....	4, 000
Total	.....	30, 358

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Salmon ..... Pounds fresh..	350, 000	*a* $16, 820
Other fish ..... Pounds fresh..	5, 357, 000	93, 140
Seal skins ..... Number..	6, 268	56, 412
Seal and fish oil ..... Gallons..	24, 200	5, 000
Oysters	.....	10, 000
Total	.....	181, 372

a Including enhancement of value in process of canning, $13,440.

224. THE COAST FISHERIES OF WASHINGTON TERRITORY.

THE PRINCIPAL FISHERIES ENUMERATED.—The whole Puget Sound region is very abundantly supplied with fish, but for want of a market the fisheries are little developed and have as yet little commercial importance. The only species of special value are the halibut (*Hippoglossus vulgaris*), which abounds everywhere in the deeper waters and main channels, but chiefly about Cape Flattery; the five species of salmon (*Oncorhynchus chouicha*, *nerka*, *kisutch*, *gorbuscha*, and *keta*), which run up all the streams, large and small, in summer and fall, and which are taken in the salt water at all seasons; the dogfish (*Squalus acanthias*), which is largely sought for the oil obtained from the liver; the herring (*Clupea mirabilis*), and the eulachon (*Thaleichthys pacificus*), which is considered when fresh as the best pan-fish of the region. Besides these, are many species of *Chiroids*, *Pleuronectoids*, *Salmonoids*, *Scorpænoids*, &c., used as food, but no one species of any great value.

The fishermen are chiefly Indians, who fish for their own consumption and live in small colonies or "rancherias" scattered about the entire sound. Nearly all the sound Indians live by fishing. No record of their number can be obtained by us and no material for any sort of accurate estimate can well be had. A few Indians in the vicinity of the towns fish for the market and peddle their fish at low prices about the streets. Some also fish for the salmon canneries. There are also a few Chinese colonies, wholly similar to those south of San Francisco, where they salt and dry a considerable amount of fish. Around the larger towns (Victoria, Seattle, Port Townsend, Tacoma) are a few Italian or Dalmatian fishermen, and at Tacoma some Americans.

OLYMPIA.—No fishing is done at Olympia, the harbor being nearly bare at low water and lined with oysters. The shipment of these oysters to San Francisco is the only fishing industry of the town. The first shipment of these oysters was made two or three years ago, after the decline in quality and quantity of the Shoalwater Bay product. This matter is elsewhere discussed.

STEILACOOM.—No regular fishing is done here. Various Indian rancherias are scattered along, where the "Siwashes" fish for their own use. Fishermen from other places often come to Steilacoom during the salmon season.

NEW TACOMA.—This place is connected by rail with Portland, and the chief supply of the Portland market of all fishes except salmon and halibut comes from New Tacoma. At New Tacoma two young fishermen from Maine have established a fishing station and are making good wages. About 200 tons of fish have been taken by them and their employés during the past year. Most of these have been shipped to Portland, where they sell at 5½ cents per pound, the salmon, during the close season in the Columbia, somewhat higher.

In summer and fall a considerable number of salmon are taken and salted and sold in San Francisco and elsewhere at 6 to 8 cents a pound. After August 1, when salmon are no longer allowed to be taken in the Columbia, the sale of salmon, flounders, &c., from Puget Sound in Port-

land is quite profitable. The salmon do not enter the rivers in numbers at this part of Puget Sound until ready to spawn in September, when they move about the bay in schools and are readily netted while "searching for the river." Many of the salmon of the different species are then "dog-salmon," and as such not so readily sold. At first their flesh is red and not bad, and can be salted as well as that of the ordinary salmon; later it becomes poor and worthless, the fish often half rotten in life, and no use can be made of it. A cargo of salted dog-salmon was once sent to Honolulu with a disastrous effect on the reputation at the Sandwich Islands of the Puget Sound salmon.

In the fall a fyke-net is planted by Savels & Staples in Puyallup River. Most of their fishing is done with seines. Gill-nets, traps, &c., are not successful in these waters because of their clearness. Traps built of brush in a way similar to the pound-nets in the East have been built and still stand in Commencement Bay, but the salmon do not run into them and they have been abandoned.

The species mostly taken are *Oncorhynchus chouicha*, *Pleuronectes stellatus*, *Lepidopsetta bilineata*, *Parophrys vetulus*, and *Salvelinus malma*, which abounds in salt water and reaches a weight of 12 or 14 pounds; the largest seen by me weighed 11 pounds. *Salmo purpuratus*, also abundant in salt water, *Hypomesus pretiosus*, &c., as well as various sculpins, "eels," &c., which have no market value.

At Gig Harbor, 8 miles from Tacoma, are three Austrian fishermen, who have been there two years. Most of the fish obtained by them are salted, but some are shipped fresh to Portland.

The salmon and the orange rockfish (*Sebastichthys pinniger*) are the species mostly sought, the latter taken with hooks in deep water. Both salmon and rockfish are barreled and shipped to Portland, San Francisco, or elsewhere. Herring are also caught and smoked, but there is little profit in it. In the summer dog-fishing is followed to some extent, the oil being "tried out" of the livers in kettles. About 100 tons of fish are taken per year, exclusive of dogfish.

Opposite Gig Harbor is a Portuguese fisherman, with one or more assistants, who fishes chiefly for dogfish.

In various places about Gig Harbor, Quartermaster's Harbor, and Point Defiance are Indian dog-fishing camps. The oil is chiefly rendered in kettles.

Near Quartermaster's Harbor is a colony termed Kanakatown, where four or five Chinamen, a negro, and several Sandwich Islanders fish and dry or salt the product, occasionally selling in Tacoma or sending to San Francisco.

SEATTLE.—The local market at Seattle is of some importance. A company of three Italians fish with seines along the shore, obtaining young salmon, flounders, &c., which are sold in a stall in the town. A company of two or three Greeks fish in the same way, but are absent at the Columbia during the salmon season. Several Austrians fish with hook and line in the deeper waters of the bay, obtaining halibut, black bass (*Sebastichthys melanops*), horse-mackerel (*Anoplopoma*), merluch' (*Merlucius*), pollack (*Pollachius*), tomcod, &c. Many Indians in the neighborhood bring in, almost daily, boat-loads of salmon-trout (*Salvelinus*), young salmon, and the various flounders, &c.

Much fishing is done by men and boys from the wharves, *Anoplopoma* and small flounders, especially *Hippoglossoides elassodon*, being the principal species taken.

There are no fishing boats at Seattle, except small skiffs. The amount of fish taken yearly must be about 300,000 pounds.

PORT BLAKELEY.—The salmon cannery of Jackson & Myers, formerly at Muchilteo, is now

located at Port Blakeley, on the west side of Admiralty Inlet, opposite Seattle. Its business is described under the head "Salmon fisheries of Washington Territory."

PORT MADISON.—A colony of about fifteen Chinamen are engaged in drying fish near Port Madison. Besides fishing themselves, they purchase large quantities from the Indians. They prepare the fish in the ordinary way, soaking them for two or three days in weak brine; then drying them on racks in the open air. They put up perch (*Damalichthys*) and different species of flounders, mostly *Parophrys vetulus*, *Lepidopsetta bilineata*, and *Pleuronichthys cœnosus*. Flounders are valued most highly by the Chinese. The different species of *Embiotocidæ* are dried principally for the use of the Chinese working in the mines. Chinese do not like salmon.

Both Chinese and Indians at Port Madison fish with coarse-meshed nets, and *throw back fish under six inches in length.*

A herring fishery, owned by Mr. J. P. Hammond, is in operation during the winter season from about November 1 to March 1. During the last season they worked but one fine-meshed seine, 450 feet long, ¾-inch mesh. Thirteen white men of various nationalities were employed, at wages of $25 to $30 per month. The herring are most abundant in February and March, when they come into the bay to spawn. They are in best condition from November to January, becoming poor and comparatively worthless as soon as they begin to spawn. The herring run into the bay in large numbers for shelter from heavy storms. The fishery has been at Port Madison since 1870. The business is constantly increasing, but there are as many or more fish than at first.

During the herring season they catch from 1 to 1,000 barrels at a haul. The herring are either smoked and dried or used for oil. The smoked fish are put up in boxes of about five dozen each, and mostly sent to San Francisco, where they are sold for 30 to 35 cents per box.

To make oil, the fish are steamed in wooden boxes and afterwards pressed. One barrel of fish produces about 1½ gallons of oil, which is worth from 35 to 45 cents per gallon. The oil is used for rough purposes—for greasing skins in tanneries, and at log camps.

During the last season (1879–'80) there were put up 2,500 boxes of smoked herring and 5,700 gallons of oil; in 1877 and 1878, 5,000 boxes and 17,000 gallons.

UTSALADDY, SAN JUAN, AND OTHER SETTLEMENTS.—At various places in the northeast part of the sound the Indians fish for salmon and dogfish, and occasionally Italians and Chinamen engage in the same business.

MUCKILTEO.—The cannery of Jackson & Myers, formerly at this point, has been removed to near Seattle. The salmon were formerly abundant here, but have now grown scarce. It has been thought that the offal from the cannery drives them away. The salmon were netted in schools in salt water by the Indians.

The species canned are the female "haddo" (*O. gorbuscha*) and the silver salmon (*O. kisutch*). The first run is in July, when the haddos appear, at first males and females similar, but afterwards the males grow dark, red, humpbacked, and hook-billed, and are rejected. They weigh but 5 or 6 pounds, and are very slimy after being taken out of water.

The silver salmon here rarely weighs over 22 pounds, the average not more than 6 or 8. In alternate years the run of haddos is very small or nothing. At other times it is extremely large.

PORT GAMBLE AND PORT LUDLOW.—At these points the only fishing done is that of Chinamen and boys from the wharves, and of the neighboring Siwash Indians. In this region considerable dog-fishing is done by the Indians, the oil being mostly rendered by putting the livers into wooden troughs and throwing in hot stones, finally pouring off the oil from the scraps.

PORT TOWNSEND.—Three Italians fish at Port Townsend for halibut and dogfish. They have

a boat (Italian) of about 1 ton burden. The fish taken are either shipped directly to San Francisco or else salted. Some of them are sold in the town, and occasionally some shipped to Portland.

NEW DUNGENESS.—Some scattering fishing for salmon, dog-fish, &c., is done at this point, and a good deal of fishing is done by Indians on the way toward Cape Flattery.

NEAH BAY.—At this point there is a considerable reservation of Indians who do nothing but fishing and sealing. The fur-seal fisheries of Cape Flattery are of considerable importance, and are elsewhere discussed by Judge Swan.

Halibut fishing is here an important industry, several hundred pounds being brought in every day. Most of the halibut are taken just outside of the Straits of Fuca on a halibut bank, some 12 miles west-northwest of Neah Bay. The halibut are taken with large hooks made of an iron or bone spike, firmly bound to wood. They are taken for the whole length of the Straits of Fuca, but most abundantly near the sea, and in the main channels as far as Seattle and San Juan at least.

Many rockfish (*S. nigrocinctus, melanops, nebulosus, ruber*) are taken, also immense cultus-cod (*Ophiodon*), and occasionally a true cod (*Gadus morrhua*).

Near Neah Bay was formerly a cannery, which has now suspended. It canned the halibut and the hoopid salmon (*Oncorhynchus kisutch*), as well as young or suitable salmon of other species. The hooped salmon is fat and excellent. The canned halibut cannot compete with canned salmon, the boiled flesh being white and flavorless, and therefore unattractive, while the expense of manufacture is not much less than that of canned salmon.

QUINNAULT.—In the Quinnault River a small salmon runs, said to be very fat and of superior quality. This is probably *O. nerka*.

GRAY'S HARBOR.—No regular fishing. A salmon cannery was formerly located here, but it is no longer in operation.

SHOALWATER BAY.—No fishermen are located here, and no fishing is done. The oyster interest has been elsewhere discussed. It is said that the bay is growing up to sea wrack, to the injury of the oysters.

VICTORIA.—Some ten fishermen, chiefly Italian, are engaged in fishing at Victoria. They fish with hook and line, taking halibut, rock-cod (*S. ruber, S. maliger*), dogfish, and ground-shark (*Somniosus*).

The halibut is mostly bought by an American and shipped fresh on the steamers Idaho and Dakota to the San Francisco market. The chief supply of halibut at San Francisco comes from Victoria. Formerly a schooner belonging at Astoria was engaged in transporting halibut from Cape Flattery and the west coast of Vancouver's Island to San Francisco, but the attempt was abandoned after one season. Combinations among the Italian fish dealers in San Francisco are discouraging to shippers, as often the price of large consignments will be brought down to figures unreasonably low on perishable fish.

Other fishermen use the seine and bring in tomcod (*Microgadus*) and various flounders, especially *Parophrys vetulus* and *Pleuronectes stellatus*. Many herring are also taken.

A large part of the supply of the Victoria market comes from Fraser's River. In their season (May) the eulachon (*Thaleichthys pacificus*) is the best pan-fish in this region. They run up the lower Fraser in enormous numbers, and every fish feeds on them. Even the sturgeons gorge themselves upon them.

The "sucheye" salmon (*Oncorhynchus nerka*) is shipped to Victoria in large numbers, and a less quantity of the sawkwey (*O. chouicha*) and sturgeon (*A. transmontanus*) also find a ready sale at low prices. The green sturgeon (*A. medirostris*) is never eaten.

E.—ALASKA AND ITS FISHERY INTERESTS.

BY DR. TARLETON H. BEAN.

225. STATISTICAL RECAPITULATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	6,000
Shoremen	130
Total	6,130

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	3,000	$60,000
Other apparatus, including outfits		7,000
Cash capital and shore property		380,000
Total capital		447,000

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Salmon (fresh) ... pounds	2,654,000	a $39,640
Other fish (fresh) ... do	105,000,000	525,000
Sea-otter skins ... number	6,000	600,000
Seal skins ... do	147,450	1,474,500
Seal flesh ... pounds	1,000,000	10,000
Seal and fish oil ... gallons	120,000	12,000
Whale oil ... do	5,000	500
Total		2,661,640

a Including enhancement in the value of salmon in process of canning, $26,640.

226. THE FISHERIES OF ALASKA.

The shore fisheries of Alaska are fully discussed in Section III of this report. The cod fishery carried on at the Shumagin Islands, the fur-seal industry of the Pribylov Islands, and also the whale and walrus fisheries, are discussed in Section V.

PART XVII.

THE FISHERIES OF THE GREAT LAKES.

By FREDERICK W. TRUE.

ELABORATED FROM NOTES GATHERED BY MR. LUDWIG KUMLIEN.

ANALYSIS.

A.—STATISTICAL RECAPITULATION:
- 227. Table of the Great Lake fisheries.

B.—LAKE SUPERIOR AND ITS FISHERIES:
- 228. Statistical summation.
- 229. The fisheries of the northwestern shore, including Duluth.
- 230. The fisheries of the southern shore.

C.—LAKE MICHIGAN AND ITS FISHERIES:
- 231. Statistical summation.
- 232. The fisheries of the western shore.
- 233. The fisheries of the eastern shore.

D.—LAKE HURON AND ITS FISHERIES:
- 234. Statistical summation.
- 235. The fisheries of the American shore.

E.—LAKE ERIE AND ITS FISHERIES:
- 236. Statistical summation.
- 237. The fisheries of the western end, including Detroit and Toledo.
- 238. The fisheries of the southern shore.

F.—LAKE ONTARIO AND ITS FISHERIES.
- 239. Statistical summation.
- 240. The fisheries of the American shore.

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PART XVII.

THE FISHERIES OF THE GREAT LAKES.

A.—STATISTICAL RECAPITULATION.

227. TABLE OF THE GREAT LAKE FISHERIES.

The fisheries of the Great Lakes, which will be considered in the following pages, are summed up in the following statements, showing in detail the number of persons employed, the amount of capital invested, and the quantities and values of the products:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	5,050

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels and boats	1,656	$266,600
Pounds	1,500	497,400
Gill-nets	44,544	214,200
Seines	148	20,400
Other apparatus, including outfits		34,200
Shore property		313,175
Total		1,345,975

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Primary products.		
Fresh fish ... pounds	43,122,270	$1,102,950
Salt fish ... do	16,793,540	402,670
Frozen fish ... do	2,821,650	126,100
Smoked fish ... do	1,721,770	109,970
Secondary products.		
Caviare ... pounds	230,160	34,315
Isinglass ... do	3,909	5,765
Oil ... gallons	5,680	2,280
Total		1,784,050

B.—LAKE SUPERIOR AND ITS FISHERIES.

228. STATISTICAL SUMMATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	414

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels and boats	155	$26,150
Pounds	43	14,950
Gill-nets	4,630	25,280
Seines	32	2,010
Other apparatus, including outfit	.....	290
Shore property	.....	12,700
Total	.....	81,380

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fresh fish	1,494,500	$47,780
Salt fish	1,549,500	57,755
Total	.....	105,535

229. THE FISHERIES OF THE NORTHWESTERN SHORE, INCLUDING DULUTH.

THE NORTHWESTERN SHORE.—The northwestern shore of Lake Superior is hilly and mountainous in character, and for the most part deeply wooded. The small hamlets which exist here are chiefly lumbering stations, and the fisheries receive little or no attention. Fish are abundant, however, in the neighboring waters, as is proven by the fact that they are visited by fishermen from Duluth and other towns on the south shore.

DULUTH AND VICINITY.—Duluth, named after the French explorer and soldier, J. Duluth, is the most westerly village on the lakes, which is interested to any considerable extent in the fisheries. It is situated on the side of one of the numerous hills which exist in this section, at the head of a harbor known as Duluth Bay. The Government has spent considerable money in improving the entrance to the harbor and in building light-houses and breakwaters, not, however, in the interest of the fisheries, but for the grain trade and other branches of commerce in which Duluth is more especially engaged. The village was formerly chartered as a city, but has recently given up its charter.

The fisheries are carried on by thirty-five men. About sixteen of them participate in gill-net fishing, eleven in pound fishing—five being in charge of the steam-tug, and six managing the nets—and the rest in seine fishing.

The gill-net fishery is the more important and about four hundred and eighty nets are in use.

The boats used are Mackinaws, about 32 feet in length and worth $100. A tug also is employed in transporting products from the fishing grounds. Only two pounds are owned at Duluth, both small and set in shoal water. They are usually established about the 10th of June. The seiners fish only for a few days or weeks.

The gill-net grounds visited by the Duluth fishermen extend along the south shore to the Apostle Islands and along the north shore to Isle Royale. The former are visited in spring and summer, the latter in fall. The pound-nets are set at the entrance of Superior Bay near Superior City, about eight miles distant from Duluth. Seining is prosecuted in the vicinity of Fond du Lac, at the head of Saint Louis Bay.

In the pound-nets and gill-nets principally whitefish, trout, and herring are taken. The catch of the two former species amounted in 1879 to about 280,000 pounds. The seine fishery yields only pike, of which during the same year, about 16,000 pounds were caught.

The shipping business was carried on by one firm until 1880, when another made a beginning. All the fish are shipped fresh, being sent as far west as Deadwood, Dak., and south to Omaha, Nebr. The larger proportion, however, is sold in Saint Paul and Minneapolis, Minn.

The fisheries of this section, as a whole, are growing in importance, although the pound-fishery seemed to have declined somewhat since five pound-nets were in use here a few years ago. There are few historical matters of importance to be recorded. No disasters occurred for twelve years prior to 1879, but in the fall of that year one fisherman was drowned.

Superior City, the next town eastward, does not engage in the fisheries to any considerable extent.

230. THE FISHERIES OF THE SOUTHERN SHORE.

BAYFIELD AND ASHLAND.—These villages are situated east of the Apostle Islands, the former at the mouth and the latter at the head of Chequamegon Bay. They are approximately of equal size and importance. Both are interested in the lumber trade, and each supports a local journal. Ashland is a watering place of some note.

Bayfield surpasses Ashland in the importance of its fisheries, and indeed the people are dependent upon them. In the former village about one hundred and thirty men were employed in the fisheries in 1879, and nearly twice that number during 1880, while at the latter point only twenty-five or thirty men found occupation in fishing. The fishermen are principally Canadian French and half-breed Indians in about equal numbers.

Gill-nets, pounds, seines, and lines are in use, but the first kind of apparatus is that most extensively employed. About 1,680 gill-nets are owned at Bayfield, but considerably less than one-fourth that number at Ashland. Their average length is about 65 fathoms. The pound fishery is prosecuted with 27 nets at Bayfield and 3 or 4 more at Ashland. They are of various sizes and depths, but all formed after the usual model. Seventeen or eighteen seines are employed, their average length being about 60 rods. In winter hook fishing is carried on among the islands near Bayfield.

The principal boat is the famous Mackinaw, but a few clinker built boats also are in use. For the pound fishery the ordinary flat-bottomed pound-boat prevails. A schooner, used in carrying fishery products, is also owned at Bayfield.

The gill-net grounds extend 90 or 100 miles eastward from the village. Pounds are set among the Apostle Islands and in Chequamegon Bay. The winter hook fishery and the seine fishery are both prosecuted among the islands, but much seining is done, also, in the shallow bays west of the Apostle Islands

The catch consists mainly of whitefish, trout, herring, and pike. The yield of both fisheries, in 1879, was about 300,000 pounds of fresh fish and 9,000 half-barrels of salt fish, worth together about $45,000.

The shipping business is controlled mainly by three firms. At least seven-ninths of the salt fish is sent to other lake distributing points—Buffalo, Toledo, Chicago, and Port Clinton. The remainder goes to Saint Paul and Minneapolis. The fresh fish is shared about equally by Chicago and Saint Paul.

The fishermen fish on shares, the outfitters furnishing boats, nets, and other apparatus, and paying a certain sum for the fish when salted. Provisions are advanced to fishermen's families on credit during the fishing season.

Fish are somewhat less abundant in this region than formerly, especially in Chequamegon Bay, but the decrease is not considered at all alarming. It is the experience of the fishermen that if fishing is desisted from on a ground which has been depleted, fish will return to it in the course of a couple of years, and the catch will again be as large as previously. The year 1879 was not considered an altogether profitable one, but the yield in 1880 was thought to have been larger than ever before. It must be taken into consideration, however, that more nets were used and that the grounds were better known than formerly.

The boats now in use are not materially different from those formerly employed. They may be, however, a trifle larger and more valuable.

We find record of only two disasters of recent occurrence. In 1878 a boat, with four men, was lost. In the same year another fisherman was lost while fishing through the ice.

ONTONAGON, PORTAGE ENTRY, L'ANSE, AND INTERVENING STATIONS.—Ontonagon is situated on the west side of Keweenaw Point, at the mouth of the Ontonagon River. Its principal industry is copper-mining, but the people are incidentally engaged in fishing. L'Anse, located at the head of Keweenaw Bay, is also sustained by mining and lumber trade, but its fisheries are important. Between these villages there are a number of hamlets, the population of which is engaged in fishing to a greater or less extent.

In this section we find about one hundred and thirty-four fishermen, eighty-eight of whom are engaged in gill-netting, thirty in the pound-net fishery, and the rest in seining and other minor fisheries. The nationalities represented, as at the villages westward, are Canadian French and half-breed Indians, in equal proportions. The owners of fisheries, however, are principally Americans.

Gill-net fishing ranks first in importance. About eleven hundred nets are in use, each 60 fathoms or a little less in length, and with $4\frac{3}{4}$ or 5-inch mesh. They are in use at all seasons of the year. The catch consists principally of whitefish, trout, and siscowet and a few suckers. The pound fishery is prosecuted with twelve nets, each worth about $350. The season lasts from May to November, unless heavy storms should make it necessary to remove them earlier. The principal fish taken are whitefish, trout, and pickerel. The seiners use eight seines, worth about $75 each, and catch mainly whitefish.

One small steam-tug of about 12 tons burden is employed in the gill-net fishery and in transporting the catch to shipping points, and a little schooner is also used for carrying the products from place to place. In regard to the boats it may be said that they are not so seaworthy as those used farther west. The cause is to be found in the fact that this section of coast is not so exposed as many others. The pound boats especially are not much better than those employed at Green Bay.

The gill-netters fish west of Keweenaw Point, in Keweenaw Bay, and eastward almost to

Marquette. The pound-nets are set in different parts of Keweenaw Bay. The seining reaches are in the vicinity of L'Anse and Portage Entry.

The yield of the fisheries during 1879 amounted to about 405,000 pounds of fresh fish and about 4,200 half-barrels of salt fish. A considerable proportion was sold at the mines in the vicinity of the fisheries and in inland towns, and the remainder was shipped to Detroit, Cleveland, Buffalo, Chicago, and Milwaukee, but the exact apportionment of the amount could not be ascertained.

The fishermen consider that whitefish have decreased appreciably within ten years, and point to sawdust, increased navigation, and overfishing as the causes of the diminution.

MARQUETTE AND VICINITY.—Marquette, the capital of Marquette County, is a small city, and a summer resort of some note. It is situated at the head of a fine harbor. The iron and lumber trades take precedence over the fisheries.

The number of fishermen at Marquette in 1879 was about thirty-three, twelve of whom were engaged in gill-netting, twelve in seining, and the remainder in the pound fishery. They are of various nationalities, only about one-third being native Americans. There is also one fisherman living at the south end of Grand Island, east of Marquette.

Pound-net, gill-net, and seine fisheries are all carried on to a greater or less extent in different years. The gill-netters fish at different points along about 50 miles of shore east of Marquette, while the pounds are set in sheltered positions in the shallow bays and the mouths of rivers between the town and Grand Island. Seining is prosecuted entirely in Marquette Harbor. Some fishing is also carried on at the trout bank, known as Stannard's Rock.

About sixty boxes of gill-nets, or three hundred and sixty nets, were employed in 1879, together with eight pound-nets and four small seines. The gill-net fishermen employ several steam-tugs of the usual model and size. Larger and better boats are used than formerly.

The catch consists of whitefish, trout, siscowet, herring, and lawyers. The yield in 1879 was about 450,000 pounds, of which enough to make 200 half-barrels was salted and the remainder sold fresh. About 25,000 pounds of the latter were shipped to Milwaukee, and of the remainder part sold to the steamboat companies and to the miners living in the vicinity and part sent to inland towns in Wisconsin and Illinois. The shipping business is entirely in the hands of three firms.

The fish are caught on shares. The dealers furnish outfits, including boats, and take one-half the fish caught as compensation. They also buy the remainder from the fishermen, paying a uniform price of 7 cents apiece.

Fifteen or twenty years ago trout fishing with hand-lines was the most important branch prosecuted, gill-nets being used only for whitefish. Pound-nets were not introduced until 1869. Seines were in use many years before gill nets were introduced, but they are now fast falling into disuse.

Some fishermen hold the opinion that there has been a gradual decrease in the abundance of all species, but particularly of whitefish and trout. Others think that this theory is without foundation in truth. They say that the spawning grounds are not disturbed, and that spawning or young fish are rarely taken; and claim that the species which appear to have decreased in number have simply moved to inaccessible or undiscovered grounds.

WHITEFISH POINT AND SAULT DE SAINTE MARIE.—Fishing has been carried on at Whitefish Point for many years, but the fishery did not assume proportions of any magnitude until the year 1870, when it was purchased by Messrs. Jones & Trevalle, of Buffalo, N. Y. A pier has been constructed and a number of buildings erected. During the fishing season twenty or thirty persons live at the Point, but in winter the place is deserted. Communication with other places is carried on entirely by water. Steamers stop at the pier, if the weather is sufficiently calm, and take away the fish.

In 1879 about twelve fishermen were employed in attending the pounds, setting gill-nets, hauling seines, and preparing fish for market.

The gill-netters use about two hundred nets. They fish in different places about the Point, but not farther than 5 or 6 miles from land. At certain seasons the tug goes 5 or 6 miles west of the Point.

Only two pounds are employed, the character of the shore being unfavorable for this kind of fishing. One is set a short distance west of the Point and the other south of it.

The seine fishery is of little moment. Only two nets are employed. The catch consists of whitefish, trout, and a few suckers. The yield in 1879 was about 350,000 pounds. Three hundred and fifty half-barrels of whitefish and trout and a few suckers were salted and shipped to Milwaukee and Chicago. The remainder of the fish was shipped fresh to Chicago, Cleveland, Erie, and Buffalo.

Fishing in this region has not been very profitable during the past five or six years. The pound and seine fisheries have been the least productive, the success of the gill-netters, on the other hand, being materially improved. The fishermen unanimously agree that the cause of the lack of success in the two former branches is to be found in the fact that the water has considerably receded from the shore. In 1874 about 2,300 half-barrels of fish were salted and a considerable amount sold fresh.

Pound-nets were introduced about ten years ago.

At Sault de Sainte Marie the majority of the fish taken are caught by Indians, with dip-net, in the rapids. One stands at the bow of the canoe with a net, and a second propels and steers the craft. Several hundred pounds are frequently taken in this way by a single canoe in one day. A few fish are also taken in traps set in Whisky Bay.

The catch consists exclusively of whitefish, trout, and pike. During 1879 about 2,500 half-barrels of fish were shipped from the Sault, all but about 50 half-barrels of which were whitefish. They were all salted and shipped to Chicago, Detroit, and Cleveland.

C.—LAKE MICHIGAN AND ITS FISHERIES.

231. STATISTICAL SUMMATION.

Summary statement of persons employed.

Persons employed	Number.
Fishermen	1,578

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels and boats	642	$125,895
Pounds	476	185,425
Gill-nets	24,599	124,740
Seines	19	2,040
Other apparatus, including outfits		8,935
Shore property		104,100
Total		551,135

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Primary products.		
Fresh fish ..... pounds..	10,728,250	$343,070
Salt fish ..... do....	7,730,740	203,425
Frozen fish ..... do....	100,000	6,000
Smoked fish ..... do....	788,590	52,930
Secondary products.		
Caviare ..... pounds..	31,330	6,620
Isinglass ..... do....	265	265
Oil ..... gallons .	200	100
Total	.....	612,410

232. THE FISHERIES OF THE WESTERN SHORE.

ESCANABA AND THE NORTH SHORE OF GREEN BAY.—Escanaba, Mich., the capital of Delta County, is situated on Green Bay, at the mouth of the Escanaba River, and of Little Bay de Noquette. It is the center of an extensive iron and lumber trade, being on the line of the Northwestern Railroad.

The fisheries of Escanaba are not unimportant. A large proportion of the fishermen who visit the islands at the entrance of Green Bay reside here, and avail themselves of the facilities for shipping which the direct railroad connection affords. In 1879 they numbered about ninety-two, thirty being employed in the pound fisheries, fifty-three in gill-netting, and nine in seining. They belong to different nationalities, but native Americans predominate.

The gill-net fishery, as appears from the number of men employed, ranks first in importance, the pound fishery taking the second place. Seining is carried on only to a limited extent.

The grounds are very extensive, occupying almost the whole northern portion of Green Bay, including Little and Big Bays de Noquette. Those about Washington and Saint Martin's Islands, which had been quite depleted, are again becoming very profitable. The fishermen disagree, however, in their statements regarding the abundance of fish. At Fish Creek, near Escanaba, they asserted that the Washington Island grounds were ruined and unproductive, but it was ascertained later that a thousand nets were in use there in 1879, and that the catch was not small. The general impression seems to be that whitefish are growing constantly more abundant in some places.

During the year 1879 about 300,000 pounds of fresh fish and 2,300 half-barrels of salt fish were received at Escanaba. The fresh fish were almost entirely whitefish and trout. About one-half of the salt fish were whitefish and trout, and the remainder suckers and herring.

The amounts given do not represent the entire yield of the fisheries of northern Green Bay. Among the islands probably seven-eighths of the amount taken is bought by traders and taken to Chicago and other centers of distribution.

The fresh fish received at Escanaba are shipped to other points by rail. About two-thirds of the whole amount is sent to Chicago, and the remainder to Saint Louis, Kansas City, and other inland towns.

About $40,000 are invested in boats, nets, and other apparatus.

During the past decade only two disasters occurred. In 1873 two fishermen were lost off the Gull Islands, and in 1879 one fell through the ice and perished.

The most important event which has taken place in the history of the fisheries is the intro-

duction of steam-tugs in both gill-net and pound fishing. The smaller boats are of better model than formerly, and the fishermen have grown more skillful in the management of them.

The yield of the fisheries of Escanaba was larger in 1879 than during the four or five years preceding. The increase was most noticeable on the grounds about Washington and Saint Martin's Islands.

MENOMINEE, MENEKAUNEE, AND VICINITY.—The communities resident on the west side of Green Bay, between Cedar River and Peshtigo Point, are more extensively engaged in and dependent upon the fisheries than those farther north.

The fishermen, as a rule, are well fitted for their occupation, but for the past four or five years their gains have been but barely sufficient to support them. Their houses are scantily furnished and are always built near the fishery and close to the beach. A few have cleared fields of considerable extent about their dwellings, but the majority cultivate only sufficient land to enable them to raise a few vegetables.

The different fisheries are scattered along the shore quite regularly. A few miles north of Menominee the road is replaced by an indistinct trail which leads through the almost impenetrable pine forests which cover the shore, and is the only line of communication between the fishing stations, except by water.

Between Cedar River and Peshtigo Point, we find about thirty families of professional fishermen, aggregating about one hundred and fifty persons. A few of the net-owners are single men, but the majority are married and have large families. The owners are principally Swedes, Americans, and Norwegians, but many other nationalities are represented among the fishermen. The Swedes and Norwegians are said to be most successful.

The pound-net fishery is the most important, and occupies the fishermen during the summer. In winter the pounds are replaced by gill-nets. The summer grounds are near shore, but in winter the fishermen venture far out on the ice. The pounds increase in depth from Peshtigo Point northward. Many in use in the vicinity of the former station are only 8 or 10 feet deep, while near Ingleston, north of Menominee, they are frequently 60 or 70 feet deep.

The value of fishery apparatus used in the fisheries of this section of shore is about $30,000. There are no special peculiarities in the nets or boats which demand attention. Steam-tugs are not employed. The Menominee dealers send boats along the shore to the different stations every day during the height of the season to collect fish from the pounds. There are also two vessels which cruise along the shore periodically, gathering up the fish which the fishermen have salted, and supplying the latter with salt and barrels.

During 1879 about 1,500,000 pounds of fish were taken, of which 500,000 pounds were sold fresh, and the remainder salted. Whitefish and herring formed the most important factor in the amount of fresh fish, but trout, sturgeon, dory, and many other kinds were included. Few fish, except whitefish, trout, and herring are salted in this locality.

The larger proportion of fresh fish is sent directly to Chicago by rail in boxes or refrigerators. One firm in Menominee uses about twenty refrigerators constantly, and considers this method of preparation for shipment less expensive and troublesome than packing in boxes. Salt fish are sent to Chicago and to several distributing points on Lake Erie.

There have been many changes in the methods of fishing at Menominee and the neighboring towns, as well as in the form of apparatus and the location of the fishing grounds. Summer gill-net fishing, which was carried on extensively in former years, has been almost entirely abandoned. In the canvass of this region in the summer of 1879, but one fisherman could be found engaged in this occupation.

Gill-net fishing through the ice was begun in the winter of 1867. Prior to this time hook-and-line fishing, which is now of minor importance, was carried on quite extensively. The favorite grounds were the shoals south of Green Island.

In this region, as well as all others, at the advent of pound nets, seines began gradually to disappear. At present only two seines are in use.

Prior to fifteen years ago the most profitable fishing grounds of this section were in Menominee River, near its mouth. Racks were constructed, in which fish were captured as they came down the stream from their spawning beds. As many as 600 barrels of whitefish were sometimes taken from one of these racks during a single season.

The spring run of whitefish was always light, but as great numbers of pike were usually taken at this season, the total catch assumed large proportions. Pike still run up the river in limited numbers, perhaps about one eighth as many as formerly, but no whitefish. Mr. Eveland stated that not a single whitefish had been taken for twelve years, and gave it as his opinion that the pollution of the water by sawdust was the chief cause of their disappearance.

The establishment of saw-mills upon Menominee River, and the consequent deposition of great quantities of sawdust in the water has effected the ruin of the fisheries in the vicinity. There are no less than thirteen mills within two miles of the mouth of the river, in the three towns Menominee, Marinette, and Menekaunee, besides planing-mills and other similar establishments. At least two of these mills turn all their refuse into the river. Mr. Kumlien states in his notes that during his stay in Menominee he noticed that there was always a large mass of sawdust, from a quarter of a mile to two miles broad, and many miles long, floating about in the bay. According to Mr. Eveland the condition of affairs has been much the same for many years, and the spawning grounds of the whitefish for a long distance outside the mouth of the river and on either shore, north and south, have been completely ruined. It is not unusual for vessels to meet portions of the mass of sawdust 20 or 30 miles from Menominee, and the water at the entrance of the bay is often covered with it. It is said to have accumulated at the mouth of the river, forming masses in some places eight feet deep.

Many of the beautiful sandy beaches of former times are now covered with spongy masses of decaying sawdust, interspersed with slabs and broken sticks. Pound nets set in 69 or 70 feet of water, miles away from the mills, become choked with all kinds of mill refuse. Bars and shoals, once the home of the whitefish, are deserted. Grounds once abounding in fish, yielding large profits, are now abandoned and new and distant ones sought, where, for the establishment of nets, increased labor and expense are necessary. Some are so far distant from any shipping point that the expenses of transportation absorb the greater portion of the profits of the fishermen.

Seines were introduced at Menominee, about 35 years ago. Those first used were about 80 rods long, the mesh at the center being 3 inches, and in the wings 4 inches. It was not unusual to take 8 or 10 barrels of fish at a haul.

OCONTO, PENSAUKEE, LITTLE SUAMICO, AND VICINITY.—All the communities residing on the west shore of Green Bay, between Peshtigo and Little Tail Points, are interested in and engaged in the fisheries to a considerable extent, although perhaps a larger amount of capital is invested in the lumber trade. All the larger villages are connected with Milwaukee and Chicago by rail, and, therefore, possess abundant facilities for disposing of their fishery products to the best advantage.

The most important class connected with the fisheries are the pound owners, of which there were thirty in 1879 within the limits marked out. Besides these there are ten men who own only gill-nets, which they employ in winter. The seiners, as a rule, are married, and have families of

four or five persons, making in all two hundred or two hundred and fifty people dependent upon the fisheries. For about ten weeks in spring, and for about the same period in fall, each of the net owners requires a number of assistants, varying from one to eight. Thus about seventy-five men additional find employment for five months. Not more than ten or twelve of the assistants are married, the remainder being young men. There are in all therefore about fifty families and sixty-five unmarried men dependent on the fisheries of this region.

With the exception of two men, a Frenchman and an Irishman, the pound-net owners represent three nationalities—American, German, and Norwegian. Among the assistants a great number of nationalities are represented.

The fishermen of this region are, almost without exception, in comfortable financial circumstances, and some have amassed considerable fortunes. They are nearly all land owners to a greater or less extent, some possessing valuable farms in addition to their fisheries.

There are few localities on the lakes where the fishermen control the business so completely. They buy their own supplies directly from the manufacturers, and in many cases ship the fish which they catch. There is one dealer, however, who buys nearly all the salt fish and a considerable portion of the fresh fish. He employs continually about five men in preparing products for market. Besides this firm there are several others of minor importance.

The practice of supplying fishermen with outfits on credit has been abolished, and although there are some men who would engage in fishing if they could secure an outfit in advance, the dealers wisely abstain from yielding to their requests.

As already intimated, the principal fishery carried on is the pound-net fishery. The pounds about Suamico form the southern section of that great line of nets extending all along the west shore of Green Bay. They are all set comparatively near shore, in from 10 to 34 feet of water.

With the approach of cold weather and the formation of ice in the bay the pound fishery gives way to the winter gill-net fishery. There are no peculiarities, however, in the mode of its operation in this region.

Seining has been almost abandoned, many of the nets having been used in the construction of pounds. The two seines still in use—one at the mouth of Suamico River, the other at the mouth of Oconto River—are small, and the amount of fish taken by means of them is insignificant.

The amount of capital invested in the apparatus and accessories employed in the fisheries in 1879 was about $33,000. The principal factors in this amount are the cost of the pound-nets and the repairs made upon them, of the boats, and of the packages in which the salt fish were shipped. These items combined amount to about five-sixths of the total sum.

As the result of the activities of the fishermen during 1879, about 600,000 pounds of fresh fish, worth $13,500, and 17,000 half-barrels, worth not less than $27,000, were sent to market. The profits were distributed among seven firms of shippers, and through them to the fishermen. The fresh fish consisted of whitefish, trout, and the various kinds—herring, black bass, pike, catfish, &c.—shipped together under the name of "rough" fish. The amount of salt fish was made up almost entirely of whitefish and herring.

At Oconto we meet for the first time with an establishment for the manufacture of caviare and isinglass. About 65 pounds of crude isinglass were prepared here in 1879.

The dealers find markets for their products in Chicago, Saint Louis, and Kansas City, the former city receiving by far the largest share. Little or no salt fish is sent to Saint Louis or Kansas City.

The principal change which has occurred in the methods of fishing employed in this region is that already referred to, namely, the substitution of pound-nets for seines.

The most productive season ever known to the fishermen of this shore occurred in the autumn of 1876. A sufficient amount of fish was taken in seventy-six pound-nets to fill, when salted, 22,722 half-barrels. The catch consisted almost entirely of herring, a species which is also the most abundant at the present time. Only 500 half-barrels of whitefish were taken.

GREEN BAY CITY AND VICINITY.—Green Bay City, situated on the Fox River, near its entrance into Green Bay, as regards its connection with the fisheries, is in some respects one of the most important towns on the bay. A large amount of fish taken in the fisheries of both the eastern and western shores of the bay is shipped through the town, and supplies of salt, twine, netting and provisions are purchased there. The fisheries of the town itself, however, are quite insignificant when compared with those of the villages farther north.

The number of fishermen permanently resident at Green Bay does not exceed twenty-five. It is increased, however, during the fall and spring, by an addition of seventy-five or one hundred semi-professional fishermen. Among seventeen of the twenty-five men first mentioned, the following nationalties were found to be represented: English, 2; French, 2; American, 2; Norwegian, 2; German, 3; Polish, 2; Swiss, 1; Belgian, 1; Swedish, 2. An equally remarkable diversity prevails in many other localities on the lakes.

A few of the fishermen are in comfortable circumstances financially, while one or two are moderately wealthy. On the other hand, some are negligent and seem to have no tact in providing for their families, although their gains are usually sufficient to enable them to live well.

Several different branches of the fisheries are carried on at Green Bay, but only to a limited extent. Gill-nets are set in the inlets which penetrate the marshy shores of the Fox River, near its mouth, and just beyond the delta four pounds are established. About one hundred and fifty small fykes and some seventeen small pounds, technically known as "baby" pounds, are also employed. Five large seines, hauled ashore by means of capstans, are still in use. In spring the number of nets is increased, seventy-five or more being employed by fishermen from Oshkosh and other inland towns, who fish here at that season.

The boats are small and not so well built as those used in the fisheries of the upper part of the bay.

The amount of fresh fish which passed through the hands of the dealers at Green Bay during 1879, coming partly from the fisheries of the city and partly from those of the upper portion of the bay, was about 811,500 pounds, worth $32,500. In addition, 10,850 half-barrels of salt fish, worth about $25,000, were shipped during the year. The fresh fish were of many kinds, whitefish, trout, herring, wall-eyed pike, and catfish being, perhaps, the most important. Whitefish of different grades, trout, and herring are the principal kinds salted. A large part of the salt fish is purchased from the fishermen in half-barrels and repacked in kits of different sizes.

Probably fully one-half of all the fish received at Green Bay is sent to Chicago, the remainder being sent to different cities and towns in the interior of Wisconsin.

During 1879 the firms dealing in netting, twine, and cordage sold about $2,200 worth of these commodities, while the salt dealers sold nearly 2,800 barrels of salt, worth about $4,000.

The boat factory located at Green Bay city has only a small and local trade. The business has decreased materially within the decade, so that that transacted in 1878 was scarcely more than one-fourth the magnitude of that carried on in 1873. At present more repairing than building is done. Three men are constantly employed, more being added when an increase of work demands it.

The firm of W. D. Britton & Co., manufacturers of barrels and other packages, during 1879 sold 16,000 half-barrels, 10,000 quarter-barrels, and 500 caviare barrels for use in the fisheries.

There has been a marked decrease in the sale of half-barrels since the practice of returning the empty ones to the fishermen was originated. The demand for caviare barrels, however, is rapidly increasing. The firm employs sixty men, but not all are engaged in making fish barrels.

Green Bay city having been for many years the chief shipping point for the bay, the fluctuations in the abundance of fish and the changes in the fishing business have been perhaps more carefully noted than elsewhere. A considerable amount of information was obtained in regard to these matters by Mr. Kumlien from Mr. Kalmbach and other dealers of the city, and may perhaps be most conveniently inserted here.

Green Bay has long had an enviable reputation for its extensive and valuable fisheries, but of late years their yield has been growing noticeably less, the decrease being most marked in the case of whitefish and other kinds which are commonly salted. The fresh fish trade has not declined, but is rather on the advance, owing to the improved facilities for shipping fish in that condition. Fresh fish are at present shipped to Kansas City, Saint Louis, Saint Joseph, and other places in the hottest weather, in perfect safety.

Mr. M. F. Kalmbach gives an instance of the abundance of whitefish in former years. In 1860 he began fishing with pound-nets in Bay de Noquette. Pounds were not generally in use at that time, his trial of them being, in fact, one of the first. He employed two nets, one 18 feet deep, the other 20 feet deep, and each about 28 by 32 feet square. In these nets, between the 10th of October and the 25th of November, he took a sufficient quantity of whitefish to fill 1,750 half-barrels when salted, and was prevented from preparing double the quantity merely from lack of the needed supplies of salt and packages. For more than a month the nets were so full that a simple dip-net was the only implement necessary to be used in securing a quantity for salting. The fish crowded about the nets seeking entrance.

In late years pound-nets with very small mesh have been extensively employed, and large quantities of small fish taken. In the fall of 1878, at one locality in the bay, over 5,000 barrels of whitefish, equal to fully 7,500,000 fish, were thrown away, being too small for market. The same practice having been in force in many other places, it would seem that the supply of whitefish must be considerably diminished.

Another cause of the decrease of whitefish may perhaps be found in the fact that they have been driven from their old spawning grounds by sawdust and other mill refuse. Prior to 1865 there were few mills on the rivers, and large numbers of fish were hatched in them rather than at the grounds about the reefs.

DE PERE AND WEST DE PERE.—The towns De Pere and West De Pere are situated on opposite sides of the Fox River, about 10 miles above Green Bay City. Large dams have been erected here, which give power to numerous manufacturing establishments, including many lumber mills. The river below the dams is wide and deep, and resembles an arm of a bay rather than a portion of a river.

The fisheries at this point, which are now insignificant, were formerly of considerable importance. The most favorable shore from which to operate was frequently rented for as much as $1,500 for the season, lasting from April to June. At this time whitefish came up the river, and were caught in abundance.

Of late years the increasing settlement of the country, the establishment of mills, and other causes have combined to render these fisheries much less productive than formerly. A recent State law has made fishing in the Fox River illegal at all seasons, but nevertheless it is still carried on to a limited extent. A considerable quantity is taken by laborers and others for family use,

the exact amount of which cannot be ascertained, although it is probably not more than 5,000 pounds.

The total yield in 1879 was about 14,000 pounds of fresh fish and 15,500 pounds of salt fish, worth together about $1,300. The fresh fish consisted principally of whitefish, trout, pickerel, and dory, in about equal proportions. The salt fish were whitefish, trout, herring, and skinned catfish.

The apparatus consists of a number of small gill-nets, two seines, and about one hundred large dip-nets. The total sum invested does not exceed $500.

A large barrel factory is located at West De Pere, in which in 1879 at least 350,000 barrels and kits were manufactured. Among them were about 60,000 herring kits, a kind of package made here for the first time in 1878. The majority of the stock is shipped to Chicago, and is used by the packers of that city. The firm employs constantly about one hundred and fifty men.

THE EAST SHORE OF GREEN BAY.—The fisheries of the east shore of Green Bay are carried on at present principally by the farmers who live along the shore. The professional fishermen, who are pound-owners, are only seven in number, six living on the mainland and one on Chambers' Island. South of Little Sturgeon Bay there are about forty-eight farmers who participate in the gill-net fishery in winter, and north of it about six more. Thus it appears that there are about sixty-two families on this shore which are more or less dependent upon the fisheries for their support. In addition, about twenty assistants are employed during the winter months.

Both the pound-owners and the farmers are almost without exception Belgians.

The men who fish with pound-nets have made but a scanty living in latter years, but the winter fishermen are usually fairly compensated for their toil.

There has been a decided decrease in the abundance of fish within the past decade. In 1873 Mr. Blakefield, of the firm of Blakefield & Minor, of Fish Creek, sold more than $4,000 worth of fresh fish from two small pound-nets, set in the vicinity of Chambers' Island. During 1879, on the same grounds, with twice the number of nets, the product was worth only about $400. On certain grounds, where a few years ago two men caught $9,000 worth of fish in their gill-nets, no fishing is now carried on. Those who formerly engaged in fishing and were successful have turned their attention to other pursuits, or have sought other fishing grounds in Lake Superior and elsewhere.

The apparatus, which consists of about 1,800 gill-nets, 15 pounds, a single seine, and a number of boats and accessories, is worth about $11,000, a large amount when compared with the catch. The fact that in 1869 at least $40,000 were invested in apparatus on this same extent of shore, the profits being more than double those now accruing, in proportion to the money invested, shows how great has been the decrease of the fisheries on this side of the bay.

Some further details in regard to the destruction of the celebrated fishing grounds at the entrance of Green Bay may be interesting in this connection. The grounds between Washington and Saint Martin's Islands were probably the most productive in the bay, and the most frequented by the fishermen. Their abandonment was due to several causes, and not least to the terrible losses of nets which occurred there in the fall of several seasons. As many as three thousand nets have been lost in one autumn, carrying down with them 500,000 or 600,000 whitefish. Although the loss of the nets was a great discouragement to the fishermen, it is the opinion of all that the presence of so large a mass of decaying fish on the spawning beds effected a much more serious injury in that it drove away the fish which were wont to congregate there. Many of the nets were grappled up in spring completely filled with fish, but the stench from them was so horrible that the fishermen could not take them into their boats.

The loss of nets occurred generally during the last days of the fishing season, early in December, after the whitefish had deposited their spawn.

The height of the prosperity of the gill-net fishery about Washington Island occurred between the years 1864 and 1867. After the latter date the decline became apparent. Fifteen years ago between four and five thousand nets were in use on the grounds, and a yearly business of $100,000 was transacted there.

Five years ago Chambers' Island supported nine pound-nets, in all of which large quantities of fish were taken, but in 1879 only two were established there, and both proved failures.

Between 1870 and 1873 not less than 60 tons of fish were shipped from Fish Creek, all taken from within a radius of ten miles.

PORTE DES MORTES, AT THE ENTRANCE OF GREEN BAY, TO AND INCLUDING MANITOWOC.—The principal fishing stations on this shore are Jacksonport, Whitefish Bay, Clay Banks, Rowley's Point, Two Rivers, and Manitowoc, of which the last two are the most important.

During the year 1879 about fifty-three men were engaged in fishing, being distributed as follows: Jacksonport, Cana Islands, and Whitefish Bay, eight; Manitowoc, four; Two Rivers and vicinity, forty-one. These, with their families, comprising in all about two hundred and thirty persons, derive their support solely from the fisheries. Besides those mentioned, ten or twelve men, principally from Two Rivers, are hired, during a part of the season at least, as assistants.

The fishermen north of Whitefish Bay are Americans, but from that point southward all, with the exception of five or six Germans, are French Canadians.

The French are all Roman Catholics. Their profession is handed down from father to son. The boys assist in fishing when very young, and develop into good fishermen and skillful boatmen.

At Two Rivers the fishermen and their families live in one locality, forming quite a colony, which is known locally as "Canada."

Most of the older fishermen are in good circumstances, but when their business is very prosperous they are all apt to live extravagantly and expend a large part of their gains. Intemperance, which was formerly quite prevalent here, has almost entirely disappeared.

The fisheries differ in character at different points along the section of shore under consideration. At Jacksonport and Whitefish Bay the pound-net fishery takes precedence, the grounds opposite the latter station having been for a long time noted for their supply of whitefish. North of Clay Banks the gill-net fishery is unimportant, but the fishermen of that village and of Stony Creek, a few miles farther south, engage in that branch exclusively. At Two Rivers and Manitowoc both gill-net and pound-net fishing are extensively engaged in.

Along the entire shore, in 1879, about 2,200 gill-nets and 40 pound-nets were employed, the total value of which was about $26,000, according to the estimates of the owners. For the management of these nets and for the preparation and storage of the fish taken, boats and other apparatus and accessories, worth about $15,000, were employed.

The yield of the fisheries for the year ending October 1, 1879, was approximately as follows: Fresh fish, principally whitefish and trout, 550,000 pounds; salt fish—whitefish and herring—355,000 pounds; smoked fish, about 10,000 pounds. The total value of these products was about $33,300.

The whole catch, with the exception of 20,000 or 30,000 pounds, is sent to Chicago by cars or boats. One firm at Manitowoc carries on a strictly local trade, selling to the people of the town and neighborhood. All kinds taken from their nets find ready sale, even lawyers, which are purchased by the Germans and Scandanavians.

The fishermen of Manitowoc and Two Rivers complain of the decrease in the abundance of

fish, but the statistics in the report of the late Mr. James Milner, published by the United States Fish Commission in 1874, the only reliable ones available, do not show such an alarming decrease as, according to their opinion, exists. Nevertheless, it is undeniable that there have been important changes, especially at Two Rivers, within the past fifteen years. About five years ago the salt-fish trade became so unprofitable that many of the fishermen of Two Rivers left the town in search of more lucrative grounds. The fresh-fish trade, on the other hand, received a new impetus at that time, greatly encouraging the fishermen engaged in it.

SHEBOYGAN, OOSTBURGH, CEDAR GROVE, AND PORT WASHINGTON.—These four villages, situated on the west shore of Lake Michigan, are about equally interested in the fisheries. Investigation showed that the number of fishermen at Sheboygan in 1879 was about twenty; at Cedar Grove, about twenty; at Oostburgh, twenty one; and at Port Washington, thirteen; making a total of seventy-four men. Those residing at Cedar Grove and Oostburgh are principally Hollanders, while those at Port Washington are Americans, and at Sheboygan Germans and Americans in about equal numbers.

Pound-net fishing is the only branch engaged in, except at Sheboygan, where gill-nets are used exclusively. The apparatus employed, comprising 54 pound-nets, about 750 gill-nets, two steam-tugs, and a number of smaller boats and accessories, is valued at about $39,000. Four steam-tugs are, in reality, owned at Sheboygan, but two of them were employed at other places during the year 1879.

The catch on this shore consists almost entirely of the four kinds, whitefish, herring, trout, and sturgeon. During 1879 not less than 865,000 pounds of fresh fish, 500 half-barrels of salt fish, and 33,500 pounds of smoked fish were shipped to market, together with about 400 gallons of fish oil.

At least three-fourths of the products are sent to Chicago, the remainder being partially consumed in the villages about the fisheries, and in part sent to Saint Louis and other inland cities and towns.

In 1866 the grounds at Sheboygan became entirely depleted, and the fishermen crossed the lake and for two years fished along the east shore. On returning, at the end of that time, they found the old grounds were again productive, and they fished there with success. Pound-net fishing was attempted at Sheboygan in 1871, but the experiment ended in utter failure, and gill-netting was consequently resumed. The principal change which has taken place in connection with the latter mode of fishing is one which has occurred along the entire shore, namely, the substitution of steam-tugs for boats.

At Cedar Grove gill-nets and seines were formerly extensively employed. Gill-net fishing was abandoned on account of the remoteness of the grounds and the lack of a good harbor which the boats might enter in stormy weather. Pounds were not introduced until 1862. In the opinion of some of the fishermen of this place there has been a marked decrease in the abundance of fish during the last twenty years.

Pounds were introduced at Oostburgh and Port Washington about the year 1865, and have been constantly in use since that time. The fishermen state that, although the number of nets has greatly increased within a decade, the yield of the fisheries has remained about stationary, and that consequently the fish are decreasing in number.

MILWAUKEE.—The fisheries of Milwaukee, although of considerable importance in themselves, do not occupy a prominent place among the industries in which the people of that city are engaged. During the year 1879 only about eighty men, one-half of them fishermen and the others dealers, clerks, and peddlers, were employed in the business. It is a singular fact, but one which shows

that the city is entirely independent of the fisheries carried on there, that the larger proportion of the fish taken by Milwaukee fishermen are shipped to Chicago and other places, while the supply for the city is obtained largely from Lake Superior.

Both gill-net and pound-net fishing are engaged in, the former more extensively than the latter. In 1879 about 2,000 gill-nets and 10 pound-nets were employed, the value of which, according to the owner, is about $9,500. In the management of the nets five steam-tugs, and a number of smaller boats and accessories, valued at about $13,000, are employed.

As a result of the activities of the fishermen during 1879, about 980,000 pounds of fish were taken, 900,000 pounds of which were whitefish and trout, and the remainder lawyers, sturgeon, and other minor varieties. About 500,000 pounds of whitefish and trout were sent to Chicago, and the rest, in part, sent to inland towns, and in part consumed in the city. The value of the products to the fishermen, who, it must be remembered, usually ship for themselves the fish they catch, was about $28,600. It may not be inappropriate to mention that in addition to the amount caught in Lake Michigan, about 75,000 pounds of fish, principally bass and pickerel, were received into the city from various inland lakes in the State.

The trade in fish received from other places is of considerable importance. Six dealers are engaged in the business. During the year 1879 they received an aggregate of 5,969 half-barrels of salt fish, which, with the exception of about 28 half-barrels, consisted of various grades of whitefish, trout, and herring. They were received in part from the east shore of Lake Michigan, north of Ludington, and from Lake Superior. More than 4,000 half-barrels were sold to the wholesale grocers of the city, by whom they were sent to the retail grocers in the surrounding country, the remainder being sent to Saint Louis, Cincinnati, and other inland cities and towns.

The decline of the importance of Milwaukee as a distributing point is shown by the striking decrease in the amounts handled by the dealers in 1879 as compared with those of former years. One firm, which disposed of 2,000 half-barrels of salt fish in 1879, in 1867 received 13,000 half-barrels, and in 1869, 14,000 half-barrels. Another firm, which also handled about 2,000 half-barrels in 1879, received nearly 7,000 half-barrels in 1872, and over 10,000 barrels in 1873.

In addition to the salt fish, about 100,000 pounds of fresh whitefish and trout, and a small amount of minor varieties, were received from outside the city, principally from Lake Superior, and sold partly in Milwaukee and partly in the neighboring inland towns.

The fisheries of Milwaukee are less extensive than formerly, owing, no doubt, in part, to their being less productive than formerly. In 1865 about seventy fishermen, employing twenty-three boats, engaged in the industry, making a very comfortable living. Since that time the number has constantly decreased.

Gill-nets and seines have been employed since the first settlement of the country, but it was not until 1865 that pounds were introduced. The Norwegian sloops, formerly in use, have given place, in large measure, to steam-tugs, within the last five or six years.

RACINE, KENOSHA, AND WAUKEGAN.—On that portion of the west shore of Lake Michigan on which these three towns are situated, the fisheries are not so important as those farther north. Only about forty-five men—twenty-six at Waukegan, nine at Kenosha, and ten at Racine—are engaged in fishing.

At Racine gill-net fishing is the only branch pursued, and at Kenosha, also, the gill-net is the most important apparatus, but at the latter place two pound-nets are owned. At Waukegan, on the other hand, pound-nets alone are in use, about twenty-seven of them being set at different points along twelve miles of shore, partly north and partly south of the village. The variety displayed in the fisheries prosecuted is due principally to the nature of the shore. Gill-nets were for-

merly extensively employed at Waukegan, but the lack of a harbor at that place made the fishing very dangerous, and it was abandoned.

At Waukegan the fishermen are of different nationalities, Americans predominating. At Kenosha they are Germans, and at Racine, Scandinavians.

The value of the apparatus employed is large, as compared with the worth of the products of the fisheries, which would seem to indicate a decline in the abundance of fish, or lessened activity among the fishermen. The nets, boats, and accessory apparatus employed, according to the estimates of the fishermen, are worth in all, about $19,000, while the products for the year 1879 brought the fishermen but about $13,500 gross. This is probably the smallest catch ever known on this portion of the shore, by at least one-fourth. It is possible that the value given does not represent the value of the entire catch, as a considerable portion of the products are sold out of the boats as soon as the latter come in, and of this amount nothing more than an insufficient estimate could be obtained.

The catch consists of whitefish, trout, sturgeon, and pike, and several of the minor varieties. At Kenosha, few of any kinds except whitefish and trout are taken, and at Racine these two, with the addition of sturgeon, make up the whole amount. On account of the proximity of the towns to Chicago, much of the fish is sent to that city fresh in ice. About one-half the yield of the Waukegan and Racine fisheries, however, is consumed in the neighboring inland villages. At Waukegan considerable quantities of small whitefish are smoked, and during 1879, about 225 half-barrels of that fish were salted. The sturgeon taken, about 30,000 pounds in 1879, are sent to Chicago to be smoked.

There are several facts connected with the history of the fisheries of this section which it may be well to have recorded. Several disasters have occurred within the last decade. In 1875 two boats, in which were eight fishermen of Kenosha, were lost during a northwest gale. The accident seriously disheartened those remaining, and many ceased fishing entirely. The only other disaster, of which information could be obtained, occurred at Racine, where, in 1876, one fisherman was drowned.

Changes have taken place in the apparatus used and the manner of fishing, as well as in the extent of the industry. In 1868 the Kenosha fisheries supported eight boats, and the occupation was considered profitable, but now, according to the fishermen's phraseology and belief, it is "played out." The cause is attributed to too exhaustive fishing and the influence of the pound-nets established south of the city. Small-mesh gill-nets were formerly employed for the capture of ciscoes, but the custom has been almost entirely abandoned. Mr. Bergerhagen, a gentleman resident at Kenosha, and conversant with the condition of the fisheries, is of the opinion that not one-fourth as many fish frequent this shore as formerly, and denounces the use of pound-nets in strongest terms.

At Waukegan pound-nets have been in use for twelve years, previous to which time gill-nets and seines were employed. Mr. D. D. Parmlee, a well informed man, residing here in 1879, stated that during the last four or five years the fishermen had not made a living by their occupation. He thought an increase was apparent at that time, however, and considered that the fishermen had no reason for alarm, as the same fluctuation had occurred in other years.

The only change in the apparatus used at Racine, is the substitution of nets with fine thread for those with coarser thread.

CHICAGO AND SOUTH CHICAGO.—Although Chicago is beyond all question the most important receiving and distributing point on the lakes, the fisheries carried on there are comparatively insignificant. They are more extensive now, however, than formerly, when the river, polluted with

the sewerage and refuse of the city, flowed into the lake. There has been little change since 1875, and in that year about three hundred men, according to Mr. Nelson (Report United States Commissioner of Fish and Fisheries, Part IV, 1875–'76, page 785), were engaged in fishing. The majority used well-built Mackinaw boats and ventured 15 or 20 miles from the city, but some fished with hand-lines near the city and caught only the less important kinds of fish.

Three pound-nets and about one hundred boats were employed, which, together with minor apparatus, were valued at about $10,000.

The catch consists principally of trout, sturgeon, and catfish. Under the general head of fish markets in another section of this report, the fish trade of Chicago is treated of at length, and it will not be necessary to give more than a summary here. According to the investigations and estimates made the amount of fresh and smoked fish received into Chicago during 1879 was as follows:

Description.	Quantity.
	Pounds.
Fresh fish:	
Whitefish	3,658,567
Trout	1,705,761
Sturgeon	41,560
Miscellaneous	274,162
River fish	230,520
Smoked fish:	
Whitefish	232,000
Sturgeon	300,000

The total amount of fresh fish was, therefore, 5,910,570 pounds, and of smoked fish 532,000 pounds. Of this amount about 2,000,000 pounds were consumed in the city and its suburbs, of which amount about 1,000,000 pounds were fresh whitefish, and the remainder river fish, trout and smoked sturgeon, and whitefish. In addition to the fresh and smoked fish, about 10,805,000 pounds of salt fish were received. The aggregate amount, therefore, handled by the dealers in 1879 was not less than 17,247,570 pounds. This amount is less by 9,552,430 pounds than that given in the newspapers for the same year, but it is more by about 10,000,000 pounds than the aggregate given in the tables for 1872, published by the late Mr. Milner in the Report of the United States Fish Commissioner.

The fisheries of South Chicago are similar in character to those carried on on the west shore of the lake. They are not very extensive, only fifteen fishermen being engaged in them. The principal apparatus, consisting of one steam-tug, three sail-boats, eleven pound-nets, and about one hundred gill-nets, is worth about $10,000. To this amount, Mr. Nelson, in the Report of the United States Fish Commissioner for 1875–'76, adds $60,000 for the value of "ice-houses, fish-houses, wagons, and various other material and property belonging strictly to the business," but this amount appears to us very large. A letter from M. Hausler & Brother, one of the principal firms at South Chicago, contains the following information regarding the yield:

"The amount of fish caught here in 1879 was about 150,000 pounds. Two-fifths were whitefish and three-fifths sturgeon and herring. All were sold fresh in Chicago."

232. THE FISHERIES OF THE EASTERN SHORE.

MICHIGAN CITY, IND., AND NEW BUFFALO, MICH.—Michigan City is the only community in Indiana interested in fishing in Lake Michigan. The grounds lie between the city and New Buffalo, the adjoining village in Michigan.

The number of fishermen at these two places is a varying one, owing to the fact that at certain seasons some come from other places, and have no residence here. During 1879 the whole number of professional fishermen did not exceed twenty-six, representing fifteen firms. Of these, four firms belonged in other places, one coming from South Chicago, two from Sheboygan, and one from Saugertauk. In addition there were thirty-four hired assistants, fifteen of whom have families, and eight peddlers and smokers. In all, fifty men having families, and twenty single men were connected with the industry. The majority of the fishermen are Germans, but there are also a number of Swedes and Americans among them.

Pound-net fishing takes precedence in importance, twelve firms being engaged in that branch, while but three are engaged in gill-net fishing. Fishing with hook-and-line is also quite extensively carried on. In 1879 the apparatus of capture consisted of twenty-five pound-nets, nine hundred gill-nets, and hand-lines carrying fifteen thousand hooks. In the management of the gill-nets one steam-tug is employed, besides three sail-boats. The value of the apparatus employed in 1879, including that already mentioned, together with twelve pound-boats, twelve fish-houses, and twelve hundred shipping-boxes, and the cost of repairs made upon the pound-nets amounted to about $32,300.

The yield of the fisheries for 1879 was a comparatively small one. The pound-net fishing was not very successful. The fishermen pronounced the catch to be below the average. At Michigan City the products consisted of 500,000 pounds of fresh fish, 25,000 pounds of salt fish, and 70,000 pounds of smoked fish, principally sturgeon. About 2,080 pounds of caviare were manufactured. At New Buffalo 75,000 pounds of fish were taken and all sold fresh.

A large part of the fish are sent directly to Chicago, but considerable quantities are also sent to the following places, named in order of their importance: Lafayette, Ind.; Kalamazoo, Mich.; Jackson, Mich.; La Porte, Indianapolis, South Bend, Valparaiso, Peru, in Indiana; Cincinnati, Ohio; and Saint Louis, Mo. Besides those sent to these places, certain quantities are retailed in the towns in the vicinity of the fisheries. Twelve wagons leave Michigan City twice every week, taking loads of about 400 pounds each.

Considering the distance from the shore at which the fishermen habitually prosecute their business, it is remarkable that so few accidents have occurred. There is one, however, which we must record. It occurred in 1874. One boat in which were four men was lost, and all on board perished. Another disaster occurred three years later, but fortunately no lives were lost. On the 22d of June, 1877, a tremendous northerly gale struck the shore, and tearing up all the pound-nets carried them as far as South Chicago. The amount of the loss was estimated at $18,000, fully equal to the value of the products obtained during the prior part of the season.

The gill-net fishery was pronounced as prosperous in 1879 as at the beginning of the decade. In 1862 and 1863 it became entirely unproductive in July, while ordinarily the season lasts until August.

Many years ago this part of the shore was famous as a seining-ground. About 1860 it was not unusual to take 1,000 or 1,500 pounds of fish at a single haul, but within ten years nothing has been done in this branch, the fish having kept farther from shore than formerly.

In 1874, the first year in which pound-fishing was carried on, three firms engaged in it made together not less than $19,500, clear of all expenses.

SAINT JOSEPH, SOUTH HAVEN, AND SAUGERTAUK.—The fisheries of Saint Joseph are more important than those of the other two villages. In 1879 ten sail-boats and one steam-tug were employed here, carrying together about sixty-four men. At South Haven but one boat was

employed, and at Saugertauk three. In all, therefore, there were fourteen boats and one steam-tug, employing about eighty-eight men. Besides these professional fishermen there are four or five men who fish with what are known as "plump-nets," and four or five others who make a living by oil rendering. Fifty of the fishermen have families, the rest being single. Although many nationalities are represented among these fishermen, the larger proportion are Germans.

Gill net fishing is the principal branch engaged in, and during 1879 no less than two thousand eight hundred nets were in use. Pound-net fishing is not carried on extensively on account of the nature of the shore. In former years seining was prosecuted to a considerable extent, but at the present time there are no seines in use. The entire value of the apparatus employed, including boats, nets, and accessories, is about $29,000. This is certainly a large amount when compared with the yield of the fisheries of the three villages.

The total catch in 1879 amounted to about 668,000 pounds, of which about 500,000 pounds were taken by the Saint Joseph fishermen. About one-third of the fish were trout, the remainder being whitefish and other species of minor value. With the exception of about 10,000 pounds the fish were sent fresh to Chicago. A small amount excepted was sent to the neighboring inland towns.

The fishermen of Saint Joseph have probably suffered more from disaster than any others on the whole of the lakes. In 1869 two boats were lost, carrying down nine fishermen. On the 29th of April, 1875, while eleven boats were fishing at a long distance from shore, a sudden and violent squall sprang up from the northwest, striking the fleet with great violence. Some of the boats were returning home and had all the canvas up; they were unable to get their sails down before the storm was upon them. Out of the whole number of boats four were lost, carrying down with them eleven of the fishermen. Not one, however, of the boats returned in safety. Some were driven upon the beach many miles from their harbor, and nearly all sustained some injury besides losing their nets, sails, and other parts of their apparatus and rigging. In 1876 one boat and one fisherman were lost, the rest of the crew being picked up by a passing vessel.

These disasters, together with the decrease of fish and the low prices received, discouraged many fishermen, and numbers of them have given up the pursuit and gone into other occupations. For several years prior to 1879 the fishermen have been losing money, but the prospect for that year was much more satisfactory.

Mr. C. P. Haywood, the famous boat-builder, is located at Saint Joseph, but during later years he has been unable to sell any boats, as the fishermen have been too poor to invest in them. He has, however, the reputation of being the best boat-builder on the lakes. His boats, known as the "Haywood," "Huron," or "Square Stern," have a great reputation in Lake Huron, but have not sustained it well at Saint Joseph, where they have been subjected to very severe trials. The first boat used here was the "Mackinaw," after which the unwieldy "Norwegian sloop" was in vogue for many years, the latter being finally superseded, as already mentioned, by the Haywood boat. There seems to be a determination on the part of the fishermen to return to the Norwegian sloop again, as it is considered absolutely safe in all weathers and is best suited for the boisterous off-shore fishing.

SAUGERTAUK TO GLEN HAVEN.—The principal fisheries on this shore are at Grand Haven, Little and Big Points Sable, Whitehall, Pent Water, Ludington, Manistee, and Point Betsy. The most important of these points is Grand Haven, where more men are engaged in fishing than in all of the other villages together. The following is the number of fishermen in each place: Grand Haven, 86; Pent Water, 4; Whitehall, 12; Ludington, 31; Manistee, 6; Frankfort, 4.

Among those enumerated are twenty-four boys. About one hundred of the fishermen have families, the remainder being young men. In addition to those mentioned there are about a dozen families of semi-professional fishermen, including some half-breeds who dress fish for the offal from which to fry out oil.

The majority of the fishermen about Ludington are Swedes and Norwegians, but a number of those having the largest trade are Americans. As a rule the fishermen are reported to be in good circumstances, and making a comfortable living for themselves. At Pent Water there are but two firms, one American and the other Norweigan. At South Haven the fishermen are almost without exception Hollanders, and they are said to be a thrifty and industrious class.

On account of the nature of the shore very little pound-net fishing is carried on from any of these villages, and the fishermen therefore have resort to gill-net fishing. Various attempts have been made to establish pounds, but they have usually been blown ashore in a short time and completely wrecked. In 1879 there were but seven in use between Glen Haven and Saugertauk. During the same year not less than 4,400 gill-nets, worth approximately $26,500, were in use. These nets, which were formerly knit by the fishermen's wives and daughters, are now bought ready-made. A variety of boats are employed, including Norwegian sloops, Mackinaw boats, Huron boats, and the ordinary pound-boats. The Norwegian sloops are used principally at Grand Haven, where the fishermen employ a large number of nets, and pursue their occupation at a long distance from shore. The value of the apparatus in use in 1879 was about $57,000, including boats, nets, and repairs of the same, fish-houses, pile-drivers, shipping-boxes, and other minor accessories.

Most of the fishermen along this shore are accustomed to ship the fish which they catch, and few of them keep any record of their trade; great difficulty, therefore, was experienced in securing the statistics of the yield of the fisheries. The total product in 1879, however, yielded a return of about $70,000. Of the amount taken about 1,060,000 pounds were caught by the fishermen of Grand Haven; this portion consisted entirely of whitefish and trout, which were shipped by boat to Chicago. Grand Haven has better facilities for shipping fish than some of the other villages, and therefore a higher price is realized here than at other points. The Whitehall fishermen are estimated to have taken 100,000 pounds, which were also sent to Chicago. At Pent Water there were but two boats in use in 1879; the owner of one of them shipped his fish to Chicago, the other selling his at retail in the village. Both together did not secure more than 7,000 pounds of fish in 1879. At Manistee the catch amounted to about 75,000 pounds, and at Frankfort to about 37,500 pounds.

About the only change that has taken place in the fisheries here has been the introduction of steam-tugs for gill-net fishing; they have not been in use more than five or six years. Many years ago a few seines were employed at different places along the shore. At these same points seines have now become abundant. The same grounds have been visited for more than twenty years.

It is the general impression of the fishermen that there has been a great decrease in the abundance of fish. They consider that the habit of throwing offal on the grounds has had a very decided effect in bringing about this condition of affairs, and they also suppose that the capture of so many young fish has had an injurious effect. In proof that there has been a decided decrease of late, one of the fishermen stated that in 1876 he took an amount of fish worth $1,400 from one pound-net, and that from the same net in 1879 he took only $600 worth. At Big Point Sable large numbers of small fish are taken, but it is said to be the practice of the fishermen to throw them into the water again, thus giving them a chance to survive. At Little Point Sable, however, none but large fish are taken, most of them being rated "No. 1."

Mr. Putnam, of Pent Water, stated that fishing during 1879 was but little better than that of prior years, and that at no point on the shore is there a more alarming decrease than here. At Grand Haven the fishing was reported to be in as good a condition as in prior years. Between 1875 and 1877 the yield was very small, but since that time it has been increasing. At Holland fishing has almost entirely died out; not, however, on account of the decrease of fish, but because the place has very poor shipping facilities, and the fishermen are able to secure but little profit from the fish which they take.

LITTLE AND GRAND TRAVERSE BAYS.—The principal fisheries of this region are carried on from Traverse City, Northport, Charlevoix, and Petoskey. The last-mentioned village has lately assumed new relations to the fisheries, being at present a shipping point of considerable importance. An enterprising firm built a large freezing-house here early in 1878, and since that time fishing in the locality has been prosecuted with increased energy. The grounds in the two bays were visited, however, many years ago by fishermen from Mackinac, with good success, but their distance from any shipping point proved too great, and the enterprise was abandoned. For a number of years afterwards no other fishermen resorted here, except a few Indians. The firm now located at Petoskey handles all the fish taken between Cross Village on the north, and Charlevoix on the south.

Sufficient has been already written to show that but little variety exists in the kinds of fisheries carried on in different parts of the lakes, or in the manner of their operation. In the region now under consideration we find the same condition of affairs which exists in other localities. Gill-net and pound-net fishing take the lead, while seining is of minor importance. Fifteen hundred gill-nets, nineteen or twenty pounds, and three seines constitute the sum of the apparatus of capture employed. Two steam-tugs, one hailing from Petoskey and one from Charlevoix, together with twenty Mackinaw boats, serve in the gill-net fishery, while in the management of the pounds about sixteen of the ordinary scow-like pound-boats are employed. These nets and boats, together with the buildings established at the fisheries, and other structures and implements of minor importance, are valued by their owners at not less than $32,000.

A large proportion of the fish taken in Little and Grand Traverse Bays are whitefish and trout, next to which herring, suckers, and black-fins are the most important. The amount of all kinds caught here in 1879 and sent fresh to different markets was not less than 224,000 pounds, in addition to which 100,000 pounds of fish were frozen, and 700 half-barrels of salt fish prepared. The fresh fish are disposed of at different points on the line of the Grand Rapids and Indiana Railroad; none, however, at least in 1879, going south of Fort Wayne, Ind. The fish frozen at Petoskey during the same season were all shipped to Philadelphia. A large part of the salt fish find sale in Chicago.

What little could be learned by investigation regarding the history of the fisheries of Little and Grand Traverse Bays has been already given.

THE STRAITS OF MACKINAC.—In this section it is necessary to include the northern shores of Lakes Michigan and Huron, from the entrance of Green Bay to the mouth of river Sainte Marie as well as the islands of Mackinac and Bois Blanc, and the south shore of the straits east from Point Wagoshance. Within these limits we find no less than eleven hundred persons dependent, to a greater or lesser extent, upon the fisheries, including the fishermen and their families, shop-keep-

ers, clerks, dealers, and others. The number of men in each branch of the fisheries and in the occupations accessory thereto, in 1879, was somewhat as follows:

Persons employed.	Number.
Pound-owners and their assistants	60
Gill-net fishermen	175
Sailors on fishing vessels	10
Clerks	5
Dealers, shopkeepers, &c	15
Fish-dressers and general assistants	10

Among these people every conceivable condition may be found from that of the poor fisherman, whose scanty profits scarcely furnish him his livelihood, to that of the wealthy merchant who owns extensive grounds and fishes by proxy. The tendency, however, is towards concentration of interests, many of the smaller fishermen selling out their stock and privileges to the wealthier firms, contenting themselves with giving their service as hired employés. Firms with large capital are now fishing with many nets, where formerly the occupation was distributed among a large number of fishermen of limited means.

The pound-owners, as a rule, are in very comfortable circumstances, and have considerable money invested in their fisheries, which are managed with commendable zeal and enterprise. A majority of them are Americans. The gill-net fishermen, on the other hand, are largely French Canadians, and among them many extremely shiftless people are to be found. A large proportion barely succeed in making a living. They often allow their nets to remain in the water for a number of weeks without removing the fish caught in them. At other times they expose them unduly to storms, and, as a result, frequently lose great amounts of twine.

A principal cause of the decrease of fishermen of small means in this region is to be found in the fact that fitters refuse to supply them with apparatus and stores on credit—a practice extensively in use here in former years.

In matter of importance, the gill-net and pound-net fisheries hold about equal rank. It is true that the whole number of nets used in the former branch, considered by themselves, are less valuable than the pounds but when we consider the worth of all the apparatus, the nets, the boats, and accessories, employed in either fishery, the amount of capital invested appears about equal The following table shows the value of all kinds of apparatus employed during the year 1879:

Apparatus employed.	Number.	Value.
Steam-tugs	4	$8,000
Schooners	1	3,000
Mackinaw boats	75	11,250
Pound-boats	40	2,400
150-ton lighter for anchor-fishing	1	1,000
Pound-nets	116	58,000
Gill-nets	6,000	30,000
Twine for repair of nets	.....	5,000
Steam pile-driver	1	500
Hand pile-driver	30	1,200
Packing-houses	6	1,800
Shanties	100	2,000
Shipping cars	30	1,200
Total	.....	125,350

Whitefish, trout, and herring are by far the most important species of fish taken in this region. Considerable quantities of pike, however, are also caught. The yield in 1879 was as follows:

Description.	Pounds.
Fresh fish:	
Whitefish and trout	770,000
Salt fish:	
Whitefish	2,200,000
Trout	167,000
Herring	162,000
Pickerel, &c	25,000
Total	3,324,000

The principal markets to which these fish were sent were Chicago, Cleveland, Detroit, and Sandusky. Of the fresh fish Chicago received about 540,000 pounds and of the salt fish 2,529,000 pounds, while 50,000 pounds of the former were sent to Cleveland, 75,000 pounds to Detroit, and 17,000 pounds to Sandusky, and about 88,000 pounds to various other places; and of the latter, 100,000 pounds to Cleveland, 75,000 pounds to Detroit, 350,000 pounds to Sandusky, and the remainder to other places. It appears, therefore, that Chicago absorbed by far the larger part.

Very little in regard to the history of the fisheries was obtained at Mackinac, except so far as relates to the products of other years. According to Captain Ketchum, in 1872 about 20,000 half-barrels of salt fish and 5,000 half-barrels, containing 140 pounds each, of fresh fish. The whole amount, with the exception of about 4,000 half-barrels trout and herring, consisted of whitefish. In 1867 the single firm of Brownlow & Bates shipped about 8,500 half-barrels of fish to Chicago, selling them at an average price of $4 per half-barrel. In 1868 they shipped about 13,000 half-barrels, of which 357 were herring and the remainder whitefish and trout. The price obtained during that year was about $5 per half-barrel. Another firm carried on a still more extensive business, shipping not less than 1,400 pounds of fish per week for three or four months at a time.

THE BEAVER ISLANDS.—The Beaver Islands, one of the most important groups in the lakes, are located at the northern end of Lake Michigan, about midway between the shores of the upper and lower peninsulas of Michigan. The island from which the group is named is the only one of considerable size in the group, and contains the village and post-office of Saint James.

The shores of Beaver Island itself, and of others of the group, are suitable in nature for the establishment of pound-nets, while many of the shoals in the vicinity, particularly those about Gull Island, are noted gill-net grounds. Seining is but little attended to; in 1879 only two seines being in use. During the same year, however, the fisheries were actively prosecuted by the use of about thirty-seven pounds and not less than seven hundred and fifty gill-nets. Mackinaw boats are most in favor for gill-net fishing, thirty-eight of them having been employed and but two Hayward boats. The ordinary pound boats are used in that branch of fishing. The value of all the apparatus employed, according to the estimates of Mr. Albert Miller, who is well acquainted with the fisheries of the group, will not exceed $26,670.

The salt-fish trade of the islands is more important than the fresh-fish trade. About 4,000 half-barrels of salt fish were prepared and sent to market in 1879, while about 100,000 pounds will represent the amount of fresh fish disposed of. Whitefish, trout, herring, and suckers make up the amount.

Mr. Charles R. Wright, who has been acquainted with the fisheries of the Beaver Islands for about twenty years, and who has furnished some material for this report, is of the opinion that there has been a decrease of 40 or 50 per cent. in the abundance of fish about the islands within two decades.

D.—LAKE HURON AND ITS FISHERIES.

234. STATISTICAL SUMMATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	976

Detailed statement of capital invested and capital employed.

Apparatus specified.	Number.	Value.
Vessels and boats	154	$29, 029
Pounds	189	49, 425
Gill-nets	3, 540	21, 680
Seines	75	12, 800
Other apparatus, including outfits	.....	6, 380
Shore property	.....	36, 600
	.....	155, 914

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Primary products.		
Fresh fish ... pounds	10, 354, 850	$267, 300
Salt fish ... do	800, 800	16, 000
Frozen fish ... do	1, 165, 000	63, 360
Secondary products.		
Caviare ... do	20, 250	2, 025
Isinglass ... do	300	500
Oil ... gallons	600	180
Total	.....	349, 365

235. THE FISHERIES OF THE AMERICAN SHORE.

HAMMOND'S BAY TO POINT SABLE.—The principal fisheries of this section of shore are those at Alpena and the Thunder Bay Islands. During 1879 about seventy-nine men were employed in fishing, many of the assistants being "Canuck" (Canadian) Indians. Nearly all of those who own boats ship the fish which they catch.

Both pound-nets and gill-nets are employed here. The gill-net fishery, however, is the most important. Pounds have been in use for twenty-five years, prior to which time gill-nets and seines were exclusively employed. Except in this particular, there has been but little change in the manner of fishing for many years. In 1879, two thousand gill-nets and about twenty-two pound-nets were in use. The apparatus employed in the management of these nets, together with the nets themselves and the accessories, were valued at $35,000.

The quantity of fresh fish taken in 1879 was about 2,344,000 pounds, and of salted fish about 100,000 pounds. The fresh fish consisted exclusively of whitefish and trout, while the salt fish were principally lake herring. These amounts were taken by the fishermen belonging to fourteen firms, in quantities varying from 20 to 230 tons. The fresh fish, with the exception of about 150

tons, were sent to Sandusky and Detroit. The salt fish were distributed to various inland towns in Michigan. It should be held in mind that a large number of the fish taken at Alpena were caught by the fishermen belonging at Detroit; the portion taken by Alpena fishermen could not have amounted to more than 300,000 pounds of fresh fish and 100,000 pounds of salt fish.

At Alcona, a small village near Alpena, two men were engaged in fishing in 1879, using a boat and a pound-net, together worth about $325. They took, as the results of their activities, about $550 worth of fish, principally of whitefish, herring, and sturgeon.

Record could be found of but two disasters, one of which occurred in 1860, when three fishermen were drowned, and the other in 1877, when a similar loss of life occurred.

In 1855 there are said to have been about fifty boats fishing at Au Sable, where at the present time there are but two. It is supposed that the refuse from the lumber mills has driven the fish away; at any rate the fish have disappeared, and fishing at this point is decidedly unprofitable. Several of the fishermen made statements in regard to the amounts of fish which they had taken in former years. Mr. Case, of Alpena, stated that he was formerly able to prepare at least 1,200 barrels of salt fish, as the result of one season's fishing, but that in 1879 he did not take more than 30 tons of fish. From three pound-nets, as the result of two nights' fishing, he has taken 450 half-barrels of whitefish. At another time, at Hammond's Bay, he took 100 half-barrels of whitefish from one net, as the result of three nights' fishing; and besides whitefish, it was estimated that there were 20 barrels of smothered fish in addition.

There is considerable talk among the fishermen about the fact of Canadian fish being brought into competition with American fish. One dealer from Detroit, who fishes in Canadian waters, and brings his fish to Alpena to be shipped to Detroit, stated that he would ship 1,000,000 pounds of Canadian fish into the United States during the season of 1879.

SAGINAW BAY AND THE CHARITY ISLANDS.—The fisheries of Saginaw Bay are among the most important on Lake Huron. During 1879 the total number of men employed in pound-net fishing, according to the best information obtainable, was one hundred and fifty-six, of whom about one-third had families. These men are employed nearly the entire year. In summer they fish with pound nets in the bay, and in winter they continue the pound-net fishing in the river under the ice or turn their attention to spearing fish. Besides these, there are at least three hundred and fifty men who fish only in the winter. The fishermen are chiefly French Canadians.

As already intimated, the principal branches pursued in Saginaw Bay are pound-fishing and spearing. The pounds are of two kinds; one kind being used in summer in the bay and the other at the mouth of the river in the winter. During 1879 not less than one hundred and sixty-five pound-nets of both kinds were in use together with spearing apparatus to the value of $4,500. About ten seines are also employed and ninety or one hundred fyke-nets. The whole apparatus in use is worth not far from $53,000.

During 1879 the fishermen sold about 2,790,000 pounds of fresh fish, of which fully 638,000 were whitefish and herring, the remainder being pike and other minor varieties. During the same season about 230,000 pounds of salt whitefish, 100,000 pounds of herring, and 80,000 pounds of pike were sent to market. About 350,000 pounds of fresh fish were shipped to various distributing points on the lake. The salt fish were sent to inland towns, principally to Cincinnati and Louisville.

A number of disasters have occurred during the past decade, but it is impossible to learn any particulars regarding them. Pound-net fishing was begun here in 1860, prior to which time fyke-nets and seines alone were employed. The fishermen are of the opinion that fish of all kinds are decreasing, the decrease being most noticeable among the whitefish. The decline of the fishery is

most apparent in the branches carried on in winter. The decrease has been so great that a supply can no longer be depended upon. The same is true of the river fisheries, which were at one time considered the most profitable in this locality. The principal cause for the decrease in the number of fish in the rivers is supposed to be the accumulation of a vast amount of refuse from the lumber mills.

POINT AUX BARQUES TO WINDMILL POINT, INCLUDING LAKE AND RIVER SAINT CLAIR.—The principal fishing points included within these limits are at Lexington, Port Sanilac, Forestville, White Rock, Sand Beach, Port Hope, Huron City, Au Sable, Grindstone City, Whitehall, and Port Huron. At none of these villages are the fisheries very extensive. The largest number of boats is employed at Sand Beach and Grindstone City. The total number of men employed in this section is about ninety. The seine fishermen, twenty-eight in number, are, however, employed for only about two and a half months. Seine-fishing, outside the river Saint Clair, is insignificant.

The principal branch carried on is the gill-net fishery. In 1879 one thousand five hundred and eighty nets were in use. The shore being altogether unsuited for pound-nets none are employed. The principal fish taken in the gill-nets are whitefish, trout, and herring. In the seines, sturgeon, herring, and yellow pike are the kinds most commonly caught.

The larger part of the total amount was sent to Cleveland, Toledo, and other distributing points. All the fish caught in the seines are sold fresh. It is the habit of some of the fishermen to keep the fish which they catch in artificial ponds, taking out only so many as are required to supply the market. This method of preserving the fish has resulted, however, several times in considerable loss. One fisherman lost 20,000 pounds of fish at one time, the fish having died in the ponds from a lack of sufficient fresh water.

As far as could be ascertained, no disaster has occurred on this shore within the past decade. The principal change in the manner of fishing has been that which has taken place at many other points, namely, the introduction of steam-tugs in the gill-net fishery. According to the statements of the fishermen, seine-fishing, especially on the lake shore, has declined, while gill-net fishing has considerably increased. Most of the boats employ less nets, but larger ones, than formerly. The boats themselves are considerably smaller than those in use ten or twelve years ago.

E.—LAKE ERIE AND ITS FISHERIES.

236. STATISTICAL SUMMATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,470

Detailed statement of capital invested and persons employed.

Apparatus specified.	Number.	Value.
Vessels and boats	538	$72,430
Pounds	758	233,000
Gill-nets	5,775	22,500
Seines	13	1,600
Other apparatus, including outfits		18,595
Shore property		154,775
Total		503,500

Detailed statement of the quantities and values of the products.

Products specified.	Quantity.	Value.
Primary products.		
Fresh fish ..... pounds..	17,054,670	$312,250
Salt fish ..... do....	6,712,500	125,490
Frozen fish ..... do....	1,406,650	51,240
Smoked fish ..... do....	933,180	57,040
Secondary products.		
Caviare ..... pounds..	178,580	25,670
Isinglass ..... do....	3,344	5,000
Oil ..... gallons..	4,880	2,000
Total	.....	578,690

237. THE FISHERIES OF THE WESTERN END, INCLUDING DETROIT AND TOLEDO.

DETROIT.—There is no fishing carried on in the immediate vicinity of Detroit, but the city is, nevertheless, an important receiving and distributing point. The following table shows the total amount of fresh fish received at Detroit in 1879:

Description.	Quantity.
	Pounds.
Whitefish	2,260,000
Trout	1,340,000
Pike	1,100,000
Miscellaneous	400,000
Total	5,100,000

The amount of salt fish was as follows:

Description.	Quantity.
	Half-barrels.
Whitefish	13,350
Trout	8,350
Herring	7,965
Pike	250
Total	29,915

Of the fresh fish about 1,165,000 pounds were frozen, all of which, with the exception of about 500,000 pounds, were sent out of the city. The entire amount of salt fish also found a market outside of the city. Large quantities are sent to different cities in New York State, and also to Boston, Philadelphia, and other cities on the coast. One firm shipped a considerable amount to Kentucky. Toledo, Sandusky, Cleveland, and other cities of Lake Erie also receive considerable quantities, which are distributed to various inland towns.

Detroit is one of the principal points at which fish are frozen. During 1879 at least 580 tons were frozen. There are several firms engaged in the business, all doing a large trade.

Regarding the amount of fish consumed in the city itself very little information could be obtained. Few of the peddlers and retailers have any idea of the extent of their business. It is probable, however, that about 500,000 pounds were consumed in 1879, 200,000 pounds of which were bought from the city wholesalers and the balance from the fishermen on the river and on Lake Saint Clair. The trade is divided among seventeen firms, most of whom have a stall in the

market. Many varieties of fish are exposed for sale, a large percentage being pike, bass, and perch. The average selling price of all kinds is not far from 6 cents a pound.

The State hatching-house of Michigan is located at Detroit, and is under the management of Mr. Owen Chase. It is estimated that the house has a capacity for hatching 20,000,000 eggs. In 1879, however, they were unable to procure more than 11,000,000 whitefish eggs. The house contains 30 Holton boxes and 75 glass jars. The hatchery has been in operation for five years and is considered in every respect a success. Those who have the management of the establishment claim that the results from the reproduction of fish give great encouragement in the work. There is said to have been a great increase in the catch, especially in Lake Saint Clair. There are some, however, who are very skeptical on these points.

DETROIT RIVER.—The fisheries of Detroit River differ in character from those of any other part of the Great Lakes. Between Windmill Point, at the head of the river, and Bar Point, at its mouth, there are no less than thirty separate stations at which fishing is carried on. The only form of apparatus in use is the seine. No pounds have ever been established in the river on account of the swiftness of the current and the comparative shallowness of the water. At each of the seining stations a small house has been built, and at each seining reach a pen is constructed of planking, varying from a few feet square to an acre or two in size, in which the fish are kept, being held for the winter market. The arrangement of ponds or pens is said to be not very satisfactory; the fish, particularly in the smaller pens, die in great numbers, causing great loss to the fishermen. The freshets, which occur from time to time in the river, bring great quantities of muddy water into the pens, and the gills of the fish become clogged with various kinds of *débris*, so that large numbers of them frequently die from this cause. About six of the stations are on the Canadian side of the river, the remainder being partly on the islands, which exist in various parts of the river, and on the American side.

The seines used at these stations are about 60 fathoms in length, 30 feet deep, and have a mesh of from 1¾ inches to 2 inches, bar measurement. The boats used are simple skiffs 24 to 30 feet long, usually manned by five to seven men. The seines are hauled every hour and are drawn in by horse-power. The greater part of the fishing is carried on in the fall, usually from about the 1st of October to the 1st of December.

The number of men at each fishery at the present time is not more than ten, but formerly sixteen or eighteen men were hired for the fall work. There is usually a boarding place at each fishery, established especially for the convenience of fishermen.

The catch consists principally of whitefish and pike. A few days before the appearance of the whitefish there is usually a run of herring, and at some of the fisheries a small-mesh seine is used for the purpose of taking them. Fishermen differ very much in their opinions regarding the amount of fish taken. Mr. Clark, one of the principal fishermen on the river, stated that usually not more than sixteen hauls were made in each twenty-four hours, and that usually forty fish were taken at a haul. Others, on the contrary, said that the number of fish taken at each haul did not exceed ten. Mr. David Davis, another intelligent man engaged in the fishery here, was of the opinion that at each fishery not more than 1,800 fish were taken during the season of 1879. He also stated, however, that the season was an unusually poor one, and that formerly 4,000 fish were not considered a large catch.

The value of the apparatus in use at each fishery, including seines, boats, pens, and houses, according to estimates made by Mr. J. P. Clark, would not exceed $1,000. The entire investment in fishery apparatus on the river, therefore, will not exceed $30,000.

MOUTH OF THE DETROIT RIVER TO TOLEDO.—The principal villages at the east end of Lake

Erie, which are interested in the fisheries, are Brest, Stony Point, and Monroe. The total number of men engaged is about one hundred and fifty, one hundred and thirty-six of whom are employed in pound-net fishing and about fourteen in fyke-net fishing. Probably about three-fourths of the pound-net fishermen have families. A large proportion of the fishermen are French Canadians.

During 1879 there were no less than one hundred and eighty-two pound-nets established on this shore. There were also about thirty fyke-nets and five seines in use. The value of these nets and of the boats and other apparatus employed in the management of them and for the storage of fish was about $60,000.

On this part of the shore there is a somewhat different arrangement, in regard to the manner of fishing, from that followed at any other localities. Some of the pounds are in use only in spring, while others are employed exclusively in fall, and others still at both seasons. Of the whole number of nets about seventy-two are in use in fall only, thirty-three in spring, and about seventy-seven at both seasons. The spring nets are deeper than those in use at other seasons, and in fall they are usually divided into two parts, each part being used as a separate net. The fall fisheries are commonly carried on in shallower water than the spring fisheries.

The small amount of seining done here is prosecuted only in winter, late in fall, and early in spring. There are no peculiarities about the fyke-net fishery.

The catch in the pounds consists principally of whitefish. In the seines, what are known as panfish are taken, consisting of the smaller species of bass, catfish, and other varieties of minor value.

The total yield in 1879 was about 2,480,000 pounds. Nearly the whole of this amount was sold fresh. The sturgeon were sent to Sandusky and Toledo, and about one-third of the other kinds was also shipped to Toledo. The remainder was shipped to different villages and towns in the interior. Only a very small amount of fish is salted in this locality.

There have been but three men drowned on this shore within the past twenty years.

In regard to the decrease of fish, Mr. Dewy, one of the leading fishermen, stated that, in his opinion, the season of 1879 was as profitable a one as the fishermen at that locality had ever known.

About the only change that has taken place in the manner of fishing has been the increase in the size of the boats and a general improvement in their model and make.

TOLEDO.—The city of Toledo, besides receiving large quantities of fish from other parts of the lake, has extensive fisheries of its own. The fishing-grounds begin just below the bridges in the Maumee River, and extend to the bay and along the shore east and west. From Cedar Point eastward to Locust Point there are a great number of pound-nets, some of them being among the most productive on the entire shore. The grounds are all shoal, especially in Maumee Bay, and, being in such a sheltered locality, nets can be set at any point where they will not interfere with navigation to too great an extent. In the pounds set in the bay little else besides pickerel and saugers are taken. No herring or whitefish are caught except when the water is extremely clear.

The best grounds for general fishing are said to be those of Cedar Point, and for whitefish in the vicinity of Stony Point.

Investigation showed that the number of men employed in the regular pound-net fisheries in this locality in 1879 was about one hundred and fifteen, while in the hook and fyke-net fisheries and other minor branches about two hundred were employed.

During the height of the season the proprietors of the fisheries employ a large number of men in dressing and packing the fish. One firm alone, in 1879, employed as many as one hundred men

in this part of the business. In the manufacture of caviare and in smoking sturgeon about eleven men are employed.

The majority of the fishermen, as well as the owners, are Americans, but there are also quite a number of Germans among them. The greater part of the fishermen are hired by the day or month, and their profits vary, of course, according to the length of time they are employed.

The boats in use at the present time are smaller than those formerly employed. Many years ago boats of over 15 and 20 tons burden were used, but it was found that they were quite too comfortable, and that the fishermen, having taken out provisions, would stay out a much longer time than was necessary, coming back whenever they felt disposed to do so. At the present time the ordinary Lake Erie pound-boat is in general use.

In all, there were about one hundred and sixty-seven pound-nets in use in 1879, but many of them, especially those set in the bay, were small and of simple construction. They do not differ materially from those in use on many parts of Lake Erie. They are usually set in water from 8 to 12 feet deep, the leaders being of different lengths, the average being, perhaps, 75 rods. Many of them are constructed of pine that has been used in the lake nets and has become partially rotten. Their value will not exceed $120 each.

The lake pounds, that is, those set between Cedar Point and Locust Point, are generally placed in water from 12 to 30 feet deep, and are, therefore, more valuable than the bay nets. They are estimated to be worth about $300 apiece. The pounds in use in this locality are set at an earlier date than those at any other point in the lake. The fishermen make it a practice to set them as soon as the ice leaves the bay. They are usually taken up again about the 1st of May, and, having been repaired, are set again late in September.

A few fyke-nets are in use in the bay and river for catching "panfish," but their products are of no considerable importance.

The extent of the hook fishing is estimated very differently by different persons. Mr. D. Y. Howell, however, who is well acquainted with the fisheries of the locality, estimated that fully two hundred men are engaged in this branch. Each man employs about five hundred hooks, and the set-lines vary in length from 1 to 6 miles. The season for hook fishing begins usually in March and lasts until August or September.

The catch consists of a great variety of fish—whitefish, herring, and saugers being among the most important. The more valuable kinds are taken in the pounds, the hook fishermen catching little except bass, catfish, and other species of minor value.

The total yield in 1879 amounted to about 12,000,000 pounds. Of this amount 7,000,000 pounds were salted, 4,500,000 pounds sold fresh, and the remainder either frozen or smoked. Probably more fish are frozen in Toledo than at any other point on the lakes. In 1879 the amount thus treated was not less than 300,000 pounds. A considerable amount of caviare, isinglass, and fish-oil are also manufactured at Toledo. In 1879 the amount of caviare was about 38,000 pounds; of isinglass, 500 pounds; and of oil, 650 gallons.

One of the fishery firms at Toledo has established a private hatchery in their warehouse, in which they hatch numbers of whitefish. The capacity of the establishment is calculated to be sufficient for 6,000,000 eggs. It is estimated that they had 15,000,000 eggs in the boxes at one time, but they lost all but about 4,000,000 eggs.

As an experiment, they have also bought or leased for a number of years several small, deep lakes in Michigan, where they have planted large numbers of young fish. The second year after the planting whitefish of considerable size were caught, and the proprietors are very hopeful of the success of the enterprise.

238. THE FISHERIES OF THE SOUTHERN SHORE.

LOCUST POINT TO OTTAWA CITY.—The principal fisheries on this section of coast are at Locust Point, Toussaint, Port Clinton, and Ottawa. As far as could be ascertained, during 1879, along the whole shore, about fifty-six men were employed in pound and seine fishing, ten in gill-net fishing, and thirty-six in fyke-net and hook fishing. All the firms which ship fish are also engaged in fishing, to a greater or less extent. Some of them are only owners of nets, and do not carry on fishing themselves. During the height of the season a large number of men are often temporarily employed, one firm often adding to its force as many as fifty or sixty men. All the nets used are owned by six firms, who carry on the fisheries by means of hired assistants.

At Port Clinton the boats are large and well made, the average length being about 32 feet. Smaller and less valuable boats, however, are used during calm weather and also in the hook fishery. The pound-nets in use at these points are set in deeper water and are more valuable than those used at Toussaint and Locust Point. In 1879 about eighty-nine pound-nets were in use along the whole shore, besides about five hundred gill-nets, thirty-five or thirty-six fyke-nets, three seines, and fifteen or twenty hook-rigs. The value of these nets, together with that of the boats, fish-houses, freezers, &c., according to the estimates of the fishermen, is about $37,500.

A large variety of fish are taken in the pounds as well as in the fyke-nets. In spring the principal kinds taken in the pounds are saugers and pike, but in fall whitefish and herring predominate. In the fyke-nets few other kinds except catfish, river bass, and other small varieties are taken. The catch of the seines consists of black bass, pike, perch, and bull-heads. The hook fishermen catch catfish almost exclusively. The total yield in 1879 was not less than 2,790,000 pounds. Of this amount about 1,700,000 pounds were sold fresh, being distributed to inland towns and sent to other distributing towns eastward. At least 60,000 pounds were frozen and sent to New York, Philadelphia, and other cities on the coast. Nearly all the herring caught are salted.

Information could be obtained of but one disaster by drowning since the commencement of the fisheries in this locality. In 1870 one fisherman was lost at Toussaint. As a rule, longer leaders are used for the pounds, and, in general, larger boats are employed than formerly. The mesh of the gill-nets has gradually been made to conform to the size of the fish to be taken, in many cases being one-half the size it was at the beginning of the decade. The fishermen and dealers generally claim that there has been a decrease in the abundance of the fish, particularly in the case of the whitefish. Some, however, among whom may be mentioned Mr. Matthews, of Port Clinton, argue that there are as many whitefish now as formerly, and that as many are caught, but that, being distributed among a larger number of fishermen, the profit accruing to each individual is less.

FISHERIES OF SANDUSKY.—The principal fishing stations in the vicinity of Sandusky are at Cedar Point, Marblehead, Spit Island, East and West Harbors, Mouse Island, Sugar Bluff, Moore's Point, Kelly's Island, and Put-in Bay. The fishing grounds of Sandusky may be divided into four great districts, each partaking of some peculiarity not shared by the others. The fisheries are generally spoken of as the Cedar Point fisheries, bay fisheries, island fisheries, and the main-shore fisheries. The Cedar Point fisheries, which are among the oldest and most important, occupy the shore from Cedar Point eastward toward Huron, a distance of about six miles. The bay fisheries are those which are carried on in the lower and upper Sandusky bays. Pounds, fykes, and seines are scattered along both shores and are owned and managed by a great many different parties. The main-shore fisheries occupy the shore west of the entrance to Sandusky Bay, the nets being distributed quite equally. The island fisheries are located at Bass and Kelly's Islands, which lie out in the lake a number of miles distant from Sandusky. The number of fishermen engaged in

the fisheries of these different localities is as follows: Kelly's Island, 22; South Bass Island, 23; Middle Bass Island, 15; North Bass Island, 6; the main shore, 63; the upper and lower bays, 94; Cedar Point, 56. In addition to these there are about thirteen men who fish but for a short time, and are engaged for the greater part of the year in other occupations. There are also twelve dealers and about nineteen clerks. Altogether, then, there are not less than three hundred and twenty-three men connected with the fisheries, the majority of whom are married and have families. Probably not less than thirteen hundred people are dependent upon the fisheries carried on from Sandusky. It should be borne in mind, however, that in this estimate the men employed in the manufacture of fishery apparatus are not included. As one might expect, the nationalities represented among the fishermen are very numerous. The Germans, however, predominate.

As already intimated, the principal branch carried on is the pound fishery. Seines, fykes, and hook-rigs are employed, but these fisheries are of minor importance. In 1879 about three hundred and forty-eight pounds were in use, together with about ten seines, fifty fyke-nets, and five hook-rigs. The boats employed are of various kinds, some quite large and worth not less than $100; others smaller and of considerably less value. Besides the boats there are two steamers which are employed in carrying the fishery products from place to place, and also two steam-tugs used in connection with the pound fisheries. The total value of the nets and boats employed in 1879, together with the value of warehouses, ice-houses, fish-shanties, docks, freezers, and other accessories, amounted to about $230,000.

The varieties of fish taken in the fisheries of Sandusky and vicinity are very numerous. In the Cedar Point fisheries the catch consists principally of herring, whitefish, &c.; in fact, these grounds are among the most famous for the abundance of the herring. In the pounds set in the bay principally soft fish are taken; herring and whitefish are never caught in them. The catch of the main-shore fisheries consists principally of herring and catfish, chiefly the former being taken in the pounds, the latter by the hook fishermen. About the islands few varieties except whitefish, herring, black bass, and sturgeon are taken. The value of the yield of 1879 was about $186,500.

A large proportion of the fish are sent to a great number of inland cities and towns. Among the most important of these may be mentioned Cincinnati, Pittsburgh, and Wheeling. Nearly all the firms located here freeze a large quantity of fish every year. A great many methods are employed and an account of them will be found in Section VI. Probably a larger amount of caviare, isinglass, and fish-oil are prepared at Sandusky than at any other point on the lakes. A large proportion of the sturgeon taken in the fisheries of many other points is sent to Sandusky to the firms who are engaged in making caviare and in smoking fish. The business of smoking sturgeon is said to be rapidly increasing and a large amount is prepared every year. The entire amount of caviare is exported principally to Hamburg; isinglass is sold wholesale to the druggists of New York City.

A considerable quantity of fish-oil is also manufactured at Sandusky and is sold chiefly to the tanneries at Buffalo.

The changes in the methods of fishing in this locality, as in others on Lake Erie, have been very few since the introduction of pound-nets in 1850. Prior to that time seines and gill-nets were extensively used, but both have gradually given place to the pound-nets, which, since their introduction, have increased in this locality at a rate of about sixteen a year. Seines are now used only in the bay fisheries, and gill-nets only about the reefs near the off-shore islands. A great diversity of opinion exists among the fishermen regarding the increase or decrease of fish. The majority of the men assert that herring and blue pike, and, in some localities, catfish are increasing, while

whitefish, sturgeon, and black bass are decreasing very rapidly. Some few, however, affirm that during 1878 and 1879 the schools of whitefish which visited the shore were larger than those during the three or four years preceding, and are of the opinion that this condition of affairs is due to the effect of artificial propagation. Others, again, have no faith whatever in "planted fish," as they call them. It seems quite evident, however, that the present supply of whitefish is not one-third what it was twenty years ago.

HURON.—At Huron, fishing is the most important occupation in which the people are engaged, and a large number of persons, besides those professionally engaged, are indirectly dependent upon the results of the industry. The number of professional fishermen in 1879 was about seventy-five, in addition to which about forty-six were engaged for a short period. The fisheries are controlled by twelve firms, who hire the necessary assistance. About two-thirds of the fishermen are married and have families. Almost every nationality is represented among them, but the Americans largely predominate. The Huron fishermen are considered a better class of men than the Lake Erie fishermen generally. As a rule, fishing is not hereditary with them, most of them having begun the business late in life. They are not so reckless and improvident as at many other places, and are said to be more energetic, hard-working, and temperate than those at Sandusky and some of the other large fishing towns. No fishing is now carried on upon Sunday, although the reverse was formerly the universal custom. The fishing at Huron is prosecuted almost entirely by means of pound-nets, no gill-nets or seines being used. There are about twenty fyke-nets set in the river, owned and operated by six or seven fishermen.

The only kind of boat used is the regular pound-boat, which is about 30 feet in length. There are no steam fishing-vessels in use at Huron, although steam-tugs are occasionally used for towing the scows to and fro.

In 1879 there were seventy-four pound-nets in use in these fisheries. They were set at different points along the shore for a distance of five miles east and about the same distance west from the mouth of the river. The nets are usually set in lines, six or seven together, the largest number in one line being ten. All the nets in any one line seldom belong to a single firm. The value of boats, nets, and other apparatus employed is not less than $58,000.

The Huron fishing grounds are considered the most profitable for herring fishing on Lake Erie. There has never yet been a total failure since fishing began. Whitefish and other migratory species are only taken in transit. The catch in 1879 amounted to about 2,392,000 pounds, making an average of about 32,000 for each pound-net. Of this amount about 840,000 pounds were sold fresh; 1,462,000 pounds salted; and 90,000 pounds frozen.

The greater part of the fresh fish was sold in various inland towns and also sent to the cities on the coast, New York receiving a large share of it. The salt fish were largely sent to Buffalo, New York, and to Philadelphia. Frozen fish found their principal market in Pittsburgh, Cincinnati, and New York. Most of the sturgeon were sent to Sandusky to be smoked. A small amount in 1879, however, was sent fresh to Pittsburgh. There is one establishment at Huron at which caviare and isinglass are prepared. The amount of caviare prepared in 1879 was about 8,100 pounds, and of isinglass 154 pounds.

There have been some changes in the fishing-boats used in this locality since the origin of the business. Twenty-five years ago the only boats employed were small row-boats; after that sloops were introduced, and they, finally, have been replaced by the pound-boats. The latter have increased considerably in size and quality of material used since they were first introduced. In fact, the pound-boats in use at Huron are among the best and largest built on the lakes. When pound-boats were first introduced no tunnel was used, and the pot had an opening 2 feet wide, the hearts

leading directly into it. On account of the defects in this form of pound-net great numbers of fish escaped, and, in fact, it was necessary to lift the nets two or three times each day in order to secure good hauls.

There have been no disasters among the fishermen at Huron since the establishment of the business.

VERMILLION.—The fisheries at this place are of less importance than those at Huron. The pound-net fisheries are owned by a single firm who hire a sufficient number of assistants to carry on the industry. Usually about ten men are employed for three months in spring, and thirty for the same length of time in autumn. Besides, there are about twelve men who follow hook fishing for catfish during five or six months of the year. About two-thirds of all the fishermen have families. A great variety of nationalities is represented among them.

The fishing grounds of Vermillion occupy a very small extent of shore, all the nets being set at one place and comparatively near together. In 1879 the number of nets in use was about 12, each of which was valued at about $400. A few gill-nets are owned at Vermillion, but they are used in fisheries at other places.

Catfishing with hook and line is quite an extensive industry at Vermillion. The total value of apparatus employed in both pound and hook fisheries, including the boats, fish-houses, ice-houses, and other accessories, is not less than $15,000. The boats used in the hook fishery are remarkably small, considering that the men often go at least 5 miles from shore, or even more. The majority of these boats are only about 18 feet long and are sloop rigged.

As occurs at other places, a large variety of fish is taken in the pounds; the principal kinds are herring, whitefish, blue pike, and yellow pike. A number of sturgeon are usually taken every season.

The catch for 1879 may be divided somewhat as follows: Fresh fish, 120,000 pounds; frozen fish, 74,000 pounds; salt fish, 146,000 pounds; total, 340,000 pounds. The value of this amount of fish is about $10,500, of which $7,000 worth is the product of the pound-nets, and the remainder the product of the hook and fyke-net fisheries. The larger part of the salt fish was sent to Buffalo, Huron, and Sandusky. The frozen fish were sent to Port Clinton, Pittsburgh, and New York, while the fresh fish were chiefly shipped to Cincinnati and Pittsburgh, as well as a large number of small inland towns in Ohio. The fishermen state that less sturgeon were taken in 1879 than ever before.

No other important changes have taken place in the methods of the fisheries; somewhat larger and better boats are now used than formerly, and also larger and deeper nets. The nets are also set much farther from the shore than in former years. The change, however, has been so gradual that no exact dates can be given.

Mr. McGraw, of the firm of Lavoo & McGraw, who is well acquainted with the fisheries, is of the opinion that blue pike and herring are increasing in abundance, while whitefish have decreased very much. He also considers that the throwing overboard of offal has had a tendency to drive the whitefish away. Twenty years ago a small seine dragged within a stone's throw of the shore would have brought enough whitefish to fill a boat. At that time small shoal-pounds with very light and thin stakes were in use, and with this simple apparatus more fish were then taken than can now be procured by the costly and elaborate forms of apparatus employed.

No disasters have taken place among the fishermen of Vermillion since fishing was first commenced at this point.

AMHERST, BROWNHELM BAY, AND LORAINE.—The fisheries of this section of shore yield large returns considering the amount of apparatus employed and the number of men engaged.

The fisheries, unlike those of Vermillion, are controlled by a large number of firms, each of which owns a few nets. In 1879 there were ten firms engaged in the fishing business, employing together about thirty-two men. Besides the professional fishermen, most of the firms living near the shore own a few gill-nets and take what fish they need for their own use, carrying on the fishery for only a few days in the best part of the season. The majority of the professional fishermen, as well as of the owners of the nets, are Germans. As a rule, the assistants are not employed for more than six months in each year.

The only form of apparatus in use is the pound-net; about thirty-nine of these were in use in 1879, being set at different points along the shore. There are three gill-netters from Erie who fish in this vicinity at certain seasons, but, besides the farmers already mentioned, there are no persons who make a regular business of gill-netting. The nets and boats employed in 1879, together with the accessories, were valued by the owners at about $22,700.

The grounds of this section are chiefly noted for the abundance of blue pike. In 1879 about 1,300 half-barrels of them were prepared for market; herring are also very abundant, the catch in 1879 being sufficient to fill about 2,600 half-barrels, when salted. The amount of other varieties taken in 1879, exclusive of sturgeon, was not less than 185,000 pounds. All of that amount was sold in the vicinity of the fisheries. The salt fish was sent to Huron and Cleveland. In addition to the amounts already mentioned, about 3,000 sturgeon, weighing not less than 50,000 pounds, were taken and sent to Sandusky to be smoked.

No disasters have occurred in this vicinity since the origin of the fisheries.

The general impression among the fishermen seems to be that there has been a great decrease among whitefish during the last decade. Ten years ago not half as many nets were in use as are now employed, but a much larger quantity of fish was taken. The decrease of other species is said to be imperceptible, some even claiming that the blue pike and the herring have increased. About eight or nine years ago the prices of all kinds of fish, except whitefish, were nearly double the present prices.

DOVER BAY.—These fisheries are not very extensive. The nets are scattered along six or seven miles of shore. During 1879 about twenty men were employed by the five firms who owned and managed the fisheries. The hired men are usually engaged for not more than six months in each year. Most of the assistants and owners are Germans. All of the net owners are also farmers, who carry on the double occupation of fishing and farming. The fishing business is said to have been quite profitable, and many of those engaged are in good circumstances.

Pound-nets are the only form of apparatus employed. In 1879 there were about twelve of these nets in use, varying in depth from 20 to 40 feet. No gill-nets are now in use at Dover Bay. They were experimented with some few years ago, but proved unprofitable.

The grade of fish taken at Dover Bay is poor; most of them are classed as "soft fish." The yield in 1879 was a little more than 300,000 pounds, the greater proportion of which was sent to Cleveland, although the wholesale dealers there care very little about handling it.

Pounds have been in use in this locality since the year 1862, but it has been only within the last eight or nine years that the fishery has met with much success. There has always been more or less difficulty experienced in keeping the nets in place on account of the exposed nature of the shore. By better management, within later years, however, this evil seems to have been eradicated. The boats now employed are larger and of better model than those formerly in use, and are usually propelled by sails instead of by oars.

CLEVELAND.—The fishery trade of Cleveland, in proportion to the population of the city, is

much smaller than that of many other lake towns. One reason for this condition of affairs is that there are no very extensive or important fisheries in the vicinity. The railway facilities also are such that the city is not especially important as a distributing center. The nearest fisheries are those of Dover Bay, about 14 miles distant, and there, as has already been stated, the fish taken are of a low grade, and not abundant. As a distributing point for salt fish, however, Cleveland is of considerable importance. Supplies are received from nearly all the larger fisheries of Lakes Michigan, Huron and Superior. A large percentage of the fish received is sold to wholesale city grocers and jobbers, who sell them in small lots, usually repacked in kits, to their customers in the surrounding country. It appears that in 1853 ten times more fish were shipped from Green Bay to Cleveland than to Chicago, while at the present time the reverse is the case.

The local consumption of fresh fish is large, and the city sustains several flourishing retail establishments. There are two retailers who supply the wealthy class. They sell only the very best varieties, and receive proportionately high prices. The other dealers sell cheaper grades, and receive the patronage of less opulent citizens.

ASHTABULA AND CONNEAUT.—The fisheries of Ashtabula and Conneaut are somewhat different in character from those of the places immediately to the westward. The nature of the coast is such that pound-nets cannot be employed, and fishing is therefore carried on almost exclusively by means of gill-nets. In 1879 there were about thirty-four men engaged in fishing, twenty-four of whom were married men with families, and the remainder single young men. Besides these there are also eight fishermen who occupy themselves in fishing for but a small portion of the year. About one-half of the fishermen are Germans and the remainder Americans. Three tugs are employed in connection with the gill-net fishery, the value of which, according to the owners, is not less than $3,000. The nets and small boats employed, together with the accessories, are worth about $6,500; making a total investment of $10,000.

It was found quite impossible to obtain exact information as to the yield of the fisheries of Ashtabula and Conneaut for the year 1879. Every man ships the fish which he catches, and only a few dealers keep any record. Mr. David Jones, of Conneaut, however, a man well informed regarding the fisheries, estimated the amount of the catch, and doubtless his figures are very nearly correct. According to Mr. Jones, the yield was about 400,000 pounds, which, at an average shipping price of 5 cents a pound for all kinds, would be worth about $20,000. Probably about seven-eighths of the whole were whitefish. The greater part of the catch was sent to Cincinnati and Cleveland, although considerable quantities were sold at Akron, Columbus, and other inland towns in Ohio. When the boats and tugs fish off Erie a large share of the fish is shipped from that point; at times some are sold to the dealers. Some of the fish-offal is used in making oil; in 1879 about $200 worth of oil was extracted from this material.

There has been a noticeable change in the manner of prosecuting the fisheries in this vicinity within the last twenty years. The boats have increased in size at least one-half within the last decade and their model has been very much improved. Twenty-five years ago fishing-nets were knit from very coarse twine, which made them heavy, and it was necessary to employ one man for every four nets. In contrast it may be stated that now two men can safely set and lift at least twenty-five nets. With these heavy nets and small, imperfectly made boats, the fishermen did not venture out more than half as far as they do at the present day. Nevertheless, at that time, they caught a great many more fish than now. It is probable that if the same kinds of nets were used now as were employed twenty years ago not enough fish would be caught to supply the wants of the fishermen themselves.

There had been no disaster at Conneaut for over twenty years, but in the fall of 1879 a boat carrying two men was lost in a gale.

WILLOUGHBY AND PAINESVILLE.—The fisheries at these two points are operated by four firms. During the fishing season they hire about forty fishermen, three-fourths of whom are married men. In addition to this number, about twenty others are temporarily employed, usually from March to July, and from September to December. In 1879, however, on account of the unusual mildness of the winter, they were employed nearly the whole year. The fishermen receive very good wages, and most of them are in comfortable circumstances. All, except two, are Americans, the two excepted being of German descent. The fishermen who receive monthly wages seem to live better than those who fish on their own account; they know exactly how much they can rely upon and usually live within their incomes, while those who are fishing for themselves always have in anticipation the capture of fabulous amounts of fish which will help them out of present difficulties.

The fisheries are prosecuted almost exclusively by means of pound-nets. In 1879 there were about seventeen of these nets located here, which, with the boats used in their management and the accessories, were valued at about $18,500. It would seem from these figures that the owners had placed rather too high a valuation upon their property.

A large variety of fish is taken in the pounds; they are all classified in three grades, known as, "rough," "hard," and "soft." Of the three grades, about 340,000 pounds were caught in 1879. In addition, not less than 4,200 sturgeon, weighing about 90,000 pounds, were caught. About one-third of the entire catch was frozen and sent eastward. Of the remainder enough were salted to fill 255 half barrels, and these were sent to Cleveland. The fresh fish are sold in various parts of Pennsylvania, Pittsburgh being the principal market. A large share of the sturgeon are usually sent to Sandusky; in 1879, however, about 8,000 pounds were smoked and sold in the vicinity.

There is a general belief current among the fishermen that there has been a considerable decrease among "hard fish," but none of importance among the "soft fish," during the past decade. Sturgeon are, perhaps, somewhat less abundant. In 1870 it was reported that 20,000 were caught at Painesville, and that some of them were sold at about $2 for a wagon-load. At Swanville more than seventy have been caught in one day by two men using grapnel-hooks.

There have been no important changes in the manner of fishing. The size of the meshes, however, in the pots of the pounds have been somewhat increased. The same kind of boats are used now that were employed when the fishery began.

MILES GROVE, OHIO; ERIE, PA.; AND BARCELONA AND DUNKIRK, N. Y.—The professional fishermen employed at the four villages mentioned are distributed about as follows: Miles Grove 14, Erie 100, Dunkirk 4, and Barcelona 6; making a total of 124. About eighty of these men are married. At Erie the boats and outfits are owned by the fishermen, in very many cases two men being in partnership. The capitalists are the dealers who buy the fish from the fishermen and ship them; they also sell twine for nets. At Erie the nationality of the fishermen is German. The manner of carrying on the fisheries at these four villages is different from that of most of the stations west of Lake Erie. The gill-net is the only form of apparatus in use. In 1879 forty-two boats, each carrying about one hundred and twenty-five gill-nets, were employed, and these together were valued at about $25,000. The only other item of the investment here is that for fish-houses, ice-houses, &c., the amount of which is not more than $3,000.

The quantity of fish taken at the four villages in 1879 was about 1,350,000 pounds. The amount may be divided somewhat as follows: Erie, 1,050,000 pounds; Dunkirk, 40,000 pounds; Barcelona, 60,000 pounds; Miles Grove, 200,000 pounds. The fish caught at Erie are sent chiefly

to eastern and interior cities. From the other villages the fish are sent to various places in New York and Pennsylvania. Miles Grove fishermen, however, send largely to Kentucky and to Pittsburgh. Quite a large amount also is shipped in cars from Miles Grove to Columbus, Ohio. No fish are smoked at Erie, and the amount salted is very small. In 1879 only 10,000 pounds of whitefish were prepared in this way.

At Erie the fishermen engage in extracting oil from fish offal. During 1879 about 800 gallons were made. It is not very carefully made, and only a small price is realized. It is sold mainly to the tanneries in Buffalo.

Considering the number of men and boats employed in this locality, the disasters have been remarkably few. In the fall of 1877 three men were lost; this was the only accident, as far as could be ascertained, for many years.

The fishermen of this region, like their class generally, are poor, owing, however, more to their shiftlessness than to lack of income. Some are in quite good circumstances and four or five have made considerable fortunes. Very little attention appears to have been given to fishing at Erie, and there are no records from which information can be gathered regarding the history of the fisheries of the place. Nearly all the fishermen here have but recently engaged in the business, few having been employed for more than ten years. The number of the boats is said to have increased very much during the last half of the past decade. The year 1878 was the most successful that has occurred since 1860, and the yield for 1879 was quite as good as that for the year 1875. There have been no very important changes in the methods of fishing, except that finer twine is used in the nets than formerly, and the boats are larger and better built.

BUFFALO.—At Buffalo fishing is rather an unimportant occupation. There are a great many men who fish in winter with hooks through the ice, and during the warmer part of the year with small seines, in the river. These catch a considerable amount of fish. Mr. Johnson, one of the oldest dealers of Buffalo, stated that, in his opinion, in ordinary winters, when the ice was thick on the lake, as many as three hundred persons, a large percentage of whom were sailors, were engaged in fishing, and that ordinarily a winter's catch would not fall far short of 300,000 pounds. Very little of this amount, however, falls into the hands of the city dealers. Pike and sturgeon are the principal kinds taken. The winter of 1879 was exceptionally mild, no ice being formed in the lake, and therefore no fishing was prosecuted.

Considerable numbers of sturgeon are caught by means of three-pronged grappling-hooks, which are dragged along the bottom. Pounds or trap-nets are not allowed in the waters of Lake Erie bordering on New York, so that the supply of sturgeon is much less than it would otherwise be. Some fishermen of Ohio attempted to use these nets near Buffalo, but were obliged to desist. Many fish caught in Canadian waters are shipped to Buffalo.

According to the best estimates that could be obtained the amount of fresh fish received into Buffalo during 1879 was approximately as follows: Whitefish, 1,083,000 pounds; trout, 628,500 pounds; mixed fish, 420,000 pounds. Of this whole amount, about 675,000 pounds were received from fisheries lying to the westward, of which account has already been taken. About 600,000 pounds were consumed in the city. Considering the population of Buffalo, this amount is quite small in comparison with the consumption of some other cities. The whole amount of fish received, fresh, salt, and smoked, was about 4,000,000 pounds. Considering the remarkable increase in the receipts of Chicago, it seems hardly possible that the trade of Buffalo could have fallen off since 1872 as much as 2,000,000 pounds. Nevertheless, the statistics for that year, as published by the late Mr. Milner, in the U. S. Fish Commissioner's Report, show that such must be the condition of affairs.

According to the statement of Buffalo dealers, the year 1879 was an exceptionally poor one. The complaint was made that Chicago, by paying higher prices than Buffalo could afford, received a large portion of the products of the fisheries of the latter place.

F.—LAKE ONTARIO AND ITS FISHERIES.

239. STATISTICAL SUMMATION.

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	612

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels and boats	167	$13,100
Pounds	34	14,000
Gill-nets	6,000	20,000
Seines	9	1,950
Shore property	.....	5,000
Total	.....	54,050

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fresh fish	3,490,000	$132,550
Frozen fish	150,000	5,500
Total	.....	138,050

240. THE FISHERIES OF THE AMERICAN SHORE.

THE FISHERY INTERESTS OF THE LAKE.—There is very little fishing carried on at the western end of this lake and the few fish caught are taken by the fishermen for their own consumption. The only fisheries which are of commercial importance are situated at the east end of the lake, near the head of the Saint Lawrence River.

There are no records to show the number of fishermen in the different villages, but the following summary, prepared from results of investigation, is probably very nearly correct:

Place.	Number.	Place	Number.
Oswego	8	Wilson	10
Port Ontario	23	Fair Haven	6
Little Sandy	12	Chaumont	12
Big Sandy	6	Sackett's Harbor	250
Stevens' Point	2	Other points*	10
Armstrong	4		
Cape Vincent	47	Total	400
Chippewa Bay	10		

* From Fox Island to Sandy Creek.

Although French Canadians are quite numerous, Mr. Clark, of Sackett's Harbor, stated that at the east end of Lake Ontario, in the vicinity of Chaumont and Sackett's Harbor, the fishermen originally came from Connecticut, bringing with them the methods they had employed in that region.

Various branches of the fisheries are carried on at the eastern end of Lake Ontario. At Oswego, Wilson, Fair Haven, and Chaumont, gill-net fishing is the principal branch engaged in, while at Cape Vincent and Sackett's Harbor pound-nets are also used, and at these two places and also at Port Ontario a number of seines and fyke-nets are in use.

The value of the apparatus used at Oswego in 1879, including two hundred gill-nets and four boats, was estimated at $800. At Port Ontario were twenty-three boats, eighteen gangs of gill-nets, seventy-five fyke-nets, and about six or seven seines. The investment was not less than $7,500. At Cape Vincent, which, with the exception of Sackett's Harbor, is the most important station in this region, the capital invested in the fisheries is about $16,500. In this amount is included the value of about 2,250 gill-nets, five pounds, one hundred and fifty trap and fyke-nets, the necessary boats for the management of these nets, and the ordinary acccessories, such as fish-houses and ice-houses. At Sackett's Harbor the number of pound-nets is much larger. In 1879 not less than thirty-one were used here. These, together with about three thousand gill-nets, one hundred traps, thirty fykes, and about three seines, were valued at about $25,500. In operating these nets, one hundred gill-net and other boats were employed, besides a steam-tug; the total value of this apparatus was $7,400. The value of accessories was estimated at $6,000.

Several disasters have occurred at the different fishing villages in this region. Twelve years ago four boats carrying three men each were lost off Port Ontario. At Cape Vincent only one man has been drowned in ten years, while in Chaumont there have been but three men lost in fifty years, although as many as three hundred have been engaged from the latter place at one time. At Hudson's Bay, in 1879, seven men were lost at one time.

Notwithstanding the prevailing cry of decrease of fish, the fishermen seem to be making very good profits, especially those who are industrious and attend carefully to their business. These remarks, however, do not apply to some of the older grounds on the south shore; for example, at Charlotte, Wilson, Fair Haven, and Poultneyville, where it is a fact that fishing is no longer profitable.

Poultneyville, N. Y., has been a resort for Canadian fishermen for a number of years. They came for the first time about 1865. At the present time, however, they have ceased coming. Mr. Harrington, of Port Ontario, who is well acquainted with the history of the fisheries at that place, says that there has been no change in the manner of fishing for a great many years, except that the salmon fisheries once carried on in the river at that place are no longer in existence. In his opinion there is a considerable decrease in the abundance of some kinds of fish, especially among whitefish.

At Cape Vincent there was no fishing of importance until 1859. Prior to that date the fish, only caught in small quantities, were consumed by the fishermen. Before the building of the railroad, which now connects this village with other places, a large portion of the catch was salted.

Messrs. Clark & Robbins, of Sackett's Harbor, stated that in 1877 they salted not less than 2,447 half-barrels of ciscoes, while in 1879 they obtained only 100 half-barrels. In their opinion, such fish as pike, black bass, and trout have increased since alewives made their appearance, while whitefish and ciscoes have decreased.

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APPENDIX.

HISTORICAL REFERENCES TO THE FISHERIES OF NEW ENGLAND.

By A. HOWARD CLARK.

ANALYSIS.

THE FISHERIES OF NEW HAMPSHIRE.

Fishing by the colonists.
Condition of the fisheries in 1791.
New Castle and Exeter.
Portsmouth from 1770 to 1870.
The Isles of Shoals.

THE FISHING TOWNS OF MASSACHUSETTS.

Newbury and Newburyport.
Ipswich.
Gloucester.
Essex.
Beverly.
Salem.
Marblehead.
Swampscott.
Nahant.
Lynn.
Medford.
Braintree and Quincy.
Hull.
Hingham.
Scituate.
Duxbury.
Plymouth.
Kingston.
Truro.
Eastham.
Orleans.
Wellfleet.
Brewster.
Chatham.
Dennis.
Yarmouth.
Sandwich.
Falmouth.
Martha's Vineyard.
Elizabeth Islands.
Wareham.
Marion.
New Bedford.

THE FISHERIES OF RHODE ISLAND.

Rhode Island in the seventeenth and eighteenth centuries.

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APPENDIX.

HISTORICAL REFERENCES TO THE FISHERIES OF NEW ENGLAND.

THE FISHERIES OF NEW HAMPSHIRE.

A brief statement of the condition of the fisheries of this State in 1791 is given above on page 105. The following additional references from official records and histories show the development of the industry during the past two hundred and fifty years:

FISHING BY THE COLONISTS.

THE SETTLEMENTS IN 1623.—"To include the early inhabitants of New Hampshire with Puritans," writes Sabine, "and among refugees from religious persecutors, as some do, is to degrade to mere fable many of the best-authenticated facts in history. The sole purpose of the first and of the subsequent proprietors was to acquire wealth by fishing and trading." In 1623 several gentlemen merchants and others, belonging to Bristol, Exeter, Dorchester, Shrewsbury, Plymouth, and other places in the west of England, formed an association under the title of "The Company of Laconia." They obtained patents from the Council of Plymouth for the country between the Merrimack and the Kennebeck, and back to the Great Lakes and the Saint Lawrence. Being encouraged by the colonists at New Plymouth, and the reports of fishermen who had made voyages upon the coast, they sent over David Thompson, together with Edward Hilton and William Hilton, who had been fishmongers in London, and some others, provided with the necessary tools and provisions and with instructions to establish a fishery.

The Hiltons set up their stages some distance above the mouth of the Piscataqua, near the present site of Dover. Another division about the same time established themselves at the place now called Odiorne's Point, where they built the first house and established salt works, to provide salt for curing their fish. The site of this house with three or four thousand acres of the surrounding land was assigned to Capt. John Mason, and the house took the name of "Mason Hall."

Odiorne's Point received its name from John Odiorne, who resided there in 1660, and his descendants have remained in that vicinity until the present day. The point is near the mouth of the river and three miles from the present market square. Certainly no better locality could have been selected for a fishing station, since here was a safe and fine harbor, and a river which was the home of the salmon, alewife, menhaden, and other varieties of fish, while the best of fishing grounds for salt-water species were in the bay close by the mouth of the river.

SOME EARLY SETTLERS.—Mr. William Pepperell, of Cornwall, and a Mr. Gibbons, from Topsham, in the west of England, two respectable gentlemen, were among the first settlers at the Shoals. For a year or two they carried on the fisheries at this place. They soon found it too limited for their views and concluded to remove to some part of the main. "To determine them whither they should go they set up each a stick and left them to fall as Providence should direct. Pepperell's fell northwest, Gibbens' fell towards the northeast. Each pursued with enthusiasm the course his stick pointed him, and the former established himself at the mouth of Piscataway River; the latter is said to have obtained a grant of the tract since called Waldo Patent.

"Sir William Pepperell, the commander of the memorable expedition against Louisbourg, was the son of this William Pepperell. As a merchant at Kittery, the oldest incorporated town in Maine, where he was born, where he lived and died, and where strangers are still shown his large mansion-house and his tomb, he was personally concerned in the fisheries. He acquired great wealth. The dignity of a baronet of Great Britain, an honor never before nor since conferred on a native of New England, was bestowed in reward of his military services; and not long previous to his death he was created a lieutenant-general."[1] He died in 1759.

GROWTH OF THE COLONY.—The building up of the colony was slow work, the colonists being absorbed entirely in the fisheries and the fur trade. In 1631 there were but three houses in the settlement. Laconia soon fell into the hands of Mason and of Sir Ferdinando Gorges, one of his associates in the company. "Their associates," continues Sabine, "discouraged by the continual demands upon them without returns for the capital invested, relinquished their shares. But Gorges and Mason did nothing to change the original designs of the first patentees. They formed no government; they merely employed men to fish and trade for them, without erecting any tribunals whatever to protect their own interests or the rights of others.

"Finally, Laconia was divided into two colonies. To Gorges was assigned, in his own right, the region east of

[1] Coll. Mass. Hist. Soc.; and Report on the Principal Fisheries of the American Seas, by Lorenzo Sabine. Washington: 1852.

the Piscataqua, to which he gave the name of Maine; and to Mason the territory on the westerly side of that river, which, in honor of the county in which he lived in England, he called *New* Hampshire.

"Mason was bred a merchant, but became an officer in the British navy, and in that capacity had resided at Newfoundland as one of the governors of that island, of the description spoken of in the second part of this report. He was, therefore, personally acquainted with the management of a fishery. * * *

"The history of industry upon the sea, for the century and a half that New Hampshire remained an English colony, is brief and without events of particular interest. In 1632 Mason wrote from London to his agent Gibbens, on the Piscataqua, that 'the adventurers here have been so discouraged by reason of John Gibb's ill dealing in his fishing voyage, as also by the small returns sent hither by Captain Neale, Mr. Herbert, or any of their factors, as that they have no desire to proceed any further until Captain Neale come hither to confer with them, that, by conference with him, they may settle things in better order.' Again, in the same letter he remarks that 'we desire to have our fishermen increased, whereof we have written to Mr. Godfrey.' In July, 1633, Gibbens said, in a communication to his employers, that 'for your fishing you complain of Mr. Gibbs. A Londoner is not for fishing, neither is there any amity betwixt the west-countrymen[1] and them. Bristol or Barnstable is very convenient for your fishing ships. It is not enough to fit out our ships to fish, but they must be sure (God will) to be at their fishing place the beginning of February, and not come to the land when other men have half their voyage.' The last letter is apparently a reply to the first, and both show that, after ten years' experience, the fishery was managed without skill, and afforded no profit, while the intimation of Gibbens, relative to the late arrival of his employer's ships, may be construed to mean that English merchants sent their vessels to our coast in mid-winter.

"The colony was indeed in an unpromising condition. For years afterwards there was but little change for the better. The colonists neglected the soil, and the food necessary for their support was obtained in Virginia and England. 'Puscataway,' said the noted John Underhill, 'is a desirable place, and lies in the heart of fishing;' and such is the uniform account of the early chroniclers; but yet the capital invested there by the original patentees, and by Gorges and Mason, was entirely lost. * * *

"The colony depended upon axes and saws, shallops and fishing-lines, until necessity compelled a resort to the plow. Its first exports of corn were mid the desolations of the struggle that resulted in giving it the rank and blessings of an independent State. * * * The trade of Portsmouth was of slow growth. The number of vessels that entered the port in 1681 was forty-nine; but some were of the burden of 10 tons, or mere boats, and none were larger than 150 tons; while the whole amount of impost or customs collected was less than £62."

The following extract from the council records for 1682 shows of how little value the local fisheries were at that time:

"Importation by strangers is of little value; ships commonly selling their cargoes in other governments, and if they come here, usually come empty to fill with lumber; but if haply they are at any time loaded with fish it is brought from other ports, there being none made in our province, nor likely to be, until His Majesty please to make the south part of the Isles of Shoals part of this government, they not being at present under any."

THE FISHERIES IN 1715 AND 1730.—"In 1715," says Sabine, "Kittery, opposite to Portsmouth, in Maine, and the seat of an extensive fishery, was made a port of entry in consequence of the improper duties and exactions (as was alleged) which the government of New Hampshire demanded of the merchants and fishermen trading at the towns on the Piscataqua. The difficulties which caused this measure seem to have occasioned much excitement. * * * An answer was framed to inquiries of the Lords of Trade and Plantations, in 1730, which shows that the commerce of Portsmouth was still small. The exports were stated to be 'fish and lumber;' the number of vessels was only five, of about 500 tons in the aggregate; and the tonnage of vessels trading there, owned elsewhere, even less. 'The province,' it was said, 'makes use of all sorts of British manufactures, amounting to about £5,000 sterling annually, which are had principally from Boston.' 'The trade to other plantations' was to the 'Carribbee Islands, whither we send lumber and fish and receive in return rum, sugar, molasses, and cotton; and as to trade to Europe it is to Spain or Portugal, from whence our vessels bring home salt.'"

CONDITION OF THE FISHERIES IN 1791.

THE COD FISHERY ON THE BANKS AND INSHORE.—Belknap, in his history of New Hampshire, thus describes the fisheries of the State in 1791: "The cod fishery is carried on either by boats or schooners. The boats, in the winter season, go out in the morning and return at night; in the spring and summer they do not return till they are filled. The schooners make three trips to the banks in a season. The first or spring fare produces large, thick fish, which, after being properly salted and dried, is kept alternately above and under ground till it becomes so mellow as to be denominated dumb-fish. This fish, when boiled, is red, and is eaten generally on Saturdays at the best tables in New England.

"The fish of the summer and fall fares is divided into two sorts, the one called merchantable and the other Jamaica fish. These sorts are white, thin, and less firm. The Jamaica fish is the smallest, thinnest, and most broken. The former is exported to Europe, the latter to the West India Islands. The places where the cod fishery is chiefly attended to are the Isles of Shoals, New Castle, Rye, and Hampton; but all the towns adjoining the river are more or less concerned in it. The boats employed in this fishery are of that light and swift kind called whale-boats. They are rowed either with two or four oars and steered with another, and, being equally sharp at each end, move with the utmost celerity on the surface of the ocean. Schooners are generally from 20 to 50 tons, and carry six or seven men

[1] West-countrymen of England. Nearly all the fishing vessels that came to America were from the west counties.

and one or two boys. When they make a tolerable fare, they bring home five or six hundred quintals of fish, split, salted, and stowed in bulk.

CURING THE CATCH; FOREIGN TRADE.—"At their arrival the fish is rinsed in salt water, and spread on hurdles composed of brush, and raised on stakes about three or four feet from the ground; these are called flakes. Here the fish is dried in clear weather, and in foul weather it is put under cover. It ought never to be wet from the time that it is first spread till it is boiled for the table. Besides the fleshy parts of the cod, its liver is preserved in casks and boiled down to oil, which is used by curriers of leather. The tongues and sounds are pickled in small kegs, and make a luxurious, viscid food. The heads are fat and juicy; but most of those which are caught at sea are thrown away. Of those which are caught near home the greater part become the food of swine.

"The fishery has not of late years been prosecuted with the same spirit as formerly. Fifty or sixty years ago the shores of the rivers, creeks, and islands were covered with fish flakes; and seven or eight ships were loaded annually for Spain and Portugal, besides what was carried to the West Indies. Afterward they found it more convenient to make the fish at Canseau, which was nearer to the banks. It was continued there at great advantage till 1744, when it was broken up by the French war. After the peace it revived, but not in so great a degree as before. Fish was frequently cured in the summer on the eastern shores and islands, and in spring and fall at home. Previously to the late revolution, the greater part of remittances to Europe was made by the fisheries, but it has not yet recovered from the shock which it received by the war with Britain.

"It is, however, in the power of the Americans to make more advantage of the cod fishery than any of the European nations. We can fit out vessels at less expense, and by reason of the westerly winds, which prevail on our coasts in February and March, they can go to the banks earlier in the season than the Europeans and take the best fish. We can dry it in a clearer air than the foggy shores of Newfoundland and Nova Scotia. We can supply every necessary from among ourselves, vessels, spars, sails, cordage, anchors, lines, hooks, and provisions. Salt can be imported from abroad cheaper than it can be made at home, if it be not too much loaded with duties. Men can always be had to go on shares, which is by far the most profitable method, both to the employers and the fishermen. The fishing banks are an inexhaustible source of wealth, and the fishing business is a most excellent nursery for seamen. It therefore deserves every encouragement and indulgence from an enlightened national legislature.

VESSEL BUILDING IN 1791.—"Fishing schooners and whale-boats are often built at the distance of two or three miles from the water. * * * Vessels of an hundred tons and upwards have been built at the distance of one or two miles from the water and drawn on strong sledges of timber, on the snow, by teams of two hundred oxen, and placed on the ice of the rivers so as to float in the spring."[1]

NEW CASTLE AND EXETER.

THE FISHERIES OF NEW CASTLE IN 1870.—The Portsmouth Chronicle of August 10, says: We are pleased to learn that the New Castle fleet is doing a big business this year, and that Harding and Doane are prospering to a very gratifying degree. One of their craft, the Velocipede, not finding fish where the rest of the summer fleet were, stood away to the southward, an unusual thing to do so late in the season, and soon took 200 barrels of mackerel in over her rails, and nearly every vessel arriving lands a good fare, schooner Pyrola, Moore, one of Messrs. Harding and Doane's fishing fleet, arriving at New Castle Monday evening, after an absence of ten weeks on Grand Bank, with 1,600 quintals of splendid fish on board. This is an immense catch, and the Pyrola claims the fishery championship; we think she has won it, though, if we remember rightly, there was an old brig that once brought in 1,600 quintals of dried cod, but that was the result of a long trip to Labrador. Another of Messrs. H. and D.'s fine vessels, the schooner W. H. Y. Hackett, Robbins, arrived Tuesday, also from Grand Bank, with 1,200 quintals of fish."

EXETER IN 1792.—"There was formerly at the falls in this town an alewife fishery, which afforded an abundant supply of that kind of fish for the inhabitants of the town and vicinity. But for want of sluices in the dams, by which they might ascend the fresh river and gain proper places for spawning, they have for many years almost disappeared. There was also, till within thirty years, a good bass fishery through the whole course of the river. But very great numbers having been imprudently, or rather, wantonly taken in one season, they almost totally left it. For several years past they have been returning to their old haunts, though in small numbers. Could people be restrained from taking them through the ice, it is thought that the river might again be replenished with them and the fishery restored. The legislature has passed an act for their preservation; but, through the inattention of those whose duty it is to guard the laws from violation, it is feared that the generous intention will be frustrated. Laws of this kind not duly enforced serve only to favor the vicious and irregular at the expense of the conscientious part of the community. Three or four miles below the falls are taken a few oysters of a small size but good relish."[2]

PORTSMOUTH, 1770 TO 1870.

THE FISHERIES AND FOREIGN TRADE FROM 1770 TO 1806.—Some reference to the early fisheries of Portsmouth has already been given in the review of the State. Toward the close of the last century a considerable foreign trade was developed. At the wharves were constantly seen vessels loading for the West Indies, Spain, and other countries, large quantities of fish forming a great part of their cargoes. During the war of the revolution, when the hook and line were temporarily laid aside, a fleet of privateers was fitted out and soon heard from in various parts of the world. The first privateers fitted out after the declaration of war were from Portsmouth, and many of them were fishing

[1] Belknap's Hist. New Hampshire. Boston: 1792. Vol. iii, pp. 211-216.
[2] Coll. Mass. Hist. Society, vol. iv, 1792, 1st series, p. 95.

vessels manned by fishermen. Until 1806, Fernald's Island, containing sixty acres, and lying immediately opposite the city, was extensively used for the curing of fish. In that year it was purchased by the Government for $5,500 and the Portsmouth Navy-yard established there.

THE PORTSMOUTH WINTER FISHERIES IN 1870.—The Gloucester Telegraph of March 23, 1870, says: "The Portsmouth fisheries employ ten vessels with forty small boats and one hundred men in the winter fisheries off that harbor. It is estimated that over a million pounds of codfish have been landed at one wharf in Portsmouth during the past winter. Nearly $30,000 worth of fish have been sold this season, mostly to dealers in Boston and New York. In and about the harbor there is now sunk over 63 miles of trawls, on which are hung over 96,000 hooks. These hooks are baited mostly with herring and sometimes with clams. The cost of one baiting for this 63 miles of trawl is about $180. Next winter will probably see 200,000 temptations set for the codfish who lie in the deep water off Portsmouth Harbor."

The Gloucester Telegraph of December 7, 1870, says: "The fishermen of Portsmouth, N. H., are having a great catch now. Four schooners arrived from a two days' cruise on Monday, bringing in 75,000 pounds of fish." The same paper for December 14th says: "The large amount of fish reported caught in Portsmouth Harbor of late were taken on trawls. One vessel, carrying fourteen men, received $1,350 for their harvest of one week, but this was very unusual."

HISTORY OF THE ISLES OF SHOALS AS A FISHING STATION.

ORIGIN OF THE NAME.—"Sailing out from Portsmouth Harbor with a fair wind from the northwest," writes Celia Thaxter, "the Isles of Shoals lie straight before you, nine miles away, ill-defined and cloudy shapes, faintly discernible in the distance. A word about the origin of this name, Isles of Shoals. They are supposed to have been so called, not because the ragged reefs run out beneath the water in all directions ready to wreck and destroy, but because of the shoaling or schooling of fish about them, which, in the mackerel and herring seasons, is remarkable. As you approach they separate and show each its own characteristics, and you perceive that there are six islands if the tide is low, but if it is high there are eight, and would be nine but that a breakwater connects two of them."[1]

FACILITIES FOR FISHING.—These islands would probably never have been settled but for the excellent advantages they afforded for the prosecution of the fisheries. The early colonists of New England were constantly on the lookout for good fishing stations. Levett, who visited the locality in 1623 or 1624, wrote: "The first place I set my foot upon in New England was the Isles of Shoals, being islands in the sea, about two leagues from the main. Upon these islands I neither could see one good timber tree nor so much good ground as to make a garden. The place is found to be a good fishing place for six ships, but more cannot well be there for want of convenient stage room, as this year's experience hath proved. The harbor is but indifferent good. Upon these islands are no savages at all."—Levett's Voyage: London, 1628.[2]

In Lechford's Plaine Dealing, published in London in 1642, it is remarked: "The Isle of Shoals and Richmond's Isle, which lie neere Pasquattaqua, are good fishing places."[3]

DISASTER.—"In 1632 a fishing shallop at the Isle of Shoals was overset."[4]

THE ISLANDS IN 1661 AND 1682.—"The Isle of Shoals were occupied at a very early date, and soon became places of note and of great resort. In 1661, they were inhabited by upwards of forty families. The fisheries were prosecuted with vigor and success at that period, and subsequently, for quite a century."[5]

In 1682, according to the records of New Hampshire, the fisheries of these islands were regarded as much more important than those of the settlements at the mouth of the Piscataqua.

TROUBLE WITH INDIANS.—In 1688 the inhabitants of Hog Island were forced to remove to Star Island on account of the depredations of the Indians, who made plundering incursions, carrying away the women into captivity while the men were fishing.

"Star Island seemed a place of greater safety; and probably the greater advantages of landing and the convenience of a wide cove at the entrance of the village, with a little harbor wherein the fishing craft might anchor with some security, were also inducements."[6]

THE FISHERIES FROM 1760 TO 1800.—"Before the war of the Revolution, when the islands were in a flourishing state, there were annually caught here, and cured for the market, from three to four thousand quintals of fish. At that time seven or eight schooners, besides boats, were employed in this business; and some used to extend their fishing voyages to the Banks of Newfoundland. About the year 1730, and afterwards, the fisheries on these islands increased to that degree that three or four ships used to load here, annually, with winter and spring merchantable fish for Bilboa, in Spain, and smaller vessels for other places. Besides, a large quantity of cod and scale fish were carried to Portsmouth, for the West India market.

"The usual drink of the fishermen, at that period, was a liquor which they called bounce, composed of two-thirds spruce beer and one-third wine. But, in a course of years, they gradually left off the use of this wholesome drink, and substituted in its place ardent spirits, which has been a principal means of the lamentable degeneracy of these people."[7]

GOVERNMENT AND RELIGION.—"The old town records are quaint and interesting, and the spelling and modes of expression so peculiar that I have copied a few. Mr. John Muchamore was the moderator of a meeting called

[1] Isles of Shoals, 1873, pp. 9, 10.
[2] Coll. Mass. Hist. Soc., vol. viii, 3d series, p. 164.
[3] *Ibid.*, vol. iii, 3d series, p. 100.
[4] Winthrop's Journal, p. 37.
[5] Sabine, *op. cit.*, p. 114.
[6] Thaxter's Isles of Shoals, 1873, p. 47.
[7] Coll. Mass. Hist. Soc., vol. vii, 1802, pp. 247-252.

'March ye 7th day, 1748. By a Legall town meeting of ye Free holders and Inhabitence of gosport, dewly quallefide to vote for Tiding men Collers of fish, Corders of wood. Addition to ye minister's sallery Mr. John Tucke, 100 lbs. old tenor.' Among the 'offorsers' of 'Gospored' were, besides 'Moderator' and 'Towne Clarke,' 'Seelekt meen,' 'Counstauble,' 'Tidon meen' (Tithing-men), Coulears of fish'—'Coulear' meaning, I suppose, culler, or person appointed to select fish—and 'Sealers of Whood,' oftener expressed corders of wood."[1]

"The fishermen of the Isles of Shoals, as a class, were moral and exemplary men during the entire period embraced in our inquiries. A place of worship was erected even before the year 1641, at which time the Rev. Mr. Hull was their minister. They were disturbed, however, in 1642, by Mr. Gibson, an Episcopal clergyman, who went among them, performed services according to the rites of his church, and created a disaffection towards the government of Massachusetts, which then claimed to exercise jurisdiction over them. The Rev. John Brock commenced his pastoral labors about 1650, and remained among them twelve years. He was an excellant man, and was succeeded by Mr. Belcher, who was equally worthy. Mr. Moody followed, in 1706, and continued their pastor upwards of twenty-five years. His successor was the Rev. John Tucke, whose ministry terminated only with his life, in 1773. Their last spiritual guide, previous to the general dispersion, two or three years afterwards, was the Rev. Jeremiah Shaw. Thus we have the remarkable fact that these lone islanders maintained religious worship, with hardly an interval, for one hundred and thirty-five years."[2]

"From the year 1754 to 1771, it appears from the records that the salary of the Rev. Mr. Tucke was paid him in merchantable winter fish, a quintal a man. There were from eighty to a hundred men then on these islands, and a quintal of fish was estimated at a guinea. His salary was considered, in his situation, as one of the most valuable, at that time, in New England."[3]

The following extract from the town records is the official history of the transactions between the islanders and their clergymen:

"MARCH 12TH, 1769.

"A genarel free voot past amongst the inhabents to cus [cause] tow men to go to the Revd. Mr. John Tucke to hear wether he was willing to take one Quental of fish each man, or to take the price of Quental in ould tenor which he answered this that he thought it was easer to pay the fish than the money which he consented to taik the fish for the year insuing." "On March ye 25, 1771, then their was a meating called and it was gurned until the 23rd day of Apriel.

"Mr. DEEKEN WILLAM MUCHMORE,
"*Moderator.*"

THE EFFECTS OF WAR.—"It is of interest to remark," says Sabine, "as showing the prosperous condition of these islands, and the means of education in 'the olden time,' that gentlemen of consideration, of some of the principal towns on the seacoast, sent their sons there for literary instruction.

"The war of the Revolution produced a disastrous change. It was found by the Whigs that their enemies extorted articles of sustenance as well as recruits for their service, and they ordered the inhabitants to abandon their homes. In obedience to the hard mandate, a large proportion removed to towns on the main land, and never returned. A single incident that occurred early in the contest will serve to illustrate the general situation of the islanders previous to their dispersion: An aged woman, who lived on Star Island, kept two cows, which fed in winter on hay cut in summer among the rocks with a knife, and with her own hands. These useful animals were always in excellent order, and to her were invaluable. To her great sorrow, though paid for, they were taken by the British and slaughtered for beef."[4]

FISH CURING IN OLD TIMES.—"The winter and summer fish," says a writer in the Mass. Historical Society Collections in 1802, "are, doubtless, of the same species. They are cured also in the same manner, except that the former, on account of the coldness of the weather, require less salt. The trouble of taking and curing the winter fish is much greater than of the summer, because the days are shorter, and the season unfavorable for drying them. The hardships endured in taking the winter fish are inconceivable by all but eye-witnesses. In summer the fishing is carried on chiefly in the night.

"In the autumn of 1800, thirteen whale-boats, ten owned on Star and three on Haley's Island, belonged to these islanders. From 1,000 to 1,500 quintals of fish are caught here annually; from 100 to 250 quintals of which are what is called winter or dun fish. In the winter and spring of 1800, when bait was plenty, and the season favorable, about 300 quintals of winter fish were taken; in 1788, when bait was scarce, and the season bad, only 35 quintals were caught.

"The following is the process of making the fish: The fish, in the first place, are thrown from the boats in piles on the shore. The cutter then takes them and cuts their throats and rips open their bellies. In this state he hands them to the header, who takes out the entrails (detaching the livers, which are preserved for the sake of the oil they contain) and breaks off their heads. The splitter then takes out the back-bone, and splits them completely open, and hands them to the salter, who salts and piles them in bulk, where they lie from ten to twenty hours, as is most convenient. The shoremen and the women then wash and spread them on the flakes. Here they remain three or four weeks, according to the weather; during which time they are often turned, piled in fagots, and then spread again, till they are completely cured for the market. The winter or dumb fish lie from ten to fourteen days in salt, and are very carefully dried, and secured in bad weather. The season for catching and curing these fish is from Feb-

[1] Thaxter's Isles of Shoals, 1873, p. 57.
[2] Sabine, *op. cit.*, p. 114.
[3] Coll. Mass. Hist. Soc.
[4] Sabine, *op. cit.*, p. 114.

ruary to May, as the weather will allow. The haddock and hake (there is a great resemblance between these fishes) are caught in summer and fall, during the night. They lie in pickle from twelve to thirty-six hours, and then are dry salted; after which they are spread upon the flakes; and, in good weather, their cure is completed in a week. The fish of all kinds, made on these islands, have the preference in market, and command a higher price. The dumb fish is consumed chiefly in New England, and is considered, by connoisseurs in fish, the best in the world. Its price is from $6 to $10 a quintal. The hake is shipped to the West Indies, to Spain, &c. The price at the Shoals is commonly about $2 a quintal. The spring fish, which is next in quality to the dumb fish, is usually sent to Madeira. The summer codfish, called Jamaica fish, which goes to the West Indies, is about $3 a quintal."

Mr. Haley, whose name one of the islands bears, is mentioned as living in the year 1800, then seventy-six years old. He had expended a large fortune in many useful works; among which was a valuable sea-wall, wharves, wind-mill, a rope-walk 270 feet long, and salt works, all of which were built before the Revolutionary war. A bake-house, brewery, and distillery were built in 1783, also a blacksmith and cooper shop. All of these enterprises were going to decay in the year 1800.

THE FISHING TOWNS OF MASSACHUSETTS.

A general historical review of the fisheries of this State is given above on pages 121 to 131, and incidental references have been made to the early fisheries of the several districts and towns. The following data consist largely of extracts from official, State, and town records, and from general and local histories, and for some of the towns are very complete. The fisheries of Boston and Provincetown are so fully discussed in Part III of this section that no further references are made to them. Many of the Massachusetts ports have in past years been interested in the whale fishery. The history of that industry will be fully discussed in another section of this report.

NEWBURY AND NEWBURYPORT.

EARLY HISTORY.—This part of the New England coast was first discovered by the elder Cabot in 1497, and was visited by Captain Gosnold in 1602 and Martin Pring in 1603. The first regular survey of this portion of the coast was made by Capt. John Smith in 1614. In 1620 it was granted to Sir Fernando Gorges and others in the name of the Grand Council of Plymouth, and under this patent was, by royal authority, first called New England. In 1628 another charter from King Charles reconfirmed the patent, with the additional right to exercise powers of government. In this charter the Merrimac River is mentioned as "a great river commonlie called Monomack or Merriemack."

The first regular settlement was made in 1635, although two years previous to this time, on September 3, 1633, the General Court had granted liberty to John Winthrop, jr., to set up a trucking or trading house on the Merrimac River. At this early date, it is claimed, sturgeon were taken from the Merrimac River and pickled, to be shipped to England. Until the year 1642 the inhabitants were mostly engaged in farming. The House of Commons passed a law exempting the exports and imports of New England from taxation. From that time more attention was paid to commerce. Fishing in the Merrimac was a regular business at this period. In 1656, quite a large trade having grown up with the West Indies, the first wharf was built. Vessels arrived with the products of the islands and returned with cargoes of dry and pickled fish, lumber, and beef. The export of pickled sturgeon had become in 1674 a regular and profitable business, being taken overland to Boston and also shipped to England. It was frequently exchanged for West India rum and molasses. A keg of sturgeon was worth from ten to twelve shillings, and one sale is recorded of "fifteen kegs of sturgeon for a small cask of rum and a cask of molasses." This year William Thomas petitioned the General Court "that he may be licensed to boyle and sell sturgeon for the counties of Essex and Norfolk, being aged and incapable of any other subsistence; but was forstalled and circumvented by others who, by hooke or crooke, for strong liquor or otherwise, procured the fish from the Indians employed to catch them by the petitioner." The petition was not granted, the river being left free to all without any hindrance. A description of Newbury says: "At the mouth of the river Merrimac stands Newbury, pleasantly situated, where abundance of sturgeon are taken, and pickled after the Manner used in the Baltick."[1]

NEWBURYPORT FROM 1764 TO 1805.—On the 28th of January, 1764, the lower or coast part of the town separated from the upper part and was incorporated as a town under the name of Newburyport. At this time the population was 2,282 persons. Shipbuilding had for a number of years been the leading business of the port. During the war of the Revolution this port engaged in privateering, sending out quite a fleet, among which, it is recorded, twenty-two sail, with over a thousand men, sailed; these were never heard of again. This port and another claim to have sent the first privateer. During 1766 seventy-two vessels were at one time under construction. With the West Indies a constant and profitable trade had been carried on up to this time.

The first fishing license on record was given July 15, 1793, to a vessel of 16 tons. The first license to a cod vessel was given March 20, 1794.

In 1805 a large foreign trade was being carried on; from April 14 to May 14, one month, the citizens imported goods to the value of $800,000.

NEWBURYPORT FISHERIES, 1806 TO 1826.—The fishing vessels and fisheries of Newburyport in and for some years after 1806 are thus discussed:

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[1] British Empire in America. London, 1741, vol. i, pp. 191, 192.

"The fishing vessels belonging to this district are not owned in the town of Newburyport alone, but a portion of them in the vicinity. In 1806 the number of vessels belonging to the district employed in the Labrador fishery was forty-five, and ten or fifteen more in the Bay fishery. These vessels averaged twelve men each, and caught in the season 5,000 quintals of fish each. The mackerel fishery was then very small. The latter branch of our fisheries was not commenced to any extent until the late war. The first vessel fitted out in this district to carry on the mackerel fishing for the season was in 1815; but in 1819 the number of vessels so employed amounted to about thirty, and the quantity of mackerel caught to about 15,000 barrels. The number of vessels employed in the year 1825 was seventy-five, and the quantity of mackerel caught was 24,000 barrels. The average quantity of fish taken in the cod fishery, by vessels belonging to this district, for the last ten years has been about 20,000 quintals, averaging about $50,000 in value. This business probably employs three hundred men. The sum paid in this district for bounties for the year 1825 was $14,998. It has been already stated that the amount of registered tonnage belonging to this town at present (1826) was 7,503 tons; of enrolled, 12,991 tons. At former periods the case was reversed, and the tonnage registered was much greater than the tonnage enrolled. From this it appears that the coasting and fishing business of the town has much increased within a few years, and in proportion as the foreign commerce has diminished. The fishing business has proved highly beneficial to the south part of the town and the contiguous parts of Newbury, where it is chiefly carried on. This fact is apparent from the evidently improved appearance and increasing prosperity of that quarter. Much as we have cause to lament the diminution of our foreign trade, still the prosperity of our fisheries, and of the coastwise trade, is a subject of much greater gratulation."[1]

During the winter of 1816–'17 the Mercantile Company of Newburyport was formed for prosecuting the Bank fishery. The fleet comprised fifty-five schooners, four sloops, and one brig; total, sixty sail, aggregating 2,847 tons. The largest vessel was 118 tons, and smallest, 8 tons. Although not considered a good year's work, $50,000 was paid for interest, and 12 per cent. profit, or 18 per cent. on the capital invested.

In 1817 Newburyport had a fleet of sixty-five vessels in the Labrador fishery, including sixty schooners, one brig, and four sloops.

In 1823 the fishermen of this port received $15,758.36 as bounty money.

THE MACKEREL FISHERY IN 1829.—On April 17, 1829, the first mackerel license was given, and in 1831 the largest amount of mackerel ever put up at this port in one year—36,000 barrels—was packed.

THE WHALE AND FUR-SEAL FISHERIES IN 1833.—A record of 1833 shows that some attention was paid to the whale fishery, three vessels having been reported to have engaged in it for a few years, but no custom-house records can be found substantiating that statement. The fur-seal fishery is also mentioned in the history of the port at this time (1833), but there are few records showing the results of the fishery.

Concerning both whale and fur-seal fisheries the following bears witness:

"The whaling business at one time promised to become a permanent interest of Newburyport. In 1833 three ships, the Merrimac, Navy, and Adeline, were engaged in the business, employing a hundred men or more, and the next year another ship was added to the little fleet. The first efforts of the several whaling companies were successful, but some temporary discouragements arising, the enterprise was abandoned, and the fortunes which were finally made in the whale fishery went to build up the prosperity of other towns. The fur-seal fishery was also prosecuted by citizens of Newburyport for some years, but that has also been abandoned."[2]

THE FISHING FLEET OF NEWBURYPORT IN 1834 AND 1835.—In 1834 the shipping interest of this port was represented by 207 sail, engaged in coasting, foreign trade, and fishing; 124 sail were in the latter class, under mackerel or cod license.

In 1835 the following sail, mostly engaged in the mackerel fishery, were in the Newburyport fleet:

	Number of sail.	Tons.
Mackerel license	125	6,325.75
Cod license	41	2,059.49
Total	166	8,385.24

This is the largest number under mackerel license for any one year.

NEWBURYPORT FROM 1840 TO 1851.—The year 1840 is noted as the opening of the railroad to this port, and the year 1847 is celebrated by the introduction into Newburyport of the telegraph.

The list of fishing vessels from the district of Newburyport in 1851 was officially given at ninety vessels, with a total of 6,012 tons, and employing nine hundred and eighty-five men. The valuation of the vessels with their outfits was estimated at $211,900. Ninety of these engaged in the mackerel fishery.

The year 1851 is also remembered as one of severe loss. On October 5 the fishing fleet, when off Prince Edward Island, was caught in a gale, and eighteen vessels, with more than twenty men, were lost. During this year the mackerel fleet landed at this port 21,202 inspected barrels.

In the same year the port received its city charter, having a population of 12,864. At this time a large part of the cod-fishing fleet took their fares off the coast of Labrador, from forty to fifty sail annually visiting that coast and securing their fares with hook and line or seines. The latter were used in the harbor and shallow water near shore,

[1] Caleb Cushing: History of Newburyport. 1826, pp. 85, 86.

[2] History of Newburyport, by Mrs. E. Vale Smith, 1854, p. 223.

at and near Salmon River. As the fish drew off into deep water the hand-line was called into play. In the use of the seine a small boat was first sent out to look over the ground, a water telescope being used. This was no more than a small box, some 8 to 10 inches square, with a glass bottom. By putting it below the surface waves or ripple of the water the bottom could be distinctly seen, and the cod, moving in schools, could be observed if on the fishing ground. The cod seine was then brought out and thrown around them. The seine was usually 100 fathoms long, 55 to 75 feet deep, with mesh 3¼ to 3½ and 4¼ to 4½ inches. After throwing around the fish the net was pursed up, as in the mackerel fishery. From 2,000 to 12,000 codfish were taken at a haul. No other fish were caught with them. The fish were always small, of an average weight of 4 to 5 pounds each. As a part of the cargo herring were often caught in nets 75 fathoms long and 32 to 48 feet deep, with 1½ to 2½ inch mesh. The herring were caught near Bradore and Assizes harbor.

THE FISHERIES FROM 1857 TO 1860.—In 1857 Newburyport had a mackerel fleet of ninety sail of vessels. The Cape Ann Advertiser of September 23, 1859, quoting from the Newburyport Herald, says: "The Labrador fishermen have done well. The Spring Hill, that arrived on Saturday, brought 190,000 fish, the largest number ever brought to this port by one vessel. We believe she also had 200 barrels of herring. Favorable reports are received from the vessels yet to arrive."

According to the Cape Ann Advertiser of June 15, 1860, the Labrador fleet of Newburyport that year numbered sixty vessels.

It was stated in the Gloucester Telegraph of January 28, 1860, that Newburyport was at that time beginning to enter the Georges Bank fishery; a new industry for that port.

THE MACKEREL AND CLAM FISHERIES IN 1870.—Concerning the prospect for the Saint Lawrence fishery of 1870, and the Newburyport clam industry, the Gloucester Telegraph for April 20 and June 15, 1870, contained the following paragraphs:

"There will be from twenty-six to thirty schooners sent from Newburyport this season for the bay of Saint Lawrence. Last year the number was twenty-six, two of which were lost; but several new ones have been added to the list, which will increase the number a little. The Race Horse, Hattie E. Smith, and a few of the larger-sized vessels will go this year."

"The clamming business at Newburyport is quite profitable and increases every year. During the three months ending with March 31 about 7,000 bushels of clams were dug in the Merrimack for the dealers, besides what were peddled and eaten in the city. The price, at 50 cents a bushel, amounts to $3,500."

THE FISHERIES IN 1871.—A statement in the Cape Ann Advertiser of January 5, 1872, says, concerning the Newburyport fisheries for 1871:

"The fresh fish brought here for the consumption of the city and country in its vicinity during the past year has amounted to over 1,000,000 pounds, valued at $30,000, for which the consumer has paid more than double this amount."

NEWBURYPORT FISHERIES FROM 1872 TO 1876.—The Newburyport Herald of October 8, 1872, says:

"Our market at the present time is abundantly supplied with fish in all varieties, which are landed fresh from the sea every day by tons. On Saturday a large lot of fresh mackerel were brought in by the market boats. Two codfish were brought in by one of our fishing boats on Saturday which weighed 80 pounds each. The old fishermen said they were the largest they had ever seen. One wherry also brought in about 400 pounds of handsome sea bass."

The Newburyport Herald of March 12, 1874, says:

"There are twenty-two vessels in this port classed as fishermen, and which, in former years, have made trips south and in the bay of Saint Lawrence; five are now engaged in the West India trade and will not return till time to fit out for bay of Saint Lawrence, and some four or five other vessels are for sale. The mackerel business has not been profitable."

In 1874 the Newburyport Labrador fleet consisted of two vessels, the Edward Lee and Edward Lameyer.

In 1876 there were one hundred and thirteen arrivals of fishing vessels in Newburyport, the product landed being valued at $125,000. The fishing fleet this year consisted of six baymen, six shore vessels, and two in the Labrador fishery.

The Labrador cod fleet for five years previous to 1876 was not very successful. Before 1871 the average fare was 1,500 to 2,200 quintals of cod, but in 1876 the average was only about 500 quintals of cod and 200 barrels of herring.

IPSWICH.

SETTLEMENT OF THE TOWN.—In the year 1614 the ground on which the town of Ipswich now stands, was marked on the chart of Capt. John Smith by the name Agawam, an Indian word signifying "a place abundantly supplied with fish." The same name is, for a similar reason, given to several places along the coast. This name was changed by King Charles to Southampton. The colonial records of August 4, 1634, record a second change to its present name, after the town of Ipswich, England, "in acknowledgment of the great honor and kindness done to our people, who took shipping there."

IPSWICH IN 1654.—The following description of the town and of the character of its inhabitants in 1634 appeared in "Wonder-working Providence," published in London in 1654:

"This Towne is scituated on a faire and delightfull River, whose first rise or spring begins about five and twenty Miles farther up in the Countrey, issuing forth a very pleasant pond. But soon after it betakes its course through a most hideous swamp of large extent, even for many Miles, being a great Harbour for Beares: after its coming forth

this place, it groweth larger by the income of many small Rivers, and issues forth in the Sea, due east over against the Island of Sholes, a great place of fishing for our English Nation; the peopling of this Towne is by men of good ranke and quality, many of them having the yearly Revenue of large Lands in England before they came to this Wilderness, but their Estates being imployed for Christ, and left in banke as you have formerly heard, they are well content till Christ shall be pleased to restore it againe to them or theirs, which in all reason should be out of the Prelates Lands in England. Let all those, whom it concernes (to judge) consider it well, and do justice herein."

JOSSELYN'S DESCRIPTION IN 1663.—This town was in 1663 also described by Josselyn:

"The next Town that presents itself to view is Ipswich, situated by a fair River, whose first rise is from a Lake or Pond twenty mile up, betaking its course through a hideous Swamp for many miles, a Harbour for Bears, it issueth forth into a large Bay (where they fish for Whales), due East over against the Island of Sholes, a great place of fishing, the mouth of that River is barr'd."

ABUNDANCE OF SALMON AND STURGEON.—Concerning the abundance of fish at this place in early times and their comparative scarcity now, Felt has written the following note:

"Animals of this sort were very abundant when Agawam was settled. Of their number, salmon and bass have nearly, and sturgeon have entirely, disappeared from our waters. There were companies, of Matthew Cradock and others, who caught large quantities of sturgeon for the European market, in Ipswich, while it was owned by the Indians. The sounds of these fish were made into isinglass. Smith remarked of Massachusetts, 'No river where there is not plenty of sturgeon or salmon or both, which are to be had in abundance, observing but their seasons.'"[1]

FISH WEIRS IN 1635.—The following order was entered on the town records in 1635, with reference to the building of weirs:

"*Wears*, 1635.—Richard Kent is allowed to build another wear on Chebacco River and enjoy the profits. John Perkins, jr., had made a wear on the same river, to have the profits of it seven years, beginning 1636, and to sell alewives at 5*s.* for 1,000. He disposes of this place to Mr. Wm. Cogswell."

FISH USED AS FERTILIZER IN 1637.—As far back as 1637, at this place, shad and alewives were so used for fertilizing the soil. *Morton* says, "One thousand of these fish were put into an acre, which would yield three times more corn than without them." This practice was derived from the Indians, and continued until 1639, during which year the General Court passed a law "that, after June 20, no bass nor cod shall be taken for manure, except their heads and offal."

The dogs seem to have caused some trouble by scratching in the fields, and the following amusing town law was passed May 11, 1644:

"It is ordered that all doggs, for the space of three weeks after the publishinge hereof, shall have one legg tyed up. If such a dogg should break loose and be found in any cornefield, doing any harme, the owner of the dogg shall pay the damage. If a man refuse to tye up his dogg's legg, and he be found scraping up fish in the cornfield the owner shall pay 12*s.*, besides whatever damage the dogg doth."

THE COD FISHERY IN 1641.—In 1641 the cod fishery was prosecuted and it is recorded by Felt that the town raised a committee to dispose of the "Little Neck" for the advancing of the fishery; that leave was granted to the fishermen to inclose this Little Neck, where a fishing-stage had been built; that every boat coming there was allowed room to make its fish, and that the boat's crew were at liberty to plant an acre of ground.

LOSS OF FISHING VESSELS.—In 1648 there was one ropemaker in the town. Several vessels from Ipswich, during the summer of this year, had been fishing at Monhegan.[2]

Concerning the fate of one of these boats, Hubbard wrote the following episode: "In October, 1648, some shallops of Ipswich, having been fishing all the summer at Monhiggin, in their way home intended to put in at Damarill's Cove on a Saturday night, and three of them got safe into the harbor's mouth before sundown. They in the fourth shallop were not willing to put forth their oars till it was very late in the afternoon, when they were becalmed, and so it was dark night before they could reach the harbor, the entrance of which they missed, and by that means were overtaken by the surf of the sea and drowned—four Englishmen and one Indian—and the goods all perished. Their friends called to them to make haste, but the sluggard is wiser in his own eyes than seven men that can render a reason."[3]

SALT-WORKS AND SHIPBUILDING IN 1652.—Salt-works were established in Ipswich in 1652 and carried on for several years, receiving a slight assistance from the town. Six years later shipbuilding was commenced.

IPSWICH FISHERIES FROM 1670 TO 1715.—The following facts are compiled from Felt's history of the town:

Permission was given to the fishermen in 1670 to take wood from the common for needed buildings and fuel. Each boat's crew had leave to feed one cow on the common.

Regarding the building of weirs in 1674, the following grant was made:

"1674.—Nathaniel Rust and Samuel Hunt are permitted to set up a weir about the Falls if it do not hinder the mill nor passage thereto." The form of a weir was as follows: "Stone walls were built down the stream till they came in contact at an angle of forty-five degrees. At this angle a cage was placed, composed of hoops with twigs fastened to them. The walls conducted the fish down to the cage and thus they were taken in great numbers."

In 1696 provision was made for the construction of buildings, which should benefit the fisheries.

"1696.—Lots are to be laid out at Jeffrey's Neck for flake-room and stages."

The whale fishery created interest a few years later, and on December 10, of the year 1706, John Higginson, of Salem, wrote to Symond Epes, of Ipswich: "I hear a rumor of several whales, that are gotten. I desire you to send

[1] Felt's History of Ipswich, Essex, and Hamilton, 1834, p. 47.
[2] *Ibid.*, pp. 109, 111.
[3] Hubbard's History of New England, p. 532.

me word how much we are concerned in them, and what prospect of a voyage. When they have done, I desire you would take care to secure the boats and utensils belonging to them."

And in the next year, under date of September 22, Mr. Higginson wrote again about whale-boats and crews at Ipswich, and remarked: "We should be in readiness for the noble sport."

In 1715 a committee of the proprietors met at Jeffrey's Neck and confirmed to the owners of thirteen fishing boats the use of the room occupied by these boats.

THE FISHERIES FROM 1723 TO 1758.—In 1723 flats were granted "to set up a house on to accommodate the fishery." The town voted in 1730 that "owners of fishing vessels shall give an account of the crews, to the clerk, on penalty of 20*s*. for every person's name omitted."

In 1747 "a passage had been made through two mill-dams for alewives."

Douglass[1] states that Ipswich had six fishing schooners in 1748, and Felt records the same number in 1758.

THE CLAM INDUSTRY IN 1763 AND 1771.—In 1763 "The commoners forbid any more clams to be dug than are necessary for the use of the people of the town and of fishing vessels. They allow one barrel for each of a crew to the banks, and in proportion for boats in the bay."

A regulation was passed in 1771, that "owners of vessels are to pay 6*d*. a barrel. The poor may dig and sell clams out of town for 2*s*. a barrel."

TREATY RIGHTS IN 1782.—Apparently for the averting of some grievance suffered by the people of this town the following vote was passed January 1, 1782: "The town vote that their Representatives endeavor to have an application made to Congress, so that they instruct their Commissioners for peace, to have the right of the United States to the fishery, an indispensable article of the treaty."

"LETTING OUT" THE CLAM FLATS.—With reference the "letting out" of the clam flats and sand banks, the following vote was passed in 1789: "The town vote to have the clam flats, as well as sand banks which had been given them by the commoners, let out, the clams at 1*s*. a barrel."

At that time 1,000 barrels were annually dug at Ipswich, which were sold in Boston and other places for bait, from $5 to $6 per barrel.

IPSWICH FISHERIES FROM 1794 TO 1825.—The fishing fleet of Ipswich in 1794 contained fifty-three fishing boats, the whole tonnage of which was 4,186.

The necessity for certain conditions for the prosecution of the river fisheries was felt in 1804, as may be learned from another record, which reads as follows:

"1804.—The fishery of shad and alewives in Mile River is to be regulated."

The following regulation was enforced in 1825:

"The privilege of catching shad and alewives in Ipswich River is let. This privilege is $1 a barrel."

At that date there were 350 barrels of alewives caught annually, on an average. These were disposed of for the West India market.

GLOUCESTER.[2]

THE SETTLEMENT OF CAPE ANN.—The history of Gloucester as a fishing station dates back to its earliest settlement by the English. The records of the colonies of Massachusetts Bay and of Plymouth make frequent mention of the importance of the fisheries of this region.

Cape Ann received its present name about 1615. It had been called Tragabizanda by Captain Smith, who, in 1614, visited its shores. Some French navigators, under Samuel de Champlain, who landed on the cape in 1605, called it Cap aux Isles. There are records of voyages to New England and references to this region prior to the visit of Champlain, as the celebrated voyage of Gosnold in 1602. It does not appear that any settlement was made at the cape until 1623, when it became the first home of the Massachusetts Colony, which, a year afterwards, removed to the present site of Salem.

Hubbard, the early historian of the colonies, gives us the following account of the first settlement of Cape Ann and its relation to some of the other settlements in Massachusetts Bay:

"Several mariners and persons skilled in navigation (whether employed by others in a way of fishing and trading or to satisfy their own humors in making further and more exact discoveries of the country is not material) had some years before looked down into the Massachusetts Bay. The inhabitants of New Plymouth had heard the fame thereof, and in the first year [1621] after their arrival there took an occasion to visit it, gaining some acquaintance with the natives of the place, in order to future traffic with them, for which purpose something like an habitation was set up at Nantasket, a place judged the most commodious for such an end. There Mr. Roger Conant, with some few others, after Mr. Lyford and Mr. Oldham were (for some offense, real or supposed) discharged from having anything more to do at Plymouth [1624], found a place of retirement and reception for themselves and families, for the space of a year and some few months, till a door was opened for them at Cape Anne, a place on the other side of the bay (more con-

[1] History of North America. London: 1750, p. 537.

[2] The following works contain extended references to the fisheries of Gloucester:

History of the Town of Gloucester, Cape Ann, including the town of Rockport. By John J. Babson. Gloucester: Published by Proctor Brothers. 1860. 8vo. pp. i-xii, 1-610.

The Fishermen's Memorial and Record Book. By George H. Proctor. Gloucester: Proctor Brothers, Publishers, Cape Ann Advertiser Office. 1873. 8vo. pp. i-iv, 1-172.

The Fisheries of Gloucester, from the first catch by the English in 1623 to the centennial year 1876. Gloucester: Proctor Brothers, Publishers, Cape Ann Advertiser Office. [1876.] 8vo. pp. 1-88.

The Fishermen's Own Book. Gloucester: Proctor Brothers, Publishers, Cape Ann Advertiser Office. [1882.] 8vo. pp. 1-274.

The files of the Gloucester Telegraph and Cape Ann Advertiser contain many fishery items.

venient for those that belong to the tribe of Zebulon than for those that chose to dwell in the tents of Issachar), whither they removed about the year 1625; and after they had made another short trial thereof for about a year's continuance, they removed a third time, down a little lower towards the bottom of the bay, being invited by the accommodations which they either saw or hoped to find on the other side of a creek near by, called Naumkeag, which afforded a considerable quantity of planting land near adjoining thereto.

"Here they took up their station, upon a pleasant and fruitful neck of land, environed with an arm of the sea on each side, in either of which vessels and ships of good burthen might safely anchor. In this place (soon after, by a minister that came with a company of honest planters, called Salem, from that in Psalms lxxvi, 2) was laid the first foundation on which the next colonies were built. * * * But the vanishing of all previous attempts did but make way for the settling the Colony of the Massachusetts, and this was the occasion thereof.

"As some merchants from the west of England had for a long time frequented the parts about Munhiggon for the taking of fish, &c., so did others, especially those of Dorchester, make the like attempt upon the northern promontory of the Massachusetts Bay, in probability first discovered by Captain Smith before or in the year 1614, and by him named Tragabizanda, for the sake of a lady from whom he received much favor while he was a prisoner among the Turks; by whom also the three small islands at the head of the cape were called the Three Turks' Heads. But neither of them glorying in these Mahometan titles, the promontory willingly exchanged its name for that of Cape Anne, imposed, as is said, by Captain Mason, and which it retaineth to this day, in honor of our famous Queen Anne, the royal consort of King James; and the three other islands are now known by other names.

"Here did the foresaid merchants first erect stages whereon to make their fish, and yearly sent their ships thither for that end for some considerable time, until the fame of the plantation at New Plymouth, with the success thereof, was spread abroad through all the western parts of England; so far as that it began to revive the hopes of some of those merchants who had not long before adventured their estates to promote so honorable a design as was the planting and peopling this new world; although finding hitherto but small encouragement that way they were ready to withdraw their hands.

"On this consideration it was that some merchants and other gentlemen about Dorchester did, about the year 1624, at the instigation of Mr. White, the famous preacher of that town, upon a common stock, together with those that were coming to make fish, send sundry other persons in order to the carrying on a plantation at Cape Anne, conceiving that planting on the land might go on equally with fishing on the sea in those parts of America. Mr. John Tylly and Mr. Thomas Gardener were employed as overseers of that whole business; the first with reference to the fishing, the other with respect to the planting on the mainland, at least for one year's time; at the end of which Mr. White, with the rest of the adventurers, hearing of some religious and well-affected persons that were lately removed out of New Plymouth out of dislike of their principles of rigid separation, of which number Mr. Roger Conant was one, a religious, sober, and prudent gentleman yet surviving about Salem till the year 1680, wherein he furnished his pilgrimage, having a great hand in all these forementioned transactions about Cape Anne—they pitched upon him, the said Conant, for the managing and government of all their affairs at Cape Anne. The information he had of him was from one Mr. Conant, a brother of his, and well known to Mr. White; and he was so well satisfied therein that he engaged Mr. Humphrey, the treasurer of the joint adventurers, to write to him in their names, and to signify that they had chosen him to be their governor in that place, and would commit unto him the charge of all their affairs, as well fishing as planting. Together with him, likewise, they invited Mr. Lyford, lately dismissed from Plymouth, to be the minister of the place, and Mr. Oldham, also discharged on the like account from Plymouth, was invited for them to trade with the Indians. All these three at that time had their dwelling at Nantasket. Mr. Lyford accepted and came along with Mr. Conant. Mr. Oldham liked better to stay where he was for a while and trade for himself, and not become liable to give an account of his gain or loss. But after a year's experience, the adventurers, perceiving their design not like to answer their expectations, at least as to any present advantage, threw all up; yet were so civil to those that were employed under them as to pay them all their wages, and proffered to transport them back whence they came, if so they desired."[1]

WHITE'S ACCOUNT OF THE SETTLEMENT OF CAPE ANN.—The following additional account of the first settlement on this Cape is found in a pamphlet entitled "The Planter's Plea," published in 1630, by Rev. John White, of Dorchester, who, with Mr. Humphrey Jackson, were specially interested in the adventure:

"About the year 1623 some western merchants, who had continued a trade of fishing for cod and bartering for furs in those parts for divers years before, conceiving that a colony planted on the coast might further them in their employments, bethought themselves how they might bring that project to effect, and communicated their project to others, alleging the conveniency of compassing their project with a small charge, by the opportunity of their fishing trade, in which they accustomed to double-man their ships, that by the help of many hands they might despatch their voyage and lade their ships with fish while the fishing season lasted, which could not be done with a bare sailing company. Now, it was conceived that, the fishing being ended, the spare men that were above their necessary sailors, might be left behind with provisions for a year, and, when the ship returned the next year, they might assist them in fishing as they had done the former year; and, in the mean time, might employ themselves in building, and planting corn, which, with the provisions of fish, fowl, and venison, that the land yielded, would afford them the chief of their food. This proposition of theirs took so well that it drew on divers persons to join with them in this work; the rather because it was conceived that not only their own fishermen, but the rest of our nation that went thither on the same errand, might be much advantaged, not only by fresh victual which that colony might spare them in time, but withal, and more, by the benefit of their minister's labors, which they might enjoy during the fishing season; whereas otherwise, being usually upon these voyages nine or ten months in the year, they were left

[1] Hubbard's Narrative, in Young's Chronicle of the First Planters of Mass. Bay Colony. Boston, 1846, pp. 19-26.

all the while without any means of instruction at all. Compassion towards the fishermen and partly some expectation of gain, prevailed so far, that, for the planting of a colony in New England, there was raised a stock of more than £3,000, intended to be paid in five years, but afterwards disbursed in a shorter time."

"As the basis of a colony, this use of the spare men, who were necessary while the fishing lasted, but useless in navigating the ship, must have been a prominent consideration among the inducements to plant in New England. Indeed, the great charge of double-manning and double-victualing the ships for the fishing voyages to Newfoundland is mentioned among the inducements as early as 1620."[1]

TROUBLE ABOUT A FISHING-STAGE.—"In one of the fishing voyages about the year 1625," says Hubbard, "under the charge and command of one Mr. Hewes, employed by some of the West Country merchants, there arose a sharp contest between the said Hewes and the people of New Plymouth, about a fishing-stage, built the year before about Cape Anne by Plymouth men, but was now, in the absence of the builders, made use of by Mr. Hewes' company, which the other, under the conduct of Captain Standish, very eagerly and peremptorily demanded, for the Company of New Plymouth, having themselves obtained a useless patent for Cape Anne about the year 1623, sent some of the ships, which their adventurers employed to transport passengers, over to them, to make fish there; for which end they had built a stage there, in the year 1624. The dispute grew to be very hot, and high words passed between them, which might have ended in blows, if not in blood and slaughter, had not the prudence and moderation of Mr. Roger Conant, at that time there present, and Mr. Peirse's interposition, that lay just by with his ship, timely prevented. For Mr. Hewes had barricadoed his company with hogsheads on the stage head, while the demandants stood upon the land, and might easily have been cut off; but the ship's crew, by advice, promising to help them build another the difference was thereby ended."

CAPE ANN IN 1639.—There are no records to show how soon after the departure of Conant Cape Ann was again visited by settlers, but it is probable that the place was inhabited and that fishing was carried on in the year 1633. One of the next references we find to the Cape Ann fisheries is the following order passed at "the Generall Courte, houlden at Boston, the 22th of the 3th M°., 1639," which reads:—

"It is ordered, that a fishing plantation shalbee begun at Cape Anne, and that the said Mr. Thompson shall have place assigned for building of houses, & stages, & other necessaries for that use, & shall have sufficient land alowed for their occations, both for their fishing & for keeping of cattle, & for corne, &c.; and that such other fishermen as will joyne in that way of fishing, & inhabite there, shall have such land, & other liberties there, as shalbee needful & fit for theire occations; & and for this end this Court doth give power to Mr. Endecott, Mr. Humfrey, Mr. Winthrope, Junior, Mr. Will: Peirce, & Joseph Grafton, or any 3 of them, to set out the said plantation, & all lands & other accommodations to such as shalbee planted there, & none to bee setled there but by their allowance."[2]

THE TOWN OF GLOUCESTER, 1642.—The settlement at Cape Ann received its name of Gloucester in the year 1642, when a minister came to the place. An early writer says:

"There was another Town and Church of Christ erected in the Mattachuset Government, upon the Northern-Cape of the Bay, called Cape Ann, a place of fishing, being peopled with Fishermen, till the reverend Mr. Richard Blindman came from a place in Plimouth Pattent, called Green-harbor, with some few people of his acquaintance, and setled down with them, named the Town Glocester, and gathered into a Church, being but a small number, about fifty persons, they called to office this godly reverend man, whose gifts and abilities to handle the word, is not inferiour to many others, labouring much against the errors of the times, of a sweet, humble, heavenly carriage: This Town lying out toward the point of the Cape, the access thereunto by Land becomes uneasie, which was the chief cause it was no more populated: Their fishing trade would be very beneficial, had they men of estates to manage it; yet are they not without other means of maintenance, having good timber for shipping, and a very sufficient builder, but that these times of combustion the Seas throughout hath hindered much that work, yet have there been vessels built here at this Town of late:"[3]

THE GROWTH OF THE FISHING INDUSTRY.—Babson's History of Gloucester says: "No accounts are preserved to show how long English fishing ships continued to make voyages to the coast of New England; but it is natural to conclude that as the country became settled the number annually decreased, on account of the reduced expense with which the business could be carried on by the colonists. In the first settlement of the Massachusetts colony at Salem, we find preparations for fishing; for, in 1629, salt, lines, hooks, knives, boots, and barrels were sent over; and mention is made of fishermen among the settlers. As early as 1634, a merchant of the country was fishing with eight boats at Marblehead; and the next year Portsmouth had belonging to her fishing trade six great shallops, five fishing boats, with sails, anchors, and cables, and thirteen skiffs. About this time, also, our own shore was the abode of a few fishermen; and several settlements were established on the coast of Maine. Of the total product of this branch of industry in any one year, our only information is derived from Governor Winthrop, who says, that in 1641 it was followed so well that 300,000 dry fish were sent to market.

"* * * The first notice connecting our settlers with the fishing business is preserved on a loose scrap of paper, which records the judgment given in a case of litigation between two of them about a piece of a net, and making mention of the 'bote and voyg.' This was in 1651, about which time Robert Dutch had a 'stage' at Stage Neck, in Squam. In 1662 Peter Duncan settled in the town, and carried on a small trade at the Point in the harbor, where it is supposed that Mr. Thompson erected a building or a frame for the purposes of his fishery, in 1639. He is the only one of our early settlers styled a merchant. At this time not more than fifteen men are known to have resided in that part of the town. Some of these probably were fishermen. One of them, in 1663, agreed to pay a debt of fifty pounds in 'good merchantable fish and mackerel.'"

[1] Coll. Mass. Hist. Soc., xxviii, p. 98. [2] Records of Massachusetts, vol. i, page 256. [3] Wonder-working Providence. London: 1654, p. 169.

GLOUCESTER AT THE BEGINNING OF THE EIGHTEENTH CENTURY.—In 1700 the number of inhabitants was seven hundred, who were mostly engaged in agricultural pursuits, the fisheries being carried on by people from other settlements. About this time commenced a season of activity in ship-building. A number of ships and brigantines were built for merchants in Boston, and several vessels were also built for use in the shore fisheries off Gloucester. In 1713 a vessel with new rig was built at Gloucester and called a schooner from a remark made at the launching, "Oh, how she scoons!" The builder, Mr. Robinson, at once said, "A scooner let her be," and that name has ever since attached to this class of vessels.

CAPE ANN FISHERMEN VISIT CAPE SABLE.—"The hostility of the French and Indians," says Babson, "along the whole eastern coast, as far as Cape Sable, had for many years rendered the pursuit of this business in that quarter one of great danger. A few vessels, however, visited that coast from Salem and other places, but Gloucester fishermen do not appear to have repaired thither till about the time of the conquest of Nova Scotia by the English in 1710. That auspicious event did not secure them from molestation, for Rev. John White, of our church, writing in 1711, says: 'The enemy make fearful depredations upon our poor fishermen at Cape Sable'; and two years afterward three men were taken from two of our sloops that were fishing there. Another hazard attended the fishery from which no human care can afford certain protection. This was early experienced by our fishermen, and the havoc of their class by storms, which has since so often shrouded the town in mourning, imparts a melancholy interest to nearly every period of our history. The first loss by shipwreck we have recorded is that of a new schooner while on a fishing voyage at Sable Island, in 1716. In October, the next year, four of a fleet of seven were lost on the passage from the fishing grounds, and to these were added, in 1722, another at Sable Island, involving, in each case, the loss of all the crew."

GROWTH OF THE FISHERIES, 1722 TO 1741.—"The history of our fishery," continues Babson, "from this time to the Revolutionary War, for want of particular information concerning it, may be briefly related. The vessels with which the business was first carried on were the sloops built in the town. A few schooners were added about 1720, of which class it is probable that the 'old bankers,' of recent times, were nearly exact representations. Between 1720 and 1730 as many vessels appear to have been fitted out from Squam River as from the harbor, but after the last date the preponderance was certainly with the latter place, where it has since remained. An account of those of Nathaniel Parsons has been given on a previous page. His was the largest business of his time of which we have any knowledge. Next to him and a few years later we find that Elias Davis was a merchant of the most extensive and successful trade, leaving at his death in 1734 six schooners, a wharf, and fishing-room at Canso, and a large amount of other property.

"In 1741 we learn that above seventy fishing vessels belonged to the town; but the condition of the business here at that time, as reported by Rev. John White, was not such as another authority[1] states it to have been in the Colony generally, nor does it appear to have been prosperous for any considerable time during the next twenty years. Indeed, it is a matter of wonder that the discouragements of that period did not cause a total abandonment of the business. But, notwithstanding the wars between France and England, and the consequent annoyance and occasional capture of our vessels by the cruisers of the enemy, and the demand for men for the provincial armies and for the naval service, the fishery was still pursued. The truth is, it had now become the basis of a profitable foreign trade, for the maintenance of which the merchants of the town would willingly encounter great risks, and could even afford to bear considerable losses.

CONDITION OF THE FISHERIES FROM 1763 TO 1779.—According to Babson, "the peace of 1763 secured to our fathers unmolested use of the fishing grounds, and from this time to the Revolution they carried on the business with energy and success, though a terrible disaster [nine vessels with their crews were lost in 1766], which inflicted a heavy blow upon the town, occurred in the meantime. We know nothing of the relative importance of the bank and shore fisheries during this period; but it seems that the latter were almost wholly confined to Sandy Bay and the cove on the outside of the cape, while the chief seat of the former was at the harbor. Neither can we ascertain the number of vessels and boats engaged in the business in any year except the last of the term here embraced. That employed in the bank fishery must have been quite large, for nineteen schooners, as we have seen, sailed at one time in the fatal year of 1766. An 'estimate of the number of fishing vessels from Massachusetts' before the war, supposed to have been made by a merchant of the town several years after that event, gives seventy-five as belonging to Gloucester, agreeing nearly with the number stated by our selectmen in 1779 to have been owned here in 1775, which was eighty, of an aggregate burthen of 4,000 tons. The average value of these vessels, we learn from another source, was about £300. The same estimate says that there were owned at Sandy Bay seventy boats, which landed 160 quintals of fish each; but this evidently exaggerates.

"Of the fisheries of Massachusetts for any period, from the beginning to the present time, we lack full reliable statistics. The earliest table I have seen is one of the cod fishery, 'from the year 1765 to 1775.' That gives, in relation to the Gloucester fisheries, 'vessels annually employed, 146; tonnage, 5,530; number of men, 888;' an exaggeration, without doubt, in each case. In a covenant for mutual insurance of the bankers in 1774, forty-five schooners are entered; but those of Daniel Pearce and Winthrop Sargent, two principal merchants of the town, and of others

[1] Hon. L. Sabine, in his Report on the American Fisheries, p. 131. Mr. White's account is contained in a letter to the Governor and Council in relation to a call upon the town for aid to the sufferers by a great fire in Charleston, S. C., as follows:

"Almost our whole dependence, under God, is upon our navigation and fishery; and our other Navigation on our Fishery: and that has so far failed by reason of ye smallness of ye price of fish, and ye dearness of salt, bread, and craft, that, of above seventy fishing vessels there are few, if any, above ten in that business. Our people are scattered abroad in the world to get their bread; many pressed, many serving as volunteers in his majesty's service; and the cry of many for necessaries is very affecting. And we have had three contributions for ye relief of the poor the last year in our congregation, and other Families are very pressing for relief."

owning one or two vessels each, were not put in; enough in all to make up the eighty mentioned as belonging here in 1775. The number of our fishing-boats at that time cannot be ascertained; but, on the authority of the selectmen for 1779, I can state that, 'in foreign merchantmen, coasters, and fishing-boats,' we had 1,000 tons. I suppose that about one-half of this tonnage was in fishing-boats, averaging, as they did a few years later, 12 tons each, and making the whole number about forty. In that case we should have the aggregate of one hundred and twenty fishing-vessels belonging to the town in 1775, of the total burthen of 4,500 tons. The schooners probably carried an average number of six men each, and the boats two, making the whole number of fishermen five hundred. Nearly all the fishermen who sailed from the town at that time belonged to it; and when we consider that our list of polls then numbered but 1,053, we see at once that the number of men employed in the fisheries here, given in the table above mentioned, must be exaggerated. [Pitkin gives the quantity of fish exported from Gloucester just prior to the Revolutionary War at 77,500 quintals.]

PROFITS TO THE FISHERMEN.—"The business yielded a scanty support to the fishermen; and, as a class, they were poor, though then, as in a more recent period of our history, according to the natural course of things, the merchants who carried it on with most success were men who had themselves served an apprenticeship at the hook and line. No means exist for ascertaining the average annual earnings of these men before the war; but the accounts of a single vessel for 1773 are preserved, and show the product of her two trips to the Banks to have been 550 quintals of fish, which sold for £302. After deducting a few small expenses, one-half of this sum belonged to the fishermen. Supposing their number to have been six, we can see that the amount received by each was but a small sum for the payment of his proportion of the provisions for the voyage and the support of his family at home.

"In these fishing voyages it was the custom for the men to go, as it was called, 'on their own hook.' An account was kept of the fish caught by each man, and at the end of the voyage the proceeds were distributed accordingly. The following account of a season's work by one crew on the Grand Banks a hundred years ago may possess interest for modern fishermen: Account of fish taken on board the schooner Abagail, Capt. Paul Hughes, in three fares to the Grand Banks in 1757. She sailed on the first fare May 16, and fished twenty-three days; on the second fare July 13, and fished twenty days; on the third fare September 22, and fished twenty-four days. She left the Banks on the last fare November 5.

	First fare.	Second fare.	Third fare.	Total.
Paul Hughes	3,501	1,146	1,996	6,643
B. Foster	2,890	689	1,421	5,000
Rufus Stacey	2,000	758	1,026	3,784
Jos. Galloway	2,209	742	1,293	4,244
Nath. Day	2,020	615	.....	3,929
Abm. Wharf	.....	.....	1,294	
Wm. Smith	1,705	609	1,121	3,435
Total	14,325	4,559	8,151	27,035

"The largest number taken in one day was 1886, on June 1.

THE FISHERIES INTERRUPTED BY WAR.—"The revolutionary crisis approached, and the commerce and fishing of the town could be no longer pursued. A great majority of the people—comprising the merchants, mechanics, fishermen, and sailors, who depended upon the maritime business of the place for a livelihood—could find no employment in their regular pursuits, and were the more eager, therefore, to prove the sincerity of their declaration, that they would defend their liberties at the expense of all that was dear to them. At the commencement of the Revolutionary War eight schooners and a large number of Chebacco boats were engaged in the fisheries of Gloucester. The schooners were employed in distant grounds, and were therefore, during the war, useless for the business in which they had been engaged. Several were converted into privateers, a few rotted at the wharves, and some were preserved till peace again made it safe to resort to the 'Banks.' One of them, of 55 tons, survived every accident, to be registered in 1790, at the venerable age of twenty-two, in the foreign commerce of the town. No means exist for ascertaining how many vessels engaged in the Bank fishery immediately upon the return of peace. One statement says that 60 were employed in it in 1788 and 50 in 1789. Another, in giving an account of fish caught by vessels from the town in the fall of the last-named year, shows that 44 vessels took 426,700 fish, and that 15 of these vessels belonged to Eben Parsons and Daniel Sargent, two merchants of Boston. Seven more belonged to each of the two principal merchants of Gloucester, David Pearce and Daniel Rogers. Concerning this revival of the fishery, it may be further stated that the custom-house records show the enrollment between October 2, 1789, and September 10, 1790, of 1 brig, 16 sloops, and 40 schooners, of an aggregate burthen of 3,108 tons. Some of the 'Bankers' made three trips in a season, and, if remarkably fortunate, landed from all, together, as many as 40,000 fish; but all the traditions of the business report that the average earnings of the fishermen were so small that they were kept in a condition of poverty. It is not surprising, therefore, that the number of vessels engaged in it decreased from year to year till 1804, when we find that only 8 of more than 30 tons burthen were engaged in the Gloucester fisheries. This small number had probably dwindled to less in 1819, when an effort was made to put new vigor into the business by the establishment of a corporation to carry it on. In that year the Gloucester Fishing Company, with an authorized capital of $50,000, went into operation.

They built 6 schooners, and with visions, perhaps, of a renewal of the ante-revolutionary prosperity of the town, commenced by giving their vessels names having initial letters in alphabetical order.

"The Amity, Borneo, Crescent, and Diligent were of the old model, deemed best for the Grand Bank fishery, and were employed in that, while the Economy and Favorite were built according to a modern style, and sent in pursuit of cod and mackerel on our own coast. The bounty act passed by Congress in 1819, or the anticipation of that act, may have added stimulus to this project; but a business which private capital avoided could hardly be expected to yield profit, even to the best corporation management, and accordingly, in the third year, this enterprise came to an end, with a loss of all the interest on the capital and a portion of the capital itself. Since this period it is probable a year in which no vessel has gone to the Grand Bank from Gloucester has sometimes passed, and not even the high price of cod in recent years [written in 1859] has tempted many of our people to send their vessels to that fishing ground.

THE INSHORE FISHERIES FROM 1792 TO 1828.—"The shore fishery of Gloucester had risen to some importance before the Revolution, and upon the return of peace the enterprise of the people was again directed to this pursuit, to which some encouragement was given by early acts of the General Government. In 1792, 133 Chebacco boats, measuring in the aggregate 1,549 tons, were engaged in it. These boats resorted to the ledges and shoal grounds near the coast, where they found, at different seasons, cod, hake, and pollock, and pursued their fishery with such success that in twelve years from the last-named date the number of boats engaged in it had increased to about 200, while the tonnage had nearly doubled. At this time the boat fishing was chiefly carried on at Sandy Bay and the other coves on the outside of the cape; but the advantage of a good harbor for their large boats drew a few of the people away from these localities to settle on Eastern Point soon after 1800. The business, however, was not profitable enough, even with additional encouragement from the General Government, to attract many new adventurers, or even to stimulate much the enterprise of the old ones, and it had a slow growth for the next quarter of a century, the annual average increase of tonnage during that time having been only about 125 tons. At the end of this period (in 1828) the whole number of vessels upward of 20 tons engaged in the Gloucester fisheries was 154, measuring 5,899 tons, to which are to be added about 40 boats, of an average burden of 15 tons. The total annual product of the cod fishery of the town at this time is said to have been about 60,000 quintals."

GLOUCESTER FISHERIES IN 1821, 1827, AND 1829.—In 1821 the George's cod fishery began, and at the same time the fishery for mackerel from Gloucester began to assume considerable importance.

In 1827, according to a statement in the Gloucester Telegraph of February 9, 1828, the products of the fisheries of this port were 66,132 quintals of fish, 27,225 barrels of mackerel, and 2,204 barrels of oil.

The condition of the fisheries in 1829 is told in an article in the Gloucester Telegraph of that year, which says:

"There are now but few vessels employed in the cod fishery from this place, as the business of late has been no source of profit to owners, owing to foreign competition and higher rates of bounty or depression in trade. When our vessels could proceed from the fishing grounds with a fare to some foreign port, and there receive a full cargo of sugars, wines, &c., it was an inducement for many to engage in the business, because such a cargo yielded an immense profit on its return to the owners and crews. The ports of Lisbon and Bilboa were the markets which generally received our staple commodity, but the trade to those places has long since ceased. The mackerel fishing is now about all that is pursued from this port and others on the seaboard of Massachusetts and Maine, with the exception of Marblehead, from whence about fifty vessels, averaging 60 tons each, have been fitted out the present season for the Grand Bank fishery."

THE GLOUCESTER FISHERIES IN 1830 AND 1837.—In 1830 the George's halibut fishery commenced, and about the same year mackerel trips were first made to the Bay of Saint Lawrence. The shore fisheries at this time were also of considerable importance. The year 1831 is famous for the great abundance of mackerel off the coast of New England.

In 1837 the assessors of the town gave the following facts concerning the fisheries for that year: "Vessels employed in the cod and mackerel fisheries, 221; tonnage of same, 9,824; codfish caught, 55,181 quintals; value of same, $186,516; mackerel caught, 43,934 barrels; value of same, $335,566; salt used in the cod and mackerel fisheries, 113,760 bushels; hands employed, 1,580; capital invested, $349,000."

THE COD FISHERY IN 1844.—From the records of the collector of the port at that time we find that the cod fisheries of Gloucester for the year 1844 employed 1,210 men and produced 86,315 quintals of fish. The amount of bounty paid March 31, 1845, was $36,423.50.

A list of the names of cod-fishing vessels belonging to Gloucester in the year 1844 is preserved in the custom-house records. It gives the following facts concerning the fleet in that year:

	Number.	Tons.	Time employed.	
			Months.	Days.
Vessels over 20 tons	189	8,745 8/95	1,430	16
Vessels under 20 tons	60	699 7/95	536	14
Total	249	9,444 13/95	1,967	30

THE FISHING FLEET IN 1846.—In the Gloucester Telegraph of January 1, 1846, is published a list of vessels then owned in the district. The list includes 161 schooners, 55 boats, and 1 sloop, aggregating 8,363.70 tons, employed in the fisheries, and 1 ship, 11 brigs, 80 schooners, 21 sloops, and 3 boats, aggregating 8,075.13 tons, employed in coasting and foreign trade. The same paper says: "Under the head of fishing vessels are placed the names of 161 schooners.

This is not the whole number of vessels that have been employed in fishing the past season, for many, after the fishing season is over, take out coasting licenses. At one time there were at least 220 schooners in the business, employing, at the lowest calculation, upwards of 1,700 men, and the 58 boats at least 150 more, making, in round numbers, 1,850 men employed in fishing. The whole number of vessels that have received bounty for the last year's fishing was 242, and the amount of bounty paid about $37,500. Many of the vessels placed under the head of coasting have been employed in fishing during the season, and have drawn bounty; others have been employed in fishing for only a few weeks. A large number of those under the head of fishing came into the district after the fishing season commenced, and consequently drew no bounty."

EXTENT OF THE FISHERIES IN 1847.—In 1847, according to a reliable statement prepared by Mr. Addison Winter and published in Babson's History of Gloucester, the extent of the fishery industry of the town for that year, exclusive of "winter wherry fishing," was as follows: Whole number of vessels, 287, measuring 12,354 tons, employing 1,681 men and 186 boys; 28 of these vessels were under 10 tons burden, 27 between 10 and 20 tons, 29 between 20 and 30 tons, 42 between 30 and 40 tons, 26 between 40 and 50 tons, 49 between 50 and 60 tons, 73 between 60 and 70 tons, and 13 over 70 tons; the product of the fisheries was 7,088,376 pounds codfish, valued at $181,703; 3,379,776 pounds halibut, $70,761; 735,506 pounds hake, $12,174; 919,188 pounds pollock, $16,566; 49,779 barrels mackerel, $290,045; 337 half-barrels tongues and sounds, $1,873; and 39,520 gallons of oil, $16,232; total value of products, $589,354.

GLOUCESTER FISHERY STATISTICS FOR 1854.—The selectmen of Gloucester made a report of the principal industries of the town for the year 1854, which was published in the Gloucester Telegraph October 24, 1855. In this report we find the following items relating to the fisheries: Number of vessels in the cod and mackerel fisheries, 282, measuring 19,374 tons; barrels of mackerel, 43,201, valued at $388,809; quintals of cod, 97,950, valued at $293,650; value of cod-liver oil, $1,020; value of salt consumed, $160,000: capital invested in fisheries, $989,250; number of persons employed in fisheries, 2,820; quantity of halibut smoked, 210 tons, valued at $25,000; quantity of fish-oil made, 23,700 gallons, valued at $13,035; 3 marine railways, with $37,000 capital and employing 8 men; 6,500 tons of ice cut, valued at $15,000; capital in net and seine factories, $5,000, hands employed, 25; 2,500 fish barrels made, valued at $1,700, and 800 fish casks, valued at $1,800; 6 sail-lofts, with $40,400 capital and employing 54 men made 1,270 sails, valued at $95,250; $3,000 invested in 4 mast and spar yards; 2 boat makers, with $1,400 invested and employing 4 men, made 102 boats; capital in ship-yards, $10,500; hands employed, 37; vessels launched, 7, measuring 605 tons.

FISHERY STATISTICS FOR 1859.—The following statement, taken from Babson's History of Gloucester, shows the condition of the fisheries in 1859: "The whole number of schooners, 20 tons and upwards, belonging to Gloucester Harbor in July, 1859, was three hundred and twenty-two, measuring in the aggregate 23,882 tons. Of this number three hundred and one, manned by three thousand four hundred and thirty-four men and one hundred and thirty-four boys, were employed in fishing. So much we learn from a statement published in the Gloucester Telegraph. The product of the fishery for that year, as nearly as can be ascertained, is here given:

	Quantity.	Value.
Mackerel ..... barrels..	59,664½	$705,833
Cod ..... quintals..	114,047	416,271
Halibut ..... pounds..	4,500,000	135,000
Oil ..... barrels..	1,400	19,600
Total	.....	1,276,704

"If to this aggregate we add the product of the herring voyages to Newfoundland and that of the business carried on at Squam and Lane's Cove, not included in the above items, we shall find the total product of the fisheries of Gloucester for 1859 not less than $1,400,000. The quantity of halibut given is an estimate founded upon information obtained from persons in the business, and is believed to be under rather than over estimated. The number of pounds of this fish sold in town last year to be dried and smoked is known to have been about a million and a half."

CENSUS STATISTICS IN 1865.—The census report of Massachusetts for the year 1865 gives the following items concerning the fisheries of Gloucester: Number of vessels, 358; tonnage of vessels, 25,670; value of products, $3,319,458; value of salt consumed, $237,275.

STATISTICS FOR 1869.—In the report of the town clerk for the year 1869 we find that the whole number of schooners and boats fitted out for fishing that year was 431; 32 vessels made trips to Newfoundland for fresh herring, and 8 to Newfoundland and elsewhere for salt herring; 120 made trips in the Grand Bank cod fishery; 272 in the George's Bank cod and halibut fishery; 194 in the Bay of Saint Lawrence mackerel fishery; and 151 in the shore mackerel fishery; the estimated product of the fisheries, in fish, oil, and manure, was $3,242,250.

THE FOREIGN COMMERCE OF GLOUCESTER FROM 1783 TO 1859.—"The foreign commerce of Gloucester," writes Mr. Babson, "which before the Revolutionary war was of no great extent, rose, after the peace, to be of considerable importance. In 1790 upwards of forty ships, brigs, schooners, and sloops were employed in it; and during the twenty years succeeding, vessels belonging to the town visited most of the principal ports in Europe and the West Indies, and a few made voyages beyond the Cape of Good Hope. One of those engaged in the latter (the Winthrop and Mary) was owned by an association of merchants called the India Company. She was of about 100 tons burden, originally a schooner, but was altered to a ship, and properly manned and armed to suit the dignity of the India trade. Having made two voyages safely to Calcutta, she was next sent to Sumatra, but was never heard from after leaving

that island on her homeward passage. This occurred about 1800. The Bilboa trade was also resumed by our merchants after the war. The first vessel that ever left Massachusetts Bay with a cargo of fish for a European market was the ship belonging to the Dorchester Company, which sailed from Cape Ann Harbor for Spain in 1623, as stated in a previous chapter of this book; but of the great trade in that article of which that voyage was the commencement we know little more than the beginning and the end. In 1767 there were sent to Bilboa from the ports of Essex County as many as 51,000 quintals of fish, of which quantity Gloucester, without doubt, furnished a considerable portion. The merchants of the town finally abandoned the trade soon after the beginning of the present century, chiefly, it is said, in consequence of discriminating duties at that port in favor of the fish of other countries. The interruption of the business of France, occasioned by the revolution in that nation, opened for a short season a profitable market for American fish, of which some of the Gloucester merchants took advantage. One schooner, fitted out from the town in 1793, went to the Grand Bank and took 21,000 fish, with which she sailed to Nantes, but, upon arriving on the coast, was ordered to Belle Isle, where the fish were sold in a green state at a half crown apiece, producing over 10,000 crowns. This was a rare case of course, and, as might be expected, the business was soon overdone, and finally, upon the resumption of the French fisheries, abandoned altogether.

"The peace in 1783 also enabled the merchants of Gloucester to pursue the West India trade again for several years without interruption. A considerable portion of this trade—that carried on with the French islands—finally ceased to be profitable in consequence of the large bounty by which the importation of French fish was encouraged, and before 1830 was totally abandoned by the merchants of the town. About the same time the unimportant commerce carried on with some of the other islands was also given up, and Gloucester turned attention to the home market, which began then to be opened, and which it has ever since found to afford the best customers for its staple products. If a particular account of our West India trade should ever be written, one incident of it possessing interest in these days of huge ships and a vast commerce will command the attention of the historian. This was the fitting out, during the embargo preceding the last war with Great Britain, of several of the small fishing-boats of the town on voyages to the West Indies. One of these boats was of 13 tons burden, and the largest was not more than 20. The act was unlawful, and they departed, of course, by stealth. The fish which they carried were sold at high prices, and the boats were disposed of without great loss, though the master of one ventured home with a cargo of coffee, which he landed at Squam in the night, and before morning was again out to sea to set his boat adrift in Massachusetts Bay, where he was finally picked up.

"The only branch of foreign commerce which has been steadily pursued by merchants of Gloucester for a long course of years is that carried on with Paramaribo, or, as it is usually called here, Surinam, the capital of Dutch Guiana. Boston vessels traded to Surinam as early as 1713, for two arrived at the former port from that place in one week of that year; but it is not known that any Gloucester vessel engaged in the trade till about 1790, when, it is said, Colonel Pearce sent a vessel there. The chief article of export is hake, supplied in part by Maine fishermen, though other provisions, as beef, pork, lard, hams, and flour, are sent in large quantities. The return cargoes consist almost wholly of molasses and sugar, but some coffee and cocoa are also brought. Under the stimulus of the very high prices of sugar and molasses in 1857 the trade of Gloucester with Surinam for that year probably exceeded in amount that of the whole foreign commerce of the town in any previous year of its history.

"The commerce of Gloucester began with the shipment of wood to Boston, a business which, in course of time, compelled the people of the town to seek their own supply abroad. This, according to the lapse of years, they obtained from places more and more remote, till at last they came to depend on Nova Scotia for this essential article. The wood-coasters of that province began to come to Gloucester about twenty years ago. The vessels were then of no greater average burden than 40 tons, but the size has increased with the growth of the business, and has now reached an average of 75. The number of arrivals of foreign vessels, nearly all of which were these wood-coasters, was, in 1859, one hundred and forty-two. Before the reciprocity treaty with Great Britain these vessels generally took home specie, but since that happy event they have carried provisions and other articles from the well-supplied stores of the town."

ESSEX.

THE GROWTH OF THE FISHERIES.—The early history of this town is included in that of Ipswich, of which it formed a part until 1819, when it became known under its present name. The following historical facts are recorded in the History of Essex by Crowell & Choate, 1865, and in Felt's History of Ipswich, 1834:

"In 1732 the fishery was successfully carried on here, and in the center of the town. The town, by a vote passed the year before, required the names of all the crews of fishing vessels in the town to be entered with the town clerk, on penalty of £20 for every omission."

"In 1770 fishing was much encouraged among us. From twenty-five to thirty Chebacco boats, with two men and a boy in each, went to Damaris Cove and brought their fish ashore here to be cured. Fish flakes were to be found on Hog Island, on Warehouse Island at the north end, on Thompson's Island, and at Clay Point."

"About 1804 forty sail of boats were engaged in the fishery on the eastern shore; a few were employed in the Bank fishery. The fishing business diminished as ship-building increased and was found more profitable. The former was mostly discontinued about 1821."

"In 1820 a company became incorporated for having a canal from Ipswich to Essex. It was made navigable early in 1821. Its length is about half a mile. It commences at Fox Creek and runs to Chebacco River. It cost near $1,100. This stock is divided into twenty-seven shares, of $40 each, and pays nearly 6 per cent. on the original amount. As an inlet to Essex from Merrimack River for *ship timber* (fishing vessels at Essex), it has kept this article

down lower than it would be had dependence been placed solely in what the vicinity would supply. Prices of freight through this canal: Oak timber, 17 cents, and pine, 14 cents a ton. Oak sawn stuff of an inch thick, 40 cents M, and of other thicknesses in proportion."

"Thirty years since [written in 1834], forty sail of boats from this place were engaged in the fishery on the eastern shore; a few were employed in the Bank fishery. The fishing business diminished as ship-building increased and was found more profitable. It was mostly discontinued twelve years ago. Nine hundred barrels of clams are dug here annually. The persons by whom they are obtained sell them, exclusive of barrels and salt, from $2.50 to $3. Such bait was formerly vended at Marblehead, and now in Boston for the prices mentioned with reference to Ipswich."

"For the last twenty years [written in 1865] about fifty men and boys have been employed, chiefly in the spring and fall, in digging clams for fishing-bait. For this purpose, the clam-flats in each town are, by law, free to all its residents, and to no others. Five bushels of clams in the shell, it is usually reckoned, make one bushel of 'meats'; about two and a half bushels of the latter are put into each barrel, and this quantity an able-bodied man can dig in three tides. One bushel of dry salt is used for each barrel. During this period of twenty years, about 2,000 barrels of clams have been dug yearly, on an average, and sold at an average price of $6 per barrel. Deducting for the cost of the barrel $1, and of the salt for it 75 cents, the sum of $4.75 per barrel or $8,500 per year has been earned in this business. The bait is marketed chiefly in Gloucester."

The Gloucester Telegraph, of October 18, 1865, states that "the fishing business of Essex is represented by seventy men, who secured during the past season 18,000 bushels of clams, netting $12,000. Capital invested, $400." The census of Massachusetts for 1875 gives the following figures for Essex: "Clam-diggers, 9; fishermen, 6; ship carpenters, 122; spar-makers, 6."

BEVERLY.

THE FISHERIES OF BEVERLY FROM 1832 TO 1845.—Mr. John Pickett, who has been engaged in the fishing business at this place from 1832 to the present time, informs us that the home fleet in 1832 consisted of from forty to forty-five sail.

The Salem Observer of June, 1838, stated that in that year there were in Beverly fifty-eight fishing vessels, employing three hundred men. The tonnage aggregated over 3,000 tons and the rate of bounty was $4 to the ton.

The Gloucester Telegraph of January 29, 1845, gives the following account of the fisheries of Beverly for the year 1844: "Twenty-three schooners, making one fare each, and twenty-five schooners, making two fares each—aggregate, forty-six schooners, 3,356 tons—brought in 30,000 quintals fish, worth $67,333, and 313⅞ barrels of oil, worth $4,622. The bounty was $13,650. Besides the home fleet, twenty-three schooners belonging to other ports brought in 12,494 quintals fish and 179 barrels of oil, and paid $2,000 for curing their catch."

The following extract from the Gloucester Telegraph of January 21, 1846, shows the amount of income from the fisheries at Beverly for the year 1845:

Codfish caught, 26,982 quintals, at $2.40	$64,756 80
Cod oil, 283 barrels, at $14.25	5,444 00
Amount of bounty paid by government	12,914 00
Tongues and sounds, 420 barrels, at $5.50	2,310 00
Total	85,424 80
Number of vessels employed in the fisheries in the year 1845	42
Number of hogsheads of salt expended	3,500
Number of hands employed	350

CONDITION OF THE FISHERIES FROM 1850 TO 1869.—The fishing business prospered and increased up to 1850, when it numbered seventy-five sail, employing 1,200 to 1,400 men, nearly all of whom were of New England birth. Vessels leaving home from the 1st to the 15th of March returned in July and refitted, making two and often three trips a year. The years 1857 and 1858 were financially disastrous ones, and since that time, with the exception of during the years 1863, 1864, and 1865, the business shows a steady decline.

The Gloucester Telegraph of January 7, 1860, says: "The amount of fishing bounties paid for the district of Salem and Beverly for the year 1859 is $18,176.76. The amount of tonnage employed in the business in this district is 4,723 tons. The number of foreign entries at the custom-house in this city for the year 1859 was two hundred and seventy-five, and the number of clearances for foreign ports during the same period was two hundred and sixty-one."

Two items from the Gloucester Telegraph give an account of the condition of the Beverly fishing fleet for 1869: "The Beverly fishing fleet last year employed twenty-seven vessels with an aggregate of 1,700 tons and three hundred and fifty men. Of codfish and halibut 32,000 quintals were landed; of oil, 350 barrels. About $200,000 was stocked.

"The Beverly Citizen states that the fishing fleet from that town has made a very successful season's work, the estimated amount of fish landed being about 32,000 quintals of codfish and halibut; number of barrels of oil, 350; amount stocked, $192,000; oil, about $9,000. The number of men employed was 350; number of vessels, 27, with an aggregate of 1,700 tons. The largest amount of fish landed by any one vessel was by schooner D. A. Wilson, owned by Pickett & Wilson, consisting of 2,288 quintals, two fares."

SALEM.

EARLY HISTORY OF SALEM FISHERIES.—The early history of the fisheries of this place, dating back to the beginning of the seventeenth century, may be best learned by a careful examination of various extracts bearing on this subject, taken chiefly from the Essex Institute Historical Collections and from Felt's History of Salem.

First are given some remarks on the commerce of Salem by Mr. George F. Cheever. These remarks apply to Salem between 1626 and 1740.

"The trade or commerce of Salem most probably dates back to, or even prior to, the settlement of the place. Adventurers to this western coast, after fish and furs, may have traded with the Naumkeags ere Conant and his associates settled here [in 1626]. To judge from the testimony of Brackenbury, Dixey, and Woodbery (Salem Records, Registry of Deeds, Vol. 5, pages 105 to 107), the early planters were on the best terms with the native Indians in Salem, and thus had the opportunity of trading with them; and the Cape Ann settlement had boats, which were doubtless used for fishing, and very probably trading, along the coast. As that settlement was originally intended as a planting, trading, and fishing one, it is most likely that fish and furs were both sought from Salem, as from the vicinity; the search for both these articles being then common to adventurers to this western coast. * * *

"The Home Company begin their trade with Salem and vicinity in 1628. They send over with Endicott certain goods to traffic with the natives for beaver, otter, and other furs, and in 1629 he is ordered to send home to the company, in London, two or three hundred firkins of sturgeon and other fish. * * *

"In 1629 we find the Home Company sending into Salem six ship-builders, of whom Robert Moulton is chief, and two coopers and cleavers of timber, the last to prepare staves for return cargo, and that they order three shallops to be built in Salem, doubtless for fishing purposes. It is most probable that these shallops, if ever built, were built upon the Neck, near or upon Winter Island, which was used for the fisheries and ship-building from the very commencement of the town. Judging from what is said of the shallop in the New England Voyages, in the Mass. Hist. Coll., of what Prince and Bradford say, and the comparison Hutchinson makes between the fishing shallops of 1749 and the fishing schooners then employed, the shallop of New England was often a decked boat of from 10 to 20 tons. * * *

"The early, the long continued, the staple trade of Salem, was the fisheries. We see indeed some of her sons from 1650 to 1658 engaged in the beaver and peltry trade, once valuable, but this was almost extinct in 1688, and at that time the fisheries, whale and other, were as productive as ever. The harbor and rivers of Salem swarmed with fish, among which cod and bass were very plenty. So plentiful were they that they were used for manure up to 1639, when the general court forbid it. Great favor was early shown the fishermen in Massachusetts by law, such as freedom from taxation on their stock and fish, and from military duty while engaged in their occupation. The early foreign trade, that is, imports of the colony, seems, during the first few years, to have been in the hands or power either of the Home Company or the government of the colony, as representing either them or the colonists; but it is doubtful if this policy ever extended over the fisheries, or, if so, it must have been for a very short period. The fisheries were considered so important that, as early as 1635, the general court appoint a committee to impress men who shall unload salt when it arrives. This is evidently, in a good part, owing to the value of the salt for the fisheries. They were not hampered with the early restrictions imposed on foreign imports, so far as we can find, and soon became profitable. After the colonists had built their houses, cleared their lands, established their common rights, raised enough to help support life, either in grain or animals, and somewhat settled down, their attention was more particularly devoted to the fisheries. [Massachusetts could not well have exported much grain before 1640, whatever she may have exported in fish, since in 1637 there were only thirty-seven plows in the whole colony, says Graham, the most of them being in Lynn.] It seems most probable that a certain class of men, however, devoted themselves in Salem almost exclusively to this business [fisheries], and from the commencement of the town. Winter Island was their headquarters. They obtained the use of certain lots on the island, and certain common rights adjacent, and this island continued to be used by fishermen until and after a division of the common lands, about 1714. It was then expressly reserved by the commoners for the fisheries, as it had ever been before. This reservation, moreover, was of a great common right, viz, the free use of this island for fishing purposes; since the fee seems, as a general rule, never to have left the town like other grants. Those who built houses, fish-houses, warehouses, and wharves on this island, only gained an *usufructuary* right for the time being. Yet this island has seen a busy fishing population gathered upon it, and as late as 1731 there were conveniences upon the *Neck*, which, in all probability, means this island, for forty vessels and their fares. All this is now a tale of the past. Indeed, just before 1700, this island was a still busier scene in all probability, as Salem sent out over sixty fishing ketches of from 20 to 40 tons, which evidently discharged their cargoes in Salem, and most likely on the common ground or land for the fishermen. In 1660 Baker's and Misery Islands were both set apart by the general court for the free use of fishermen, and were probably intended to be especially used by the Salem, and perhaps Marblehead, fishermen. From the year 1629 to 1740, or thereabouts, Winter Island seems to be the headquarters of the Salem fishing trade, and that trade itself seems to have been our staple trade down to a much later period, even to the American Revolution, and the great change of trade consequent upon it."[1]

From the annexed statement of Mr. G. C. Streater may be gathered some idea of the luxuriance of the Salem waters in 1630:

"SATURDAY, JUNE 12, 1630.

"Governor John Winthrop and his companions, on board the Arbella, and with the noble lady Arbella on board, approached Salem Harbor. * * * After a short sojourn, Governor Winthrop wrote home to his wife, who remained

[1] Essex Institute Hist. Coll., vol. i, pp. 67-74.

in England: 'We are here in a paradise. Though we have not beef and mutton, &c., yet (God be praised) we need them not; our Indian corn answers for all. Yet here is fowl and fish in abundance.' They had had early proof of the abundance of fish, for Governor Winthrop's journal informs us that just before the Arbella reached the harbor of Salem they caught with a few hooks, in two hours, no less than seventy-six codfish, 'some a yard and a half long and a yard in compass.' All the accounts returned to England by the pioneer emigrants concurred in extravagant praise of the new country, and we now read their quaint and highly-colored narratives as amusing curiosities of literature. * * *

"'The abundance of sea fish' (says Mr. Higginson, 1629) 'is almost beyond believing, and sure I should scarce have believed it, except I had seen it with mine own eyes.' He had seen hundreds of bass seined at one time in our own waters, and mentions lobsters as being so abundant that even boys could catch them. But of lobsters, he says, as for myself I was soon cloyed with them, they were so great, and fat, and luscious.'"[1]

The curing, culling, and final disposition of the fish caught are described by Mr. Cheever:

"Fish being the great staple of Salem, as of the colony, was of course the early object of the care and attention of the legislature. Laws were passed protecting it as well as the fishermen. The curing of it seems to have become at least a distinct business, left to those called shoremen who received the fish on return of the fishers and cured and dried it. It then passed under the review of the cullers, who were sworn officers, certainly after 1700, and was divided into merchantable, middling, and refuse; also, scale fish. The first two went to Spanish and the first-class markets, the refuse to the slaves in the West Indies, and perhaps the poorer classes of Europe. The fish from Acadia (Nova Scotia) (Cape Sable fish) was in great demand in Bilboa, Spain, as being a superior fish, and was largely shipped there. Marblehead sent this description of fish to Spain even after our American Revolution. In 1670 the legislature denounced the use of Tortuga (West India) salt on account of its impurity, and fish cured by it was made unmerchantable by law. Winter Island and the adjoining Neck seem to have been especially devoted in Salem to the fisheries; Winter Island being in 1695, and yet later, the headquarters, to judge by history, tradition, and old papers. How far Salem may have been engaged in the whale-fishery is dubious. Some of her sons may have gone down to Cape Cod on such an errand; for the Cape, as late as 1714, was so largely visited by cod and whale fishers that the general court that year made all the province lands there a precinct and the visitors to it (fishermen) support a settled minister at £60 per annum by a tax of 4 pence a week levied on each seaman, to be paid by the master of the boat for the whole company. This was in the days when no man was permitted to be absent from church a month, if in health, without presentation before the grand jury, and punishment by a fine of 20 shillings."[2]

The same writer thus describes the fisheries and vessels used in the same, which, when developed further, led to the elevation of Massachusetts as a State noted for its prominence in the fisheries:

"The English had freely used the coast of New England for the fisheries before the settlement at Salem, and the royal charter reserved this right to Englishmen after the settlement, a right which was freely used, it seems. Newfoundland had an English settlement at the time.

"The early fisheries were quite profitable, to judge from Levett's account of the trade in 1623-'24, wherein he says he has 'attained to the understanding of its secrets.' According to him, a ship of 200 tons, with a crew of fifty men, the ordinary crew of such sized vessels in the fisheries, would be at an outlay of some £800, the cost for nine months' victualing, &c. One-third of the catch, 'fish and train,' being deducted as 'fraught' for the owners, another as a share for the crew, and the balance for expenses, the owner's one-third part of the cargo would yield £1,340 'for disbursing of £800 nine months.' The cargo sold in Spanish ports from 36 to 44 rials per quintal. Our Salem fishing craft were not so large as Levett's 'ship,' but were shallops of from 10 to 20 tons, say, ketches of from 20 to 40, and finally schooners from 30 to 60, or more, carrying not more than from four to eight or ten men, say. Small boats were perhaps used at first. Still the trade was profitable, Salem and Massachusetts being built up by it in the early day. The fisheries and the timber trade gave Salem doubtless two-thirds or more of her early wealth."

FISH AND FISHING, 1616 TO 1635.—Felt, referring to the abundant supply of herring in 1616 and previous to that date, has recorded this statement, made more than two hundred and fifty years ago:

"In Virginia they never manure their overworn fields, which are very few, the ground for the most part is so fertile; but in New England they do, striking at every plant of corn a herring or two, which cometh in that season in such abundance they take more than they know what to do with."[3]

Felt then adds (quoting another statement made somewhat later than the above):

"After fish became scarce, though abundance were taken for food of the inhabitants and for exportation to foreign ports, the supplies of the barnyard and of the sea-shore were of course more depended on to strengthen our lands."

The same author says:

"A letter from the company in London to Mr. Endicott in 1629, among other things spoke of 'building shallops for the fishing business, by six shipwrights then here. One of these mechanics, Robert Moulton, was master workman. It proposed fishing in the harbor or on the banks. It requested, that if the ship, which had arrived with emigrants, should be sent to fish on the bank, and not return hither immediately, 'the bark already built in the country,' might be fitted out to bring back the fishermen.' We perceive from this that a vessel had been made, most probably at Naumkeag; and that the *Desire*, afterwards launched at Marble Harbor, was not the first vessel built in the colony, as some have supposed. The fishermen just mentioned had been employed in England to reside here for teaching and encouraging their business. A storehouse was erected for the shipwrights and their provision, by an order of April 17, and another for fishermen and their stores, by an order of May 28. Records were to be kept of their stock, provisions, and proceedings."

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[1] Essex Institute Hist. Coll., vol. ii, p. 2. *Ibid.*, vol. i [1859], p. 122. Annals of Salem, vol. i, 2d ed., p. 243.

Felt quotes the following words of Mr. Higginson uttered in 1629, and contrasts them with the facts concerning the same fish, "the bass, in 1845," when they were "seldom seen in our waters:"

"Whilst I was writing this letter my wiffe brought me word, that the fishers had caught 1600 basse at one draught, which if they were in England were worth many a pound."

A regular distribution by law of land to the fishermen was in 1635 ordered by the Salem authorities. Felt has thus entered the occurrence:

"1635.—Our town authorities, to 'avoid the inconvenience found by granting of land for fishermen to plow,' ordered 'a howse lott and a garden lott or ground for the placing of the flakes, according to the company belonging to their families, the greatest family not above two acres and the common of the woods neer adioyning for their goates and their cattle.'"[2]

GRANTS OF LAND TO FISHERMEN AND OTHERS.—In the Essex Institute Historical Collections, Vol. ix, 1868, are the subjoined desires and grants of and to certain persons of Salem:

"23TH OF THE 11TH MO: ANN° 1636.

"William Hackford Received for an Inhabitant & may also have a ffishing Lott."

"7TH OF 12 MO: 1636.

"Sarg: Woolf may have a fishing Lott at Wint^r Harbo^r.

"AT A TOWNE MEETING 11TH OF Y^e 5 MONETH 1636.

* * * "Its agreed—That Thomas Moore sonne to widow Moore & his wife are received for Inhabitants and may have one fishing lott on the neck.

"AT A MEETING THE 25TH OF THE 10TH MONETH, 1637.

* * * "There is graunted to Richard Graves: half an acre of land upon the neck for the setting of his howse, hee promising to follow fishinge.

"THE 3D DAY OF THE FIRST MONETH, 1637.

"Widow Moore desireth a howse loote neere vnto the Winter Iland, among the ffishermens lotts.

"THE 21TH OF 11TH MONETH 1638.

"Graunted to John Browne an halfe acre lott for a ffishing lott neere to Winter Harbor.

"4TH DAY OF THE 12TH MONETH, 1638.

"Graunted to Joseph Younge, an halfe acre lot neere the winter harbor for fishinge. Also a 10 acre lott neere to Mr. Downinge's farme.

"Graunted to Thomas ffryar 5 acres of land & a halfe acre lott neere winter harbor for fishinge.

"Graunted to Henry Swan halfe an acre of land neere to Winter harbor for fishinge as also a 10 acre lott, neere to the Pond by Mr. Blackleech his farme.

"Graunted to Joseph Kitcherill halfe an acre at Winter harbor if he imply it in ffishing.

"THE 4TH DAY OF THE 12TH MONETH.

"Graunted to Hugh Browne half an acre of land neere about winter harbo^r for to further his fishing, wch if hee follow it not, hee is to surrender it againe to the towne.

"Daniell Jiggles desires an halfe acre lott neere about Winter Harbo^r for their fishing affaires.

"There is graunted to Daniell Jiggles half an acre of land neere aboute Winter harbo^r for fishing vppon the like termes as Hugh Browne hath his.

"THE 18TH OF THE 9TH MONETH, 1639.

* * * "Edmond Tompson hath graunted him halfe an acre of land at winter harbo^r or thererbouts for a fishing lott.

"Graunted to Henry Hayward an half acre of land for a fishing lott about winter harbor. It is permitted that such as have fishing lotts about Winter Harbo^r & the Iland shall have libertie to fence in their lotts to keepe off the swine and goates from their fish, soe that they leave it open after harvest is in.

"Graunted to [Richard] Moore an half acre of land for a fisher lott, near about winter harbor.

"Graunted to Matthew Nicks fisherman 5 acres of land."

Felt states that on May 22, 1639, the general court of Salem, for the encouragement of the fishery, exempted the stock employed in it from taxes. They forbad cod and bass fish to be used for manure.

Additional encouragement was given to the Salem fishermen in the same year, as may be seen from the following:

"1639, Nov. 18th.—Those having lots about Winter Harbour and the Island, have liberty to fence in their lots to keep off the swine and goats from their fish, so shall they leave it open after the cattle is in."

All engaged in fishing were still further favored; for in 1639, after granting facilities to Maurice Tomson and others for a fishing establishment at Cape Ann, the general court ordered, that for the encouragement of other similar enterprises, the vessels, stock, and fish should be exempted for seven years, from all country charges. The fishermen were declared, during the seasons for catching fares, free from military duty.

This vote, recorded in the Essex Institute Collections, was passed in 1639:

"Att a generall Towne meeting in ye 11th moneth 1639.

"Voted.—That the Iland Caled Winter Iland may be fenced Inn for the saftie of the fiishing trade & so to Continue vntill the prim. of the third month Caled May vnless such as have Goats doe fence in the flakes for the saftie of the fish."

SALEM FROM 1648 TO 1670.—The two next statements—a grant and an order—are also indicative of the interest taken in the fisheries by the Salem town authorities:

"At a gen'll toune meeting held the 8th day of the 5th moneth 1643.

* * * To Richard More, halfe an acre joyned to his howse as a fisherman."

"At a generall towne meetinge, held the 13 of the 4th moneth 1644.

"*Ordered*, * * * . And that the doggs at [winter] neck shall be tyed vp in the day tyme & if any doggs there spoile fish, that they also shall either be sent away or killed."

The prayer for and the granting of certain islands to become, for all practical purposes, the property of the fishermen are related in these words:

"At the first session of the legislature in 1660, Salem applied to them for a grant of the three islands. Part of their application ran thus: 'Whereas ther are certayne Ilands neare our towne, comonly knowen by the names of the Miserys and Baker's Iland, fit for fishinge imployments, a great part of our imployment, our humble request to this honored Court is, that they would be pleased to grant the propriety of those Ilands to ye towne of Salem, and you shall further ingage your pettioners to be thankfull to you, desiringe Almighty God to inable you with his presence and blessinge in all your waighty occasions.' An affirmative answer was delayed till the next session. This was thus recorded: 'Vpon a motion made in the behalfe of the inhabitants of Salem, this Court judgeth it meete to graunt to them certaine Islands, knowne by the name of Miseries and Baker's Island, lying in the mouth of theire harbor, provided that it shall be lawfull for any fishermen to make vse of them in making fish, and whatever conduceth theretaso, building houses, stages, etc., as also wood and flaking in all fishing seasons.' Here we have another instance of provision, made for the fishery, as ordered by the Charter. As to the Miseries, the Great one contains about 64 acres, and the Little, between 3 and 4. They are united by a bar which at half tide is above water. John Lambert and others petitioned the town, 1662-'63, that they might plant there in the course of their fishing season."[1]

Still further grants were made for the benefit of the fishermen of Salem: * * * "The fishermen were early protected by law, and granted various privileges, and in 1663 were empowered to use wood from any common lands for fish flakes and stages—the English fishermen possessing still greater privileges—being allowed to enter on to private lands for the purpose, paying a reasonable sum, however, for damages. It was trespass in our fishermen to do this, but the English fishermen were considered to have their privileges under the charter. The colonists did not like such an exercise of their claims, but from policy perhaps forebore to deprive them of them."[2]

The Salem court in 1670 thus gave judgment on the use of a certain salt in the curing of the fish: "Whereas, by the blessing of God, the trade of fishing hath been advantageous to this country, which is likely to be impaired by the use of Tortuga salt, which leaves spots upon the fish by reason of shells and trash in it," and then forbid such fish to be accounted merchantable."[3]

TROUBLE WITH INDIANS IN 1677.—The following account, compiled from Felt's Annals of Salem, shows the loss suffered by Salem fishermen at the hands of the Indians in 1677, and the means taken to regain the captured. "One of the principal men of Salem said: 'Some of us have met with considerable loss by Indians lately taking our vessels. Some, lately come in, say that the Indians purposed to pursue four more of our ketches, we therefore desire, that a vessel, with 40 or 50 men, may be immediately sent to protect them and retake those and the poor captives already taken.' The council accordingly complied, 25th. A record of the first church follows: 'The Indians having taken no less than 13 ketches of Salem and captivated the men, (though divers of them cleared themselves and came home), it struck great consternation into all people here, and it was agreed, that the Lecture day should be kept as a Fast.' The services were performed. 'The Lord was pleased to send in some of the ketches on the Fast day, which was looked on as a gracious smile of Providence; also 19 wounded men had been sent to Salem a little while before. Also a ketch, with 40 men, was sent out of Salem, as a man of war, to recover the rest of the ketches. The Lord gave them success.' This vessel was called the Supply, commanded by Nicholas Manning. Among the wounded were James Veren and Anthony Waldern, of this place. Two of our townsmen, Nathaniel Kun and Peter Petty, were killed. These four appear to have been connected with the preceding vessels, while on fishing voyages at the eastward. Joshua Scotlow's narrative says that, August 18, on signing articles of peace at Pemaquid, Madockawando delivered up five men, who belonged to ketches of Salem and Marblehead."

In 1681, through fear of similar invasions upon ketches fishing near Cape Sable, the military committee of Salem, on May 24, "petitioned government that they might impress a vessel and men, and send her to prevent such a purpose, promising that if the report were false, they would pay the cost, but if true, the Province would pay them."

The French also, in July, 1681, captured two Salem ketches.[4]

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[1] Annals of Salem, by Felt, vol. i, 2d ed., p. 238. [2] Essex Inst. Hist. Coll., vol. i, p. 89. [3] Felt, vol. ii, 2d ed., p. 212. [4] *Ibid.*, p. 213.

FISH AND OIL IN 1687.—Under date of 1687 was written a letter of a commercial character, interesting as showing the valuable commodities at that time, by a Mr. Hollingworth, then a merchant in Barbadoes, to his mother at Salem. The letter is directed on the outside, "For Mrs. Elanor Hollingworth, Att Sallem, In New England," and reads:

"DEAR AND HONOURED MOTHER: My Duty be presented to you with my kind love to my brother and sister and to ye children. Yours by Mr. Prance I Recieved; fish now att present bares A good rate by Reason ye Newfoundland men are not yet Come in but I believe itt will be low anuffe about three months hence; bread and peiece [pease] hath been A good Commodity and Contenues, loumber is lowe still, oyle will be ye principle Commodity but in good Cuske wee are in great likelihood of A brave cropp; this latter part of ye year hath proved very Seasonable, ye lord be praised for itt, pray lett my brother see this letter I cannot tell what to advise him to send as yett besides oyle but in A short tyme wee shall see what these Newfoundland men will doe what quantityes of fish they bring in and then I will advice farther. I will slip noe opportunity in advising him, soe with my serviss to all my frinds I subscribe my Selfe your obedient Son to Command.

"WM. HOLLINGWORTH.

"pray fail not my dear Mother in sending me half kentle of Cuske and some aples and some barberyes and ye lott of Cuske.

"Barbadoes, Septem. 19, 1687, Bridgeton.

"My Serviss to Mr. Croade, Mr. Andrews, and to Mr. Adams, and to Mr. Benj. Allin."

[NOTE.—The *oil* mentioned in this letter may, in part, have been whale oil from the Cape Cod whale fisheries, or taken, perhaps, by Salem whaling-boats in Massachusetts Bay.][1]

Mr. Felt, in his History of Salem, says that James Loper, of that town, in 1688, petitioned the colonial government of Massachusetts for a patent for making oil. In his petition Loper represents that he has been engaged in whale-fishing for twenty-two years.

PIRATES AND OTHER ENEMIES.—The interests of the fisheries being in danger by reason of pirates and other enemies, the following item appeared June, 1689:

"1689, June 13: Our government orders a vessel to scour our coast of pirates, then carry soldiers on the Eastern expedition, and protect our fishing-vessels on the coast of Acadie."[2]

Certain vessels from Salem were captured by French frigates in the summer of the same year. This fact and its consequences upon owners of vessels are recorded by Felt as follows:

"1689, September 17: The ketches John and Eliza, commanded by Ezra Lambert; Margaret, by Daniel Gyles; Diligence, by Gilbert Peters; Thomas and Mary, by Joshua Conant; and, 18th, Dolphin, by Isaac Woodbury, all of Salem, are taken by two French frigates. Soon after this our merchants send a petition to the council, stating that several of their vessels had not returned with their last fares; that six of them, with thirty men, had been captured and carried into Port Royal. They also remark that they are discouraged from fitting out their fishing craft next spring, and desire that an agent may be despatched to see about those detained by the French."

These acts of piracy, as Sabine says, tended to check the prosperity of Salem, and in 1693 the French war caused a great loss of ketches to that port, for upwards of fifty of her fishing ketches were taken by the French and Indians.

A British frigate next appears to vex the fishing vessels from Salem, for we learn that Joseph Sibley, George Harvey, aged 46, and Henry Harvey, 43, in 1693 were on their homeward passage from a fishing voyage to Cape Sable, and were impressed on board of a British frigate. After seven weeks' service in this vessel, the captain forced Sibley to go on board of another ship. "Susannah, wife of the latter, having four children, petitions the governor to redress the wrongs of her husband."

The province expressed their willingness to assist those endeavoring to recover from a French privateer the persons who had been captured, and Felt records this entry made on the town records in 1694:

"1694, June 12: 'Whereas some gentlemen of Salem are sending out a ketch to St. John's river and parts adjacent for fetching off some of their people, lately taken by a French privateer and carried thither,' and 'his excellency is to dispatch an express by said ketch to the captain of the frigate Nonesuch, it is voted that if the ketch miscarry by reason of this express the province will bear the loss of her.'"

The terrible loss suffered by Salem on account of the French war may be gathered from the following extract from a letter written in 1697 by John Higginson to his brother Nathaniel:

"In the year 1689, when the war first broke out, I had obtained a comfortable estate, being as much concerned in the fishing trade as most of my neighbours. But, since that time, I have met with considerable losses; and trade has much decayed. Of sixty odd fishing catches belonging to this towne, but about six are left. I believe that no towne in this Province has suffered more by the war than Salem."[3]

[Dated, Salem, 20, 6, '97.]

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[1] Essex Inst. Hist. Coll., vol. i, pp. 84-85.

[2] Felt, *op cit.*, vol. ii, 2 ed., p. 214.

Coll. Mass. Hist. Soc., vol. vii, 3d series, p. 202.

In 1699 the governor gave a pass for each of the following vessels,[1] bound on a fishing voyage:

Class.	Name.	Captain.	Tons.	Men.
Ketch	Mayflower	John Curtis	30	6
Ketch	Endeavour	Thomas Mascoll	30	5
Barque	Dolphin	Samuel Allen	30	5
Sloop	Dolphin	Robert Warren	25	5
Ketch	Prosperous	Joseph Brown	40	6
Sloop	Trial	John Collins	35	6
Sloop	Mary	John Webb	36	6
Sloop	Hope	John Allen	36	6
Ketch	Sea Flower	Samuel Lambert	35	6
Ketch	Bonetta	Martin Masury	25	5
Ketch	Swallow	Joseph English	30	5
Sloop	Sterling	William Tapley	35	6
Ketch	Blossom	William Pride	35	5
Ketch	Speedwell	Joseph Tuck	35	5

FOREIGN MARKETS IN 1700.—In 1700 the foreign trade of Salem was thus described by Higginson: "Dry merchantable codfish, for the markets of Spain, Portugal, and the Straits. Refuse fish, lumber, * * * . Our own produce, a considerable quantity of whale and fish oil, whalebone, ———."

TROUBLE WITH THE INDIANS AND FRENCH.—Four accounts of captures of Salem fishermen, between 1702 and 1706, by the French and Indians, are recorded by Felt as follows:

"1702, June 2: The Secretary, Isaac Addington, addresses a letter to the Governor of Acadie. 'We have received information that fishing ketches belonging to Salem, forced by bad weather to put into port Sea Tour, near Cape Sable, were attacked by about twenty Indians, May 23, at break of day, who took three of them with their companies, and killed David Hilliard, master of one of them. They detain these vessels and two of the men. They pretend to have done this under a commission from the governor of Port Royal.

"1702, July: Capt. John Harraden, taken and carried to Port Royal, returns with two Salem ketches which had been captured.

"1705, August: The sloop Trial, Capt. John Collins, and sloop Dolphin, Capt. William Woodbury, on a fishing voyage, are captured by a French privateer and carried to Port Royal.

"1706, September 1: A ketch, Capt. Joseph Woodbury, was cast away at Cape Sable. While her crew, assisted by others, were saving her materials, some Indians shot one of them dead. The rest escaped."

The authorities of Salem, feeling the losses to which they had been subjected, stated in 1711, September 3, "that as their fishery has decayed, and they have met with losses at sea, they were unable to repair their fort, as the governor had proposed."

And this statement is followed, in 1715, by a vote which, if passed, must have proved a source of gain to the town of Salem:

"1715, November 22: The town vote that each fishing-vessel belonging here may dry its fish for 5s. a year on Winter Island; and each vessel not of Salem may have the same privilege for 20s."

The depredatory acts committed upon Salem boats by Indians and other parties called forth, in 1794, this petition:

"1724.—Inhabitants of Salem and vicinity petition that, as Indians had taken several of their fishing vessels and made privateers of them, and it being reported that many of them had gone to the coast of Cape Sable to continue their attacks, Government would afford suitable protection. Accordingly, August 10, Joseph Majory was commissioned to sail in the sloop Lark, accompanied by a whale-boat, to prevent such depredation."[2]

FOREIGN TRADE.—"In 1726 an act was passed at Salem for the better curing and culling of fish, as by the lack of such care this article, offered in foreign markets, 'has brought disreputation on the fish of this country.'"[3]

The owners of Salem vessels in 1728, and on from that date, were accustomed in some instances to give instructions to the captains of their vessels. This instruction, given in 1728, by Samuel Browne, of Salem, to Capt. John Trouzell, is here appended as recorded in the Essex Institute Hist. Coll.: "Trouzell is ordered to deliver his cargo of 'Scale Fish, middling Cod, and merchantable Cod' at Bilboa, Spain, and thence get freight for Lisbon or Cadiz, and load with salt at St. Ubes for N. E.; or he may take a freight from L. or C. to Ireland, Holland, or England, and then go to the Isle of May for salt."

Felt records that in 1732 Salem had about thirty fishing vessels, much less than formerly, and the same number which went on foreign voyages to Barbadoes, Jamaica, and other West India Islands; some to the Wine Islands; others carried fish to Spain, Portugal, and the "Streights."

"In 1735 it was voted by all interested in the exporting of fish from Salem to the West Indies that D. Epes and B. Brown should be directed to make a just representation of the great decay of the fishery, and the grievous burthen

[1] Felt, *op. cit.* vol. ii, 2d ed., p. 215. [2] *Ibid.*, p. 217. [3] *Ibid.*

on the West India trade, by reason of the late act of Parliament imposing a heavy duty on the goods imported from the islands, called foreign, &c.

"It appears from the custom-house quarterly accounts of Salem from Michaelmas, 1747, to Michaelmas, 1748, that the number of vessels that cleared out upon foreign voyages was 131, and the number of those entered was 96, viz:

	Cleared out.	Entered in.
Ships	4	1
Snows	12	11
Brigs	21	11
Sloops	31	18
Schooners	63	55
Total	131	96

"In which were shipped off to Europe 32,000 quintals of dry codfish; to West India Islands, 3,070 hogsheads (at 6 to 7 quintals refuse codfish per hogshead) for negro provision. New England shipped off no pickled codfish."[1]

Eight schooners went out of Salem during the year 1749. This number was not so large as usual. "Each of them," says Felt, "was about 50 tons, carried 7 hands, caught on an average 600 quintals a year, made five fares in this time, two to the Isle of Sable and three to the banks along Cape Sable shore. The merchantable cod were exported to Spain, Portugal, and Italy, and the refuse to the West Indies for negro slaves."

THE FISHERIES OF SALEM FROM 1755 TO 1794.—In 1755 the authorities of Salem determined to build a balanced bridge over the North River channel in the place of the one already there. The indenture for this work had a circular stamp on the top of it, which, besides having "II pence" at the bottom, had a codfish in the middle, and round the fish "Staple of the Massachusetts."

Preparations were being made in 1757 for the invasion of Canada, and under date of March of that year "a call was made on one Richard Lechmere as to fishing vessels and others fit for transporting troops to New York for the invasion of Canada, and belonging to his port, which included this [Salem] and other sea-board towns."

An entry on the town records, made in September, 1762, shows the interest taken by the people of Salem in their own vessels fishing on the banks when they had been told of the intentions of a French privateer. It reads thus:

"1762, September 14: The governor states that soon after the invasion of Newfoundland the inhabitants of Salem and Marblehead, who were concerned in the fishery northwest of Nova Scotia, were alarmed with advice that a French privateer was cruising in the Gut of Canso, and petitioned for the protection of their fishing vessels employed in those seas, and that he fitted out the Massachusetts sloop, that she had just returned, being gone a month, had heard of a French pirate there, and assisted the vessels there to finish their fares."

The products of the Salem fishing vessels for 1762 are here given:

"This year there were 30 fishing vessels owned here, which brought home 6,233 quintals of merchantable and 20,517 quintals of Jamaica fish. This account was handed, in 1764, to a committee of Boston, who were engaged to prevent the renewal of the sugar act, as detrimental to the fishery."

A loss of three fishing vessels from Salem occurred in the early spring of 1766 by the fury of a storm, which drove also many other Salem fishing vessels off the banks, some of them returning without cables, anchors, &c.

The subjoined letter will evidence the feeling shared by all the New England fishing towns in regard to the treatment they had received at the hands of the British Government. The letter was written by Benjamin Pickman to William Brown, of the Massachusetts legislature, in November, 1766: "I perceive there is a committee appointed to consider the difficulties the trade of this province labors under. You have herewith the depositions of two of our shippers, who were barbarously treated by a Captain of one of his majesty's sloops of war, under the direction of Governor Palliser (of Newfoundland), which I think ought, in the strongest manner, to be represented at home."

In November, 1767, a committee reported that the fishery and trade of Salem were under great embarrassment; one result whereof was that several townsmen were appointed to unite with those of other towns to obtain relief for the fishermen from the payment of the Greenwich Hospital money.

Between 1765 and 1775 an annual average shipment from Salem of 12,000 quintals of fish was made to Europe at $3.50, and the same to the West Indies at $2.60 a quintal.

Between April and September of the same year Salem's loss is thus estimated: Fifty sail of fishing vessels, fallen one-half, £7,500; in flakes, &c., for them, at £50 pounds each, £2,500; and of the fishery for one year, £5,000.

In 1782 it was voted by the Salem authorities that the commissioner for peace with Great Britain should be instructed by Congress to make the right of the United States to the fishery an indispensable article of the treaty.

Between 1786 and 1799 the annual average of bank fishing vessels (from Salem) was twenty, making 1,300 tons and carrying 160 men.

In 1788 the Salem fishermen were very successful. Some brought in 600 quintals

Salem's fleet from 1790 to 1794 is thus recorded: In 1790 there were 7 fishing schooners; 1791, 17; 1792, 24; 1793, 26; thus far schooners included boats; in 1794 there were 13 schooners and 3 boats.

[1] Douglas's North America. Boston and London: 1755. Vol. i, p. 539.

In 1794 the people offered a petition to Congress for further encouragement to their fishery, which had been seriously diminished. Fish-stalls were ordered by the town authorities to be erected that the fish might not be exposed to the sun in warm weather.

THE FISHERIES FROM 1836 TO 1850.—The Salem cod and mackerel fishery in 1836 was prosecuted by 14 vessels, aggregating 906 tons, and manned by 130 fishermen. These vessels caught 5,464 quintals of cod, worth $16,552; and 2,569 barrels of mackerel, worth $21,450. The salt used in both fisheries was 8,274 bushels.

From April 1, 1844, to April 1, 1845, there were but 3 vessels, manned by 27 fishermen, engaged in cod-fishing. Their aggregate tonnage was 239; their catch, 2,650 quintals, worth $7,400; they used 2,720 bushels of salt.

The salmon, sturgeon, and herring fisheries of Salem, once so prosperous, had passed away long ago.

The following table, copied from the Gloucester Telegraph of March 20, 1850, exhibits a summary view of the extent of the cod-fishery of the district of Salem and Beverly for the season ending November 30, 1849:

Tonnage employed	2,400
Men and boys	246
Amount of bounty paid	$9,416
Fish cured, 17,323 quintals	$60,815
Oil, 11,098 gallons	5,583
Tongues and sounds, 330 barrels	1,888
Total value of product	68,286

MARBLEHEAD.

HISTORY OF MARBLEHEAD FROM 1629 TO 1647.—In the town records the line of progress can be traced from the time when a few Naumkeag Indians lived on the ground on which now stands the town of Marblehead, among rocks, swamps, and forests, to the time when the annual expenses of the town, including the minister's salary, were £250; at this time Marblehead was a part of Salem, or Salem a part of it, for it was Marblehead that gave the name to the whole settlement. "Here is plentie of marblestone," wrote Francis Higginson in 1629, "in such store that we have great rocks of it, and a harbour near by. Our plantation is from thence called Marble-harbour."

This name was soon changed to Salem, but the old name was retained for the portion since called Marblehead till 1633, when its present name was generally agreed upon.

Marblehead, doubtless, had settlers as early as 1626 or 1627. The first mentioned inhabitant was Thomas Gray.[1]

Felt, in his Annals of Salem, wrote in 1845:

"This settlement was so denominated from its abundance of rocks, anciently called marble, and from its high and bold projection into Salem harbor. Its bounds included Naugus Head, which, in 1629, became the site of the noted Darby Fort. It was selected about this time as well adapted for carrying on the fishery. Mr. Cradock, the first governor of the Massachusetts corporation, had one of his companies here in this business, not later than 1631. Isaac Allerton and Moses Maverick, his son-in-law, the former among the first settlers of Plymouth, were here as soon as 1634, with their servants similarly employed. Wood gives the ensuing description in 1633: 'Marvil Head is a place which lyeth 4 miles full south from Salem and is a very convenient place for a plantation, especially for such as will set upon the trade of fishing. There was made here a ship's loading of fish the last year, where still stand the stages and drying scaffolds.'"

The following account of Isaac Allerton's settlement in Marblehead and the effect of his energetic example is here given in greater detail:

"In 1631 Isaac Allerton, having already made five voyages to England in the interest of the Marblehead colony, came to Marblehead in the White Angel, and in the same vessel, loaded with fish, he soon after went to England again. Returning, he made Marblehead his home, building there a large fish-house and employing many vessels. * * * The impulse which Allerton had given was seconded by others, so much so that the third vessel built in New England was built here in 1636, the Desire of 120 tons burden. * * * All foreign trade[2] was soon abandoned, and early in the next century fishing was the only business of the place. * * * This was the period when nearly all the fine old houses in the town were built."[3]

Josselyn in 1663 gave this brief description of the location of the town of Marblehead:

"To the North-ward of Linn is Marvil or Marble-head, a small Harbour, the shore rockie, upon which the Town is built, consisting of a few scattered houses; here they have stages for fishermen, Orchards and Gardens, &c."[4]

In 1629 there was a condition made in the New England charter having special reference to the fisheries. Felt, having enumerated some of the other conditions, further says:

"Another condition of the new charter was that the subjects of England should be allowed to fish on our shores; to set up wharves, stages, and houses, and use needed wood without molestation."

"This condition," he continues, "was in conformity to previous and repeated resolutions of the House of Commons. It seems that such a condition was acted on so as to produce complaint. William Walton and other inhabitants of Marblehead presented a petition to General Court, in 1646, as follows: 'Whereas there come yearly into our

[1] Harper's Magazine, July, 1874, p. 197.
[2] Referring to the slave trade.
[3] Harper's Magazine, July, 1874, pp. 197, 198
[4] Josselyn's Voyages, p. 129.

plantation many fishermen y^t are strangers, and have formerly don vs very much damage in ye consuming of our firewood, stage timber and flake stuff.' They desired that an order might be established on this subject."

An order to prevent swine from wandering about the fishing-stages was made at "a court, holden at Boston, April 1, 1633," which read:

"It is ordered, that if any swine shall, in fishing time, come within a quarter of a myle of the stage att Marble Harb^r, that they shalbe forfected to the owners of the s^d stadge, & soe for all other stadges within theis lymitts."[1]

The town records of Salem, Massachusetts, the 28th of the first month, 1636, contain this item:

"John Peach ffisherman and Nicholas Mariott having fenced about five acres of ground on Marble Neck (though contrarie to the order of the towne) yet Its agreed that they may for present improve the said place for building or planting, provided alwayes that the propriety thereof be reserved for the right of the towne of Salem, to dispose of in processe of tyme to them or any other ffisher men, or others as shalbe thought most meet, yet soe as that they may have reasonable consideracon for any chardge they shalbe at."[2]

The offense, for which the above-mentioned persons were reproved by the town authorities, was committed by one John Gatchell, in 1637. He was fined 10 shillings, but half of this amount was to be abated "in case he should cutt off his long har off his head."[3]

It was probably with a view to put an end to all misdemeanors of this kind that in 1636 this order was made and recorded on the town records of Salem:

"THE 2^d OF THE 11th MO: 1636.

"Item, it is ordered for the better furthering of the fishing trading & to avoid the inconvenience we have found by granting of land for fishermen to plant, That none Inhabiting at Marble Head shall have any other accommodation of land, other than such as is vsuallie given by the Towne to fishermen viz. a howse lott & a garden lott or ground for the placing of their flakes: according to the company belonging to their families, to the greatest family not above 2 acres: & the comon of the woods neere adjoyning for their goates and their cattle."[4]

For the protection of the Marblehead fishermen, lawful holders of land granted to them, from intrusion by foreign fishermen this law was adopted:

"At a Generall Courte, at Boston, for Election the 6th of the 3th M^o, 1646.

"Upon ye petition of Marblehead men ye Co^rt thinke fit to declare, y^t howsoev^r it hath bene alowed custome for forraigne fishermen to make use of such harbo^rs & grounds in this country as have not bene inhabited by Englishmen, & to take timber & wood at their pleasures for all their occasions, yet in these parts wch are now possessed, & ye lands disposed in ppriety to sev^rall townes & psons, & y^t by his ma^ties grant, und^r ye great seale of England, it is not now lawfull for any person, eith^r fisherman or other, eith^r forreyner or of this country, to enter upon ye lands so appriated to any towne or pson, or to take any woode or timber in any such places, w^thout ye licence of such towne or pprieto^r; & if any pson shall trespas herein, ye towne or pprietor so iniured may take remedy by action, or may pserve their goods or other interest by opposing lawfull force against such uniust violence; pvided, y^t it shalbe lawfull for such fishermen as shalbe implied by any inhabitants of this iurisdiction in ye sev^rall seasons of ye yeare to make use of any of o^r harbo^rs, & such lands as are neere adioyning, for ye drying of their fish, or oth^r needfull occasions, as also to take such timber for firewood as they shall have necessary use of, for their fishing seasons, where it may be spared, so as they make due satisfaction for ye same to such towne or pprietor."[5]

Two months later this additional declaration and order was delivered:

"Att a Genne^rall Cou^rte of Elecc̃ons, begunne the 6th of May, 1646.

"In ans^r to the peticon of seũall inhabitan^ts of Ma^rblehead, for redresse of many great abuses comitted on their inheritances by seuerall fishermen, itt is heereby declared, & o^rde^red that howsoeuer it hath binn an allowed custome for fo^rreigne fishe^rmen to make use of such ha^rbo^rs & grounds in this country as have not binn inhabited by English, & to take timber & wood at their pleasure for all their occac̃ons, yett, in these ptes, wch are now possessed, & the lands disposed in pp^riety to seuerall tounes & psons, & that by his maj^ts graunte vnde^r the greate seale of England, itt is not now lawfull for any pson, either fishermen or others, either fo^rreine^rs o^r of this country, to enter vpon any lands so appiated to any toune or pson, or to take any wood or timber in any such places w^thout the licence of such toune or pp^riety; & if any pson shall trespasse herein, the toune o^r pp^riety so iniu^ried may take their remedy acc̃on, or may psecute their goods or other interest, opposing by lawfull fo^rce ag^nt such vnjust violence; provided, that it shallbe lawfull for such fishe^rmen as shallbe imployed by any inhabitants of this ju^risdicc̃on, in the seuerall seasons of the yeere, to make vse of any of o^r ha^rbo^rs, & such lands as are neere adjoyning, for the drying of their fish, & other occac̃ons, as also to take such timber or fierwood as they shall have necessary vse of for their fishing seasons, where it maybe spared, so as they make dew satisfacc̃on for the same to such toune or p^rprietyes. By both."[6]

The offenses which called forth the above laws were due in part to the neglect hitherto shown on the part of the town authorities when making grants of land. "From the bramble-bush on the north, so many feet, to the bramble-bush on the west," &c., was no uncommon designation.[7]

By this time, 1647, Marblehead had become largely interested in fishing. Felt has recorded this statement:

"1647.—By the middle of January the vessels at Marblehead had caught, in the season of fishing, about £4,000 worth of fish."[8]

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[1] Records of Massachusetts, vol. i [1628-1641], p. 104.
[2] Essex Institute Hist. Coll., vol. ix, p. 27.
[3] Harper's Magazine, July, 1874, p. 198.
[4] Essex Institute Hist. Coll., vol. ix [1868], p. 27.
[5] Records of Massachusetts, vol. ii, p. 147.
[6] *Ibid.*, vol. iii, p. 63.
[7] Harper's Magazine, July, 1874, p. 198.
[8] Annals of Salem, vol. ii, 2d ed., p. 212.

PROTECTION OF FISH DURING SPAWNING SEASON.—For the regulation of the fisheries the following orders were passed by the general court in 1668 and 1679:

"It is ordered by this court and the authority thereof, that no man shall henceforth kill any codfish hake haddock or polluck to dry for sale in the month of December or January because of their spawning tyme, nor any mackrell to barrell in the month of May or June, under penalty of paying two shillings for each quintall of fish and five shillings for each barrell of mackrell; nor shall any fisherman cast the garbage of the fish they catch overboard at or near the ledges or grounds where they take the fish nor shall any of the boates crew neglect to obey the order of the major of the vessel to which they belong for the tymes and seasons of fishing, nor shall they take or drink any more strong liquors than the major thinks meet to permit them, under the penalty of twenty shillings for the first offence, for the second 40, for the third three months imprisonment. * * 29 (8) 1668."[1]

DUTIES OF FISHERMEN.—The following order was passed by the general court June 13, 1679:

"For encouragement of fishing trade: It is ordered by this court & authority thereof that all fishermen that are shipt upon a winter & spring voyage shall duly attend the same according to custom or agreement with respect to time, and all ffishermen yt are upon a fishing voyage for the whole summer shall not presume to break off from said voyage before the last of October without the consent of the owner, master & shoreman upon the penalty of paying all damages."[2]

ABATEMENT OF TAXES ON FISHING VESSELS, 1694.—The general court passed the following order November 2, 1694:

"Upon reading the petition of sundry of the inhabitants of Marblehead, on behalf of said town, praying that they may be eased of the duty of tonnage for their fishing shallops, and that they may only be considered and taken in as other ratable estate:—voted—That Fishing Boats be abated of the said duty of tonnage and that they pay onely to the Publick as other ratable estate, according to the valuation set by the act or acts of the court for the granting of publick taxes and no otherwise."[3]

TROUBLE WITH FOREIGNERS, 1695.—The Marblehead fishermen seem to have suffered through the invasions of foreigners. Felt records the following entry made on the town records September 23, 1695:

"*September* 23, 1695.—As a French privateer had captured shallops at the Isle of Shoals, another in our bay, and it is said that 'Major Brown's ketch, which was taken, and other booty, are in a harbor in or near Casco Bay,' a commission is requested for a ketch and shallop, with 40 or 50 fishermen of Marblehead and Salem, to sail from this place, in pursuit of the enemy. The petition was allowed, and funds were granted for the enterprise."

NAVAL PROTECTION FOR THE FISHERIES.—Concerning the protection of the fisheries, the military authorities had the following correspondence in 1696.

Letter to Captain Legg, at Marblehead:

"Upon application of yourself and other Gentlemen concerned in ye Fishery I was ready to gratify you with a convoy so far as might become best with ye other service proposed by his Majesty's ship into ye Bay of Fundy, and did accordingly order Captain Paxton to attend that service, he then acquainting me only of his want of fifteen men, and I understood you were ready to supply them rather than to faile of his assistance, and I expected it had been done, and that he had been gone to sea. But I have this day received at Letter from Captain Paxton at Marblehead in which he advises of want of 30 men more to complete his number, and that he has not yet received any from yourself, and therefore expects positive orders, &c."[4]

Letter from William Stoughton to Capt. Went. Paxton, Commander of His Majesty's ship Newport, dated Boston, May 4, 1696.

"I received yours of this date whereby I understand you are still at Marblehead and am surprised at the account you give of the want of 30 men to make up your compliment. You never mentioned more than fifteen unto me before your going hence, which I expected would be made good unto you by the Gentlemen concerned in the Fishery and you say they will provide them. I hoped that a considerable part of that service would have been performed before this. I am sorry that the Fishery should not be assisted having made provision for that design but the time is very much passed away that I fear the other service proposed for you (which is of such importance) will be disappointed in case you should pursue your order to continue with them till they make their Fare. But if you think it may be with the safety of his Majesty's ship without a further supply of men to convoy them to the Fishing Ground, and so to return back to this place, I do consent to and order your going so far with them. Let not the time run out farther, that if you are not in a capacity for this service other measures may be taken, of which give me speedy notice."[5]

THE FISHERIES OF MARBLEHEAD FROM 1715 TO 1790.—In the autobiography of Parson Barnard, chosen minister of Marblehead in 1715, are found these words, referring to his arrival there in 1715: "Nor could I find twenty families that could stand on their own legs; and they were generally as rude, swearing, drunken, and fighting a crew as they were poor. I soon saw the town had a price in its hands, and it was a pity they had not the heart to improve it."[6]

After giving this most deplorable account of the moral, social, and commercial state of the settlement before 1720 he states that by the middle of the century a great change had been experienced, and thus describes the rise of the fishery trade: "Mr. Joseph Swett, a young man of strict justice, of great industry, enterprising genius, quick apprehension, and firm resolution, but small fortune, was the first man who engaged in it (sending fish to foreign markets). He sent a cargo to Barbadoes, and from the profits of the voyage found that he increased his stock, and went on building vessels, till he was enabled to send vessels to Europe, loading them with fish and *pointing out to others the path to*

[1] Massachusetts Maritime Manuscripts, vol. i, p. 59.
[2] *Ibid.*, vol. ii, p. 184.
[3] *Ibid.*, p. 549.
[4] *Ibid.*, vol. iii, p. 89.
[5] *Ibid.*, p. 88.
[6] Harper's Magazine, July, 1874.

riches. The more promising young men of the town followed his example; and from this small beginning Marblehead became one of the first trading towns in the bay."

"From this time," he continues, "the town began to export its own fish. In 1740 the town had 150 vessels engaged in fishing, and at least a third as many more in carrying them to Bilboa and other Spanish ports. The town became second in population and wealth to Boston, and, when the days of trial came, its port of entry and its freest benefactor."

"As soon as the fishing business began to resume its accustomed activity," says Road, "a law was passed by the legislature requiring a tax of sixpence a month for every fisherman in the province. The penalty for the non-payment of the tax was a fine of £20 sterling. The passage of this act was considered a great hardship by the fishermen of Marblehead, who complained that they could barely obtain a livelihood, and could ill afford to pay the tax. This occurred about the year 1735. Finally, one Benjamin Boden, a man more daring than his associates, determined to resist what he termed 'the imposition,' and flatly refused to comply to the requirements of the law. The collector, William Fairchild, esq., after vainly demanding the tax, brought a suit against the delinquent for the amount. This action on the part of the collector caused great excitement throughout the town, and finally a town meeting was called to consider the matter. At this meeting the tax was denounced unjust and oppressive, and the town voted to pay the penalty and the costs of any suit or suits arising from a resistance to the six-penny act."[1]

Concerning the condition of the Marblehead fisheries about the middle of the last century, Douglass writes:

"Marblehead, in New England, ships off more dried cod than all the rest of New England besides; anno 1732, a good fish year, and in profound peace, Marblehead had about 120 schooners, of about fifty tons burthen; seven men aboard, and one man ashore to make the fish, is about 1,000 men employed from that town, besides the seamen who carry the fish to market; if they had all been well fished, that is, 200 quintals to a fare, would have made 120,000 quintals. At present, anno 1747, they have not exceeding seventy schooners, and make five fares yearly; first is to the Isle of Sable; the codfish set in there early in the spring, and this fare is full of spawn: formerly they fitted out in February, but by stormy weather having lost some vessels, and many anchors, cables, and other gear, they do not fit out until March. Their second fare is in May to Brown's Bank, and the other banks near the Cape Sable coast; these are also called spring fish. Their third and fourth fares are to St. George's Bank, called summer fish. Their fifth and last fare is in autumn to the Isle of Sable; these are called winter fish. New England cod is generally cured or dried upon hurdles or brush. Anno 1721, were cured at Canso, off Nova Scotia, 20,000 quintals of codfish; but, as it is said, the officers of that garrison used the fishermen ill, and no fishery has been kept there for many years. At present, anno 1747, there is cured in all places of British North America about 300,000 quintals dry merchantable cod."[2]

In a foot-note Douglass adds:

"Within these few years our cod-fishery, whaling, and ship-building have failed much; and by peculation and depopulation we were like to have been carried into ruin; but it is hoped we may have better times; at present our trade is not half so much, and our taxes from 30 to 40 times more than they were a few years ago. Anno 1748 only 55 fishing schooners at Marblehead."

"The depredations of the French on the sea against the commerce and the fisheries of the English colonies during the year 1756 were severely felt in Marblehead. Several vessels, with their crews belonging here, were captured while on fishing banks, causing great distress among their families and great excitement in town. The exposed condition of the harbor caused serious apprehensions of an attack from the enemy, when the people were less prepared to meet it, and it was finally voted to present a petition to the lieutenant-governor praying for the protection of the province. The petition prayed also for the protection of the fishing interest, and stated that 'in time of war the fishery is prosecuted with much greater difficulty and risk than any other branch of business,' as will appear by the late capture of our vessels by the French while on the fishing banks.

"'That, by the small extent of our town (the whole extent being little more than 2 miles square, and that rocky and barren), the inhabitants can have no prospect of exchanging this for a more profitable employment in time to come.'

"During the year 1768, 9 vessels, with their crews, were lost, and the following year 14 others met with a similar fate, making a total of 23 vessels and 122 men and boys. Besides these, a large number were drowned by being washed overboard from vessels which returned. A large number of widows and orphans were thus left to the care of the town, and the grief and suffering caused by these terrible calamities was very great."[3]

"In the year 1766 there were 40 ships, brigs, snows, and other vessels of nearly 12,000 tons in the aggregate [belonging to Marblehead] engaged in foreign trade. Marblehead was then second only to Boston in the number of its inhabitants. It was taxed accordingly, and more hard money was imported here than into any other town in the province of Massachusetts. As its trade flourished the wealth of its inhabitants rapidly increased. Vessels loaded with codfish sailed from the town for Bilboa, in Spain, or Bordeaux, France, and came back either freighted with the products of those countries or bearing doubloons or dollars."[4]

The above extract will convey some idea of Marblehead's success as a port of foreign trade and as a fishing town.

"For a time," writes Road, "the attention of the people of Marblehead was diverted from public affairs by the disasters to their fishing fleet at sea. During the year 1768, 9 vessels, with their crews, were lost, and the following year 14 others met a similar fate, making a total of 23 vessels and 122 men and boys. Besides these, a large number were drowned by being washed overboard from vessels which returned. A large number of widows and orphans

[1] Road's History of Marblehead, p. 50.

[2] British Settlements in North America. 1760. Vol. i, p. 302.

[3] Road's History of Marblehead, pp. 60–77.

[4] Gloucester Telegraph, February 20, 1861.

were thus left to the care of the town, and the grief and suffering caused by these terrible calamities was very great. There were at this time about 60 merchants engaged in the foreign trade, besides a very large number of 'shoremen' who prosecuted the fisheries. Some of the houses built by these merchants were among the finest in the province, and one, the palatial residence of Col. Jeremiah Lee, is said to have cost over £10,000."[1]

"From 1768 to 1770," says Collector Dodge, of Marblehead, "the town lost 23 vessels and all their crews, amounting to 162 men, who left 70 widows and 155 children. I find by the records of the custom-house in the year 1790, there were 103 vessels with tonnage of 6,769 tons licensed in the cod-fishery."

We find the first fishing license on record at Marblehead dated 1789. As far back as 1768 it is recorded at the custom-house there were 258 vessels belonging to this port, of which fully one-half were engaged in fishing, taking their fish on the Grand Banks of Newfoundland and near home, off the New England shore. A large part of the catch of codfish, after being thoroughly cured, was packed in drums and exported to France, England, West Indies, and other foreign ports.

"The British Parliament," says Road, "having prohibited the colonists in 1775 from carrying on fisheries on the banks of Newfoundland, it was deemed imprudent for the fishing fleet to venture out. As nearly if not quite all the vessels belonging to the town were ready for sea, a committee was chosen to wait upon the owners and shippers and request them not to proceed on the voyages until after the time of prohibition had expired. A circular letter was also addressed to the fishermen of other towns, requesting them to adopt a similar course, as the safety of their lives and the welfare of their families depended upon their prudence and forbearance."

In General Washington's diary may be found this statement, referring to the people of Marblehead in 1789:

"The chief employment of the people of Marblehead (males) is fishing. About 110 vessels and 800 men and boys are engaged in this business. Their chief export is fish. About 5,000 souls are said to be in this place, which has the appearance of antiquity; the houses are old, the streets dirty, and the common people are not very clean."

THE FISHERIES AT THE BEGINNING OF THE PRESENT CENTURY.—The Marblehead Ledger in 1860 gave the following account of the fisheries of Marblehead in the early part of the present century:

"About 50 vessels sailed to the banks in the summer of 1815, and as the markets were bare of fish they did well. * * * Seventeen new schooners were added to the fleet in 1816 or 1817—all built at Essex. The fisheries of Marblehead were most prosperous during the first six or eight years of the century. An immense quantity of codfish was then exported to France, Spain, and the West Indies, if not to other countries, and those exportations were made mostly in the winter in vessels that had been fishing in the summer, some going direct from the banks to foreign ports. To Spain the fish was carried as often wet as dry, but that sent to the West Indies was always well dried and packed in casks or 'drums.' As a general thing, no return cargoes were brought from Spain. The fish sold at Bilboa and other Spanish ports were paid for in doubloons, and our vessels would often proceed from those ports to the Cape de Verde Islands and there purchase cargoes of salt. From France we received our pay in silks, wines, olive oil, and other articles, all of which found a ready sale. Sugar, molasses, coffee, rum, pine-apples, oranges, lemons, and other tropical products were brought from the West Indies, and disposed of without delay. There were times in the Spanish and French harbors when fish commanded an extremely high price. I was in conversation not long since with an old fisherman, who informed me that he once went to Bilboa as a mate of a fish-laden schooner, and that the cargo was sold at the rate of $20 a quintal. 'We got,' said he, 'about $1 for every fish we carried out.' He added that he had known the article to bring a still higher price, but this was soon after the termination of the war of 1812.

"It appears to have been not an uncommon occurrence half a century ago for the skipper of a vessel, after having loaded his craft with codfish on the banks, to set sail at once for some French or Spanish port, thus being away from home for six to nine months. Many years since a large number of our bankers used to make three trips in the course of a season, leaving the harbor as early as the 1st of February and remaining out on their last cruise until the 1st of December. On one occasion a banker on her third trip was so buffeted by adverse winds that she did not arrive home until the 24th of January. At another time one of the fleet made Cape Cod Light on the 10th of December, the weather being then very moderate; but on the following morning she encountered a furious northwester, which drove her off the coast. The gale continued with unabated violence nearly four days, and when it had spent its force the skipper of the vessel, finding himself far to the southward, without fish, provisions, and almost entirely destitute of water, deemed it expedient to bear away for the Bermudas. He arrived at one of those islands after a three days' run, and remained there throughout the winter; and on the 20th of March, when he and his crew were supposed to have long since perished in the surf of the Isle of Sable, the skipper rounded Neck Point and brought his craft to anchor off the foot of Wharf Lane, reaching home just in season to prevent the marriage of his loving wife to the captain of a Penobscot wood coaster."

MARBLEHEAD IN 1821.—Hodgson remarks of Marblehead as a fishing place in 1821:

"Marblehead, the second town in the Commonwealth before the Revolution, is now comparatively 'the top of a rock, a place for the spreading of nets in the midst of the sea.' It is from this place, principally, that the Newfoundland fishery is carried on. The trade, however, has latterly been very unproductive, and I saw the fishing craft, which was now drawn on shore, very generally advertised for sale or charter."[2]

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[1] History of Marblehead, pp. 77, 78. [2] Hodgson's Journey, p. 237.

STATEMENT OF MARBLEHEAD FISHERIES IN 1831.—The Gloucester Telegraph of April 28, 1832, says: "Six vessels were lost in season of 1831, and, generally speaking, the season was unfavorable. Fifty-seven vessels were engaged in the cod and mackerel fishery, with crews numbering 412 men:

1,682,650 fish were taken, and the weight of same was 55,000 quintals, at $2.25	$137,500
Oil made, 885 barrels, at $14	12,390
Sounds, tongues, &c., 1,236 barrels	5,000
Mackerel, 1,600 barrels, at $3.50	5,600
	160,490
Deduct salt consumed, 8,000 hogsheads, at $4	32,000
	128,490
Deduct bait consumed, 1,000 barrels, at $5	5,000
Leaving	123,490
Now, if we add bounty allowed	17,000
We shall have this sum to divide between owners and crews	140,490
First three-eighths for owners	52,682
	87,808

to be divided between 412 men, which will give $213.52 while employed, on an average eight months.

"The amount of sounds, tongues, halibut, &c., saved, if accurately known, would have no doubt added one quarter to these last items."

STATISTICS FOR 1832.—The Gloucester Telegraph of February 9, 1833, says: "By a statement in the Marblehead Gazette it appears that the 54 vessels engaged in the bank cod-fishery from that town the past year, employing 324 men and 46 boys, brought home 60,000 quintals of fish, amounting to $150,000, 810 barrels of oil, $10,125, and sounds, tongues, &c., to the value of $5,000 to $7,000 more. To this is to be added the bounty allowance, amounting to $16,128. The whole product was therefore $176,000. After deducting expenses of salt and bait, the owners received about $53,000, and the crews $88,340, amounting to $254.58 per share, while employed, say eight months."

THE FISHING MOST PROSPEROUS IN 1839.—According to Road: "The year 1839 may be said to have been the period when the fishing business of Marblehead reached the zenith of its prosperity. At that time 98 vessels, only 3 of which were under 50 tons burden, were employed in the business—a larger number than have ever sailed from this port since the time of 'Jefferson's embargo.'"

DECLINE OF THE FISHERIES.—The Revolution, the French and English wars, and the war of 1812, with the embargo that preceded it, soon put an effectual stop to the astonishing prosperity which Marblehead had enjoyed, for the most part uninterruptedly, since 1750.

"Before the Revolution the town had 12,000 tons of shipping and 1,200 voters; after the war she had only 1,500 tons of shipping and 500 voters, while there were about 500 widows and 1,000 orphans in the place."[1]

From the year 1840 there was a gradual decrease in the fisheries until 1846, when 11 vessels were lost with 65 men, leaving 43 widows and 150 fatherless children, which seriously diminished the fleet, reducing it 937 tons.

The Barnstable Patriot of April 28, 1847, contained this item:

"MARBLEHEAD FISHING BUSINESS.—A native of Marblehead informs us, says the Danvers Courier, that this business, which has been for several years the chief pursuit of the citizens of that town, is now nearly abandoned. They have determined to fit out but 15 vessels this year, while in 1837 there were 122 vessels which belonged to Marblehead and were engaged in the cod-fishery on the banks. They have been compelled thus to limit their interests in this business, principally by the long train of unfortunate and disastrous circumstances which has for the last few years accompanied their enterprise."

FISHERY STATISTICS FOR 1856.—The Gloucester Telegraph of February 10, 1857, gives the following item: "The whole number of vessels engaged in the fishery business in Marblehead in the year 1856 was 43; amount of tonnage, 2,782 tons; number of men, 322; number of fish taken, 893,000, weighing 26,079 quintals, valued at $137,188; with 11,074 gallons of oil, valued at $10,870. The amount of the bounty was $14,598, which, added to the value of the fish and oil, made a total of $163,656."

SHELL HEAPS.—To turn aside for a moment from the continuous tale of decreasing prosperity to an incident of curiosity noted in the Essex Institute Historical Collections, vol. ii, p. 12, we annex this statement: "The monstrous heap of half-decayed and broken clam shells at Throgmorton's Cove renders it certain that this charming and secluded spot was often visited by the Indians as a favorite fishing place, or a sort of aboriginal summer watering-place. The shells now remain as when cast aside by the Indian families, who must have devoured shell-fish in immense quantities. Some 30 cords have been taken away as manure, but yet a great collection remains."

CONDITION OF THE FISHERIES FROM 1860 TO 1865.—The Cape Ann Advertiser of January 27, 1860, says: "Forty-four vessels were engaged in cod-fisheries from Marblehead in 1859. They fish entirely on the Grand Banks, which is more profitable though less pleasant than the mackerel fishery." In the Marblehead Ledger of May 12, 1860, it was stated that the fleet was that year greatly reduced, there being but 35 vessels engaged in the bank fishery. During the previous winter some had been sold to other places, and others put into the coasting and freighting business.

[1] Harper's Magazine, July, 1874, p. 201.

The "Ledger" of June, 1860, says: "The arrival of the first fishing vessel from the banks shows that this long established business is destined at no very distant day to be discontinued. The schooner Florence Hooper sailed about ten weeks since for the banks and returned on Friday, June 1, with but 1,500 fish, and reports a great scarcity. It seems hard for men to leave their homes with hopes buoyant of success to go on voyages known to everyone as an occupation in which they would not engage except for the *chance* of being successful in a good catch of fish; when to return after an absence of two months or more, knowing the time spent amounting to nothing, and perhaps in debt to the vessel, to say nothing of hardships and risks, the bounty the only compensation, though small."

In 1861 the business partially recovered. When the war of the rebellion broke out it took most of the young men out of the business and reduced the fishing fleet to 21 vessels in 1865.

After the close of the war the fishing business of Marblehead fell to a low ebb. Some of the best vessels were sold and more were ready for sale.

SWAMPSCOTT.

THE FISHERIES FROM 1794 TO 1860.—The Gloucester Telegraph of January 8, 1870, contained the following item, showing the extent of the Swampscott fishing fleet in 1795:

"In 1795 but 1 vessel, the Dove, a schooner of about 20 tons, owned by James Phillips and four others, sailed from that place in pursuit of fish. This was the first vessel owned in Swampscott, and she would make but a sorry show if placed alongside the neat, trim, fast-sailing crafts that compose the winter fleet of that flourishing town."

The Cape Ann Advertiser of January 13, 1860, referring to the number of vessels in the fleet in the year 1800, states that there was only 1 fishing schooner in Swampscott at that time and its name was the "Lark."

The number of vessels engaged in the fishing fleet in 1855, and the value of their catch, together with the tonnage of the vessels and the number of men employed on them, is here given:

"During the week ending March 3, 1855, the Swampscott fishermen were unusually successful. The number of boats employed was 14 and the aggregate tonnage 600. The total number of men employed was 126, and the fish which they caught sold for $5,272. None of the boats, excepting one, were out more than five days."[1]

About the close of the next year, also, some of the Swampscott fishermen were very successful:

"During the week ending December 13 the schooner Flight, Captain Stanley, with 13 hands, caught 62,700 pounds of codfish. And a short time before, the crew of the Jane caught in one day, among a large number of codfish of the ordinary size, 12 which weighed on an average 56 pounds each. Capt. Nathaniel Blanchard caught one codfish which weighed 94 pounds gross, and 78 pounds dressed."[2]

"In 1857 haddock appeared in great numbers at times during the early part of the year. On the 13th of March about 100 of the Swampscott fishermen, in 12 boats, caught in some six hours 160,000 pounds of fish, almost entirely haddock."[3]

Lewis & Newhall record the large catch of fish made by the little schooner Flying Dart, in 1860, as follows:

"The little fishing schooner Flying Dart, of Swampscott, with a crew of 12 men, on the 25th of February, brought in 14,000 pounds of fish, caught by them that day. The fish were readily sold at an average rate of 2 cents a pound."

THE FISHERIES FROM 1870 TO 1874.—The Gloucester Telegraph of January 1, 1870, contains an article on the winter fishery of Swampscott for the year 1869, and the disposition made of the fish; the article is here reproduced:

"Fifteen vessels and 200 men are engaged the present season in the fishery business from Swampscott. The vessels, which vary in size from 40 to 80 tons, leave their anchorage every morning, when the state of the weather will allow, and return as early as possible in the afternoon. The fish that have been caught are sold as soon as landed upon the beach, and being packed in large wagons are conveyed in the night to Boston, where they are ready for the early customers on the following morning. The Swampscott fishermen have done quite well thus far the present season, there having been no very cold or extremely rough weather, while the catch has been fair and the demand steady at good prices. They well deserve all they get, for few men labor harder or suffer more in the pursuit of a livelihood than the fishermen."

In 1870 the winter fishery of this place was very extensive, as will be seen by the following statement from the Gloucester Telegraph of December 3, 1870:

"Twenty Swampscott schooners are now engaged in winter fishing, being the largest number ever employed in the business. The boats are bringing in large quantities of cod and pollock, which are selling at low prices."

The product of the Swampscott fisheries for the third quarter of the year 1872 is given as follows in the Gloucester Telegraph of October 12, 1872:

"During the quarter ending October 1, 1872, the number of barrels of mackerel caught and landed at Swampscott was 7,000, which, at $8 per barrel, amounts to $56,000. Three hundred thousand pounds of cod were taken, which, at 2 cents per pound, amounts to $6,000. Twenty-five barrels of oil were obtained, which, at $15 per barrel, amount, to $375; making a total of $62,375."

During the quarter ending June 30, 1874, the Swampscott fishermen landed 320,000 pounds of cod, valued at $10,400; 180,000 pounds of mackerel, valued at $4,500; and 10,000 lobsters, valued at $600; making a total yield of $15,500.

[1] History of Lynn by Lewis & Newhall, p. 443. [2] *Ibid.*, p. 448. [3] *Ibid.*, p. 450.

NAHANT.

NAHANT IN 1633.—The following description of the land on which Nahant stands was written in 1633:

"'Vpon the South side of the Sandy Reach, the Sea beateth, which is a true prognostication to presage stormes and foule weather, and the breaking up of the Frost. For when the storme hath been, or is likely to be, it will roare like Thunder, being heard sixe miles; and after stormes casts up great stores of great Clammes, which the Indians, taking out of their shels, carry home in baskets. On the North side of this Bay is two great Marshes, which are made two by a pleasant River, which runnes between them. Northward up this river goes great store of Alewives, of which they make good Red Herrings; insomuch that they have been at charges to make them a wayre, and a Herring house to dry these Herrings in; the last year were dried some 4 or 5 Last [150 barrels] for an experiment, which proved very good; this is like to prove a great inrichment to the land, being a staple commodity in other Countries, for there be such innumerable companies in every river, that I have seen ten thousand taken in two hours, by two men, without any weire at all saving a few stones to stop their passage up the river. There likewise come store of Basse, which the English and Indians catch with hooke and line, some fifty or three score at a tide. At the mouth of this river runnes up a great Creeke into that great Marsh, which is called Rumney Marsh, which is four miles long and two miles broad, halfe of it being Marsh ground, and halfe upland grasses, without tree or bush; this Marsh is crossed with divers creekes, wherein lye great store of Geese and Duckes. There be convenient Ponds, for the planting of Duck coyes. Here is likewise belonging to this place divers fresh Meddowes, which afford good grasse, and foure spacious Ponds, like little Lakes, wherein is good store of fresh Fish, within a mile of the Towne; out of which runnes a curious fresh Broocke, that is seldom frozen, by reason of the warmness of the water; upon this stream is built a water Milne, and up this river come Smelts and frost fish, much bigger than a Gudgeon.'"[1]

THE CLAM INDUSTRY IN 1712.—Beyond the above little is known of the early history of Nahant. The following item from Lewis & Newhall's History of Lynn shows that the waters of Nahant furnished great quantities of clams:

"1712.—This year, all the shells, which came upon the Nahant beaches, were sold by the town, to Daniel Brown and William Gray, for thirty shillings. They were not to sell the shells for more than eight shillings a load, containing forty-eight bushels, heaped measure. The people were permitted to dig and gather the clams as before, but they were required to open them on the beach, and leave the shells. The house in which I (Newhall) was born, was plastered with lime made from these shells."

NAHANT IN RECENT YEARS.—For many years this romantic spot has been famous as a seaside resort. Handsome summer houses gradually replaced the fishermen's huts that once dotted the shores, until now there is scarcely a spot where the fishermen can congregate. One vessel owned here is employed for a part of each year in the lobster fishery.

LYNN.

LYNN FROM 1633 TO 1857.—William Wood wrote in 1633: "The land affordeth to the inhabitants as many varieties as any place else, and the sea more; the Basse continuing from the middle of April to Michaelmas (September 29) which stayes not half that time in the Bay (Boston Harbor); besides, here is a great deal of Rock cod and Macrill, insomuch that shoales of Bass have driven up shoales of Macrill from one end of the sandy Beach to the other; which the inhabitants have gathered up in wheelbarrows. The Bay which lyeth before the Towne, at a lowe spring tyde will be all flatts for two miles together; upon which is great store of Muscle Banckes, and Clam banckes, and Lobsters amongst the rockes and grassie holes."

In the early part of the year 1631 the resources of Lynn were very limited. We are told by Lewis and Newhall that "provisions were very scarce, and many persons depended for subsistence upon clams, ground-nuts, and acorns."

In the next year the town authorities passed an order whereby the fish, bass, and alewives could ascend the Saugus River to the Great Pond. This order, dated October 3, and recorded by Lewis and Newhall, reads:

"1632, October 3: It is ordered, that Saugus plantation shall have liberty to build a ware upon Saugus Ryver; also, they have promised to make, and continually to keepe, a goode foote bridge, upon the most convenient place there."

This weir was chiefly built by Thomas Dexter, for the purpose of taking bass and alewives, of which many were dried and smoked for shipping.

The following additional facts, recorded by Lewis and Newhall, show the condition of the fisheries from 1633 to 1857:

"At a town meeting on the 12th of July, 1633, Edward Richards testified that Mr. Tomlins 'was not to stop or hinder the alewives to go up to the Great Pond.'"

And in 1646 the following was a condition in a deed of property: "To allow sufficient water in the Ould River for the Alewive to come to the wyres before the Grantor's house."

A similar petition to that permitted for the benefit of the people of Saugus was also granted in favor of the people of Reading in response to their prayer of October 3, 1879, viz: "That the alewives might be permitted to come up to Reading pond, as before; that they might find no obstruction at the iron works, but 'come up freely into our ponds, where they have their natural breeding place,'" which was granted.

In 1696 immense numbers of great clams were thrown upon the beaches at Lynn by storms. The people were permitted, by a vote of the town, to dig and gather as many as they wished for their own use, but no more; and no

[1] History of Lynn by Lewis & Newhall, p. 144.

person was allowed to carry any out of the town, on a penalty of 20*s*. The shells were gathered in cart-loads on the beach, and manufactured into lime.

For nearly a century and a half there is no record of the progress of the Lynn fisheries. The next fact noted is that in the year 1832 a whaling company was formed and 5 ships employed. They harbored in Saugus River, but on the crossing of the railroad, in 1838, they were removed to Boston. None of the whale-ships were built at Lynn. A ship-yard was established in the western part of the town about this time, but no vessel larger than a schooner was built there.

To increase the value of the fisheries an act was passed on March 26, 1852, by the Lynn authorities, to prevent the destruction of shad and alewives in Saugus River and the tributary streams in the city of Lynn. Shad had long before disappeared, but alewives continued abundant.

"In the summer of 1857 much excitement took place in many places (Lynn included), concerning the discovery of pearls in fresh-water mussels and clams. Many small ones were found in shell-fish taken from the floating bridge and flax-ponds in Lynn, but not enough to render the search more profitable than regular labor. It was quite amusing occasionally to observe some venerable and demure citizen, who never in his life had been guilty of imagining there was such an amusement in the world, wending his way toward the ponds, and fancying his real object entirely concealed by the rod and line and other sporting gear with which he had so cunningly encumbered himself."

MEDFORD AND VICINITY.

VESSEL FISHERIES OF MEDFORD FROM 1629 TO 1639.—The following interesting sketch is from Brooks's History of the town, printed at Boston in 1855:

"To Medford belongs the honor of establishing the first fisheries in 'London's Plantation of Massachusetts Bay.' Careful and costly preparations for this business were made in England in 1629, by Mr. Cradock, who believed it the most promising investment then offered from the New World. In the company's 'first general letter,' under date of April 17, 1629, is indicated a course of trade which was to be pursued by the Medford fishermen. It is thus: 'We have sent five weigh of salt in the Whelpe, and ten weigh in the Talbot. If there be shallops to be had to fish withal, and the season of the year fit, pray let the fishermen (of which we send six from Dorchester), together with some of the ship's company, endeavor to take fish, and let it be well saved with the said salt and packed up in hogsheads and send it home by the Talbot or Lion's Whelpe. At the same time they send 'a seine, being a net to fish with. May 28, 1629; they say, 'We send salt, lines, hooks, knives. boots, &c., for the fishermen, desiring our men may be employed in harbor, or upon the bank. If you send ships to fish on the bank and expect them not to return again to the plantation, &c.'

"By this it appears that those vessels which had caught a cargo of fish 'on the bank' were expected to take them thence to London. September 3, 1635, the general court chose a committee of six 'for setting forward and managing a fishing trade.' That fishing was profitable, we have the following early record: 'Thirty-five ships sailed this year (1622) from the west of England, and two from London, to fish on the New England coasts, and made profitable voyages.' Through the instrumentality of our fishing interest, the general court passed the following order, May 22, 1639: 'For further encouragement of men to set upon fishing, it is ordered that such ships and vessels and other stock as shall be properly employed and adventured in taking, making, and transporting of fish according to the course of fishing voyages, and the fish itself shall be exempt, for seven years from henceforth, from all country charges.'

"To show how minute was the fostering care of our fathers on this point, we have the following order of June 2, 1641: 'It is ordered that fishermen shall have their fish for bait at the same rate that others have at the wears, and be first served.' 'The property of Governor Cradock, invested at Medford for fishing and other purposes,' was large. Mr. Savage says, 'he maintained a small plantation for fishing at Mistick, in the present bounds of Malden, opposite to Winthrop's farm, at Ten Hills.' Complaint was made by our fishermen of a law, passed by Plymouth Colony, which laid a tax of 5*s*. on 'every share of fish' caught by strangers 'at the cape.'

"From all that we can gather, we conclude that Mr. Cradock had invested as much as $15,000, which, in various trade here, must have made Medford a thriving and populous plantation for an infant settlement. The fishing business continued for fifteen or twenty years, but with less and less profit to Mr. Cradock. It was finally abandoned as a failure, and afterwards the river-fishing alone claimed attention.

SHAD AND ALEWIFE FISHERIES IN MYSTIC RIVER.—"May, 1639: The price of alewives in Medford, at this time, was 5*s*. per thousand. This made food incredibly cheap.

"That Mystic River, as a resort for fish, was early known and greatly valued, appears from many testimonies. In Josselyn's account of his two voyages to New England (1638), we have the following record: 'The river Mistick runs through the right side of the town (Charlestown), and, by its near approach to Charles River in one place, makes a very narrow neck, where stands most part of the town. The market place, not far from the water side, is surrounded with houses.' In Mystic River were 'bass, shad, alewives, frost-fish, and smelts.' Josselyn says, 'We will return to Charlestown again, where the river Mistick runs on the north side of the town (that is, on the right side, as before said), where, on the northwest side, is the town of Mistick, three miles from Charlestown, a league and a half by water, a scattered village. At the head of this river are great and spacious ponds, full of alewives in the spring-time; the notedest place for this sort of fish.'

"This quotation from Josselyn, while it goes to prove that bass, shad, and alewives were no strangers in our rivers, shows likewise that the population of our town was then settled chiefly between the two brick houses now standing, and that the place was called Mistick. The 'wear' or fishing dam at Medford was at the outlet of the pond,

and, as our river was 'the notedest place' for fish in the early days of our plantation, we presume that the 'seine, being a net sent to fish with,' was the first seine ever drawn in its waters, *and the first drawn on this continent.* This was probably in 1631; and the first draft was doubtless an event of liveliest interest, of rare wonder, and exceeding joy. If any web or filament of that pioneer 'seine' had come down to us, it would be fitting for the town, in the year 1881, to parade it as a banner, and under it to unite in celebrating the fifth fishermen's jubilee on the river.

"June 6, 1639: 'It is ordered that all wears shall be set open from the last day of the week, at noon, till the second day in the morning.' Johnson, in his 'Wonder-working Providence,' says 'The Lord is pleased to provide for them great store of fish in the spring-time, and especially alewives, about the bigness of a herring. Many thousands of these they use to put under their Indian corn.'

"Had Mr. Cradock's letters to his agents in Medford been preserved we should certainly have in them a complete history of the fishing establishment he maintained here, and probably a comparative estimate of sea and river fishing. The introduction of the drag-net, in 1631, when Mystic River was full of fish, was an example that would be followed more and more as proper seines could be knit and easy markets secured. The narrowness of the river, the steepness of its banks, its freedom from rocks, and its many convenient landing-places rendered net-fishing easy and cheap. It settled down into a regular business, and any one had a right to pursue it. We have no account of the intermittent run of certain fish as witnessed in our time. We presume it may not have been so remarkable then, when dams and water-wheels had not impeded or frightened the finny adventurers, or when filth and poisons had not made their highways dangerous. We think it will be found that several species of fish will have periodic returns to places which they have left for many years. Acts of legislation have not been wanting by our town or State; *but the fish care nothing about votes.*

"The first mention of specific action by the town, as such, is dated January 18, 1768, when it was voted 'to petition the general court concerning the fishery in this town.'

"March 3, 1768: Mr. Benjamin Hall and others petition the general court 'for liberty to draw with seines at two different places in Mistick River three days in a week.' This petition was not acted upon for some years. The next act of the general court touching this prolific trade in Medford was in February 16, 1769, and was as follows: 'An act to prevent the destruction of fish called alewives and shad in Mystic River, so called, within the towns of Cambridge, Charlestown, and Medford, and for repealing all laws heretofore made for that purpose. Whereas the fishery in Mystic River, in the county of Middlesex, if properly regulated, will be of great public utility, as it serves to promote the cod-fishery and is also of advantage to the particular towns through which the river runs, affording, in some measure, subsistence and support to the inhabitants thereof, and is therefore necessary to be preserved,' &c.

"The act provides that each of the three towns is empowered to choose a committee for the preservation of fish, whose duty it shall be to keep out of the river all obstructions to the free ingress of the fish. The act grants to Cambridge the right to fish, within the limits of that town, on Monday, Tuesday, and Friday; and to Charlestown and Medford the right of fishing, within the limits of those towns, on Monday, Wednesday, and Friday—from the first of March to the last day of June. Penalty for each violation of the law, £3. In this act the right of each inhabitant to fish is recognized and secured. If persons from other towns should either stop or catch fish in this river they shall each be fined £3 for every such offense; and the committee shall have power to arrest them, and sell their seines, drag-nets, marsh-nets, baskets, or any other implements used by them. This act to be in use five years and no longer.

"Immediately on the passage of this act the town proceeded, April 2, 1798, to a new step, indicated in the following vote: 'Voted that the town will let out their fishing-grounds to the highest bidder the present year.' While this vote was based upon the original right of the town to the fisheries within its borders, some minor questions arose, which led the inhabitants, at the same meeting, to choose a committee to inquire into the rights of the town in the fishing-grounds. The result was that January 21, 1803, the town 'voted that a petition be presented to the general court, at their present session, to enable the town to let out the right of taking fish in Mystic River, within the limits of the town.' The legislature granted the petition; and Medford then divided the fishing districts thus: 'First, from Charlestown and Malden line to Medford Bridge; second, from the bridge to the beach opposite James Tuft's barn; third, from the above-named beach to the Charlestown line westerly.

"Among the earliest fishermen were John Cutter, Jonathan Tufts, and Benjamin Teel. In 1803 Cutter paid $65, Tufts $13, and Teel $13, for the right of fishing. John Cutter fished near the 'dike,' or 'labor in vain;' Isaac Tufts fished from the bridge to Rock Hill; and Capt. Samuel Teel and his nephew from Rock Hill to the pond. The names of the fishermen are seldom given in the records. Charles, Simon, and Seth Tufts are there. In 1812 the fishermen paid $100 for the right. The average, for twenty years, has been $250. In accordance with the decision of the legislature, the town voted, March 14, 1803, to sell their right of fishing in Mystic River. It was sold for $91, at public auction. The next year it was sold, in the same manner, for $160; and this equitable mode of disposing of it became established, and the premium offered continued for several years to increase. The vote of the town was generally thus, as in March 1, 1824: 'Voted that the selectmen be appointed a committee to dispose of the privilege of taking shad and alewives within the limits of said town the ensuing season.'

"In 1835 Joseph L. Wheeler bought the 'upper reach,' from Marble Brook to the pond, for $27.50 per annum; and James Rogers bought the 'lower reach,' from Marble Brook to the eastern border of the town, for $122.50 per annum. The annual sales have lately (1855) been less than $200. The shad and alewives were abundant till 1815 or 1820, when they began gradually to withhold their visits. A writer says that about the year 1800 it was common to take 1,500 shad annually at 'Little River' (near Fresh Pond), but that in 1852 there was not one taken, and that, proportionally, a similar statement might be made concerning alewives.

"Nothing can frighten alewives; but the shad is an exceedingly shy and timid fish. Its disappearance from our

rivers is therefore attributed to the terrific noises made by railroad cars as they cross the Mystic at Charlestown. The largest number of alewives taken by one draft from Mystic River was in 1844; and they counted some more than 58,000! We once saw taken, by one draft from this river, shad sufficient to fill six horse-carts.

"The shad of late years have not been abundant; only 40 or 50 taken during a season. The number of alewives has also greatly diminished; and the town receives about $150 by selling its right of fishing through the year. Smelts continue to make their annual spring visit in undiminished numbers, and when, for noblest ends, they stealthily enter our creeks and little streams they are watched by the hungry boys, who, for sport or profit, drive them into their scoop-nets by dozens. In this town they do not let enough escape to keep the race alive, and if in all other towns they were so destroyed this beautiful and delicious fish would become extinct among us. The greatest draft—by a certain nameless boy, fifty years ago—numbered 63. They were taken from Marble, or Meeting-house, Brook.

THE FISHING FOR BASS.—"In Mystic River the bass have wholly disappeared, though there are those living (1855) who remember to have seen them plenty, and some of them weighing more than 30 pounds. In 1776 a negro named Prince was at work on the bank of the river opposite the shallow where the ford was, a few rods above the bridge, where he saw an enormous bass swimming very slowly up the river. The tide was inconveniently low for the bass, but conveniently low for the negro. Plunge went Prince for the fish, and caught him. No sooner was he out of the water than a desperate spring, such as fishes can give, released him from his captor, and back he falls into his native element. Quick as a steel-trap Prince springs upon him again, and again catches him and lifts him up. The fish struggles, and Prince and fish fall together. Again Prince rises, with his prize in his arms, and then brings him ashore. It weighed 65 pounds. Prince thought that such a wonderful fish should be presented to the commander of the American forces then stationed on Winter Hill. His master thought so too. Accordingly, Prince dressed himself in his best clothes, and, taking the fish in a cart, presented it to the commander, and told the history of its capture, and the commander gave him *six cents!*

FISHERIES FOR MISCELLANEOUS FRESH-WATER SPECIES.—"In Mystic Pond there are few fish at present. The fresh-water perch, which appear in the sun like a fragment of a rainbow shooting through the water, are the most numerous. The *bream* are not uncommon, but their size is very small. The tomcod come to winter there, and are easily taken thus: Some ten or twelve of them gather about a small stone, very near the shore, and each makes his nose to touch the stone. The fisherman sees this unfrightened family circle quietly reposing, and he suddenly and strongly strikes the ice with an axe directly over the unsuspecting group. The blow stuns the fish, and he quickly cuts a hole and takes them all out. Of minnows there are scarcely any, owing to the presence of that fresh-water shark, the pickerel. Eels are taken in winter by means of forked irons thrust into the mud through holes in the ice, and smelts are taken at the same time, in the river at Charlestown, by means of the common hook.

THE OYSTER FISHERY.—"Oyster fishing is another branch of trade carried on from Mystic River. In the early settlement of our town, oysters were extensively used as food, and they were easily taken. They so far abounded in that part of the river which is now between our turnpike river-wall and Malden Bridge that they obstructed navigation. Mr. Wood, speaking, in 1633, of these hindrances, has these words: 'Ships, without either ballast or lading, may float down this (Mystic) river; otherwise the *oyster-bank* would hinder them, which crosseth the channel.' This oyster-bank is one of those unfortunate institutions whose fate it has been to be often 'run upon,' and on which the 'drafts' have been so much greater than the 'deposits' that it long ago became bankrupt. Yet, like an honest tradesman, it has never despaired, and within our memory has made some good fat dividends. In 1770 the sludge from the distilleries was supposed to have poisoned those shell-fish.

THE LOBSTER FISHERY.—"Lobsters have not frequented our river in great numbers; but in 1854 they came up in large companies as far as Chelsea Bridge; and, in the warm month of October, more than 2,000, of prime quality, were taken from that bridge. The names of all the fishermen in Medford cannot be recovered, but among them there have been men of that great energy which secures success.

FISH TRADE.—"The fish found their market chiefly in Boston, and were sometimes cured, and sent in barrels to the Southern States, as food for slaves, or to the West Indies for common consumption. Many were smoked, after the manner of herring, and eaten in New England; many more were used as bait for cod-fishing on the banks. Alewives, in early times, were sometimes used as manure, and shad were salted in tubs, and eaten in the winter.

FINANCIAL PROFITS.—"The income from these fisheries may not have been very large, unless we count the support which fish furnished as food; and, in such case, we apprehend the income was great indeed. They gave a needed and most welcome variety in that brief list of eatables with which our fathers were wont to be contented.

"In 1829, by the enterprise of Mr. John Bishop, the business of mackerel-fishing was attempted. Some of the finest schooners from the fleets of Hingham were purchased and fitted out in amplest order. Three schooners were built in Medford for this service. But, before two years had elapsed, it was found impossible to compete with Plymouth, Hingham, Gloucester, and Boston. In these places, barrels and salt were cheaper than at Medford, and the common market more accessible, especially in winter."[1]

BRAINTREE AND QUINCY.

EARLY HISTORY OF FISHERIES.—The following sketch is from the history of these towns, by W. L. Pattee:

"The first action the town took in reference to encouraging and establishing this branch of industry was at a public meeting held March 3, 1755, when as an inducement for the citizens of Braintree, or persons from other towns, to engage in this enterprise, the following terms were voted: 'That for the encouragement of the bank cod-fishery to

[1] Brook's History of Medford: Boston, 1855, pp. 381–388.

be set up and carried on within this town, that such persons either of the town or who may come into the town from other places, and shall annually, during the proper season of the year, employ themselves in their own vessels or those of others, in catching and curing of codfish, are hereby freed and to be freed from and released of their poll tax for the space of three years next ensuing the time of their commencing in the said business, and so long as they continue in it within said term upon the provision that all such persons who come from other places shall be approved of by the selectmen of the town or a major part of them, from time to time, and such of them as shall be by the selectmen disapproved of shall be still subject to be warned out of the town according to law.' To what extent the business was transacted under this encouragement of the town we are unable to say. However, this industry was carried on at that time to considerable extent, as building vessels for this trade continued to be prosecuted at the Point and neighborhood from that time to the Revolutionary War, when it was suspended, and the hardy fishermen were selected to man our impromptu navy. * * *

"After the Revolutionary War the fish business was revived in Quincy. In the early part of this century Mr. Nickerson, Major Vinal, and Mr. Bramhall were engaged, to a considerable extent in this business at the Point. It continued to be successful until the embargo and the war of 1812 seriously interfered with its prosperity. At the close of the war the business was again revived, and continued to prosper with varied success. A large share of the business was in the hands of capitalists of Provincetown and other Cape Cod towns. In 1833 the fish interest began to concentrate at Germantown. Captain Brown took up his residence there that year; Captain Hodgkinson in 1834, and Captains Prior, Rich, Holmes, and others about that period. The land at Germantown was mostly occupied by fish flakes, as great numbers were brought there to be cured. In 1836, the business amounted to a little rising $30,000. Ten vessels were engaged in cod and mackerel fishing. The amount of codfish caught and cured was 6,200 quintals, the value of which was estimated at $18,800.

"The number of barrels of mackerel packed for market was 1,750, the value of which was estimated at $12,242. The number of men engaged in the business was 100. The local fish trade was at first carried on by different persons, who would go out in the morning and procure fish, and in the afternoon dispose of their fine large fresh fish from their wheelbarrows for 6 cents each. In 1823 the first cart, owned by a Mr. Rice, was used for the disposal of fish. Mr. Snow, of Boston, succeeded Mr. Rice, and made a fortune out of the business. Mr. Samuel Andrews was engaged in the local trade longer than any other person, and died at a ripe old age of 75 years 10 months and 11 days."

THE WHALE-FISHERY.—"Whale-fishery business was established at Germantown and at Quincy Point about the same time. The first vessel fitted out, of any note, at Germantown was the Cambrian, in 1839—a top-sail schooner, which sailed on a cruise of eighteen months under Captain Holmes, of Germantown. The Cambrian made quite a successful voyage, having procured 20 whales and secured 420 barrels of sperm oil. The Ontario sailed under the command of Captain Prior; also the John Rove Dodge, the Curaçoa, and others, which were equally as fortunate in supplying their owners with oil from the greasy monsters. The Cambrian was probably the first whale-ship that sailed from this port. The Creole, under the command of Captain Cook, the principal owners of which were Messrs. Calvin White, of Braintree; Simon Gillett, Ebenezer Woodward, Daniel Baxter, Isaiah G. Whiton, and Charles A. Brown, of Quincy, sailed the latter part of the year 1840, for the Western Islands, where she was fortunate in securing a fine cargo, consisting of 540 barrels of sperm oil and 10 of blackfish, which liberally remunerated all those connected with the vessel and voyage. She was absent nine months and a half. The brig Eschol also sailed as a whaler."

HULL.

EARLY HISTORY OF HULL AND ITS FISHERIES.—The original name of this town was Nantascot, an Indian word, and the place was given to the fishermen by the general court of Massachusetts in 1641 for the purpose of encouraging the fisheries. The present inhabitants trace their deeds back to the following order from the general court of Massachusetts, dated June 2, 1641: "It is ordered that a plantation for the furthering of fishing shall be set up at Nantascot, and that all the neck to the end of the furthest beach towards Hingham, where the tide overfloweth, shall belong to it, and that such of the present inhabitants of Hingham as will follow fishing, and will move their habitation thither, shall have land and meadow upon Nantasket Neck according to the order here established; and that all other men that will follow fishing, and will remove their habitation thither, shall have such accommodation there as the plantation will afford; and that it shall be lawful for any other fishermen inhabiting any other towns within the bay to set up stages at Nantasket, or any of the islands belonging thereto, with sufficient ground for the drying of their fish. And there shall be allowed now, at the first, to every boat which shall use fishing, four acres of upland for the present, and the meadow to be disposed of in an equal portion among such as have cause; and it is further ordered that the island called Pedock's Island, and the other islands not already disposed of, shall belong to Nantascot, to be to the use of the inhabitants and fishermen so soon as they shall come to inhabit there."

A commission of four men was formed to lay out and dispose of the land as ordered. Among the first twelve men that availed themselves of this order we find the names of John Prince and Nathaniel Bosworth; each of these received 2 acres of land.

Thirty years afterwards, in 1671, we find these two men presenting the following petition:

"To the Right Honoured Magistrates and Deputies of the General Court of New Plymouth, now sitting:

"The wise providence of the great Guide of all men and actions having so ordered, by his providence, to bring me here in this juncture of time, wherein there hath been brought under consideration that fishing design, of late years found at Cape Cod, for mackerel with nets; which, when we came from home, I may truly say I had not the least thought to have, in the least manner, troubled this honoured assembly with things about; yet, being here, and

understanding that possibly there may be brought under consideration something in order to the restraint of foreigners from fishing there, and it may seem an expedient, founded on good reason, that it should so be, I would humbly intreat this honoured court that I may, as I desire with humbleness, so I may without any offence to this honoured Assembly, present you with some particulars referring to that small town of Hull, in which we live.

"May it therefore please this honoured Court to understand that my humble request is, first, whether that the honoured Court may not have or see just cause why our little place of Hull, though not out of your jurisdiction, may still enjoy the privileges we have hitherto had, though others should be denied; and the reasons I would humbly suggest are these: First, because we were some of the first that were the discoverers and first bringers of it to light, as it now is attended to the profit of the whole colony here, which we would willingly think were some ground to build our hopes on for the enjoyment of such a privilege. Secondly, because we humbly conceive that those of your town who have been on that employ will say, as well as we know, that ours coming there have been a further aim and no hindrance to them. And, thirdly, let me with all humbleness say that, had it not been for some of us, we believe it had not been kept afoot to this time; for our friends in your patent, after the first or second voyage, had given it off again, and had not some of us kept on, and so been instrumental, beating out by evening there, and travelling on the shore at all times and seasons, and so discovered the way to take them in light as well as dark nights, it had not been so certain a thing as now it is; or had we kept but that one thing private, we know it had, if we may inoffensively so speak, been a great obstruction to it to this day. But we were open-hearted to yours, and told them what we knew, and we hope that your Honours, and this honoured Assembly, would be so to us. We humbly beseech your Worthies not to be offended, though we thus speak, if it may be said that as we were the first that laboured in it, so we have had the first and most profit by it; may it please you to let us freely say, without offence, that this last year, wherein your both persons and colony had the opportunity to improve it, hath yielded more profit clear that two or three years before, because we were but just now come fully to understand it; but the truth is, by reason of the dearness of salt and lowness of mackerel in the years before, and our gaining was not so considerable; especially add this to it, that in three, we lost one voyage for want of understanding what we have made them acquainted with, as to the light moons. But if you think that the motion, as to the whole town, may be too large, because it may be there may be very many, we humbly leave it to the honoured Court to bound the town to what number you see good, two or three, or what you see good; and so having made bold to present and trouble you with lines, I pray account it not a presumption, but an humble request in the behalfs of that little town of ours, which hath a great part of its livelihood by fishing. And so, in all humbleness, leaving these things to your consideration, I humbly take leave, and rest your humble petitioners in the half of ourselves and town.

"JOHN PRINCE.
"NATHANIEL BOSWORTH.

"PLYMOUTH, *this 8th June*, 1671."[1]

In answer to the above petition the following grant was made, providing certain persons of Hull with means to enable them to prosecute the mackerel fishery at Cape Cod:

"Att the Generall Court of Election, att Plymouth, the fift of June, 1671.

"In answare vnto the petition prefered to this Court by Mr John Prince and Mr Nathaniel Bosworth, of the towne of Hull, allias Nantaskett, in the behalfe of the said towne, to have libertie to imploy some boates and theire companies for the takeing of mackerell with nets, att the season thereof, att Cape Codd, this Court doth grannt vnto them libertie for twe boates and these companies, to take mackerell there att the season thereof; soe as they make payment of what is due to the collonie from forraigners, notwithstanding. any order of Court extant, prohibiting others to fish there."[2]

For the management of the town business, as also for the greater encouragement of the fishery industry at this place, the order below appended was in 1647 directed in these words:

"Att a Generall Courte of Electon, held ye 26th of ye 3 mo: 1647.

"There being now diners ffreemen & men of good abillity in Hull who may comfortably carry on the affayres of a towne, they are enabled by the authorities of this Court to order the prudentiall affayres of ye towne, according to former orders of this Court & course of other plantations, pvided that, according to former orders of Court they endevour the advanncemt of fishing, & that such fishermen as are there already & others wch shall come thither may have all such reasonable priviledges & encouragemt as the place will afford, & that such places as are fitt for fishermen may be reserved for that purpose; & wth this caution also, that Wm Parkes, Mr Glouer, & Mr Duncan, or any two of them, be appoynted to se the order of Court for advance of ffishing duely obserued."[3]

HINGHAM.

THE FISHERIES OF HINGHAM IN THE SEVENTEENTH CENTURY.—In the middle of the seventeenth century Hingham and the employment of its inhabitants were thus briefly described:

"Hingham, which is scituate upon the Sea coasts South-east of Charles River, being a place nothing inferiour to their Neighbours for scituation, and the people have much profited themselves by transporting Timber, Planke and Mast for Shipping to the Town of Boston, as also Cedar and Pine-board to supply the wants of other Townes, and also to remote parts, even as far as Barbadoes. They want not for Fish for themselves and others also."[4]

[1] Coll. Mass. Hist. Soc., vol. vi, 1st series, pp. 127, 128.
[2] Plymouth Colony Records, vol. v, *1668–1678*, p. 63.
[3] Records of Massachusetts, vol. iii, p. 106.
[4] *Wonder-working Providence.* London, 1654, p. 85.

The fishing interests of this place were thus furthered by the "General Court at Boston, the 14th of the 4th M°, 1641:

"It is ordered, that a plantation for the furthering of fishing shall fourth wth bee set up at Nantascot, & that all the neck to the end of the furthest beach towards Hingham, where the tide overfloweth, shall belong to it; and that such of the p'sent inhabitants of Hingham as will follow fishing, and will remove their habitations thither, shall have land & meadowe upon Nantaskot Neck, according to the order heare established, & that all other men that will follow fishing, & will remove their habitations thither, shall have such accommodations there as the plantation will afford; and that it shalbee lawfull for any other fishermen inhabiting in any other of the townes w^thin the Bay to set up stages upon Nantaskot, or any of the ilands belonging thereto, wth sufficient ground for the drying of their fish.

"And that there shalbee alowed now, at the first, to ev^ry boate wch shall use fishing, 4 acres of upland for the p'sent, & the medow to bee disposed of by an equall p'portion among such as shall have cattle; & it is further ordered, that Mr Stoughton, Mr Duncan, Mr Glover, Willi: Heath, & Willi Parks, or any 3 of them, Mr Stoughton to bee one, shall in convenient time repair to Nantaskot, & set out the lands & medow there, according to the meaning of this order; and it is further ordered, that the iland called Pedocks Iland, & the other ilands there not otherwise disposed of, shall belong to Nantaskot, to bee to the use of the inhabitants & fishermen, so soone as they shall come to inhabite there.

"And this Court, or some of the Court at Boston, shall from time to time appoint 2 or 3 able men to set out land, & stage roome &c, to such as shall come to inhabite or fish there; & in the meane time the comissioners aforenamed, or 3 of them as aforesaid, shall dispose of the same; provided, always, that no p'son shalbee stated in p'priety in any land or medowe there (though the same bee allotted to them) before hee bee a setled inhabitant there, & in a course of fishing."[1]

The following order, relative to payment for powder supplied to Strawberry Bank, was given at—

"A Generall Co^rt, held at Boston, the 7th of the First M° 1643-1644.

"Strawberry Bank is granted to have a barrell of powder, paying for it in dry fish, as Dover is to do for the barrell granted formerly to Northam."[2]

HINGHAM FISHERIES IN 1851 AND 1860.—The Hingham Journal of April, 1860, states:

"In 1851 there were 37 vessels, of 2,491 tons, belonging to this port, owned here and manned by 500 persons. We cannot say that the number of vessels has much increased since that time, yet what we have constitute a very handsome fleet. Before the end of the month some of our vessels will be on George's and other fishing grounds, looking out for schools of mackerel."

The result of the mackerel fishery for 1860 is given as follows:

"MACKEREL.—Mackerel have been found plenty off the coast of Maine, and the shore fishing promises better than for many years before. They take the hook readily, as in olden times.

"The Hingham Journal gives the following late arrivals in that port and Pocasset, after a short absence: Schr. Pony with 113 headed bbls; Oasis 200 do. do.; Omega 185 packed bbls; Eleanor F. 205 headed bbls; Emma 160 do. do.; Prairie Flower do. do. Northern Light 180 do. do."[3]

COHASSET.

THE FISHERIES IN 1821.—The Rev. Jacob Flint in 1821 wrote the following description of the fisheries engaged in by the people of this place, with some details as to number of vessels, men, quintals caught, &c.:

"There are 41 vessels of different tonnage owned in Cohasset. Of these, 1,067 tons are employed in the mackerel fishery. They take, in a season, 2,420 barrels; 200 tons are employed in the cod-fishery; taking 2,590 quintals of codfish (average for a number of years). The fishing vessels employ 223 men and boys. Some of the largest vessels are employed in foreign trade. After the season for taking fish, a number of the fishing vessels are employed in the coasting trade with various parts of the United States, and some in trade with the West Indies."[4]

At that time, according to the same authority, there were a number of extensive salt-works, at which about 5,500 bushels of salt were annually made.

THE MACKEREL FISHERY IN 1860.—The following details concerning the mackerel fishery of Cohasset for 1860 are from the Barnstable Patriot:

"The mackerel fishery of Cohasset has closed for the season, piling the wharves with tiers of bbls. of that aquarial flesh. One of the fleet, the Harriet Torey, has landed 1,500 bbls. William Burdick, of the above vessel, has caught 117 bbls. with his own hook, and will clear $548.00."

SCITUATE.

FISHING STATION AT SCITUATE; LICENSE FOR OYSTER PLANTING.—In 1633 the ship William set up a fishing station at Scituate, the object of which was, doubtless, the capture of cod.

In 1639 the following license was granted to a Mr. William Vassall:

"1639, December. Licence or liberty is granted to Mr. William Vassall to make an oyster bank in the North River, 60 rods in length, and across the said river, in some convenient place, near his farm there, called the 'West

[1] Records of Massachusetts, vol. i, p. 326.
[2] *Ibid.*, vol. i, p. 57.
[3] Barnstable Patriot, August 21, 1860.
[4] Coll. Mass. Hist. Soc., vol. ii, 3d series, p. 102.

New-land,' and to appropriate it to his own use, forbidding all others to use the same without his license. [Colony Records.]—The inference seems to be that the oyster was not common in this river."[1]

EARLY HISTORY OF THE MACKEREL FISHERY.—The following interesting account of the mackerel fishery from 1680 to 1812, including certain laws regarding the capture of the fish only at certain seasons, modes of capture, and habits of the fish, appears in the Collections of the Massachusetts Historical Society, vol. iv, 2d series:

"The mackerel fishery has been pursued with great success from Scituate during a long series of years. As early as the year 1680 Robert Studson, of Scituate, with Nathaniel Thomas, of Marshfield, it appears, hired the 'Cape Fishery' for bass and mackerel of the colony. Subsequent to 1700 it was common for a vessel to take 800 or more barrels during the season within Massachusetts Bay, which were worth in those early times about 40 shillings, O. T., the barrel. It was common, we are told in later annals, at Boston and at Plymouth, &c., when making an outfit cargo for the Jamaica market, to floor a vessel, as it is termed, with an hundred or more barrels of Scituate mackerel. It is probable the packing out, so termed, was usually performed in Boston in old times. In 1670, in Plymouth Colony, at the June court, this law passed: 'Whereas we have formerly seen great inconvenience of taking mackerel at unseasonable times, whereby their increase is greatly diminished, and that it hath been proposed to the court of the Massachusetts that some course might be taken for preventing the same, and that they have lately drawn up an order about the same, this court doth enact that henceforth no mackerel shall be caught, except for spending while fresh, before the first of July annually, on penalty of the loss of the same, the one half to the informer and the other to the colony.' In 1684, on the motion of William Clark, a merchant of Plymouth, the court passed an order prohibiting the seining of mackerel in any part of the colony, when the court leased the cape fishery for bass and mackerel to Mr. Clark for seven years at £30 per annum, but which he resigned 1689.

"Dr. Douglass, who wrote on New England about 1750, says of mackerel: 'They set in the second week of May, lean, and seem to eat muddy; some are caught all summer. There is a second setting in for autumn, fat and delicious eating. They are north latitude fish, and are not found south of New England. Beginning of July for a short time they disappear, or will not take the bait; hook mackerel, for a market, are preferable to those caught by seines, which bruise one another.' These fish, it seems, were formerly seined for the purpose of bait, a practice now disused, and all are taken by the hook. (The people of Hull, it seems, first taught the Plymouth colonists to take them at Cape Cod by moonlight. See Hist. Coll., vol. vi, 1st ser., p. 127.) They are a capricious and sportive fish. In cloudy, and even wet, weather they take the hook with most avidity. They are very partial to the color of red; hence a rag of that hue is sometimes a bait. A small strip of their own flesh, taken from near the tail, is used as a bait with most success.

"In early times the shores of our bays were skirted by forest trees quite near to the water's edge. In the month of June, when all nature is in bloom, the volatile farina of the bloom of the forest trees then floats in the air, and occasionally settles on the smooth surface of the seas. Then it is that this playful fish, attracted by this phenomenon, leaps and bounds above the surface of the water. So again, at a later period, in July and August, winged insects, carried away by the southwest winds, rest and settle on the bosom of the ocean, a welcome herald, it is said, to the mackerel catcher. Such are the habits of many fishes, and hence the use of the fly as a bait by the angler of the trout streams.

"A mackerel fishery existed in former days at Plymouth. There were perhaps twelve small schooners thus employed in autumn, taking 50 barrels a week each, in the bay, about the year 1754. The people of Rhode Island and Connecticut were largely concerned in this fishery formerly, it being very common to see 20 or more small sloops from this section of New England, occasionally taking shelter under Plymouth beach in stormy periods. But the places where these fish are now taken are chiefly George's Banks, Nantucket Shoals, and Block Island Channel. In the year 1770 we are told there were upwards of 30 sail of vessels in this branch of the fisheries, from Scituate; but not so many since 1783 to 1812. War, the scourge of national prosperity, destroys or suspends all exterior fisheries. We hope and trust a state of peace will revive and prosper them."

A series of essays on commerce appeared in a Boston newspaper about the year 1784. One of them was devoted in part to the fisheries, in which the writer (probably James Swan, esq., a member of the general court for Dorchester), with felicity of expression, eulogized the mackerel fishery, saying "that it was of more value to Massachusetts than would be the pearl fisheries of Ceylon."

RIVER FISHERIES IN 1815 AND 1831.—The kinds and distribution of fish, off and in the river close by Scituate, were written in 1815 and recorded in the Collections of the Massachusetts Historical Society, vol. iv, 2d series, as follows:

"Bass, shad, alewives, smelt, and eels seek North River; cod and other sea fish common to all the bay are taken just without the harbour."

Mr. Samuel Deane in 1831 wrote concerning the Scituate alewife fishery:

"We first notice the fisheries of the streams. It is reasonable to conjecture that the first alewives were taken in the first herring brook, as some of the earliest settlements were near that stream. These fish ascended this brook to George Moore's pond, and as the stream was narrow they were easily taken in nets. They continued to ascend this brook until the mills prevented them in late years by not being provided with suitable sluices. Recently (1831) an attempt has been made to restore them, but without much success. Mr. Hatherly had 'a herring weir' on Musquashcut brook, near his house, in 1640. We believe that a few of these fish find their way through the gulf to the Musquashcut pond at the present day.

"On Round brook was formerly an abundant alewife fishery. As late as 1794 an act of the general court was procured by Scituate and Cohasset, for renewing the fishery, by providing sluices at the mills, regulating the time

[1] Coll. Mass. Hist. Soc., vol. iv, 2d series, p. 228.

and manner of taking them, and removing the obstructions to their ascending to Hezekiah Towers' pond, to which 'they formerly ascended abundantly, to the great advantage of said Towers.' We believe the act was repealed in 1800, and the fishery is extinct. In the second herring brook these fish used to ascend to Black pond, but they have long since been repelled by the mill-dams. Smelts continue to visit this brook. They are taken in the latter end of March. In the third herring brook these fish used to ascend the valley swamp. But here they have been destroyed in like manner as above. The shad and alewife fishery in the North River has long been a subject of controversy between Scituate and Pembroke, and is so at present. In their ascending to the Matakeeset Ponds they used to be taken in great abundance. Since an act of court in 1761, permitting seines to be drawn in the North River, it is alleged that they have been fast diminishing. Whether this or the mills at Pembroke, or some unknown cause has produced this effect, we know not, but certain it is that these fisheries were reduced to comparatively little value in 1825, but since that time the fish have increased."[1]

THE MACKEREL FISHERY IN 1831 AND 1851.—Deane wrote in 1831 of the mackerel fishery: "We believe there are now about 35 [vessels] annually fitted out, of various tonnage, from 50 to 150 tons, and carrying from 6 to 15 hands. The number of barrels taken by our vessels in 1828 was something more than 15,000."

In 1851, according to the report of the inspector-general of fish, Scituate had 13 vessels in the mackerel fishery, aggregating 715 tons, and manned by 119 men and boys.

DUXBURY.

THE WHALE-FISHERY.—"Schooners, sloops, and perhaps larger vessels were engaged in the whale-fishery from Duxbury as early as the beginning of the last century, and for some years quite a number of the inhabitants were thus employed. Their resort was at first along the shore and between the capes, but by the close of the first quarter of the century they had extended their grounds, and now the coast of Newfoundland became to be generally frequented; and even as late as 1760, or perhaps later, vessels were employed in the Saint Lawrence Gulf.

"On a blank leaf in the account book of Mr. Joshua Soule, of Duxbury, was found the following memorandum: 'Whale vieg begun. elisha cob sayled from hear March ye 4, from Plymouth ye 7, 1729.'"[2]

THE COD-FISHERY IN THE LAST CENTURY.—Joshua Delano and Joshua and Josiah Soule, according to Winsor, owned vessels at Cape Sable in 1737. Three or four was the number usually on the fishing-grounds at that time. This number steadily increased, with some detriment during the Revolution, until in 1785 or 1786 there were 64 bank fishermen, averaging 70 tons each.

FRESH-WATER FISHERIES.—Two ponds near Duxbury are thus described in the Collections of the Massachusetts Historical Society for 1794, vol. ii:

"The pond is one mile and a half from the salt water. It is half a mile wide, one and a half in length. The red and sea perch, shiners, pout, and sometimes pickerel are found in it. Half a mile northwest of this lies a smaller pond, about one mile in circumference. No streams run into it, neither is there any communication of water upon the surface of the earth from it to the larger pond. It is always very nearly the same height."

THE FISHERIES IN 1849.—Concerning the state of the fishery in 1849 the following facts are given by Winsor:

"The fishing business has now engaged the people of Duxbury for nearly a century and a half, though of late years the aggregate of tonnage engaged has been considerably less than was employed about ten or fifteen years ago."

KINGSTON.

ABUNDANCE OF FISH IN 1815.—A writer in the Collections of the Massachusetts Historical Society, vol. iii, 2d series, says:

"The land which the natives cultivated was easily tilled, and, aided by fish as manure, produced considerable quantities of Indian corn. The bay abounded with fish and fowl, the shores and flats with shell-fish, the streams with alewives, frost-fish, smelts, and eels, in their season. * * * The frequent places of their habitation are discoverable by shells and marks of fire. * * * The fishery, till the war, was in latter years wholly carried on from that place. Formerly fish were cured at Sunderland, so called, on Jones' River, one mile from the sea. Before the Revolutionary War the fishery was more extensive than since. About twenty schooners were owned in the town. * * *

"At Rocky Nook (Kingston) are salt-works, producing about 200 bushels of salt in a season."

THE FISHERIES IN 1837 AND 1879.—Since the early history of the State this town has had a small fishing fleet. In 1837 its fleet was larger than in any other year. At that time 7 vessels engaged from this port in the mackerel fish-fishery, and 22 in the cod-fishery. In former times quite a numer of vessels were built each year. One eccentric builder constructed 10, and named them after the first ten months of the year.

There were 3 Kingston vessels engaged in the Grand Bank cod-fisheries in 1879, the statistics of which are included in the summary for Plymouth district.

PLYMOUTH.

OBJECT OF THE PLYMOUTH COLONISTS.—One of the objects of the establishment of colonies in New England was the development of the fisheries, about which wonderful stories had been told in England by the early voyagers. That the Plymouth colony contemplated entering upon the fisheries we find from the following statement in Governor Bradford's History of the Colony:

[1] History of Scituate, Mass., by Samuel Deane, pp. 23, 24.

[2] Winsor's History of Duxbury, p. 350.

"After such travail and turmoil and debates which they went through, things were gotten ready for their departure from Leyden. A small ship was provided in Holland, of about 60 tons, which was intended, as to serve to transport some of them over the seas, so to stay in the country and to tend upon fishing and such other affairs as might be for the good and benefit of the whole, when they should come to the place intended. Another was hired at London, of burden about nine score, and all other things got in a readiness."[1]

THE COLONISTS LAND AT PLYMOUTH.—Although the original plan of the Plymouth settlers had been to land at some point farther south, yet they were led by circumstances to decide upon Massachusetts, and in December, 1620, made a landing at Cape Cod, and later at Plymouth, where they found a good harbor, which they surveyed and described to be "in the shape of a fish-hook; a good harbor for shipping, larger than that of Cape Cod; containing two small islands without inhabitants, innumerable store of fowls, different sorts of fish, besides shell-fish in abundance."[2]

The inclemency of the season was not at all favorable for fishing, and as the newcomers were not well provided with provisions, they would have suffered much had it not been for the kindly assistance of the Indians, who instructed them in their methods of fishing and planting. Early in the month of January, 1621, "one of the sailors found alive upon the shore a herring, which the master had to his supper; which put us in hope of fish, but as yet we had got but one cod; we wanted small hooks."[3]

THE RETURN OF THE MAYFLOWER TO ENGLAND.—Phineas Pratt, in his manuscript narrative, written in 1662, says: "Thay^r Shipp [Mayflower, 1620] being reterned & safely Arived in Eingland, those Gentlemen & Marchents, y^t had vndertaken to supply y^m wth things nesasary, vnderstanding y^t many of y^m weare sick & some ded, maed hast to send a ship wth many things nesasary; but so^n Indescret man, hoping to incoridg thay^r freinds to Come to y^m, writ Letters Conserning ye great plenty of fish fowle and deare, not considering y^t ye wild Salvages weare many times hungrye, y^t have a better scill to catch such things then Einglish men have."[4]

FREE LIBERTY TO FISH.—The first Plymouth patent, made June 1, 1621, has this item concerning the fisheries: "Together with free libtie to fishe in and vpon the Coast of New England and in all havens ports and creekes therevnto belonging. And it shalbe lawfull for the said Vndertakēs & Planters, their heires & successo^rs freely to truck trade & traffiq with the Salvages in New England or neighboring thereabout at their wills & pleasures without lett or disturbance [As also to have libtie to hunt hauke fish or fowle in any place or places not now or hereafter by the English inhabited.]"[5]

ABUNDANCE OF FISH.—A letter of William Hilton's in Smith's New England Trials, printed in 1622, describing Plymouth, says there are "Many great Lakes abounding with Fish, Fowle, Beuers, and Otters. The Sea affords vs as great Plenty of all excellent Sorts of Sea-Fish, as the Riuers and Iles doth Varietie of Wild Fowle of most vsefull Sorts."[6]

FISH USED AS MANURE.—Governor Bradford, in his History of the Colony, says: "Afterwards they (as many as were able) began to plant ther corne, in which servise Squanto stood them in great stead, showing them both ye manes how to set it, and after how to dress & tend it. Also he tould them excepte they gott fish & set with it (in these old grounds) it would come to nothing, and he showed them y^t in ye middle of Aprill they should have store enough come up ye brooke, by which they begane to build, and taught them how to take it, and wher to get other provisions necessary for them; all of which they found true by triall and experience."[7]

LOBSTERS, SHAD-SPAWN, ETC.—A journal of one of the colonists for the year 1621 says: "We set forward the 10th of June, about nine in the morning [Mr. Prince thinks this is a mistake, and that it ought to have been the 3d of July], our guide, Tisquantum, resolving that night to rest at Namasket [*i. e.*, Middleborough.—H.] a town under Massasoit, and conceived by us to be very near, because the inhabitants flocked so thick on every slight occasion among us; but we found it to be 15 English miles. On the way we found ten or twelve men, women, and children, which had pestered us till we were weary of them, perceiving that (as the manner of them all is) where victual is easiest to be got there they live, especially in the summer; by reason whereof, our bay affording many lobsters, they resort every spring-tide thither, and now returned with us to Namasket. Thither we came about three in the afternoon, the inhabitants entertaining us with joy in the best manner they could, giving us a kind of bread called by them Mazium, and the spawn of shads, which then they got in abundance, insomuch as they gave us spoons to eat them; with these they boiled musty acorns, but of the shads we eat heartily. They desired one of our men to shoot at a crow, complaining what damage they sustained in their corn by them; who, shooting and killing, they much admired it, as other shots on other occasions.

"After this, Tisquantum told us we should hardly in one day reach Pakanokick (the same as Pokanoket), moving us to go 8 miles farther, where we should find more store and better victuals. Being willing to hasten our journey, we went, and came thither at sunsetting, where we found many of the men of Namasket fishing at a weir which they had made on a river which belonged to them, where they caught abundance of bass. These welcomed us also, gave us of their fish, and we them of our victuals, not doubting but we should have enough wherever we came."[8]

FISHING IN 1621.—Governor Bradford states that in September, 1621, "They begane now to gather in ye small harvest they had, and to fitte up their houses and dwellings against winter, being all well recovered in health & strenght, and had all things in good plenty; for as some were thus imployed in affairs abroad, others were excersised in fishing, aboute codd, & bass, & other fish, of which ye tooke good good store, of which every family had their

[1] Young's Chronicles of the Pilgrim Fathers. Boston, 1844, p. 86.
[2] Belknap's American Biography. New York, 1846, vol. ii, p. 321.
[3] Young, *op. cit.*, p. 171.
[4] Coll. Mass. Hist. Soc., vol. iv, 4th series, p. 477.
[5] *Ibid.*, vol. ii, 4th series, pp. 160, 161.
[6] Hazard's "State Papers." Philadelphia, 1792, vol. i, p. 120.
[7] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 100.
[8] Belknap, *op cit.*, vol. iii, p. 86.

portion. All ye somer ther was no wante. And now begane to come in store of foule, as winter aproached, of which this place did abound when they came first (but afterwards decreased by degrees)."[1]

A letter from Edward Winslow to a friend, under date of December 11, 1621, says: "For fish and fowl we have great abundance. Fresh cod in the summer is but coarse meat with us. Our bay is full of lobsters all the summer, and affordeth variety of other fish. In September we can take a hogshead of eels in a night, with small labor, and can dig them out of their beds all the winter. We have mussels and others at our doors. Oysters we have none near, but can have them brought by the Indians when we will."[2]

SCARCITY OF FOOD IN 1622.—One of the excursions made by Mr. Winslow "was by sea to Monahigon, an island near the mouth of Penobscot Bay, to procure a supply of bread from the fishing vessels, who resorted to the eastern coast in the spring of 1622. This supply, though not large, was freely given to the suffering colony, and, being prudently managed in the distribution, amounted to one-quarter of a pound for each person till the next harvest."[3]

Freeman states that, "In the month of May, 1622, the provision of the settlers at Plymouth being spent, Mr. Bradford records, 'A famine begins to pinch us, and we look hard for a supply, but none arrives.' From some fishing vessels on the coast bread was obtained to the amount of a quarter of a pound per day for each person till harvest, and this the governor caused to be dealt out daily, 'or some had starved. The want of bread had abated the strength and flesh of some, and had swelled others, and had they not been where are divers sorts of shell-fish they must have perished.'"[4]

Winslow's "Good News from New England," printed in London in 1624, says: "In the end of August [1622] came other two ships into our harbor. The one, as I take it, was called the Discovery, Captain Jones having the command thereof; the other was that ship of Mr. Weston's, called the Sparrow, which had now made her voyage of fish and was consorted with the other, being both bound for Virginia.

* * * "For our own parts, our case was almost the same with theirs [Massachusetts Bay Colony], having but a small quantity of corn left, and were enforced to live on ground-nuts, clams, mussels, and such other things as naturally the country afforded, and which did and would maintain strength, and were easy to be gotten; all which things they had in great abundance, yea, oysters also, which we wanted; and therefore necessity could not be said to constrain them thereunto."[5]

THE FISHERIES DECLARED FREE.—Governor Bradford thus mentions the arrival of the Paragon: "About ye later end of June [1623] came a ship, with Captaine Francis West, who had a comission to be admirall of New England, to restraine interlopers, and shuch fishing ships as came to fish & trade without a licence from ye Counsell of New England, for which they should pay a round sume of money. But he could doe no good of them, for they were to stronge for him, and he found ye fisher men to be stuberne fellows. And their owners, upon complainte made to ye Parlemente, procured an order y^t fishing should be free."[6]

NEED OF FISHING APPARATUS.—Winslow gives the following good advice: "I will not again speak of the abundance of fowl, store of venison, and variety of fish, in their seasons, which might encourage many to go in their persons. Only I advise all such beforehand to consider that as they hear of countries that abound with the good creatures of God, so means must be used for the taking of every one in his kind, and therefore not only to content themselves that there is sufficient, but to foresee how they shall be able to obtain the same. Otherwise, as he that walketh London streets, though he be in the midst of plenty, yet, if he wants means, is not the better, but hath rather his sorrow increased by the sight of that he wanteth, and cannot enjoy it, so also there, if thou want art and other necessaries thereunto belonging, thou mayest see that thou wantest and thy heart desireth, and yet be never the better for the same. Therefore, if thou see thine own insufficiency of thyself, then join to some others, where thou mayest in some measure enjoy the same; otherwise, assure thyself thou art better where thou art."[7]

FISHING WITH A NET.—Bradford thus tells of the struggles of the colonists in 1623:

"They haveing but one boat left and she not over well fitted, they were divided into severall companies, 6. or 7. to a gangg or company, and so went out with a nett they had bought, to take bass and such like fish, by course, every company knowing their turne. No sooner was ye boate discharged of what she brought, but ye next company tooke her and wente out with her. Neither did they returne till they had cauight something, though it were 5. or 6. days before, for they knew ther was nothing at home, and to go home emptie would be a great discouragemente to ye rest. Yea, they strive who should doe best. If she stayed long or got litle, then all went to seeking of shell-fish, which at low-water they digged out of ye sands. And this was their living in ye somer time, till God sente y^m beter; & in winter they were helped with ground-nuts and foule. Also in ye somer they gott now and then a dear; for one or 2. of ye fitest was apoynted to range ye woods for y^t end, & what was gott that way was devided amongst them."[8]

ENCOURAGEMENT TO PERSEVERE.—In a general letter written to the Plymouth settlers, and brought from England on the ship Ann in 1623, is this noble sentiment:

"If ye land afford you bread, and ye sea yeeld you fish, rest you a while contented, God will one day afford you better fare. And all men shall know you are neither fugetives nor discontents. But can, if God so order it, take yi worst to yourselves, with content, & leave ye best to your neighbours with cherfullness. Let it not be greeveous unto you y^t you have been instrument to breake ye ise for others who come after with less difficulty, the honour shall be yours, to ye worlds end, &c."[9]

SALT WORKS AND FISHING SHALLOPS BUILT.—"In 1624 Plymouth contained thirty-two dwelling houses, and about

[1] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 105.
[2] Young's Chronicles of the Pilgrim Fathers. Boston, 1844, p. 233.
[3] Belknap, *op. cit.*, p. 94.
[4] Freeman's Hist. of Cape Cod. Boston, 1862, vol. i, p. 104.
[5] Young, *op. cit.*, pp. 238, 329.
[6] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 141.
[7] Good News from New England, in Young's Chronicles, p. 372.
[8] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 137.
[9] *Ibid.*, p. 144.

one hundred and eighty persons. The inhabitants had erected a salt work; and this year they freighted a ship of a hundred and eighty tons."[1]

The journal of one of the settlers, under date of June 17, 1624, says:

"The ship carpenter sent us is an honest and very industrious man, quickly builds us two very good and strong shallops, with a great and strong lighter, and had hewn timber for two hetches; but this is spoilt; for in the hot season of the year he falls into a fever and dies, to our great loss and sorrow. But the salt man is an ignorant, foolish, and selfwilled man; who chooses a spot for his salt works, will have eight or ten men to help him, is confident the ground is good, makes a carpenter rear a great frame of a house for the salt and other like uses; but finds himself deceived in the bottom; will then have a lighter to carry clay, &c., yet all in vain; he could do nothing but boil salt in pans. The next year is sent to Cape Ann, and there the pans are set up for the fishery; but before the summer is out, he burns the house and spoils the pans, and there is an end of this chargeable business."[2]

THE FISHERIES NOT SUCCESSFUL.—Under date of March, 1624, Governor Bradford says:

"Shortly after, Mr. Winslow came over, and brought a prety good supply, and a ship came on fishing, a thing fatall to this plantation. He brought 3. heifers & a bull, the first beginning of any cattle of that kind in ye land, with some cloathing & other necessaries, as will further appear; but withall ye reporte of a strong faction amongst the adventurers against them, and espetially against ye coming of ye rest from Leyden, and with what difficulty this supply was procured, and how, by their strong & long opposision, bussiness was so retarded as not only they were now falne too late for ye fishing season, but the best men were taken up of ye fishermen in ye west countrie, and he was forct to take such a M^r. & company for that imployment as he could procure upon ye present."[3]

Among a number of objections answered and sent to England in 1624, by Governor Bradford, was the following: "^r. ob: The fish will not take salt to keepe sweete. Ans: This is as true as that which was written, that ther is scarce a foule to be seene or a fish to be taken. Things likely to be true in a cuntrie wher so many sayle of ships come yearly a fishing; they might as well say, there can no aile or beere in London be kept from sowering."[4]

The story of a fishing trip to the coast of Maine in 1624 is thus told by Governor Bradford:

"They having with some truble & charge new-masted and rigged their pinass, in ye begining of March, they sent her well vitaled to the eastward on fishing. She arrived safely at a place near Damarius cove, and was there well harbored in a place wher ships used to ride, ther being also some ships allready arived out of England. But shortly after ther arose such a violent & extraordinarie storme, as ye seas broak over such places in ye harbor as was never seene before, and drive her against great roks, which beat such a hole in her bulke, as a horse and carte might have gone in, and after drive her into deep-water, wher she lay sunke."[5]

Governor Bradford thus writes of the colonists in 1625:

"This storme being thus blowne over, yet sundrie sad effects followed ye same; for the Company of Adventurers broake in peeces here upon, and ye greatest parte wholy deserted ye colony in regarde of any further supply, or care of their subsistance. And not only so, but some of Layfords & Oldoms friends, and their adherents, set out a shipe on fishing, on theire owne accounte, and getting ye starte of ye ships that came to the plantation, they tooke away their stage, & other necessary provisions that they had made for fishing at Cap-Anne ye year before, at their great charge, and would not restore ye same, excepte they would fight for it. But ye Govr sent some of ye planters to help ye fisher men to build a new one, and so let them keepe it. This shipe also brought some small supply, of little value; but they made so pore a business of their fishing, (neither could these men make them any returne for ye supply sente,) so as, after this year, they never looked more after them."[6]

PERMISSION TO FISH AT KENNEBEC.—The Patent of the Old Colony of Plymouth, granted January 13, 1629, has these items concerning the fisheries: "And forasmuch as they have noe convenient Place, either of Tradinge or Fishinge within their owne precincts, whereby (after soe longe Travell and great Paines) so hopefull a Plantacon may subsiste, as alsoe that they may bee incouraged the better to proceed in soe pious a Worke, * * * The said Councell have further given and granted * * * the Space of fifteene Englishe miles on each Side of the said River called Kennebek, and all the said River called Kenebek, * * * and all Grounds, Fishinges, &c.; * * * with Liberty of fishing upon any Parte of the Sea-coaste and Sea-shores of any of the Seas or Islands adjacent, and not beinge inhabited, or otherwise disposed of by Order of the said Presidente and Councell;[7]

THE FISHERIES IN 1629.—Under date of the year 1629 Governor Bradford writes:

"This paying of 50 p^r cent. and dificulty of having their goods trāsported by ye fishing ships at ye first of ye year, (as was beleeved,) which was ye cheefe season for trade, put them upon another projecte. M^r. Allerton, after ye fishing season was over, light of a bargan of salte, at a good fishing place, and bought it; which came to aboute 113 ^li.; and shortly after he might have had 30 ^li. cleare profite for it, without any more trouble aboute it. But Mr. Winslow coming that way from Kenebeck, & some other of ther partners with him in ye barke, they mett with Mr. Allerton, and falling into discourse with him, they stayed him from selling ye salte; and resolved, if it might please ye rest, to keep it for them selves, and to hire a ship in ye west countrie to come on fishing for them, on shares, according to ye coustome; and seeing she might have her salte here ready, and a stage ready builte & fitted wher the salt lay safely landed & housed. In stead of bringing salte, they might stowe her full of trading goods, as bread, pease, cloth, &c., and so they might have a full supply of goods without paing fraight, and in due season, which might turne greatly to their advantage. Coming home, this was propounded, and considered on, and aproved by all but ye Govr, who had no mind to it, seeing they had allway lost by fishing; but ye rest were so ernest, as thinkeing

[1] Holmes' American Annals, 1805. Vol. i, p. 131.
[2] Prince, New England Chronology. Boston, 1736, p. 227.
[3] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 157.
[4] *Ibid.*, p. 162.
[5] *Ibid.*, p. 156.
[6] *Ibid.*, p. 196.
[7] Hazard's "State Papers," vol. i, pp. 300, 301.

that they might gaine well by ye fishing in this way; and if they should but save, yea, or lose something by it, ye other benefite would be advantage inough; so seeing their ernestness, he gave way, and it was refered to their friends in England to alow, or disalow it. Of which more in its place."[1]

TROUBLE ABOUT THE FISHING VESSEL FRIENDSHIP.—"They looked ernestly for a timely supply this spring," [1630] says Governor Bradford, "by the fishing ship which they expected, and had been at charg to keepe a stage for her; but none came, nor any supply heard of for them. At length they heard sume supply was sent to Ashley by a fishing ship, at which they something marvelled, and the more y^t they had no letters either from M^r. Allerton or Mr Sherley; so they went on in their bussiness as well as ye could. At last they heard of M^r. Peirce; his arivall in ye Bay of ye Massachusetts, who brought passengers & goods thither. They presently sent a shallop, conceiving they should have something by him. But he tould them he had none; and a ship was sett out on fishing, but after 11 weeks beating at sea, she mett with shuch foull weather as she was forcte back againe for England, and, ye season being over, gave off ye vioage. * * *. But Mr. Allerton had bought another ship, and was to come in her, and was to fish for bass to ye eastward, and to bring goods, &c. * * *. Aboute ye midle of somer arrives M^r. Hatherley in ye Bay of Massachusetts, (being one of ye partners,) and came over in ye same ship that was set out on fishing (called ye Frendship). * * *. Bass fishing was never lookt at by them, but as soone as ever they heard on it, they looked at it as a vaine thing, that would certainly turne to loss. And for Mr. Allerton to follow any trade for them it was never in their thoughts. * * * After these things Mr. Allerton wente to ye ship aboute his bass fishing. * * *

"Now about these ships & their setting forth, the truth, as farr as could be learned, is this. The motion aboute setting forth ye fishing ship (caled ye Friendship) came first from ye plantation, and ye reason of it, as is before remembered; but wholy left to them selves to doe or not to doe, as they saw cause. But when it fell into consideration, and ye designe was held to be profitable and hopefull, it was propounded by some of them, why might not they doe it of them selves, seeing they must disburse all ye money, and what need they have any refferance to ye plantation in y^t; they might take ye profite them selves, towards other losses, & need not let ye plantation share therein; and if their ends were other wise answered for their supplyes to come too them in time, it would be well enough. So they hired her, & set her out, and fraighted her as full as she could carry with passengers goods y^t belonged to ye Massachusetts, which rise to a good sume of money; intending to send ye plantation supply in ye other ship. The effecte of this Mr. Hatherley not only declared afterward upon occasion, but affirmed upon othe, taken before ye Govr & Dep: Govr of ye Massachusetts, M^r. Winthrop & Mr. Dudley: That this ship—Friendship was not sett out nor intended for ye joynt partnership of ye plantation, but for ye perticuler accounte of Mr. James Sherley, Mr. Beachampe, Mr. Andrews, Mr. Allerton, & him selfe. This deposition was taken at Boston ye 29, of Aug: 1639 as is to be seen under their hands; besides some other concurente testimonies declared at severall times to sundrie of them."[2]

THE ALEWIFE FISHERIES REGULATED IN 1633.—The following order concerning the capture of alewives and some other fish was passed at a general court held the 28th of October, in the ninth year of the reign of King Charles:

"Whereas God, by his providence, hath cast the fish called alewives or herrings in the middest of the place appointed for the towne of Plymouth, and that the ground thereabout hath been worne out by the whole, to the damage of those that inhabite the same, that therefore the said herring, alewives, or shadde comonly used in the setting of corne be appropriated to such as doe or shall inhabite the towne of Plymouth aforesd, and that no other have any right or propriety in the same, onely for bait for fishing, & that by such an orderly cowrse as shall be thought meet by the Govr & Cowncell."[3]

FISHERY GRANTS IN 1641 AND 1642.—"In 1641, Mr. John Jenny was allowed certain privileges at Clarke's Island; 'to make salt, and which he was to sell to the inhabitants at 2 s. the bushel.' * * * "Herring wear let for three years to three persons, who are to deliver the shares of herrings and to receive 1 s. 6 the thousand for their trouble.

In 1642, "Thirty acres of land were granted at Clarke's Island (the use of them) to the five partners that make salt for twenty-one years."[4]

PERMISSION TO FISH AT CAPE COD.—"In the month of October, 1650, the permission formerly given to John Stone, of Hull, to make use of lands at Cape Cod for bass fishing, was withdrawn by the court; and leave was granted 'to Mr. Thomas Prince, Capt. Miles Standish, and Mr. William Paddy, with such others of Plymouth, Duxbury, and Nawsett, as shall join with them,—they to make use of any lands, creeks, timber, &c., upon the Cape land, in such convenient places as they shall choose,' for the said fishing purposes."[5]

SCHOOLS SUPPORTED BY FISHERY.—Deane, in his history of Scituate, says:

"In 1670, 'the court did freely give and grant all such profits as might or should accrue annually to the colony, for fishing with nets or seines at Cape Cod, for mackerel, bass, or herrings, to be improved for and towards a free school in some town of this jurisdiction, for the training up of youth in literature for the good and benefit of posterity, provided a beginning be made within one year after s^d grant, &c.' This school was immediately established at Plymouth, and was supported by the proceeds of the Cape fishery until 1677, when the following change was ordered, viz: 'In whatever Township in this government, consisting of fifty families or upwards, any meet men shall be obtained to teach a grammar school, such township shall allow at least twelve pounds, to be raised by rate on all the inhabitants of s^d town: and those that have the more immediate benefit thereof, with what others shall voluntarily give, shall make up the residue necessary to maintain the same, and that the profits arising from the Cape

[1] Coll. Mass. Hist. Soc., vol. iii, 4th series, p. 126.
[2] *Ibid.*, pp. 267 *et al.*
[3] Plymouth Colony Records, vol. i, 1633-1651, p. 17.
[4] Coll. Mass. Hist. Soc., vol. iii, 2d series, p. 183.
[5] Freeman's History of Cape Cod, vol. i, p. 203.

fishing, heretofore ordered to maintain a grammar school in this colony, be distributed to such towns as have such grammar schools, not exceeding five pounds per ann. to any town, unless the court treasurer or others appointed to manage that affair, see good cause to add thereunto. * * * The Cape fishery was rented annually for from thirty to forty pounds. We observe that in 1680, Robert Stetson, of Scituate, and Nathaniel Thomas (probably of Marshfield) hired the fishery. It continued but eleven years; for we observe that in 1689, the rent was appropriated towards the salary of the magistrates; and after the union of Plymouth and Massachusetts in 1692, the fishery was free, as we believe. The towns of Duxbury, Rehoboth, and Taunton received the five pounds, a part of the term when this court order was in force."

THE FISHERIES IN 1668 AND 1670.—Freeman records that "in 1668 the colony complained of annoyance and interruption of the fisheries on the part of Massachusetts, and an order was passed, remonstrating with the general court of the Massachusetts Colony against the intrusion."

"A valuation of the town in 1670 states the 'fish boats' of Plymouth thus:

Four at £25	£100
Two at £18	36
One at	12
	148

"These, though called boats, we consider shallops, of some burthen, though probably without decks."[1]

DUTIES OF THE "WATER BAYLEY."—The following order was passed by the general court at Plymouth July 4, 1672: "It is enacted by the Court that if any pson or psons that shall att any time heerafter: shipp: or load on board any: ffish into any vessell; which shalbe caught att Cape Cod but such as hee or they shall giue an accoumpt off to the water Bayley; all such ffishes shalbe forfeite to the Collonies vse; And that the Water bayley be heerby impowered to make seizure of all such ffish as shall att any time become forfeite; and to giue an accoumpt therof vnto the Treasurer; or such as shalbe appointed by the Majestrates or any four of them; to take the said accoumpt."[2]

DIVISION OF PROFITS.—The court at Plymouth, July 5, 1678, made the following order: "Thomas Clarke, of Plymouth, late of Boston, complaineth against Mr. Constant Southworth, of Duxberry, in an action on the case, to the damage of 40ll, for that the said Southworth doth detaine and withhold from the said Clarke one eight pte of the yeerly proffitts of the fishing att Cape Codd, notwithstanding the said Southworth did bargaine and contract, in the year seauenty seauen, with the said Clarke, that the said Clarke should receiue and injoy the eight pte of the said proffitts during the time that the said Southworth," &c.[3]

MACKEREL SEINING OR NETTING PROHIBITED IN 1684.—His Majesty's court at Plymouth passed the following order July 1, 1684: "This Court takeing into theire serious consideration the great damage that this collonie and our naighbours is likely to sustaine by the catching of mackerell with netts and saines att Cape Codd, or else where neare any shore in this collonie, to the great destruction of fish, and to the discurragement of severall fishermen,—

"This Court doth therfore enacte, and be it heerby enacted, by the authoritie therof, that noe pson or psons whatsoeuer, after the publication heerof, shall catch or draw on shore any mackerell, with nett or netts, sayne or saynes, in any pte of this collonie; and if any pson or psons shall heerafter presume to catch any mackerell by setting or shooling any nett or sayne, every such pson or psons soe offending as aforsaid shall forfeite for his or theire said offence all such netts or saynes as shalbe soe improned, and all such mackerell as shalbe soe caught by him or them, and shall alsoe forfeite every such vessell, and all such vessells, or boates, as shalbe imployed therin, whether catch, sloop, or boat, as shalbe imployed in taking or carrying away any such fish, if att any time the pson or psons soe offending be taken within the gov'ment, or the vallue therof, the one moiety to the collonie, and the other moyety to the informer, that shall procecute the same. And for the better excution of said law, power shalbe giuen by some one or more of the magestrates by warrant to some fitt man to acte as a water bayliff to make seasure of any such forfeitures as aforsaid."[4]

And on July 4, 1684, the court made this order: "Mr Willam Clarke, of Plymouth, came into the Court and tendered, that if this Court would make a law to prohibitt the catching of mackerell with saines in any pte of this collonie, hee would and did engage to the Court that hee would give and pay vnto the Treasurer thirty pound pr annum, for seauen yeares, in currant New England mony, for the basse fishing att Cape Codd; wherupon this Court passed an order to prohibit sayning for mackerell, and ordered the Treasurer to make a lease to the said Clark of Cape Codd, onely for basse fishing, seauen yeer, for the said sum of 30ll per annum."[5]

MACKEREL LAW REPEALED.—At the general court in October, 1689, "it was ordered, that the law in our printed booke, page 31, prohibitting saining for mackirill at Cape Cod be henceforth made void and of no force.

"Ordered, that the magistrates of the county of Barnstable, or any two of them, be a comittee to dispose and manage the Cape fishing as pr order of Court directed, and to impower such officers as are necessary under them to looke after the same.

"Ordered that the severall acts and orders of Court about fishing at Cape Cod, in our old printed law booke, page 38 & 39, vizt, so much or so many of them as are noted to be revived in the margent of sd booke, begining at number 4 & ending at N: 5, are all of them revived and made, and hereby declared to be of full force, untill this Court shall otherwise order."[6]

[1] Coll. Mass. Hist. Soc., vol. iii, 1st series, p. 167.
[2] Plymouth Colony Records—vol. xi. p. 231.
[3] *Ibid.*, vol. vii, p. 213.
[4] *Ibid.*, vol. vi, p. 141.
[5] *Ibid.*, vol. vi, p. 139.
[6] *Ibid.*, vol. vi, p. 218.

THE CAPE COD FISHERY.—The Plymouth court on the first Wednesday of October, 1689, made the following order:

"Mr William Clarke, having formerly hired the fishing at the Cape, & his lease not yet expired, came personally into this Court, and openly quitted his claime thereto for the future, & desired the Court to release him therefrom, which was then granted, he sattisfying what is justly due to this colony for the time past.

"The Court order, that the Treasurer of this colony use such lawfull means as to him shall seeme meet for the recovery of what is due from Mr William Clarke to this colony respecting the Cape fishing, and to receive ye same for the use of this colony."[1]

THE ALEWIVE FISHERIES IN 1730.—"The alewive fishery at the brook in this town had long been considered as of considerable importance, and proper regulations were from time to time provided to prevent the destruction of the fish. This year it was ordered, that, in order to prevent obstructions to the alewives going up the pond to spawn no person shall take more fish from the town brook, or Agawam River, than are necessary for their families' use, and no person to take any for a market, on a penalty of 20 shillings for each barrel. A committee was appointed to see that families were reasonably provided for, and the poor supplied."[2]

THE FISHERIES FROM 1670 TO 1800.—"From this period [1670] to 1770, the fisheries were doubtless progressive; at which time 70 sail may be assumed as the number of fishing vessels, from 30 to 45 tons, navigated by from 7 to 8 men.

"Merchant vessels from 1755 to 1770, say, in the Liverpool trade: 1 brig of 130 tons, 1 brig of 160 tons, and 1 brig of 180 tons—total, 3 brigs of 470 tons.

"Only 1 vessel, Captain Worth, sailed from Boston in this trade, except a schooner owned by S. A. Otis, esq., which made her outfits at Plymouth. Liverpool was then a small place comparatively to what it is now. Outward cargoes, liver-oil, lumber, potash, then made at Middleborough, whence also the lumber; return cargoes, salt, crates, freight for Boston. Other vessels in the merchant service, say 20. Outward cargoes, fish; destination, Jamaica, chiefly, Spain, and, after the reduction of the French Islands, Martinico, and Guadaloupe. Description. One small ship (the Lion), brigs, schooners, sloops. At the peace of 1783, very few of these remained; some few schooners perhaps; subsequent to which fishing vessels increased in size and aggregate tonnage; yet it may be less in number."[3]

Dwight gives the following account of Plymouth in 1800: "To the inhabitants the fishery is an object of primary importance. To some it is a source of wealth and to multitudes of a comfortable, cheerful living. The most valuable branch of it is the cod-fishery; the next those of mackerel and herrings. All these are sold in Spain and Portugal, or on the islands belonging to these countries. Formerly they were carried to Boston market. The level margin of the ocean for about 2 miles above and below the town is, during the proper season, wholly devoted to this business."[4]

COD-FISHERY AT STRAITS OF BELLE ISLE.—In 1814 it was written:

"The Straits of Bell isle fishery is of modern date in Plymouth, and was increasing previous to the present war. These vessels carry whale-boats, in which the fish are taken, and remain absent through the summer."[5]

FRESH-WATER FISHERIES IN 1815.—The ponds of Plymouth were thus described in 1815:

"Of ponds there are perhaps fifty or more that are permanent; several of magnitude; some containing small islands; two admitting alewives from Buzzard's Bay; and one, Billington Sea, from the Atlantic side. Mr. Hearne, in his journey, tells us that 'turbot, pike, and perch, prefer lakes and rivers bounded and shaded by woods.' If this be the habit of the alewife, as we suspect it is, perhaps it would be well to leave margins of trees on lakes to which they resort. South Pond has expanse and beauty, but no natural outlet. A water course, so called, was cut from it about the year 1701, perhaps half a mile or more, uniting it with the headwaters of Eel River, to attract alewives into it. It did not succeed, as to its primary object. This water course is always passed in going to this pond; a pleasant feature in the landscape, reflecting sands pure and white as the pearls of Ceylon. This is very deep, and contains white and red perch of the largest size."[6]

THE COD AND MACKEREL FISHERIES FROM 1830 TO 1835.—The Gloucester Telegraph of March 20, 1830, states that "during the past season the fishermen of Plymouth have taken 487,366 fish on the Grand Bank, 295,000 in the Straits, and 3,565 barrels of mackerel. The number of barrels of mackerel packed by Hingham vessels the last season is 31,826."

The following statement of the cod and mackerel fishery of Plymouth, for the summer of 1831, is recorded by Thacher:

"Schooners in the cod-fishery 32, averaging 61$\frac{47}{95}$ tons, employing 8 men each, and landing 19,165 quintals of fish. The number of barrels of mackerel inspected this season is 2,183. To the inhabitants of the town the cod-fishery is an object of primary importance. To some it has been a source of wealth, and to multitudes of a comfortable, cheerful living.

"The fishermen, in general, are respectable for good morals, correct habits, and civil deportment. The idea prevails with some of them that fishing employment is less honorable than foreign voyages; but let them consider that all honest enterprise and industry is honorable, and that fishing voyages are less liable to sickness and less exposed to dangers and vicious example; and, moreover, that the employment prepares them for services in the navy, where they may have the honor of fighting the battles of their country. It is much to the credit of our fishermen that when on the banks they carefully abstain from fishing on Sundays.

"Those vessels that are employed in the Strait of Belle Isle fishery carry whale-boats, in which the fish are taken

[1] Plymouth Colony Records, vol. vi, p. 218.
[2] Thacher's History of Plymouth, p. 173.
[3] Coll. Mass. Hist. Soc., vol. iii, 2d series, p. 167.
[4] Dwight's Travels, iii, 1882, pp. 113, 117.
[5] Coll. Mass. Hist. Soc., vol. iii, 2d series, p. 168.
[6] *Ibid.*, p. 181.

and kept through the summer. To fit a vessel of 70 tons, carrying 8 men, for a fishing voyage of four months, it requires about 100 hogsheads or 800 bushels of salt (that from the Isle of May is preferred), about 20 barrels of clam bait, 35 or 40 barrels of water, 20 pounds of candles, 2 gallons of sperm oil; these articles are in the fisherman's phrase called great generals, and are paid for from the proceeds before any division of the profits is made. The stone ballast, and a suit of clothes for the men who salt the fish, are also included in the great generals. After these articles are paid for, and the fish sold, the profits are divided in the proportion of three-eighths to the owners and five-eighths to the crew. If the crew furnish their own provisions, each man carries from 30 to 50 pounds of ship-bread, from 3 to 6 gallons of molasses, from 14 to 28 pounds of flour, some butter, lard, and vinegar, formerly 2 to 6 gallons of rum. At the present time (1835) some vessels go entirely without ardent spirits. Each man carries six cod lines, 30 fathoms long, four lead weights of 5 pounds each, two dozen cod hooks, one pair of large boots reaching above the knees, and a piece of leather or oil-cloth to defend his breast from the wet. A few other articles, called small generals, are paid for equally by each man, as two cords of wood, a barrel of beef, 1 bushel of beans, 20 bushels of potatoes, 3 bushels of Indian or rye meal. It is customary for the owners to put on board two or more spare anchors and forty fathoms of cable. The fish are brought home in the salt, and after being washed are spread on flakes to dry."[1]

REVIEW OF THE WHALE-FISHERY FROM PLYMOUTH.—Thacher, in 1835, wrote as follows: "There were a number of schooners and sloops employed in the whale-fishery in this town previous to and immediately succeeding the war of the Revolution; but there are now no vessels of that class so employed. In the year 1821 a number of citizens associated themselves together and built a ship of 350 tons for the purpose of fitting her for the Pacific Ocean whaling, which they named the "Mayflower" in honor of the ship that brought our forefathers here in 1620. The ship sailed in September, 1821, and after making three successful voyages, and landing rising 6,000 barrels of oil, a part of the owners sold to some gentlemen of New Bedford, where she was transferred in 1831, and repaired, and sailed from that place in April, 1831; a part is still (1835) owned in this place. In 1821 another company was formed, consisting principally of the same persons that built the "Mayflower," and built another ship, which they called the "Fortune," in memory of the second ship that came into these waters. This ship is of 280 tons burthen, and has made three voyages, and landed about 5,700 barrels of oil, and is now on her fourth voyage. In 1830 the ship "Arbella," of 404 tons, and navigated by 35 men, was sent out, and in 1831 the ship Levant, of 385 tons, navigated also by 35 men, sailed for the Pacific Ocean in pursuit of sperm whales. The two last-named ships are of the largest class, and fitted out in a thorough manner; and it is hoped that they may meet with success to induce others of our fellow citizens to embark in this enterprise, which has brought wealth and prosperity to other towns, and is believed can be carried on here to as good advancement as from most other places. The three ships now employed in the whale-fishery amount in the aggregate to 1,060 tons, navigated by 92 officers and seamen; the produce of this fishery may be estimated at about 2,000 barrels of sperm oil annually. Connected with this establishment are the manufacture of about 3,000 oil casks, and about 1,500 boxes, or of 4,500 pounds of sperm candles annually. A fourth ship has this year (1832) been fitted out."[2]

THE FISHERY FOR EELS IN 1833.—Concerning Eel River it was written in 1833: "This originates in ponds and springs back of Eel River village, crosses the post road to Sandwich, and empties into the sea near Warren's farm. It is appropriately called Eel River from the abundance of eels which it yields to the support of the industrious poor. Perhaps it will not be extravagant to say that about 150 barrels are annually taken there."[3]

[For a statistical review of the cod-fisheries of the customs district of Plymouth from 1815 to 1879 see page 216.]

TRURO.

DESCRIPTION OF TRURO AND THE FISHERIES IN 1794.—"A traveler from the interior part of the country, where the soil is fertile, upon observing the barrenness of Truro, would wonder what could induce any person to remain in such a place. But his wonder would cease when he was informed that the subsistence of the inhabitants is derived principally from the sea. The shores and marshes afford large and small clams, quahaugs, razor-shells, periwinkles, mussels, and cockles. The bay and ocean abound with excellent fish and with crabs and lobsters. The sturgeon, eel, haddock, cod, frost fish, pollock, cusk, flounder, halibut, bass, mackerel, herring, and alewife are most of them caught in great plenty and constitute a principal part of the food of the inhabitants. Formerly the bluefish was common, but some years ago it deserted the coast. Beside these fish for the table there is a great variety of other fish, among which are the whale, Killer or thrasher, humpback, finback; skrag, grampus, blackfish, porpoise (gray, bass, and streaked), snuffer, shark (black, man-eating, and shovel-nosed), skate, dogfish, sunfish, goosefish, catfish, and sculpion, to which may be added the horseshoe and squid. The crampfish has sometimes been seen on the beach. This fish, which resembles a stingray in size and form, possesses the properties of the torpedo, being capable of giving smart electrical shock. The fishermen suppose, but whether with reason or not the writer will not undertake to determine, that the oil extracted from the liver of this fish is a cure for the rheumatism.

"Formerly, whales of different species were common on the coast, and yielded a great profit to the inhabitants, who pursued them in boats from the shore. But they are now rare, and the people, who are some of the most dexterous whalemen in the world, are obliged to follow them into remote parts of the ocean. Two inhabitants of Truro, Capt. David Smith and Capt. Gamaliel Collings, were the first who adventured to the Falkland Islands in pursuit of whales. This voyage was undertaken in the year 1744 by the advice of Admiral Montague, of the British Navy, and was crowned with success. Since that period the whalemen of Truro have chiefly visited the coasts of Guinea and Brazil. A want

[1] Thacher's History of Plymouth, p. 316. [2] *Ibid.*, p. 317. [3] *Ibid.*, p. 322.

of a good market for their oil has, however, of late compelled them to turn their attention to the cod-fishery. In this they are employed on board of vessels belonging to other places."[1]

THE FISHERIES IN 1837.—We have another view of the fisheries in 1837, when they were about at the height of their prosperity. In Freeman's History of Cape Cod, vol. ii, p. 540, we find the following statement:

"In 1837 there were 63 vessels engaged in the cod and mackerel fisheries, producing 16,950 quintals of codfish and 15,750 pounds of mackerel, and together employing 512 hands."

EASTHAM.

SHELL FISH.—As early as 1644 the clam-fishery in Town Cove, a great inlet which opens on the west side of the town, became the subject of regulations by the English settlers. In the first series of the Collections of the Massachusetts Historical Society, volume viii, page 165, we find the following compact:

"In 1644 it was agreed between the English and Indians that such of them as were natural inhabitants of the place should have liberty to get shell fish in the cove; and likewise that they should have a part of the blubber which should be driven on shore, the proportion to be determined by the English."

When Orleans was allowed to withdraw from Eastham as a separate town, the clam-fishery was not forgotten. On page 159 of the Collections above quoted it is recorded:

"By the act of incorporation which separated Orleans for Eastham the benefits of the shell-fishery are to be mutually shared. About a hundred barrels of clams for bait are annually collected in Eastham."

CONDITION OF THE FISHERIES IN 1802.—The vessel fishery at Eastham, now a thing of the past, appears to have been commenced at the close of the last century. By referring to the Massachusetts Collections again, in the same place, we find the following note:

"Three fishing vessels only are owned by the inhabitants, and three coasters, which in summer bring lumber from the district of Maine, and in winter go to the West Indies. Not so many of the young men are engaged in the cod-fishery as in other lower towns of the country, but a number are employed in the merchant service, and sail from Boston."

THE FISHERIES FROM 1830 TO 1862.—In 1830, according to Mr. Philip Smith, as many as 15 or 20 vessels belonging to Eastham lay in the cove above the town. "In 1837," according to Freeman, "the cod-fishery gave 1,200 quintals, and the mackerel 4,550 barrels." The same author, writing in 1862, states:

"The fisheries are prominent. The *whale* fishery has become a thing that *was*; the cod and mackerel fisheries are prosecuted. The benefits of the shell-fishery in Town Cove always formed an item of no inconsiderable profit."

ORLEANS.

THE FISHERIES OF ORLEANS IN 1802.—The following account of the fisheries of Orleans is quoted from volume viii, 1st series, of the Collections of the Massachusetts Historical Society:

"The horse-foot or king-crab was formerly much used for manuring land set with Indian corn and potatoes; and it is still employed in Orleans, in the south part of Dennis, and in other parts of the county. It is chopped into small pieces, and not more than one, and sometimes not more than a quarter, put into a hill. As it contains an abundance of oil, it affords a strong manure; and with it the light land may be made to yield 20 bushels of corn to an acre. It is, however, too hot a manure, and causes the land to exert itself so much that it cannot easily recover its strength. Attention of late is paid to the collection of sea-weed from the shore. When corn is to be raised, it is spread on the land, and it is put into the holes for potatoes. It is a preservative against worms, five sorts of which, in this place and in other parts of the county, are very destructive to Indian corn.

"Fishes are the same as in other towns of the county. A few tautang are caught in Town Cove. Bass enter the waters within the beach the 1st of June, and are caught with hooks. In the ocean, a few rods from the beach, they are taken with seines during the summer. *Eels* are so plenty that in the winter, when the coves are covered with ice, a hundred bushels are sometimes, by a company of 20 or 30 persons, collected in a day. Though no oysters are to be found on the shores, yet quahaugs and clams are in greater profusion than in any other part of the county.

"The quahaug (*Venus mercenaria*), called by R. Williams the poquan and the hen,[2] is a round, thick shell-fish, or, to speak more properly, worm. It does not bury itself but a little way in the sand, is generally found lying on it in deep water, and is gathered up with iron rakes made for the purpose. After the tide ebbs away, a few are picked up on the shore below high-water mark. The quahaug is not much inferior in relish to the oyster, but is less digestible. It is not eaten raw, but is cooked in various modes, being roasted in the shell, or opened and boiled, fried, or made into soups or pies. About half of an inch of the inside of the shell is of a purple color. This the Indians broke off, and converted into beads, named by them suckanhock or black money; which was of twice the value of their wampum, or white money, made of the meteanhock or periwinkle.

"The razor-shell (*solen*) is so named from its resemblance in size and shape to the haft of a razor. It is said to force itself, not only upwards and downwards, but diagonally. This motion is affected by means of a round fleshy protuberance, as long as the little finger of a man's hand, and composed of rings. There is more irritability in this worm than in the clam. Several days after the razor-shell has been caught, if the protuberance is held between the fingers, and is touched with the point of a knife, the worm draws itself up to it with force. This worm is not common in the bay of Massachusetts, though it has sometimes been obtained there. The open shells, however, are

[1] Coll. Mass. Hist. Soc., vol. iii, 1st series, p. 199.

[2] "Poquanhock, corrupted into quahaug, or quauhog, is the word with a plural termination. [See Coll. Hist. Soc., vol. iii, p. 224.]"

to be found on Chelsea beach, a few miles from Boston. The shells, with the living worms in them, can without much difficulty be procured at Orleans and other parts of the county of Barnstable; but as they are not taken, except a few at a time, they are not often eaten.

"The sea clam, which is at present called the hen, the quahaug having lost that appellation, is bivalve (as are also the quahaug and razor-shell) and oval. It is generally found in deep water, and is gathered with rakes, not being buried far in the sand. As it has frequently been known to injure the stomach it is not often eaten. Before the Indians learned of the English use of a more convenient instrument they hilled their corn with hoes made of these shells, to which purpose they are well adapted by their size. If a handle could be easily fixed to them they might be employed as ladles and spoons.

"The clam (*Mya arenaria*) is of the same shape, but much smaller. This worm is buried in the sand from 4 to 18 inches deep. A small perforation, through which, after the tide has ebbed away, it ejects water perpendicularly, marks the spot where it lies. The worm has the power of thrusting upward its black head or snout, and of drawing it down again. This snout is frequently bitten off by flounders and other fishes. Whether the shell moves or not the writer is unable to determine, as he has received contradictory accounts. The Indians were very fond of clams, which they called sickishuog (this is a word with a plural termination. See Coll. Hist. Soc., vol. iii, p. 224. If the author might be allowed to revive an old term he would denominate the common, or small clam, the sicki, a word of easy pronunciation, and which would distinguish it from the fresh-water clam and the three other testaceous worms above mentioned). Being unacquainted with salt, the Indians made use of them and of their natural liquor to season their nausamp and boiled maize. Many of the descendants of the English consider clams as excellent food. But they require strong stomachs to digest them, unless the whole of the snout is rejected. They would be more valued if they were less common. But as long as a peck of clams, which are sufficient to afford a small family a dinner, can be procured with little more labor than a peck of sand they will not be much prized. The clam continues alive several days after it is taken from its hole. This is well known to fishermen, and is proved by the following singular fact. A gentleman, not far from Boston, ordered a number of clams to be dug and to be put into his cellar, intending to make use of them as bait. They remained there several days, when the shells, as is usual, beginning to open, a rat thrust his paw into one of them attempting to pull out the worm. The two shells closed together with force and held him fast. As the clam was too big to be dragged through his hole the rat was unable to make his escape; and at length his cries excited the attention of the family, who came and saw him in the situation described.

"Clams are found on many parts of the shores of New England; but nowhere in greater abundance than at Orleans. Formerly 500 barrels were annually dug here for bait; but the present year 1,000 barrels have been collected. Between 100 and 200 of the poorest of the inhabitants are employed in this business, and they receive from their employers $3 a barrel for digging the clams, opening, salting them, and filling the casks. From 12 to 18 bushels of clams in the shell must be dug to fill, when opened, a barrel. A man by this labor can earn 75 cents a day, and women and children are also engaged in it. A barrel of clams is worth $6; the employers, therefore, after deducting the expense of the salt and the casks, which they supply, still obtain a handsome profit. A thousand barrels of clams are equal in value to 6,000 or 8,000 bushels of Indian corn, and are procured with not more labor and expense. When, therefore, the fishes, with which the coves of Orleans abound, are also taken into consideration, they may justly be regarded as more beneficial to the inhabitants than if the space which they occupy was covered with the most fertile soil. The riches which they yield are inexhaustible, provided they are not too wantonly lavished. For after a portion of the shore has been dug over and almost all the clams taken up, at the end of two years, it is said, they are as plenty there as ever. It is even affirmed by many persons that it is as necessary to stir the clam ground frequently as it is to hoe a field of potatoes; because if this labor be omitted the clams will be crowded too closely together and will be prevented from increasing in size."

WELLFLEET

THE FISHING INDUSTRIES OF WELLFLEET IN 1794 AND 1802.—In the Collections of the Massachusetts Historical Society for the year 1794 (vol. iii, 1st series, pp. 119–121) is found the following account of the fish and fisheries of Wellfleet, written by Levi Whitman:

"The people in this town are engaged in the sea service. A sailor is looked on as one engaged in the most honorable and beneficial employments. There are but few mechanics. Our vessels commonly fit out from Boston, and go thither to dispose of their oil, fish, bone, &c. Perhaps there are but few towns so well supplied with fish of all kinds as Wellfleet; among which are some that are uncommon, such as the swordfish and cramp fish. The latter, which when touched with human flesh, give it an electrical shock, has been caught on our shores. The oil of this fish is said to be beneficial in certain cases. We also have the billfish in great plenty in the month of October. No part of the world has better oysters than the harbor of Wellfleet; time was when they were to be found in the greatest plenty, but in 1775 a mortality from an unknown cause carried off the most of them. Since that time the true Billingsgate oysters have been scarce; and the greater part that are carried to market are first imported and laid in our harbor, where they obtain the proper relish of Billingsgate."

Freeman gives the following account of the fisheries in 1802, but does not state whence he derived his information:

"The business of the town at this date [1802] was thus noted: 'Engaged in the whale fisheries were five vessels. They carried salt, that should they not load with oil in the straits of Belle Isle or Newfoundland, they might make up their voyage with codfish. In the cod and mackerel fisheries four vessels were exclusively engaged; in the fisheries around the cape twelve vessels were employed; and in carrying oysters to Boston, Salem, Newburyport, and Portland, four other vessels.'"[1]

[1] Freeman's History of Cape Cod. Boston, 1862, vol. ii, p. 678.

WELLFLEET IN 1844.—The Rev. Enoch Pratt, writing in 1844, gives the following topographical description and historical account of the town:

"There are three harbors in the town, all having about the same depth of water, 12 feet at high tide. One is called the River Harbor, in the north part of the bay; another, in the center of the town, called Duck Creek Harbor; and the third, in the south part, called Blackfish Creek.

"These harbors are of great importance to the town, as they are safe, and afford the best facilities for carrying on the cod and mackerel fisheries, which have always been very extensively prosecuted. These employ the largest portion of the male inhabitants, who derive from them their principal support.

"In some past years there have been more than one hundred sail of vessels engaged, mostly in the mackerel-fishery, and with great success. The vessels are from 20 to 50 tons. For three or four years past they have not been able to take that fish in such quantities as formerly, consequently the number of vessels engaged has been reduced to about seventy at the present time. There are three wharfs and packing establishments. Formerly the whaling business was carried on here extensively, with large schooners, many of which were built here, of timber that grew on the shore."[1]

WELLFLEET MACKEREL-FISHERY IN 1860.—The Barnstable Patriot of August 28, 1860, gives the following account of the fisheries at Wellfleet for that year: "Number of vessels, 75; value, including outfit, $375,000; 20,000 barrels mackerel were sold last year, at $12 a barrel, amounting to $240,000. Not only does the mackerel-fishery prosper, but a new source of thrift in the oyster-fishery is open during a portion of the year that mackerel are not taken."

WELLFLEET IN 1862.—Freeman, in his history of Cape Cod, published in 1862, in regard to Wellfleet, says:

"The employment of the male inhabitants is almost entirely connected with the ocean. The cod and mackerel fisheries have always been extensively prosecuted here. More than one hundred vessels, some years, being engaged in the business. For the accommodation of those thus employed are several wharves and packing establishments.

"From the table-lands of Eastham is a range of hills extending through this town, Truro, and Provincetown, to Race Point. West, and in range of these hills, are several ponds, namely, Duck Pond, in the center of the town, 15 fathoms deep, perfectly round, with a beautiful shore of white sand; Hopkins Pond, one-quarter of a mile farther north, of about the same size, but not so deep; Great Pond, 1 mile in circumference, having several small ponds flowing into it, abounding with red perch; Long Pond about 20 rods distant from the last named, which also abounds with fish, and has near it the village formerly known as Lewis's Neighborhood; Turtle Pond, between Long and Hopkins; Gull Pond, large and beautiful, 1¾ of a mile in circumference, abounds with perch, and being in their season the resort of alewives, lying at the eastern extremity of Hunt's Hollow, near the east side of the cape; Newcomb Pond, also on the east side, and connecting with Great by a small stream: Herring Pond, from which issues Herring Brook, yielding large quantities of alewives in their season; and Squier's Pond, situated in Duck Creek village, also affording fish. Beside there are others less important."

Pratt also describes these ponds, and speaks of the species of fish they contain. He says:

"Great Pond is nearly round, 1 mile in circumference, and abounds with red perch. Four small ponds are near it, the waters of which sometimes flow into it. Turtle Pond is between Long Pond and Hopkins Pond.

"Long Pond is on the eastern side of Great Pond, about 20 rods distant, is 1 mile in length, and contains red perch. Near this pond are four or five dwelling-houses, and the village is called Lewis's Neighborhood. Gull Pond is the largest and most perfect pond in the town. It is perfectly round, 1¾ miles in circumference, and contains herring and perch. It is at the eastern extremity of Pearce's hollow, and near the back side of the cape. Near it is a small pond, called Newcomb's, which is connected with Great Pond by a stream of water, and another, called Herring Brook, from which herring are taken in the spring in considerable quantities. There are three other small ponds near the eastern shore. Squire's Pond is small and round; it is situated in Duck Creek village, and affords perch and eels."[2]

BLACKFISH AND WHALE FISHERY.—According to Freeman, "the whaling business was, in early times, carried on extensively here, and in the taking of whales none were more expert than the Indians then inhabiting the neighborhood, whose services were always in demand. This fishery, once the chief employment, was lucrative; and and by it some large properties were acquired. But little has been done here in whaling since the Revolutionary period, except that occasionally the species of whale called blackfish make their appearance and are taken; or peradventure a whale of the larger kind is seen to blow in Barnstable Bay, possibly in Wellfleet Bay, or Provincetown Harbor, which is the signal for sport that is generally successful."[3]

THE OLD OYSTER-BEDS.—From the statements of the historians Pratt and Freeeman, it would appear that at the time of the settlement of Wellfleet great oyster-beds existed in the bay, and that the oyster-fishery, which has now almost entirely died out, during the early years was one of the most important fisheries of the town. In Pratt's history we find the following account:[4] "Oysters and other shell fish were found in the bay in great abundance, at the first settlement, which not only afforded a supply for the inhabitants but in time were taken to Boston and other places for sale. This business has been carried on extensively and profitably to those engaged in it. Shops and stands were opened in Boston, Salem, Portland, and other places, where the oysters were sold in quantities to suit the purchasers.

"In 1770 all the oysters in the bay died. What caused the destruction is not certainly known, but it is supposed

[1] History of Eastham, Wellfleet, and Orleans: Yarmouth, 1844.
[2] *Ibid.*, p. 112.
[3] Freeman's History of Cape Cod. Boston, 1862, vol. ii, p. 655.
[4] *Op. cit.*, pp. 111, 112.

that, as at this time a large number of black fish died and came on shore, where their carcasses remained, producing a very filthy condition of the water, it caused this mortality.

THE FIRST OYSTERS BROUGHT FROM THE SOUTH.—"The inhabitants of the town tried the experiment of bringing oysters from the south, and laying them down on the flats, which succeeded well. In the course of a year they doubled their size, and their quality was much improved. This soon became a large business, and a number of vessels have been employed in the spring of every year in bringing them here. The number of bushels which are annually brought is about 60,000. Nearly all the oyster-shops and stands in Boston and in other cities and towns in this State are supplied from this place, and are kept by persons belonging to this town. This business affords a living for many families." A few pages further on, alluding to the native oyster-beds, he says:

NATIVE OYSTER-BEDS.—"Oysters were found in great abundance on the flats at the first settlement, but at this time (1769) the inhabitants had so increased, and such quantities were taken for consumption and for Boston market that it became necessary, to prevent their entire destruction, for the district to take measures to preserve and propagate them.

LEGISLATION RELATIVE TO THE OYSTER-FISHERY.—1772, "an act had been passed by the general court, regulating the taking of oysters in Bilingsgate Bay. It was now voted by the district to ask the court to repeal the act so far that in the three summer months they should not be taken for Boston market, nor in July and August for the use of the inhabitants.

"The oyster-fishery at this time (1773) appeared to engage the general attention of the inhabitants. A vote was passed to the effect that, whereas the oyster-fishery in this district was the principal support of many of the inhabitants, and of great advantage to the province in general, and, whereas also, it has been greatly hurt and damaged by persons taking the young oysters, and, notwithstanding the law of the province, would be ruined if, not timely prevented, it was therefore agreed to make and adopt by-laws to preserve them."[1]

In 1774 "additional regulations were made for the preservation of the oyster-fishery, in conjunction with doings of the towns of Eastham, and approved by the court."[2]

In 1785 the subject again attracted attention, and among the petitions sent to the general court was one "to prevent the people belonging to other towns from taking oysters and other shell fish in our (Wellfleet) Bay";[3] and once more, in 1798, "a petition was presented to the general court for an act to prevent the destruction of shell-fish."[4]

DESTRUCTION OF THE OYSTER-BEDS.—The beds did not survive, however, the destruction which took place a few years prior to this time, and the native oyster shortly became practically extinct. Some years later a business of very considerable magnitude sprang up in transplanting oysters from southern grounds and replanting in Wellfleet Harbor. By the year 1846 this business had grown to such an extent that the supply of replanted oysters was almost sufficient to meet the entire demands of Boston market. The Gloucester Telegraph of January 21, 1846, gives the following account of the business, quoted from the Yarmouth Register:

"Most of the oysters sold in Boston are supplied by inhabitants of the town of Wellfleet. Between thirty and forty Wellfleet vessels have gone south for cargoes. On their return the oysters are taken out and laid down on the flats in the harbor. Each man has a portion of the flats staked off for his exclusive use, and when wanted in Boston he goes to his submarine premises, takes up his oysters and forwards them to the city by the packets. The custom of laying them down at Wellfleet enables the fishermen to keep the market always supplied with fresh oysters. It is said their flavor is improved by being laid down a few months in salt water. On some years many of the oysters laid down die, but generally the increase in the size compensates for the loss in number."

TRANSPLANTING OYSTERS.—Freeman refers to the destruction of native oysters (which, according to him, took place in 1775) and then alludes to the rise and growth of the business of transplanting Southern oysters in the following words: "The town, however, is still noted for this delicious bivalve; and immense quantities are carried hence to Boston and other cities. The fish is supplied by importations from the South, brought and laid in the harbor where they soon acquire the flavor and richness of the old Billinsgate oyster, and in a single year double their size. The business is one of magnitude. In bringing the fish to the planting-grounds, and in the removal of them after probation, many vessels are employed. Not less than 60,000 bushels was the average of oysters transplanted here annually many years since. The present extent of the business we are unable to define statistically."[5]

BREWSTER.

CONDITION OF THE FISHERIES IN 1862.—Freeman, in his History of Cape Cod, commenting on the condition of Brewster in past days, says: "The fisheries were never a prominent business here. They are carried on here to some extent, less now than formerly. About fourteen or fifteen years ago two vessels, the Emma C. Lathrop and the Miles Standish, were owned in the town. They belonged to Capt. Nathan Crosby, and were employed in the mackerel fishery.

"The extensive salt works, which once formed no unimportant feature of the northerly portion of the town, have, of late years, been fast disappearing. Some remain (1862) but their numbers and importance are greatly diminished.

"The alewife fishery received its annual share of attention, an agent being appointed to take care of the town's right to it. This fishery, in Stoney Brook, is less productive than formerly. Fish weirs, constructed on the flats

[1] Pratt, *op. cit.*, p. 126.
[2] Freeman's History of Cape Cod. Boston, 1862, vol. ii, p. 664.
[3] Pratt, *op. cit.*, p. 133.
[4] Freeman, *op. cit.*, vol. ii, p. 677.
[5] *Ibid.*, p. 656.

making from the shore of this and neighboring towns, now afford large quantities of alewives, bluefish, and in fact most of the varieties found in the bay."

CHATHAM.

History of the Chatham Fisheries.—The fisheries of Chatham, which at the time of the Revolutionary war had grown to very considerable importance, suffered severely during that conflict. From a description of Chatham in the Collections of the Massachusetts Historical Society, vol. viii, 1st series, we learn "that in 1774 Chatham had 27 vessels in the cod-fishery. In the year 1783, four or five vessels only were left in the harbors, but the 'town was filled with widows mourning the loss of their husbands and sons.' With the return of peace, however, the fishery revived and the tears of the wretched were wiped away." That this recovery from the effects of war was very rapid, we may learn from the fact that "in 1790, 40 vessels, a number of them from other places, cured their fish in Chatham Harbor."

In 1802, according to the description above quoted, the condition of the fisheries was as follows: "A few of the young and middle aged men are engaged in mercantile voyages, and sail from Boston; but the great body of them are fishermen. Twenty-five schooners, from 25 to 70 tons, are employed in the cod-fishery. They are partly owned in Boston and other places but principally in Chatham. About one-half of them fish on the banks of Newfoundland, the rest on Nantucket Shoals, the shores of Nova Scotia, and in the Straits of Belle Isle. On board these schooners are about 200 men and boys, most of whom are inhabitants of Chatham, and they catch one year with another 700 or 800 quintals to a vessel. Besides the fishing vessels there are belonging to the town 5 coasters, which sail to Carolina and the West Indies. Fish are plenty on the coast * * * Shell-fish are found in great abundance on the shores, particularly quahaugs and clams. Great quantities of bait are dug for the use of the fishermen. There are excellent oysters in Oyster pond, but they are scarce and dear, selling for $1 a bushel. In no part of the county can wild fowls be obtained in such plenty and variety. Food can so easily be procured either on the shores or in the sea, that with the profit which arises from the voyages, in which it must be confessed they labor very hard, the people are enabled to cover their tables well with provisions."

In Freeman's History of Cape Cod, it is stated that "there were, in 1837, when the population was much less than at present, 22 vessels owned here and engaged in the fisheries, yielding that year 15,500 quintals of codfish, then worth $46,500; and 1,200 barrels of mackerel, worth $9,600."

Prior to 1845 almost or quite all of the Chatham vessels were engaged in the Bank fishery for cod. They frequented to a large extent the Grand Banks, Green, and Western Banks. They would make one long summer trip, and then lay up. If a man made $200 in those days he was considered to have done well.

From this time the bank cod-fishery began to decline and the mackerel fishery to increase. This was largely due to the fact that the harbors of Chatham gradually filled with sand, and in time precluded the use of the large vessels necessary for the bank fishery.

As early as 1840 or 1845 the fisheries were carried on at the southern extremity of Monomoy, where at that time a good harbor existed, both by Chatham fishermen and those of other towns. Fish stores, wharves, and temporary dwellings for summer use were built here. About 1850, or perhaps a few years later, more than fifty vessels were owned here by two Chatham firms. The majority of these vessels were mackerelmen. But this harbor, like the others, soon filled with sand, and the vessels one after another were sold and went to other ports, and the business here gradually died out. Many of the vessels, however, still remained until the time of the late war, and many that were twelve or fifteen years old were sold at prices which equaled their original cost.

In 1866 the business of the off-shore fishery was transferred to Harding's Beach, where at first two firms, and later one, have carried it on to a limited extent up to the present time.

When the vessel fishery had seriously declined, weirs began to be introduced, and at first were very profitable. The fish were sold to smacks which came from Connecticut.

In 1842, as many as 100 boats from Monomoy employed nets for the capture of shad. At that time shad were commonly salted for market.

Seines for bluefish and bass were introduced into Chatham about thirty-five years ago.

"The manufacture of salt," says Freeman, "once prominent, has declined here as in other Cape towns, and from similar causes. There were, in 1837, no less than 80 establishments for the manufacture of salt here, yielding 27,400 bushels, valued at $8,220."

DENNIS.

Dennis from 1844 to 1876.—It is stated[1] that in 1844 the capital invested in the fisheries in the whole town of Dennis was $36,300.

In 1845 or 1846 the first wharf was built in Dennis Port. Prior to this time there were curing establishments at Herring River in Harwich, and the fish were brought from the vessels, anchored at some distance from shore, in scows. The business rapidly increased for ten or twelve years after the building of the wharf. Between 50 and 70 vessels were then owned here, about one-half of which fished for mackerel and one-half for cod. Hand-lines exclusively were used in the fisheries. Seines and trawls were introduced about ten years ago.

[1] A Complete Descriptive and Statistical Gazetteer of the United States of America, etc., by Daniel Haskel and J. Calvin Smith. New York, 1844, p. 175.

In former years the manufacture of salt was carried on in Dennis very extensively. In 1840 no less than 37,315 bushels were made in the town.

A number of years prior to 1841 as many as 22 mackerel vessels were sheltered in a little artificial harbor at the east of Dennis village, and as many as 10 or 12 vessels wintered there. In 1841 there were 16 or 17 mackerel vessels here. Among these were the Theater, the Isabella, and the Greek Bride. The crew of the latter vessel was lost, taking 21 men out of a little district.

In a few years the number of mackerel vessels increased to 22. Later, codfishing was taken up to a small extent. Four vessels were employed at one time.

About the year 1860 the harbor became choked with sand, and at the present time small cat-boats can hardly go in except at high tide. The fishing vessels, of course, were sold. None have been owned here since 1865. The breakwater, which stood at the mouth of the harbor, was demolished about 1876.

YARMOUTH.

A note on the condition of Yarmouth in 1802 gives the following facts in regard to the fisheries: "On the Yarmouth side of Bass River there are six wharves, three near the mouth of the river, and three a mile north of it. There are here 21 vessels. One brig sails immediately to the West Indies. Ten coasters, from 30 to 40 tons burden, sail to Boston, Connecticut, or the Southern States, and thence to the West Indies. The other 10 vessels are fishermen; 1 is of 100 tons; the rest are from 40 to 70 tons. The fishing vessels go to the Straits of Belle Isle, the shoals of Nova Scotia, or Nantucket Shoals. On a medium, a fishing vessel uses 700 bushels of salt a year. One or two vessels are annually built on Bass River, chiefly on the western side.

"In Lewis's Bay, in Yarmouth, there are 4 coasters, of about 45 tons each, and 10 sail of fishermen, from 45 to 50 tons. They catch fish on the coast from Nantucket Shoals to Nova Scotia."[1]

"In 1837," writes Freeman, "there were in South Yarmouth alone 13 vessels engaged in cod and mackerel fisheries, producing 4,300 quintals of codfish and 2,287 barrels of mackerel."

Twenty years later, however, the fisheries suffered a great decline. Freeman says: "The fishing business had so far declined in 1857 that the Yarmouth Register said of it: 'It has well nigh died out. Not more than 2 or 3 vessels have been sent from this port the present season, where formerly 20 or 30 sail were employed. Our citizens have turned their attention to foreign commerce, or the coasting and packeting business, which pays altogether better than our facilities for carrying on the fisheries, compared with Provincetown, Gloucester, Wellfleet, and other places on the coast.'" There was no increase in the offshore fishing business after this time, and its entire extinction followed speedily. In 1863 the "Register" announced that the last of the fishing fleet had been sold.

The manufacture of salt has been carried on for about seventy years. A great many men turned their attention to this business at the time of the war of 1812, when the embargo laid upon the shipping made it impossible to carry on the fisheries, and from this time it rapidly increased. In 1837 no less than 52 establishments for the manufacture of salt existed in Yarmouth.

SANDWICH.

The historical documents relating to the fisheries of Sandwich are quite numerous, and furnish a more or less connected commentary on their varying condition from the middle of the seventeenth century to the present time.

THE ALEWIFE-FISHERY IN 1645.—The alewife-fishery seems to have attracted much attention from the early colonists, and it is to this matter that the oldest documents relate. In 1645 we have an act regulating this fishery:

"Whereas notw^th^standing the free liberty granted for fishing and fowleing," begins the preamble, "It manefestly appeareing that the Towne of Sandwich hath received p^r^judice by stopping of the passage of the heareing or alwives to their ware by setting of netts to take Basse by private psons to the gen'all p^r^judice of the whole Towne. It is therefore enacted by the Court that if any pson or psons shall p^r^sume to sett any netts in the said River to stopp the passage of the said heareings or Alewives or hinder their comeing vp to the said ware during their season wch is from the middle of Aprill to the last of May shall forfaite tenn pounds as often as hee or they shall so doe, to the Colonies use."[2]

THE WHALE-FISHING FROM 1652 TO 1702.—Seven years later, in 1652, the inshore whale-fishing seems to have come into prominence and to have agitated the legislators of that time. "It was ordered," writes Freeman, quoting the old records, "that Edmund Freeman, Edward Perry, George Allen, Daniel Wing, John Ellis, and Thomas Tobey, these six men, shall take care of all the fish that Indians shall cut up within the limits of the town, so as to provide safety for it, and shall dispose of the fish for the town's use; also, that if any man that is an inhabitant shall find a whale and report it to any of these six men he shall have a double share; and that these six men shall take care to provide laborers and whatever is needful, so that whatever whales either Indian or white man gives notice of, they may dispose of the proceeds to the town's use, to be divided equally to every inhabitant." The court subsequently appointed "agents to receive the oil for the country."

"All the larger fish yielding oil are meant. So numerous were whales in the bay, and such was the activity of the whalemen that instances were frequent of whales escaping wounded from their pursuers and dying subsequently,

[1] Coll. Mass. Hist. Soc., viii, 1st series, 1802, p. 141.
[2] Plymouth Colony Records, vol. xi, 1623-1682, p. 49.

being washed to the shores. Besides these, the grampus and other large fish were often stranded on the flats by the action of the tides."[1]

In 1653 the town provided "that the pay of all whales shall belong to every householder and to every young man that is his own equally."

"The contest for the right of whales seems to have been carried on with vigor. It was further ordered, September 13 [1653], 'that Richard Chadwell, Thomas Dexter, and John Ellis, these three men, shall have all the whales that come up within the limits and bounds of Sandwich, they paying to the town for the said fish £16 a whale.' It was also 'provided that if any of these three men have notice given them by any person who has seen a whale ashore or aground and has placed an oar by the whale, his oath may, if required, be taken for the truth and certainty of the the thing, and the said three persons shall be held liable to pay for the said whale although they neglect to go with him that brings them word. And if they do not go with him then said person shall hold the said whale, and by giving notice to any third man shall have paid him for his care herein £1. And in case there come ashore any *part* of a whale, these four men, Mr. Dillingham, Mr. Edmund Freeman, Edward Perry, and Michael Blackwell, are to be the judges of the whale before it shall be cut off from, to determine the quantity less a *whole* whale; and then, without allowing further word, those three men, viz, Richard Chadwell, Thomas Dexter, and John Ellis, shall make payment for said whale one-third in oil, one-third in corn, and one-third in cattle, all marketable, at current prices, &c.'"[2]

In 1659 "the town appointed 'John Ellis and James Skiff to take care of the whales and all other fish that yield oil in quantity;' and, subsequently, sale was made to John Ellis of 'the right of all such fish coming within the limits and bounds of the town the next three years.'"[3]

At the beginning of the next century, however, it was thought well to divert the resources of chance into a means of supporting the clergy, and the drift-whales became the perquisites of the minister, much as the fees for matrimonial services do at the present day.

"In 1702 the town gave to Rev. Roland Cotton 'all such drift-whales as shall, during the time of his ministry in Sandwich, be driven or cast ashore within the limits of the town, being such as shall not be killed with hands.'"[4]

THE ALEWIFE FISHERY FROM 1674 to 1715.—In the mean time the legislation relating to the alewife-fishery became unsettled, and on March 4, 1674—

"It is granted by the court, that Richard Bourne, of Sandwich, shall have 12,000 of alewives yearly, belonging to that land conferred on him at Pampaspecitt."[5] In 1695 it was ordered "that 4*d.* per M. be paid the town's agent for catching the town's herrings." And, "for the schoolmaster," £10 was appropriated "the present year."[6]

"Until the year 1718 large quantities of herring had been taken from the river for fertilizing the soil; the whole surplus exceeding the quantity required for food; it was now ordered that no herrings shall be taken in future to 'fish corn.'"[7]

CONDITION OF THE FISHERIES FROM 1802 to 1862.—We get a glimpse of the condition of affairs in Sandwich at the opening of the present century from the description by Wendell Davis:

"The fisheries have been repeatedly attempted," he writes, "but never with general success. This line of busines, has always been prosecuted with more advantage in the eastern than in the western part of the country."[8] Freeman, who has examined much of the history of the town, confirms this statement of the non-importance of the fisheries, excepting those for shell-fish. He writes:

"The bays and their inlets still, as formerly, yield their supply of cod, haddock, bass, halibut, sheepsheads mackerel, tautog, scup, bluefish, flounders, smelts, eels, and other fish, whenever a challenge is fairly offered; but piscation was, at no period of the history of Sandwich, a prominent employment of its inhabitants; and of late years its dependence for supplies of this sort has been chiefly on the toils of the inhabitants of other places; labors of more utility taking the precedence here.

"The cod has certainly made no progress in these waters since the day of Wood in 1654. He says: 'Codfish, in these seas, are larger than in Newfoundland, 6 or 7 of them make a quintal.'"[9]

THE OYSTER INDUSTRY, 1634 TO 1862.—We shall have to turn to Freeman's account again in order to learn the history of the oyster fishery:

"Oysters which were once very abundant and of superior quality have not entirely vacated their beds; but, in some of the best locations, have become nearly exterminated. They are yet supplied in diminished quantities from Manomet River; but, from the constant exactions upon them, are of small size. Those in the bays on the south side, formerly abundant and very large and finely flavored, have ceased, except as occasionally the once noted 'bay oyster' is discovered by some lucky wight in deep water, whither they have withdrawn. Bay oysters in their primitive condition, were very aptly described by Wood (1634): 'The oisters be great ones in form of a shoe-horne, some a foot long. The fish without a shell so big it must admit of a division to be got in your mouth.' Clams and quahaugs are yet at hand; the latter especially on the south side. Some of the large sea-clams yet remain on the north side, and lobsters in great profusion.

"Wood says, 'clams, or clamps, lye under the sand, every six in seven of them having a round hole to take air and receive water at. When the tide ebbs and flows, a man running over these clam banks will presently be made all wet by their spouting of water out of these small holes.' The sea-clams are doubtless the same of which Wood says, 'In

[1] Freeman's History of Cape Cod. Boston, 1862, vol. ii, p. 50.
[2] *Ibid.*, pp. 50, 51.
[3] *Ibid.*, p. 62.
[4] *Ibid.*, p. 85.
[5] Plymouth Colony Records, vol. v, 1668-1678, p. 140.
[6] Freeman, *op cit.*, vol. ii, p. 88.
[7] *Ibid.*, p. 91.
[8] Coll. Mass. Hist. Soc., 1802, vol. viii, 1st series, pp. 122, 123.
[9] Freeman, *op. cit.*, vol. ii, p. 31.

some places there be clams as big as a penny white loaf.' But we can indulge no further in Mr. Wood's account of the fishes, except to add a few lines from his notice of shell-fish, which we give rather as a specimen:

"'The luscious lobster, with the crabfish raw,
The brinish oister, muscle, periwigge,
And tortoise sought for by the Indian squaw,
Which to the flats dance many a winter's jigge,
To dive for cockles, and to digge for clams,
Whereby her lazie husband's guts shee cramms.'"[1]

FALMOUTH.

THE FISHERIES OF FALMOUTH SINCE 1800.—Freeman thus comments upon the fisheries of Falmouth at the opening of the present century:

"The fisheries were never a very prominent business here; and yet, in 1800, of 60 vessels owned here, of about 55 tons average, 6 were employed in the fisheries; 2 going to the Straits of Belle Isle, and 4 fishing at the shoals."[2]

The whaling business was carried on at Wood's Holl quite extensively forty years ago. There were at one time as many as 8 vessels hailing from that port. There was a candle factory here at that time. The whale oil, however, was sold in New Bedford largely. As the men died who had carried on the business, the vessels were sold one by one, and the business here gradually ceased.

Freeman's account confirms the facts given above, alluding to the former whale-fishery of the town in the following words:

"Considerable ship-building was formerly carried on here; and, at one time, 9 ships, averaging about 350 tons each, were employed in the whale-fishery from this port. The capital invested was about $260,000; the number of men engaged in the business was about 250; and the aggregate return was, of sperm oil, 4,952 barrels, or 148,560 gallons; whale oil, 275 barrels, or 8,250 gallons. This place, like others, has passed through business vicissitudes, but has ever been regarded as in many respects an important and interesting locality.[3]

Prior to 35 years ago there were several fishing schooners at Wood's Holl. At one time there were 2 bankers and 2 which went to Nantucket shoals. Relics of the old fleet are remembered by the names "Ann," "Isaac Cromwell," and "Sea Serpent." The "Sea Serpent" was a sharp-stern pinkie boat. It was finally decked over and changed to the "Wanderer."

Salt-works existed here 30 or 40 years ago to a large extent, but no trace of them now remains. Two dollars a bushel was often obtained for the salt.

MARTHA'S VINEYARD.

Martha's Vineyard was discovered by Gosnold in 1602, though he gave that name to Noman's Land, rather than to what is now the Vineyard.

In 1642 "the Vineyard" was settled by Thomas Mayhew, of Southampton, England. In 1644 it was placed under the jurisdiction of Massachusetts, and in 1664 was transferred to New York, but was restored to Massachusetts in 1692.

HISTORY OF EDGARTOWN AND HOLMES' HOLE.—Edgartown was formerly a whaling port of considerable importance. According to Starbuck, the deep-sea whale fishery was begun here in 1738 by one Joseph Chase, who came from Nantucket and established himself on the shore of Edgartown Harbor, and built a wharf and try-work. He carried on the fishery for two or three years with his sloop, the Diamond, a vessel of 40 tons, but finally stopped on account of his want of success.

In 1739 James Claghorn purchased the Leopard, a sloop of 40 tons, and commenced the fishery, but he also retired in two or three years.

In 1742 John Harper commenced the fishery with several vessels, but ran through the same course as the others, withdrawing in a few years.

Regardless of the results accruing to his predecessors, in 1744 John Newman commenced the whale-fishery. Unfortunately his vessel was lost about a year later, while temporarily engaged in bringing corn from the South to supply the lack at home.

In 1757, an embargo being upon the shipping, John Norton, for Martha's Vineyard, and Abishai Folger, for Nantucket, prayed the general court of Massachusetts that they might be allowed to send vessels on whaling voyages as usual, stating that unless they were permitted so to do many of the people must suffer for the necessities of life.

In 1775 only 12 whaling vessels, with an aggregate of 720 tons, were in use at Martha's Vineyard. This number of vessels was fitted out annually from Martha's Vineyard from 1771 to 1775, and employed 156 seamen, and annually took 900 barrels of sperm oil and 300 barrels of whale oil.

The outbreak of the Revolutionary war affected the whale-fishery at Martha's Vineyard, as it did in other localities in New England. Vessels were seized and carried to England or destroyed, and the business became precarious and loss was almost certain.

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[1] Freeman, *op. cit.*, vol. ii, p. 32. [2] *Ibid.*, p. 421. [3] *Ibid.*, p. 421.

Mr. Samuel Osborne, jr., the owner or agent of the whaling fleet now hailing from Edgartown, states that this place has for many years had vessels in the whale-fishery. In 1858 the fleet numbered 19 sail; in 1879 it was reduced to 4 sail, and in 1881 numbered 6 vessels. In early times many of the Nantucket fleet fitted here, and thus brought considerable profit to the town. During the late war several vessels were sold away from here, and the death of two or three capitalists prior to 1870 caused a withdrawal of vessels to other ports. The business of whaling has made a good many people wealthy in the town. Nearly every voyage in the last ten years has yielded a profit. There are said to be no poor people in the town, the valuation of $3,000,000 being well distributed among the 1,300 inhabitants. A number of retired whaling merchants reside here, and own parts of vessels in other ports. There are also some ladies who own shares in vessels.

In 1778 ships of the British navy made forays in the sea-coast towns of New England. At Holmes' Hole 4 vessels, with several boats, were destroyed, and in Old Town (Edgartown) Harbor, Martha's Vineyard, a brig of 150 tons, a schooner of 70 tons, and 23 whale-boats were destroyed.

In regard to the growth of other fisheries besides the whale-fishery at Martha's Vineyard we have no information until 1807. In 1603, however, the shores are said to have abounded with fish and shell-fish of various kinds.

In 1807 the clam-fishery was carried on at Edgartown. Two thousand dollars' worth of clams, at $9 per barrel, were sold in Edgartown in that year. At that time they were also beginning to be taken in Menemsha Pond and other places for bait. Oysters also occurred on the south shore in two brackish ponds. Lobsters were scarce, and only found about the wharves at Edgartown.

For a number of years prior to 1848 three banking vessels were owned at Edgartown.

In 1807 there was one fishing vessel at Holmes' Hole.

The manufacture of salt was carried on at Martha's Vineyard as on Cape Cod. In 1807 there were three sets of salt works at Edgartown, covering 2,700 feet, and in Tisbury five sets, covering 8,900 feet. The manufacture was then on the increase.

That oysters were once natives of Martha's Vineyard is evident from the following paragraph, quoted from a description of the island in the Massachusetts Historical Collections, second series, 1807, page 58:

"The oyster is found in Newtown Pond, and in two other ponds on the south shore, one of which is in Edgartown, and the other in Tisbury. It is fresh to the taste, but it is improved in its relish and rendered fatter by digging a canal through the beach and letting the salt water flow into the fresh-water ponds. As the southerly wind soon fills up the canal, the digging must be renewed four or five times in a year.

ELIZABETH ISLANDS AND WAREHAM.

EARLY HISTORY OF THE FISHERIES.—On Nonamessset Island in 1807 was "one dwelling, containing two families, and about 900 feet of salt works built in the year 1805. The fishes are the same as those of the vicinity, but lobsters, which are scarce at Martha's Vineyard, are caught in great abundance at all the Elizabeth Islands."[1]

Gosnold's voyagers, in 1602, found at the Elizabeth Islands "divers sorts of shell-fish, as scollops, muscles, cockles, lobsters, crabs, *oysters*, and wilks, exceeding good and very great."[2]

THE FISHERIES OF WAREHAM IN 1815.—The following description of Wareham in 1815 is given in vol. iv, 2d series, Massachusetts Historical Society Collections, pp. 286–289:

"The Wemeantic, the sources of which are in Carver, attains the name of river on the southwestern borders of Wareham, where it may be 3 rods in width. * * * Alewives ascend this stream to two ponds in Carver. * * * Agawam Brook, issuing from a pond in Plymouth, may be 8 or 9 miles long. * * * Trout, which abound, are very partial to this stream, doubtless loving its cold sources. The general course of this brook is southwest, up which the alewives have ever ascended, in vast numbers, to Half Way Pond, Plymouth. * * * The whale-fishery in the West India seas, and on the coasts of the United States, has been formerly pursued with that precarious success incident to the employ, probably before the Revolution, and much more so since. * * * The fish, common to this bay, are found at Wareham, such as tataug, sheepshead (now become rare), rock, and streaked bass, squitteag, scuppeag, eels, with the migratory fish, menhaden, and alewives. One codfish having been caught within the Narrows (say thirty years since), is the only instance of this fish nearer than the open bay, or Gay Head. The quahaug clam is common, and the oyster is taken in two or more places. The latter, which is of small size, is frequently carried for sale overland to Plymouth."

EAST WAREHAM IN 1870–'71.—The Gloucester Telegraph, of May 7, 1870, stated that Wareham realized $605 that year from the sale of the right to catch herring in the Agawam River in that town.

The New Bedford Evening Standard of April 24, 1871, reported as follows for that year:

"WAREHAM.—The first catch of alewives for the season in the Agawam River, in Wareham, was on Friday of last week. The privilege was purchased the present year for $600 by a party in Plymouth, whose inhabitants have equal rights to the fishery with citizens of Wareham.

"Mr. George Sanford, of East Wareham, who has bought the right to fish this stream for the past fourteen years, informs us that there has been a gradual decrease of fish for the last six years, and that although during this period there has been no perceivable diminution of small alewives in their annual passage from the ponds to the sea, the number of adults taken last year was less than one-half caught in 1864. Mr. S. states that large quantities of white perch have been caught in the river this season by hook-and-line fishermen."

[1] A description of Dukes County, August 13, 1807, in Coll. Mass. Hist. Soc., vol. iii, 1807, 2d series, pp. 75, 79.

[2] Coll. Mass. Hist. Soc., vol. viii, 2d series, p. 69.

MARION.

HISTORY OF MARION.—The present town of Marion with the adjoining towns of Rochester, Mattapoisett, and a large part of Wareham were originally known as the Sippican territory, and purchased July 22, 1679, from the Indian chiefs Watuchpoo and Sampson, they receiving permission to sell the territory from King Phillip, the youngest son of Massasoit, *the good*, he being the king or chief ruler of the Wampanoag tribes. Phillip was his successor.

Rochester was incorporated as a town on June 4, 1686, receiving its name from the ancient city of Rochester, England, which was the early home of many of the first settlers. It is recorded in history that the oysters found on those shores were celebrated by the Romans for their excellence; and the pioneers to the Sippican territory, finding an abundance and great variety of excellent fish, gave the name in memory of their old home. For a time Rochester embraced the town of Marion.

In the Collections of the Massachusetts Historical Society, 1815, vol. ii, 2d series, p. 259, is this statement regarding Rochester:

"The town doubtless takes its name from the ancient city of Rochester in Kent, England, a shire from whence many of the first planters of Scituate (and of course Rochester) emigrated. That ancient city had the jurisdiction of the oyster fishery, and it appears in history that these oysters were celebrated by the Romans for their excellence."

And in volume iv, pp. 255, 256, is this description of the varieties of fish to be found there:

"*Fish.*—Tataug, scauppaug, eels are the most common fish near the shores, with alewives in their season. At several places of resort oysters have become less common; the quahaug and lesser clam are found in the place. Without the harbor, the bay affords a greater variety; but not the codfish, nearer than Gay Head."

In volume x, page 31, is this statement, written in 1823:

"The principal manufacture of this town is salt. This business is carried on on an extensive scale, and it is believed that more salt is manufactured in this town than in any other town in the Commonwealth, and it is the most productive of any business here practiced."

And on page 36 of the same special reference is made to the fish found in Assawamsett Pond and Mattapoisett River and Merry's Pond in these words:

"A part of Assawamsett Pond lies on the north side of this town, and the line of the town crosses two islands of considerable bigness in this pond. Assawamsett Pond is the largest collection of water in Massachusetts. * * * In this pond is a vast quantity of iron ore, which increases nearly as fast as it is dug. In the southerly part of this pond are large quantities of fish, such as pickerel, whitefish, perch, roaches, chubs, hornfish, and vast quantities of sea or white perch are taken in the fall of the year, when the young alewives can be had for bait, which is the only bait which can be used with success. * * * On the right hand of the road from Rochester to Plymouth lies Merry's Pond, a most beautiful sheet of water, and is nearly as round as a circle. In this pond are a few fish of the minor species. There is no natural inlet or outlet to this pond, but a few years since the town, at the expense of $100, cut a canal from it to Sippican River, hoping to induce the alewives into the pond. No success attended the attempt. * * * Mattapoisett River, though small, is of some consequence besides what results from the mills, namely, on account of the alewife fishery. The privilege of taking said fish in said river the inhabitants are by law authorized to sell, which brings into the treasury about $400 annually. It would be much more productive if the taking the fish illegally could be effectually prevented."

On July 22, 1879, the three towns—Marion, Rochester, and Mattapoisett—celebrated their bi-centennial anniversary, and among the guests were some of the lineal descendants of the kings Massasoit and Sassacuss. A small band of King Phillip's tribe yet remains in the adjoining town of Lakeville, upon the Indian reserve lands known as Betty's Neck. The Indians there are fully civilized citizens, with their schools and churches, and are highly spoken of by all who know them for their industry, intelligence, and temperance.

NEW BEDFORD.

THE ORIGINAL SETTLERS.—This is a place of much historic interest. It was first discovered by Bartholomew Gosnold, who, in company with thirty-one others (eight of them sailors), sailed from Falmouth, England, in the small ship Concord, on March 26, 1602, with the intention of settling in Virginia. They discovered the group of islands on the east side of Buzzard's Bay, and landed on May 24 at the outer island, now known as Cuttyhunk. They named the group the Elizabeth Islands, and the one on which they landed and built a fort they called Elizabeth, in honor of their queen. The group yet retains the name. The daring explorer and discoverer has not been forgotten, the islands baring the township name of *Gosnold*.

On May 31, 1603, while part of the men were building a fort, Captain Gosnold sailed across the bay, first anchoring not far from Round Hills on the west and working east until he discovered the mouth of the river and the west shore on which New Bedford is now built. The island of Cuttyhunk, on which they built a fort, bore the Indian name of Pooentohhunhunnoh. It contains about 516 acres of land. Finding the Indians friendly, they landed and loaded their vessel with sassafrass root—considered of great value for medicinal purposes—cedar and furs; this last they purchased of the Indians. Part of the company were to return to England with the cargo while the remainder located a permanent settlement. These latter became dissatisfied for fear they would never see their share of the valuable cargo, so they all embarked, and on the 15th of June of the same year made sail for England. Captain Gosnold afterwards returned to Virginia where he died August 22, 1607.

Thus the first attempt at a settlement here was made eighteen years before the landing of the Pilgrims on the

celebrated Plymouth Rock. It was, however, some thirty or forty years after the above landing before a permanent settlement was made by the English. The settlement was called Dartmouth and purchased from the Indian chief Massasoit, and his son, Wamsutta, in 1654. This may be seen by a perusal of the following deed:

"BRADFORD, GOVERNOUR.

"NEW PLYMOUTH, *November* 29, 1652.

"Know all men by these presents that I, Wesamequen, and Wamsutta, my son, have sold unto Mr. William Bradford, Captain Standish, Thomas Southworth, John Winslow, John Cooke, and their associates, the purchasers or old comers, all the tract or tracts of land lying eastward from a river called Cushewagg, to a certain harbor called Aconaksett, to a flat rock on the west side of the said harbor. And whereas the said harbor divideth itself into several branches, the westernmost arme to be the bound, and all the tract or tracts of land from the said westward arme to the said river of Cushewagg, 3 miles eastward of the same, with all the profits and benefits within the said tract, with all the rivers, creeks, meadows, necks, and islands that lye in or near the same, and from the sea upward to go so high that the English may not be annoyed by the hunting of the Indians in any sort of their cattle. And I, Wesamequen, and Wamsutta, do promise to remove all the Indians within a year from the date hereof that do live in the said tract. And we, the said Wesamequen and Wamsutta, have fully bargained and sold unto the aforesaid Mr. William Bradford, Captain Standish, Thomas Southworth, John Winslow, John Cooke, and the rest of their associates, the purchasers or old comers, to have and to hold for them and their heirs and assignes forever. And in consideration hereof, we the above mentioned are to pay to the said Wesamequen and Wamsutta as followeth: Thirty yards of cloth, 8 morse-skins, 15 axes, 15 hoes, 15 pair of breeches, 8 blankets, 2 kettles, 1 cloak, 2 pounds in wampam, 8 pairs stockings, 8 pairs-shoes, 1 iron pot, and 10 shillings in another commoditie, and in witness hereof we have interchangeably set to our hands the day and year above written.

"JOHN WINSLOW.
"JOHN KING.

"In the presence of—
"JONATHAN SHAW.
"SAMUEL EDDY.

"WAMSUTTA, his M M mark."

Another old record gives the boundary of Dartmouth (this embraced the present towns of Westport, New Bedford, Dartmouth, and Fairhaven) as made with the Indian, John Sassamon, agent for Phillip Sagamore, of Pokamockett, &c.

GIVEN THE NAME NEW BEDFORD.—As the little settlement grew into quite a village belonging to Dartmouth, it was thought best to give it a name to distinguish it from the other part of the town, and on a public occasion, Mr. Joseph Rotch suggesting it should be called "Bedford," in honor of Joseph Russel, an old citizen, who bore the family name of the Duke of Bedford, it was adopted, and the old gentleman was after known as the duke, and for many years the place was known as Bedford. On ascertaining that there was another town of the same name in the State it was called New Bedford, and on February 22, 1787, it cast loose from Dartmouth and was duly incorporated as a town, embracing the present town of Fairhaven until April 22, 1812, when that town withdrew and was duly incorporated. A large number of ships were formerly built at New Bedford, the first having been launched in 1767; this was named "Dartmouth" and has become historic from having been one of the vessels which came into Boston Harbor loaded with tea which was thrown overboard December 16, 1773.

NEW BEDFORD IN 1792.—A description follows, written in 1792, of New Bedford and its fisheries; "There are also several other islands in the river, most of them small, yet yielding some pasturage, and very commodious for several purposes, particularly for those who make a business of salting fish. There is good fishing in the river for the smaller kind; and not far distant from the mouth they catch the larger sort. But few markets in any of our sea-ports are equally supplied with variety of fish, and such as are very excellent. Here are sold cod, bass, blackfish, sheepshead, &c."[1]

SALT AND FRESH WATER FISHES.—In 1858 the varieties to be found in the waters of New Bedford were:

"*Fish.*—Salt water: Smelt, tom-cod, herring, shad, menhaden, flat-fish, lump-sucker, whiting, chogset, bass, tautog or blackfish, scup (scuppang, pogies) cod, mackerel, haddock, pollock, bluefish, rock bass, sheepshead, flounder, perch, eel, sculpin, scate, stingray, bellows-fish, rudderfish, squetteague, squid, swellfish, toad-grunter, shark, dogfish, frost-fish, skipjack. Shell-fish: Oysters, quahaugs, clams, lobsters, crabs, scallops, winkles, razors, mussels, star-fish or five-fingres, barnacles. * * * Fresh water: Trout, perch (white, red, yellow), pickerel, chub, carp, silverfish, minnow, hornpout, eel, clam.[2]

THE FISHERIES IN 1870.—Mr. Welcome A. Almy stated to the fishery committee of the Massachusetts legislature in 1870: "I should think there were as many as 25 fishing boats which make a regular business of fishing from New Bedford. Some carry two men and some carry four. There are probably one 100 men engaged in the business. Some go in smacks. There are several hundred who will go fishing more or less. There are some laboring men who go fishing to get food for their families. Formerly there were more men who went for that purpose than now."

THE WHALE-FISHERY.—A brief sketch of the whale-fishery from New Bedford has been given on pages 271, 272, and a much fuller history of this industry will be given in Section V of this report.

[1] Coll. Mass. Hist. Soc., vol. iv, 1st series, p. 233.
[2] Ricketson's History of New Bedford, 1858, p. 403.

THE FISHERIES OF RHODE ISLAND.

RHODE ISLAND IN THE SEVENTEENTH AND EIGHTEENTH CENTURIES.

FISHING BY THE ABORIGINES.—Arnold, in speaking of the food used by the aborigines of Rhode Island in 1622, says: "But of all their different sorts of food, none were more highly esteemed than clams. In all seasons of the year the women dug for them on the sea-shore. The natural juices of this shell-fish served them in place of salt as a seasoning for their broth, their nassaump,[1] and their bread, while the tenderness and delicacy of the flesh have preserved its popularity to this day, amid all the culinary devices of an advanced civilization."[2] Whales, sometimes 60 feet in length, were often cast up on the shores, and, being cut in pieces, were sent far and near as a most palatable present. In the early part of the seventeenth century, hunting, fowling, and fishing were the chief occupations of the Indians. They used nets made of hemp, setting weirs across the rivers, and killing the bass with arrows as the fish became entangled in the meshes of the nets. The head of the bass was considered a great luxury. The sturgeon they caught with a harpoon of their own invention, going out in their canoes to attack it. This fish was so highly esteemed by them that they would rarely sell it to the English.

THE SETTLEMENT; FISHERY PRIVILEGE.—Rhode Island was first settled in June, 1636, at Providence, by Roger Williams, from Massachusetts. Two years later, William Coddington and others, who had, like Williams, been persecuted for their religious belief, came from Massachusetts, and purchased of the Indians the island of Aquidneck. They effected a settlement on this island, now called Rhode Island, and from this sprung the towns of Newport and Portsmouth. In 1643 a third settlement was made at Warwick, by John Greene, Samuel Gorton, and others. This same year Roger Williams sent to England and obtained a patent for the united government of the settlements. The patent was dated March 14, 1643-'44, but did not go into operation till 1647. It defined the settlements as the "Incorporation of Providence Plantations in the Narraganset Bay in New England."

This patent continued in force till 1663, when a charter was obtained from King Charles II, of England, incorporating the colony of Rhode Island and Providence Plantations." In this charter was the following paragraph relative to the fishing industry:

"Provided alsoe, and oure express will and pleasure is and wee doe by these presents, ffor vs, our heirs and successours, ordeyne and apoynt, that these presents shall not, in any manner, hinder any of oure lovinge subjects whatsoever, ffrom useing and exerciseing the trade of ffishing upon the coast of New England, in America; butt, that they, and every or any of them, shall have ffull and ffree power and liberty to continue and vse the trade of ffishing vpon the said coast, in any of the seas thereunto adjoyninge, or any armes of the seas, or salt water rivers and creeks, where they have been accustomed to ffish; and to build and sett upon the waste land, belonginge to the sayd Collony and Plantations. such wharfes, stages and workehouses as shall be necessary for the salting, drying and keepeing of theire ffish, to be taken or gotten upon that coast. And ffurther, for the encouragement of the inhabitants of our sayd Collony of Providence Plantations to sett upon the businesse of takeing whales, itt shall bee lawefull ffor them, or any of them, having struck whale, dubertus, or other greate ffish, itt or them, to pursue unto any parte of that coaste, and into any bay, river, cove, creeke or shoare, belonging thereto, and itt or them vpon the said coaste, or in the sayd bay, river, cove, creeke or shoare, belonging thereto, to kill and order for the best advantage, without molestation, they makeing noe wilfull waste or spoyle, any thinge in these presents conteyned, or any other matter or thing, to the contrary, notwithstanding.

"And further alsoe, wee are gratiously pleased, and doe hereby declare, that if any of the inhabitants of our sayd Collony doe sett upon the plantinge of vineyards (the soyle and clymate both seemeing naturally to concurr to the production of wynes), or bee industrious in the discovery of ffishing banks, in or about the sayd Collony, wee will, ffrom tyme to tyme, give and allow all due and fitting encouragement therein, as to others in cases of lyke nature."

There having been some troubles as to the extent of Rhode Island during the deposition of Charles II, after his restoration to the throne, the people of Rhode Island presented a petition to the King, in which they asked that Rhode Island might be restored to the state and extent of land which it enjoyed when the first charter was granted, and that thus the people might be encouraged to "goe on propagating plantations * * *, promoting of * * * ffishinge, &c."

FISHERY LAWS AND REGULATIONS.—In May, 1680, in the 24th answer to a set of questions from the lords of the privy council, the assembly said: "We answer that a fishing trade might prove very beneficiall provided accordinge to the former artickle there were men of considerable estates amongst us willing to propagate it."

The Rochester court of common pleas, on March 6, 1687, passed an act to encourage fishing in Pettaquamscot Pond.

On June 19, 1716, Starve Goat Island was granted, upon petition of three fishermen of Providence, for the purpose of curing and drying fish.

On October 28, 1719, the Warwick assembly empowered the town council to preserve and improve the fishing in their rivers, forbidding the setting of weirs, dams, or nets; also established vendue masters in their town, to be chosen before the annual election, whose fees were to be 2½ per cent. on the amount of the sales, and who were to settle with the owners of the goods within five days.

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[1] Massaump is a pottage made of unparched meal.

[2] Arnold's History of Rhode Island, from which work, in connection with the colonial records of the State, this historical sketch is compiled.

On August 18, 1735, in order "to protect Pawcatuck River fisheries, it was forbidden to erect dams or weirs on any stream to hinder the passage of fish or to catch them for three days in the week except by hook and line."

And on June 13, 1737, so as "to preserve the perch in Easton's Pond, it was forbidden to draw seines either in the ponds or creek."

April 1, 1741: A petition by James Greene and others to place a dam across the south branch of Pawtuxet River in the town of Warwick, and to erect works thereon for the refining of iron. This petition was against former decisions [as being an obstruction to the fish] but was granted.

On October 28, 1761, "a lottery was granted to raise £1,500, old tenor, for making a passage around the Pawtucket Falls, so that fish of almost every kind who choose fresh water at certain seasons of the year may pass with ease." It was represented that the country above the falls would derive much advantage by thus facilitating the access of the fish to the upper waters. Twelve years later, in August, 1773, the assembly passed "an act making it lawful for any one to break down or blow up the rocks at Pawtucket Falls to let fish pass up. * * * And the said river was declared a public river."

September, 1765: An iron-ore bed was discovered on Pawtuxet River, in Cranston, early in the spring of 1765, and in September following the petitioners prayed for a dam, and were allowed to build one on condition that they would construct a suitable passage for fish round it, and maintain the same from April 10 to May 20 annually, agreeable to a law that had been in force thirty years.

February 23, 1767: "An act to prevent the Pawtuxet and Pawcatuck Rivers from being obstructed by weirs and seines, so as to prevent the passage of fish, was enforced by a penalty of £50."

THE WHALE-FISHERIES, 1731 to 1789.—"June 14, 1731: To encourage the whale and cod fisheries a bounty of 5 shillings for every barrel of whale-oil, 1 penny a pound for bone, and 5 shillings a quintal for codfish caught by Rhode Island vessels and brought into this [Rhode Island] colony was offered."

June 11, 1733: "The whale-fishery had long been conducted on a small scale within the colony. Whales frequented the quiet waters of Narragansett and were often taken with boats. A stimulus had been given to this enterprise by the recent premium placed upon it, so that vessels began to be fitted out for the purpose. The first regularly-equipped whaleman from Rhode Island of which we have any knowledge arrived in Newport at this time with 114 barrels of oil and 200 pounds of bone, upon which bounty was paid. It was the sloop Pelican of Newport, owned by Benjamin Thurston, and about fifteen years before smaller sloops had begun to be used at Nantucket for taking whales. At this time some 25 sail, all under 50 tons burden, were there employed, obtaining about 3,700 barrels of oil annually." This was the commencement of "that victorious career of industry," long afterwards illustrated in the British House of Commons by the splendid rhetoric of Burke:

"Look at the manner [said Burke] in which the people of New England have of late carried on the whale fishery. Whilst we followed them amongst the tumbling mountains of ice, and beheld them penetrating into the deepest frozen recesses of Hudson's Bay and Davis's Straits, whilst we are looking for them beneath the Arctic Circle, we hear that they have pierced into the opposite region of polar cold, that they are at the antipodes, and engaged under the frozen serpent of the south."[1] * * *

Had not the war with England occurred, no doubt Rhode Island's fisheries would have grown with very rapid strides. Its disastrous effects to the fisheries were acutely felt, as will be seen in the next item:

"In consequence of the war the Jews, who had done much for their adopted state, had all left by the fall of 1779. Aaron and Moses Lupez at one time owned 27 square-rigged vessels, several of which were whaling-ships, besides many smaller craft."

The whaling-boats were in this same year (1779) put to a use other than that for which they were built. We next read:

"In July, 1779, Colonel Barton's corps of infantry were raised for the special purpose of protecting the sea-board of Rhode Island from Tory forays. They were furnished with whale-boats built expressly for that service."

THE PROVIDENCE FLEET IN 1789.—An item in Arnold's history, concerning the Providence fleet, and dated July 5, 1789, says:

"At this time 101 vessels, exclusive of river craft, were owned in Providence, amounting nearly to 10,000 tons, more than three-fourths of which were employed in the foreign trade and on whaling voyages. The ship General Washington returned from China after an absence of nineteen months. This was the first arrival at Providence direct from Canton."

[1] Speech on moving resolutions for conciliation with the colonies, March 22, 1775.

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INDEX TO FISHERY INDUSTRY.

A.

Page.

Abalone—
- Fishery 596, 601, 613
- Meats 594, 599, 601, 603, 604, 607, 618
- Shells 594, 597, 599, 601, 604, 607, 618

Abalones, dried 596
Absecom inlet, New Jersey 394
Accomac county, Virginia 461, 465
Acipenser sturio 502
Acoakset river, Massachusetts 274
Acushnet river, Massachusetts 267, 270
Adams, J. and B. C., on fisheries of Camden, Maine. 49
Adamsville, Rhode Island 294
Addison, Maine 25
Ælurichthys marinus 586
Africa, exports of fish to 205, 206
Agawam river, Massachusetts 733
Agawam station, Massachusetts, alwewife fishery of 264
Alabama—
- Fisheries of 568
- Statistics of salt-water fisheries of 568

Alabama river 570
Alameda, California 619
Alameda county, California, statistics of fisheries of 624
Alaska—
- Cod fishery of 630
- Fisheries of 591, 630
- Fur-seal industry of 630
- Shore fisheries of 630
- Statistics of fisheries of 630
- Walrus fishery of 630
- Whale fishery of 630

Alaska Commercial Company 591, 593
Albemarle sound—
- Alewife fishery of 481
- Shad fishery of 481

Albicore 595, 600
Alcona, lake Huron 658
Alewife—
- Hedges 67
- Pounds 57
- Weirs 48, 76, 111, 709

Alewife cove, Connecticut 318
Alewife fishery in—
- Connecticut river 319
- Maine 15, 45, 47, 48, 55, 57, 61, 64, 67, 74, 75, 102
- Maryland 427
- Massachusetts 213, 222, 234, 235, 239, 244, 245, 246, 248, 249, 252, 258, 260, 264, 265, 267, 273, 274, 275, 276, 686, 710, 711, 716, 717, 721, 723, 727, 728, 730, 731, 733, 734

Alewife fishery in—Continued. Page.
- New Hampshire 679
- North Carolina 478
- Rhode Island 294, 297, 303, 308, 309
- Virginia 451, 456

Alewives 268, 428
- Early abundance of ... 82, 132, 221, 709, 710, 716, 724
- For bait 119, 154, 156, 157, 163, 213, 248, 261
- Fresh 119, 133, 138, 183, 186, 187, 193, 196, 225, 254, 259, 263, 275, 284, 314
- In lake Ontario 673
- Pickled 121, 188, 191, 192, 225, 248, 255, 263, 276, 285, 314
- Smoked 121, 225, 248, 276, 285, 296, 297, 709
- Statistics of catch of 109, 118, 284, 314, 344, 383, 411, 417, 424, 452, 479, 504, 505, 515, 523

Algæ, commercial value of 268
Algæ Fertilizer Company 69
Alicante, fish exports to 129
Alligator-gars 570, 578
Alpena, Michigan 658
Altamaha river, Georgia 502, 514
Amagansett, New York 353, 360
Ambergris 264, 272
Amelia island, Florida 524
American lunch fish 370
Amesbury, Massachusetts 132, 134
Amherst, lake Erie 667
Amityville, New York 371
Anastasia island, Florida 525
Anacapa island, California 599, 601
Anchovies, herring as 11, 13
Anchovy for bait 603
Anclote keys, Florida 537, 548, 549
Angel island, California 619
Angola, Delaware 416
Anna Maria, Florida 546
Annapolis, Maryland 427, 445, 467
Anne Arundel county, Maryland 442
Annisquam, cape Ann, Massachusetts 143, 165
Annisquam river, Massachusetts 143
Antarctic fur-seal fishery 118, 315
Anticosti island, halibut at 157
Antipoisen river, Virginia 460
Apostle islands, lake Superior 635
Appalachee bay, Florida 554
Appalachicola, Florida—
- Fish-curing at 562
- Fisheries of 559
- Gill-net fishing at 561
- Mullet-curing at 561
- Mullet fishery of 559

Appalachicola, Florida—Continued. Page.
Oyster industry of 563
Appalachicola bay, Florida 559
Appalachicola fishery at Palm key 546
Appledore island, Isles of Shoals 111, 112
Apponagansett bay, Massachusetts 273
Apponaug, Rhode Island, clam and scallop fisheries of 305
Aptos, California 605
Aquitticaset pond, Massachusetts 267
Arcachon, France, oyster culture at 472
Arius felis 585, 586
Armstrong, lake Ontario 672
Arnold's *History of Rhode Island* 737
Arrowsic, Maine 74
Artedius megacephalus 612
Artedius quadriseriatus 612
Ashapoo river, South Carolina 508
Ashland, lake Superior 635
Ashley river, South Carolina 506
Ash Point, Maine 55
Ashtabula, Ohio 669
Aspee bay, Massachusetts, squidding at 159
Assateague bay, Maryland 425
Assawamsett pond, Massachusetts 734
Assonet, Massachusetts 278
Atkins, C. G., river fisheries of Maine 10
Atlantic and Virginia Fertilizing Company 353, 360
Atlantic City, New Jersey 394, 395, 399
Atlanticville, New York 363
Atwood, Captain N. E 63, 227, 231
Atwood, Elisha, on whale fishery of Wellfleet, Massachusetts 235
Atwood, J. R., on fisheries of cape Cod 223
Au Sable 659
Australasia, exports of fish to 205, 206, 207
Austrian fishermen 615, 627
Avery point, Connecticut 317
Azores—
Exports of fish to 205, 206, 207, 217
Whale fishing at 229

B.

Babson's *History of Gloucester* 686
Babylon, New York 371
Backies, fishing for 309
Back river, Virginia 457
Bailey's Mistake harbor, Maine 20
Bairdiella chrysura 525, 529
Bairdiella punctata 586
Bait—
Alewives for 119, 154, 156, 157, 163, 213, 248, 261
Anchovy for 603
Capelin for 135
Clams for 22, 25, 36, 37, 38, 41, 42, 47, 54, 59, 67, 73, 77, 93, 95, 96, 98, 100, 133, 136, 139, 141, 156, 165, 179, 225, 244, 255, 259, 271, 358, 686, 694, 724, 726, 729
Cod 231, 707
Cod spawn for sardine 151
Conchs for 85, 539
Crabs for eel 308
Crawfish for 539
Drum 512
Eel 195, 268, 364
Bait—Continued. Page.
Fresh fish for 10, 22, 24, 29, 37, 46, 53, 66, 73, 77, 93, 94, 95, 108, 118, 119, 120, 284, 314
Frozen herring for cod 17
Herring for 28, 42, 57, 71, 154, 156, 157, 161, 162, 163, 164, 179
Horsefeet for 367
Lobster 26, 40, 141, 165
Lobsters for 262, 269
Mackerel for 154, 163
Menhaden for 28, 31, 78, 151, 154, 159, 235, 261, 362, 370
Mullet for 585
Sardines for 609
Sea-gulls for 156
Shack 156
Shuckfish for 307
Smelts for 609
Sperling for 134, 163
Squid for 156, 159, 160, 161
Value of 170
Bait-chopper 195
Bait-mill, machine 68
Baiting fleet 159
Baiting Hollow, New York 351, 354
Baker's island, Massachusetts 698
Baldwin, New York 372
Baltimore, Maryland—
Market for fresh fish 197
Oyster packing in 443
Oyster trade of 204, 444, 445
Bank cod fishery 28, 129, 233, 315, 683, 690, 693, 694, 696, 707, 729
Banquereau—
Cod fishery 245, 267, 273
Halibut fishery 60, 100, 156, 157, 175, 180
Barataria, Louisiana 579
Barbadoes, fish exports to 167, 704
Barcelona, New York 670
Bar Harbor, Maine 34
Barlowtown, Massachusetts 251
Barnegat bay, New Jersey 385, 386
Barnegat inlet, New Jersey 384, 389
Barnegat, New Jersey 394, 396
Barnstable district—
Cod fishery of 226
Fishing fleet of 223
Mackerel fishery of 226
Review of 223
Statistics of fisheries of 224
Whale fishery of 226
Barnstable, Massachusetts—
Eel fishery of 246
Lobster fishery of 246
Mackerel fleet of, in 1851 116
Salt-works at 127
Scallop fishery of 246
Weir fishery at 246
Barracuda 595, 597, 600, 605, 618
Barrels—
Fish 166, 167, 170, 211, 212, 222, 486, 643, 645
Mullet 546, 547, 552
Barren island, New York 353
Barrington, Rhode Island 286, 287
Barrington river, Rhode Island 288

Page.
Barter's island, Maine 69
Bartholomew, Tallon & Co 577
Bartlett's island, Maine 33
Bass—
Former abundance of 695, 697, 709, 716, 717, 724, 725, 731, 735
In Boston market 195
In California 595
In eastern Florida 525, 529
In South Carolina and Georgia 502, 511
In the great lakes 648, 662
Sea 118, 119, 138, 193, 225, 259, 263
Striped 118, 119, 133, 138, 193, 196, 225, 254, 259, 263, 275
Bass at—
Long Island, New York 345, 347, 376
Plymouth, Massachusetts 221
Bass fishery—
At Long Island, New York 346, 375
Early history of 710, 711, 721, 736
In Connecticut 317, 319
In eastern Florida 529
In Massachusetts 136, 241, 246
In Rhode Island 283, 294, 298, 308, 309, 310
In South Carolina 508
Bass river, Massachusetts 242, 244, 245
Bass-traps 307
Bass-weir 709
Bastard-snappers 507, 508
Bath district—
Review of fisheries of 72
Statistics of fisheries of 72
Bath, Maine—
Commercial interests of 75
Fishery interests of 72, 75
Bath, New York 375
Bay cod fishery 129, 130
Bay de Noquette, lake Michigan 639, 644
Bayfield, lake Superior 635
Bay mackerel 427
Bay-men of Long Island 369
Bay of Chaleur—
Cod fishery 129
Mackerel fishery 43, 65
Bay of Fundy—
Cod fishery 14, 16, 25, 28, 30, 56
Fisheries 23, 32, 35, 39, 40, 44, 65, 67, 154, 174, 175, 195
Bay of Islands herring fishery 170, 171
Bay of Saint Lawrence mackerel fishery (*see also* Gulf) 141, 152, 153, 172, 173, 175, 214
Bayonne 384
Bayou—
Boulfen 579
Chalons, Louisiana 579
Cook, Louisiana 579
Cyprian, Louisiana 579
Muscle, Louisiana 579
Bay Point, Florida 549
Bayport, New York 368
Bay Ridge, New York 376
Bay Shore, New York 365, 370
Bay View, Massachusetts 143, 165
Bayville, New York 348
Beach Haven, New Jersey 394, 396

Page.
Beacon Brothers 542
Bear inlet, North Carolina 485
Bear's neck, Massachusetts 141
Beaufort and Morehead City, North Carolina—
Crab fishery of 491
Cured-fish trade of 486
Description of 485
Fresh-fish industry of 486
Mullet fisheries of 487
Porpoise fishery of 490
Pound nets at 489
Quahaug industry of 491
Salmon-trout fishery of 488
Scallop fishery of 492
Turtle fishery of 491
Whale fishery of 490
Beaufort and Port Royal, South Carolina, fisheries of 510
Beaufort, North Carolina 477, 485, 486, 487, 488, 489, 490, 491, 492
Beaufort river, South Carolina 511
Beaufort, South Carolina 501, 504, 510
Beaver islands, Lake Michigan 656
Beaver-skins 62
Belfast district—
Review of fisheries of 45
Statistics of fisheries of 46
Belfast, Maine, fisheries of 45, 47
Belgian fishermen 643
Belgium, exports of fish to 205, 206
Belknap's *History of New Hampshire* 678
Bellmore, New York 372
Bellport bay, New York 362, 365, 367
Bellport, New York 367
Bergen ridge, New Jersey 384
Berkeley, Massachusetts 278
Berlin, Maryland 425
Beverly, Massachusetts—
Cod fishery of 127, 694
Fisheries of 178, 179, 180, 694
Mackerel fleet of, in 1851 116
Biddeford, Maine 97, 98
Biddeford Pool, Maine 97, 98
Big Point Sable, lake Michigan 653
Big Sandy, lake Ontario, fishermen of 672
Bilboa, exports of fish to 130, 693, 696, 705
Billingsgate island, Massachusetts 238
Billington sea, Massachusetts 221
Biloxi, Mississippi 571, 575
Birds, sea, eggs of 592
Black bass 354, 570, 575, 578, 627, 642, 664, 666, 673
Blackfish 284, 502, 506, 511, 525, 552
Fishery 235, 319, 493, 502, 504, 507, 524, 727
Oil 121, 151, 713
Blackfish (or tautog) 314, 316, 360, 383, 390, 735
Blackford, E. G 353
Black Point harbor, Maine 82
Black Point, Maine 81
Black rocks, Merrimack river 134
Blackwater, Delaware 417
Blankinship cove 265
Bloater herring 11, 14, 18, 20, 77, 87, 191, 192
Block island, Rhode Island—
Cod fishery of 267, 273

Block Island, Rhode Island—Continued. Page.
Description of 299
Fisheries of 299
Fishing-boats of 301
History of 302
Lobster fishery of 317
Mackerel fishery of 175
Oysters at 287, 292, 321
Pound-net fisheries of 301
Blue-cod 604
Blue creek, Florida 553, 554
Bluefish 268, 303, 307, 357, 361, 502, 552, 555, 561, 577, 731, 735
Abundance of 296, 358, 360, 361, 368, 370
Catch of 119, 138, 225, 254, 259, 263, 284, 314, 316, 317, 344, 350, 351, 354, 376, 382, 389, 404, 411, 424, 425, 452, 453, 458, 459, 479, 480, 486, 505, 515, 523, 524, 536, 537, 595
Gill-net fishery 227, 228, 232, 247, 309, 389
In Boston market 193, 195, 197
Pickled .. 121, 188, 225, 248, 255, 483, 487, 562, 564, 568
Smoked 121, 255
Trolling 388, 396
Bluefish fishery in—
Connecticut 317, 332
Louisiana 576
Maryland 425
Massachusetts 195, 227, 228, 238, 239, 241, 243, 244, 245, 246, 247, 248, 249, 253, 255, 256, 257, 260, 265, 267, 269, 273, 274, 729
New Jersey 390, 397
New York 347, 351, 354, 362, 372, 374
North Carolina 481, 482, 483, 485, 496, 497
Pensacola, Florida 567
Rhode Island 294, 297, 298, 301, 304, 306
Virginia 457, 462, 463
Blue Hill, Maine 38
Blue pike 667, 668
Blue Point, New York 366, 368
Blue Point oysters 203, 369
Boat- and vessel-building at—
Bristol, Maine 61
Friendship, Maine 59
Boat-building 57, 59, 60, 61, 63, 69, 101, 132, 134, 145, 241, 643
Boat-fisheries of New England 21, 34, 41, 42, 46, 48, 49, 51, 52, 53, 54, 57, 58, 59, 60, 61, 64, 68, 70, 74, 85, 99, 115, 134, 141, 146, 162, 163, 223, 240
Boat-fishermen of New England 18, 21, 29, 36, 57, 70, 132, 141, 215, 224
Boats and vessels, statistics of, for—
Great lakes 633
Lake Erie 659
Lake Huron 657
Lake Michigan 638
Lake Ontario 672
Lake Superior 634
Boats, number and value of, in—
Alabama 568
Alaska 630
California 594
Connecticut 314
Delaware 411
Eastern Florida 523, 524
Georgia 514, 515
Boats, number and value of, in—Continued. Page.
Great lakes fisheries 633
Gulf states 536
Louisiana 574, 576
Maine 13, 22, 37, 46, 53, 66, 73, 77, 93, 94, 95
Maryland 423, 424
Massachusetts 118, 120, 132, 138, 178, 183, 187, 215, 254, 258, 263, 375
New Hampshire 108
New Jersey 381, 383
New York 343
North Carolina 478, 479
Oregon 624
Pacific coast 592
Pennsylvania 403, 405
Rhode Island 284
South Carolina 504, 505
Texas 582
Virginia 451, 452
Washington territory 625
Western Florida 536
Boats, oyster, statistics of .. 107, 280, 294, 436, 437, 439, 441
Boca Ceiga bay, Florida 548
Boca Grande, Florida 540
Bogue sound, North Carolina 485, 489
Boisbubert island, Maine 27
Bolinas, California 619
Boneless fish 119, 120, 145, 146, 148, 188, 191, 192, 211, 212, 222, 377
Boxes for 166, 167
Refuse 211, 220
Bonito fishery 118, 119, 259, 262, 263, 268, 274, 301, 388, 389, 576, 595, 597, 600
Bon Secour bay, Florida 570
Boone island, Maine, herring fishing at 98, 99
Booth Bay, Maine—
Early fisheries of 68
Fisheries of 67
Menhaden industry of 65, 69
Present condition of fisheries of 68
Boot pond, Massachusetts 221
Bordeaux, fish exports to 705
Boston district—
Review of 186
Statistics of fisheries of, in 1879 187
Boston fish bureau 190, 192
Boston, Massachusetts—
As a fish market 190
As a fish producer 190
Capital in fishing industry of 190
Clam industry of 198
Early importance of fisheries of 189
Exports of fish from, in 1633 189
Exports of fish products from 122, 204–207
Fish barrels and boxes at 211, 212
Fisheries of 115, 116, 119
Fish fertilizers at 211
Fish-hook manufacture at 212
Fishing-fleet of, in 1879 189
Fish trade of 186, 187, 189
Fresh-fish business of 193–197
General description of 189
Ice industry of 209, 210
Imports of fish products into 207–209
Isinglass industry of 211

Boston, Massachusetts—Continued. Page.
Lobster industry of 198
Mackerel fleet of, in 1851 116
Net manufacture at 213
Oil-clothing manufacture at 212
Oyster industry of 199–204
Oysters shipped to 442, 468
Receipts of dry fish at 192
Receipts of pickled fish at 191, 192
Receipts of smoked fish at 192
Salt industry of 209, 210
Trade in boneless fish 191
Trade in canned fish 197
Trade in dry fish 190
Trade in fishing-lines 212
Trade in pickled fish 190
Trade in smoked fish 191
Value of fish caught by men of 187
Whale fishery of 189
Whaling fleet of 115
Bounty—
On fish exports 127
On salt 230
To cod-fishing vessels 128, 129, 135, 156, 184, 216, 221, 230, 683, 694, 702, 707
Bower's beach, Delaware 412, 413
Boxes, fish 71, 140, 148, 166, 167, 211, 212
Brachyopsis verrucosus 612
Bradford, Massachusetts 132, 134
Bradford's *History of Plymouth Colony* 717
Braintree, Massachusetts 213
Early history of fisheries of 712
Branford, Connecticut, oyster industry of 324
Brazil, exports of fish to 205
Brazos Santiago, Texas 586, 587
Bream fishery 507, 516, 529, 570, 575, 578, 712
Bremen, Maine, fisheries of 57, 60
Brenton's cove, Rhode Island 298
Brenton's point, Rhode Island 298
Breslau, New York 371
Brest, lake Erie 662
Brevoortia tyrannus 363, 493, 509, 586
Brewster, Massachusetts 239
Fisheries of, in 1862 728
Mackerel fleet of, in 1851 116
Salt-works at 728
Bridgehampton, New York 362
Bridgeport, Connecticut 332, 336
Oyster business of 335
Bristol county, Rhode Island 303
Bristol Ferry, Rhode Island 283, 297
Bristol harbor, Rhode Island 303
Bristol, Maine—
Boat fisheries of 61
Early settlement of 60
Menhaden industry of 61
Vessel fisheries of 60
Bristol, Rhode Island 286, 303
British Guiana, exports of fish to 205, 206
British Honduras, exports of fish to 205
British provinces, imports from 117
British provincial fishermen 146
Broad bay, Maine, smelt fishery at 64
Broadkill creek, Delaware 414
Broad river, South Carolina, drum fishery of 511
Broiled mackerel 50
Brookhaven, New York 365, 367
Brooklin, Maine 38, 42
Brooks' *History of Medford, Massachusetts* 712
Brooks, Professor 470
Brooksville, Maine, fisheries of 41, 42
Brook-trout 193, 370, 598
Brownhelm bay, lake Erie 667
Brown's bank, cod fishery on 50, 154, 175, 194
Brown's cove, Maine 58
Brownsville, Texas 586
Brunswick, Georgia 501, 504, 518
Fishery interests of 518
Whale fishery of 518
Brunswick, Maine 79
Clamming interests of 80
Flounder fishery of 81
Brush weirs for herring 19, 21, 23, 24, 26, 28, 33, 34, 38
Bryce, T. T., fish-packer 456
Bucksport, Maine 44
Buffalo, New York 578, 671
Bull-head turtles 664
Bullock's cove, Rhode Island 288, 289
Bullock's point, Rhode Island 318
Bull's bay 507
Bunker City, New York 353
Burnham & Morrill, lobster canning by 88
Burnt Coat, Maine 39
Bushy Point beach, Connecticut 317
Butterfish 118, 119, 249, 259, 263, 268, 294, 307, 359, 383, 389
Buzzard's bay, Massachusetts 199, 249

C.

Cables, manufacturers of 120
Cabrilla 597
Cadiz salt 36, 44, 168, 169, 210, 234
Cain, Captain I 496
Calais, Maine, fisheries of 12, 14
Calf-pasture island, Connecticut 337
California—
Cod fishery of 593
Commercial fisheries of 594
Fisheries of 592
Salmon fishery of 593
Salt industry 591
Sea fishery of 593
Statistics of fisheries of 592, 593
Whale fishery of 593
Cambridge, Maryland, oyster industry 427, 445, 467
Camden, Maine, fisheries of 45, 49
Camp, fishermen's 57, 69, 72
Canada—
Effect of free trade with 17
Imports from 207, 208, 209
Canadian fish competing with American 658
Cana islands, lake Michigan 646
Canarsie, New York 373, 374
Cancale Bay oysters 433
Cancer antennarius 613
Cancer magister 613
Cancer productus 613
Candles, spermaceti 119, 131
Canimicut, Rhode Island 288
Canimicut Point, Rhode Island 289

Page.
Canned—
Clam-chowder 89, 121, 188, 197
Clams .. 11, 22, 25, 34, 37, 47, 77, 81, 89, 93, 96, 370, 484
Crabs 428, 429, 456, 484
Fish 11, 14, 30, 67, 119, 121, 188, 197, 198, 608
Fish-balls 121, 188, 197, 198
Fish-chowder 121, 188, 197
Halibut 629
Herring 10, 11, 25
Lobsters 11, 14, 17, 22, 24, 25, 30, 31, 34, 36, 37, 47, 49, 51, 54, 67, 77, 78, 79, 81, 88, 197
Mackerel 10, 11, 14, 25, 30, 34, 37, 47, 49, 50, 51, 54, 56, 67, 77, 79, 81, 88, 118, 119, 188, 197, 198
Menhaden 370
Oysters 410, 443, 467, 527, 573
Quahaugs 484
Salmon 591, 592, 625, 629
Sardines 10, 11, 25
Shrimp 585
Smelts 121, 188, 197
Spanish mackerel 484
Turtle 484, 527
Cannery—
Clam 44, 81, 96, 98, 370, 484
Crab 429, 456, 484
Lobster 69, 79, 81, 88, 89, 197
Mackerel 69, 79
Canning industry—
At Boston, Massachusetts 197, 198
Of Castine, Maine 44
Origin of, at Eastport, Maine 17
Canoe Place, New York 363
Cape Ann, Massachusetts—
Early history of 686
Fisheries of 115, 137, 143, 162, 163, 164, 686, 698
Cape Breton—
Lobster canneries at 197
Squid fishery 160
Cape Charles, Virginia 461, 463
Cape Cod 115, 127, 146, 159, 230, 723
Fisheries of 223
Cape Elizabeth, Maine 76, 87, 92
Cape Fear, North Carolina 496
Cape Fear river, North Carolina 487, 492
Cape Hatteras 496
Cape Henlopen 403, 409, 415
Cape Lookout, North Carolina 487
Cape May goodies 395
Cape May, New Jersey 394, 395, 397
Cape Mendocino, California 621
Cape Neddock, Maine, fisheries of 101
Cape Negro, cod fishery off 154
Cape Newagen, Maine 68, 70
Cape North cod fishery 175
Cape Porpoise, Maine 98, 99, 100
Cape Sable—
Cod fishery 61, 65, 68, 70, 71, 129, 175, 245
Fishery 699, 701
Cape Small Point, Maine 76
Cape Vincent, lake Ontario, fishermen of 672, 673
Capelin for bait 135
Capeville, Virginia 462
Capital in fisheries of—
Alameda county, California 624
Alaska 630

Capital in fisheries of—Continued. Page.
Barnstable district 224
Bath district 72
Belfast district 46
Boston district 187
California 593, 594
Castine district 36
Connecticut 313
Delaware 411
Del Norte county, California 624
Eastern Florida 523
Edgartown district 258
Fall River district 275
Frenchman's Bay district 29
Georgia 514
Gloucester district 137, 138
Great lakes 633
Gulf states 536
Humboldt county, California 624
Kennebunk district 94
Lake Erie 659
Lake Huron 659
Lake Michigan 638
Lake Ontario 672
Lake Superior 634
Los Angeles county, California 599
Louisiana 576
Machias district 21
Maine 10
Marblehead district 182, 183
Marin county, California 624
Maryland 423
Massachusetts 118, 120
Mendocino county, California 624
Monterey county, California 607
Nantucket district 254
New Bedford district 262
Newburyport district 132
New Hampshire 108
New Jersey 381
New York 343
North Carolina 478
Northern New Jersey 384
Oregon 624
Pacific coast 592
Passamaquoddy district 13
Pennsylvania 403
Plymouth district 215
Portland and Falmouth district 77
Rhode Island 284
Saco district 93
Salem and Beverly district 178
San Diego county, California 599
San Francisco county, California 618
San Luis Obispo county, California 602
San Mateo county, California 607
Santa Barbara county, California 602
Santa Cruz county, California 607
Sonoma county, California 624
South Carolina 504
Southern New Jersey 393
Straits of Mackinac 655
Texas 582
Ventura county, California 599
Virginia 451

Page.
Capital in fisheries of—Continued.
Waldoborough district 53
Washington territory 625
Western Florida 536
Wiscasset district 66
York district 95
Capital in oyster trade of Maryland 448
Capital in salt-water fisheries of—
Alabama 568
Georgia 515
Maryland 424
Capital in sea-fisheries of—
Eastern Florida 524
North Carolina 479
South Carolina 505
Virginia 453
Captiva island, Florida 540, 541
Caranx pisquetus 517
Cardenas market 544
Carmelo bay, California 603
Carmelo, California 603
Carmelo river, California 603
Carmelo Whaling Company 604
Carp 354, 735
Carpenteria, California 600
Carry-away, menhaden 79
Carter & Co 383
Carter's creek, Virginia 460, 471
Cartwright & Co., B. C 353
Carver's Harbor, Maine 50, 51
Casco bay, Maine 76, 78, 79, 80
Clamming interests of 81
Flounder fishery of 81
Cashe's Bank fishery 8, 158, 164
Castine district—
Clam fishery of 36
Lobster industry 36
Review of fisheries of 35
Castine, Maine—
Canning industry of 41
Fisheries of 35, 36, 43
Trade with fishing vessels 44
Casting-nets 576, 585
Cast-net fishery 522, 525, 543, 550, 562
Cast-nets, statistics of 423, 478, 479, 504, 509, 514, 515, 523, 524, 525
Castroville, California 604
Caswell, L. B 111
Casy point, Rhode Island 307
Catfish 411, 484, 485, 516, 517, 530, 578, 586, 618, 642, 643, 650, 662, 664, 665
Cat island, Alabama 571
Cavalli 556
Caviare 377, 503, 505, 510, 633, 639, 642, 651, 657, 663, 665, 666
Cayucos, California 601
Cedar Grove, lake Michigan 647
Cedar Grove, New York 376
Cedar island, Isles of Shoals 111
Cedar Keys, Florida 550
Mullet fishing at 551
Oyster beds at 552
Seine fishery at 550
Cedar point 662, 663, 664
Cedar river, lake Michigan 640

Page.
Central Wharf Company 228
Centre Moriches, New York 365
Centreport, New York 349
Centreville, Massachusetts 248
Centropomus undecimalis 586
Chænobryttus gulosus 516
Chætodipterus faber 586
Chambers's mill, Florida 550
Chandeleur islands 570, 575, 576, 578
Chandler's river, Maine 24
Channel bass 552
Charity islands, lake Huron 658
Charles river, Massachusetts, oyster beds 199, 201
Charleston, South Carolina—
As a commercial center 506
As a distributing center 510
Boat-fisheries of 508
Fishery interests of 501, 504, 506–510
Former importance of fisheries of 506
Menhaden fishery of 509
Mullet fishery of 508
Retail fish trade of 509
Shrimp fishery of 509
Vessel fisheries of 507
Charlestown, Massachusetts, mackerel fleet of, in 1851 116
Charlestown, Rhode Island 286, 289, 308
Charlevoix, lake Michigan 654
Charlotte harbor, Florida 540
Fish curing at 542
Fishing boats of 541
Fishing stations of 540, 541
Charlotte, lake Ontario 673
Chase, Owen 661
Chatham, Massachusetts—
Clam fishery of 241
Cod fishery of 127, 240
History of fisheries of 729
Mackerel fishery of 116, 240
Present condition of fisheries of 240
Weir-fishery of 240
Chatham Port, Massachusetts 240
Chattahoochee river, Florida 559
Chaumont, New York 672, 673
Chebacco boats 35, 40, 50, 129, 163
Chebacco river, Massachusetts 685, 693
Chebeague island, Maine 80
Cheever, George F., on Salem fisheries 695
Chelonia mydas 527
Chequamegon bay, lake Superior 635, 636
Cherryfield, Maine, fisheries of 27
Chesapeake bay—
Oyster beds 469
Oyster industry of 429–448
Oyster industry, statistics of 469
Oyster planting in 469
Oysters 180, 182, 204, 272, 290, 294, 325, 410, 429, 457, 469
Chesapeake Oyster Company 201
Chessehowiska river, Florida 549
Chester river 442
Chicago, Illinois 197, 649
Chili, exports of fish to 205, 206
Chilmark, Massachusetts 258

Page.
Chincoteague bay, Virginia 470
Chincoteague island, Virginia 425, 441
Chinese fishermen 592, 616, 617, 619, 626, 628
Chinese purse-net fishing 612
Chippewa bay fishermen 672
Choctawhatchee inlet, Florida 567
Chogset 735
Chondrus crispus 219
Chowan river, North Carolina 478
Chowder—
Canned 197
Clam 89
Christian, Robert 569
Chub 480, 618, 734, 735
Chum, fish 69
Church & Brother 369
Church Brothers 496
Church, D. T 297
Churchill, Charles O 223
Church's point, Rhode Island 295
Clam—
Cannery 44, 81, 96, 98, 370, 484
Chowder, canned 89, 121, 188, 197, 370
Diggers 24, 198
Fishery, laws regulating 96, 98, 136
Flats 14, 21, 24, 25, 31, 34, 36, 38, 43, 55, 59, 98, 134, 136, 277
Peddlers 97, 102, 148
Steamer 44, 305
Clam fishery in—
Connecticut 333
Delaware 412, 413, 415, 417, 418
Maine 25, 26, 36, 38, 41, 48, 49, 59, 60, 67, 70, 74, 79, 80, 92, 96, 98, 99, 100, 101, 102
Maryland 425, 429
Massachusetts 134, 136, 165, 198, 215, 220, 222, 232, 234, 239, 240, 241, 244, 248, 249, 255, 256, 269, 270, 274
Massachusetts, early history of 684, 686, 694, 725, 733
New Hampshire 108
New Jersey 387, 388, 392, 398, 399
New York 344, 345, 346, 347, 348
North Carolina 487
Rhode Island 284, 296, 304, 305
Virginia 462
Clams 109, 121, 197, 216, 221, 223, 225, 265, 267, 284, 285, 314, 376, 412, 462, 485, 495, 517, 594, 596, 597, 599, 601, 621, 709, 724, 726, 735
Canned ..11, 22, 25, 34, 37, 47, 77, 81, 89, 93, 96, 370, 484
Flushing bay 346
For bait 11, 22, 25, 36, 37, 38, 41, 42, 47, 54, 59, 67, 73, 77, 80, 93, 95, 100, 121, 133, 134, 139, 141, 179, 255, 259, 263, 686, 694, 724, 729
For cod-bait 156, 231, 358
For drum-bait 512
For eel-bait 195, 271
For food 11, 14, 22, 37, 47, 54, 67, 73, 77, 80, 93, 94, 95, 121, 133, 134, 139, 141, 188, 255, 259, 263, 276
Hard 344, 345, 346, 347, 348, 349, 350, 351, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 367, 372, 374, 382, 383, 411, 424, 425, 452, 453, 479, 480, 505, 515, 523, 524
Little Neck 346
Clams—Continued. Page.
Razor 367, 374, 596
Salted 79, 96, 136, 694
Sea 199, 367, 374, 726, 730
Shelled 25, 80, 97
Soft 92, 344, 345, 346, 347, 348, 349, 350, 351, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 364, 367, 371, 372, 374, 375, 382, 383, 385, 392, 393, 399, 411
Clapham, Thomas, fish-culturist 347
Clark, A. Howard 113, 281, 311, 675
Clark's cove 272
Clark's island, Maine 109
Clark's point, Massachusetts 272
Clay banks, lake Michigan 646
Clearwater harbor, Florida 549
Cleveland, Ohio 668
Clinton, Connecticut 318, 321
Oyster industry of 321
Shad fishery of 321
Clinton harbor, Connecticut 321
Club-house, New York 369
Clupea æstivalis 390, 458, 459, 480, 481, 484
Clupea chrysochloris 586
Clupea mediocris 458, 459, 517
Clupea mirabilis 626
Clupea sapidissima 389, 481, 502, 517, 528
Clupea vernalis 390, 458, 459, 480, 481, 484
Cobb's island, Virginia 462
Cobscook bay, Maine 15, 18, 19, 20
Cobscook river, Maine 18, 19, 21
Cocheco river, New Hampshire, oyster-beds in 110
Cod 176, 186, 724, 731, 734, 735
Blue 604
Boneless 148, 188, 377
California 615
Cultus 609, 629
Cured for export 90
Desiccated 148
Early abundance of 695
Evaporated 148
Fresh 89, 118, 119, 133, 138, 147, 172, 178, 183, 187, 193, 194, 215, 221, 225, 254, 259, 263, 284, 314
George's 176
Gill-nets 164
In Charleston market 510
In San Francisco 618
Method of curing 129, 135, 301, 678, 681, 705
Oil 110, 145, 150, 285, 679, 692, 708
Pickle-cured 155, 156
Pickled 86, 91, 121, 139, 172, 188
Presented to Charles the Second 123
Rock 615
Roe 151, 179
Salt for curing 210
Seines 135, 684
Shredded 377
Sounds 142, 151, 167, 179, 679, 694, 702, 707
Tongues 167, 179, 679, 694, 702, 707
Cod, catch of, in—
Connecticut 314
Maine 9
Massachusetts 118
New Hampshire 109
New Jersey 382
New York 344

Page.
Cod, catch of, in—Continued.
Rhode Island 284
Cod, dry, in—
Maine 11, 13, 14, 22, 23, 29, 34, 37, 46, 53, 66, 69, 73, 77, 93, 94, 95
Massachusetts 120, 124, 129, 130, 131, 133, 135, 139, 146, 156, 167, 172, 173, 174, 179, 183, 188, 191, 192, 214, 215, 216, 223, 225, 226, 227, 231, 255, 259, 263, 692, 700, 701, 705
New Hampshire 106
New York 377
Rhode Island 285, 302
Coddington's cove, Rhode Island 298
Codfish—
Exports of 124, 167
Quantity sold in San Francisco 618
Cod fishery—
Bounty to vessels in 128, 129, 135, 156, 184, 216, 221, 694, 702, 737
Gulf of Saint Lawrence 25, 227, 231
History of 124, 127, 129, 130, 131, 678, 680, 682, 683, 685, 690, 691, 692, 693, 694, 696, 701, 702, 704, 705, 706, 707, 708, 713, 715, 717, 719, 723, 725, 726, 727, 729, 730
Statistics of catch .. 9, 109, 118, 127, 216, 317, 344, 382
Cod fishery at—
Biddeford Pool, Maine 98
Kennebunk, Maine 99
Long Island, New York 358, 361, 372, 374, 376
Wells, Maine 100, 101
York, Maine 102
Cod fishery in—
Barnstable district 223, 226, 227, 231, 233, 234, 239, 240, 242, 243, 245, 246, 247, 248, 249
Bath district 72, 74, 76
Belfast district 48, 51
Boston district 187, 189, 193, 194, 214
Castine district 35, 39, 40, 41, 42, 44, 45
Connecticut 313, 315, 316
Edgartown district 260, 261, 262
Fall River district 276
Frenchman's Bay district 28, 31, 32, 33, 34, 35
Gloucester district 137, 141, 145, 146, 147, 154, 155, 156, 162, 163, 164, 172, 173, 174, 175, 176, 177
Machias district 23, 24, 25, 26, 27
Marblehead district 184, 186
Massachusetts 116, 117, 124, 127, 129, 130, 131
Nantucket district 255, 256, 258
New Bedford district 262, 267, 273
Newburyport district 134, 135
New Hampshire 108, 109, 111
New Jersey 384, 390, 391, 392, 394, 396, 397
Passamaquoddy district 14, 16, 20
Plymouth district 214, 216, 221, 223
Portland district 78, 83, 84, 85, 89
Rhode Island 294, 299, 300, 309
Salem and Beverly district 179, 180
Waldoboro' district 52, 56, 58, 60, 61, 63, 64
Wiscasset district 65, 68, 69, 70, 71, 72
Cod fishery of the—
Pacific 593
Shumagin islands 630
Coggeshall's ledge 300
Coggshall point, Rhode Island 298

Page.
Cohansey creek, New Jersey 392
Cohansey point, New Jersey 400
Cohasset, Massachusetts—
Cod fishery of 127
Fisheries in 1821 715
Irish-moss industry of 214
Mackerel fishery in 1860 715
Mackerel fleet of, in 1851 116
Cohasset narrows, Massachusetts 249
Cohasset river, Massachusetts 249
Cold Spring, New York 348, 349
Cole, Augustus, Irish-moss industry by 219
Cole, Charles A., Irish-moss industry by 219
Cole's river, Massachusetts 275, 276, 277, 280
College Point, New York 346
Collin's bay, Massachusetts 181
Collins, Frank W 48
Collins, Harvey 233
Collins, J. W 407, 425
Columbia River salmon fishery 591
Combahee river, Georgia 502
Comstock Brothers 369
Conanicut island, Rhode Island 287, 298
Conception bay, squid at 160
Conch for bait 85, 539
Coney island, New York 374
Conklin, Captain B. F 357
Conneault, Ohio 669
Connecticut—
Fisheries of 313, 716
Mackerel fleet of, in 1851 116
Statistics of fisheries of 313
Statisties of menhaden industry of 313
Statistics of oyster industry of 313
Connecticut river—
Fisheries of 313, 319
Shad fishery of the 115, 319
Connetquoit river 369
Conscience bay, New York 350
Constable hook, New Jersey 384
Contoocook river 131
Contra Costa county, California 619
Cook, Captain Benjamin 159
Cook, W. D., & Sons 332
Cooper river, South Carolina 506
Copper-paint factories 145
Cordage, manufacture of 75
Cordell Banks cod fishery 593
Corfish 62
Corker, Captain Samuel 509
Cornfield Point, Connecticut 319
Corpus Christi, Texas 586, 587
Corrotoma river, Virginia 460
Cos Cob, Connecticut 339
Cottage City, Massachusetts 258
Cottus grœnlandicus 40
Cottus octodecimspinosus 40
Cotuit, Massachusetts 202, 248
Cove oysters 467, 573
Cove sound, North Carolina 485, 489
Coxswain's ledge 300
Crab fishery at—
Long Island, New York 345, 348, 349
Wickford, Rhode Island 307

Page.
Crab fishery in—
California....604, 613
Delaware....412, 413, 415, 416, 417, 418, 419
Gulf of Mexico....570, 577, 578
Maryland....428
New Jersey....387, 391, 392, 399
North Carolina....487, 491
Crabs—
Canned....428, 456, 484
Early abundance of....724, 735
For bait....604
For drum-bait....512
For eel-bait....308
Hard....363, 368, 370, 371, 372, 373, 374, 375, 383, 399, 428, 429
Horseshoe....725
King....393, 725
Soft....193, 197, 363, 368, 370, 371, 372, 373, 374, 375, 383, 410, 416, 417, 428, 613
Crabs, catch of, in—
Delaware....410, 411
Georgia....515
Louisiana....576
Maryland....424, 425, 429
New Jersey....381, 382, 383, 384, 385, 393
New York....344
North Carolina....479, 480
South Carolina....505
Texas....582
Virginia....452, 453, 462
Western Florida....536
Crabs, catch of, on—
Long Island, New York..345, 349, 351, 357, 358, 359, 360, 361, 362, 363, 364, 365, 368, 370, 375, 376
Pacific coast....592, 613
Crampfish....724, 726
Cranberry isles, Maine....33
Crane Neck point, New York....350
Cranev Island flats....454
Cranston, Rhode Island....286
Crawfish....578, 594, 596, 605
Canned....601
Fishery....536, 576, 577, 597, 598, 599, 601, 603
For bait....539, 600
Crevallé....517, 552, 578, 586
Crisfield, Maryland....427, 429, 467
Crisfield oyster-packing industry....445
Croakers....411, 425, 454, 493, 502, 508, 511, 525, 529, 570, 574, 584, 586
Croatan sound....456, 483
Crocker, Captain James B....244
Crocker, Daniel B....245
Crockett, Captain L....463
Crooked river, Florida....560
Crowell, Captain Christopher....127
Crow's island, Massachusetts....267
Crystal River bay, Florida....549
Crystal river, Florida....549
Cuba, exports of fish to....205, 206, 207
Cuban markets....540, 544
Culloden point, New York....352
Cultus cod....609, 629
Cumberland Bone Company....69
Cumberland island, Georgia....518
Cumberland, Maine....79
Page.
Cundy's Harbor, Maine....79
Cunners....118, 119, 133, 138, 178, 183, 187, 193, 196, 215, 225, 268
Curers, packers, and fitters, number of, in—
Connecticut....313
Maine....10, 13, 21, 29, 36, 46, 53, 66, 72, 76, 93, 94, 95
Massachusetts....120, 132, 138, 178, 182, 187, 215, 224, 254, 258, 262, 275
New Hampshire....108
Rhode Island....284
Curing fish—
In Florida....564
Methods of....74, 85, 123, 628
Currituck sound, North Carolina, fisheries of....456, 480
Cushing, Maine....55, 57
Cushing's island, Maine, lobster-grounds....87
Cushing's point, Maine, shell-heaps at....81
Cusk....118, 176, 183, 186, 187, 193, 194, 215, 225, 724
Dry....13, 22, 29, 37, 53, 66, 73, 77, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 191, 192, 215, 225, 699
Fresh....119, 133, 138, 172, 178
Cusk fishery....84, 100, 109, 118, 194
Cusk-skins, leather from....150
Cutchogue, New York....356
Cutler, Maine, fisheries of....23
Cut river, Massachusetts....222
Cutt's island, Maine....109
Cuttyhunk island, Massachusetts....261
Cymatogaster aggregatus....612
Cynoscion maculatum....462, 486, 487, 493, 502, 511, 525, 528, 529, 586
Cynoscion regale....363, 389, 394, 410, 412, 413, 483, 493, 502

D.

Dab, flat-fish called....361
Dagle, Captain Charles....159
Dago fishermen....585
Dagsborough, Delaware....410, 417
Damariscotta mills, Maine....67
Alewife fishery of....64
Fisheries of....64, 67
Damariscotta river, Maine....60, 64
Damariscove, Maine....65
Dana & Co....90
Dana, Charles A....348
Danish fishermen....566
Danish fishermen of Gloucester....146
Dansby, Francis W....569
Darien, Connecticut, oyster industry of....339
Darien, Georgia....518
Darling & Smithers....457
Dartmouth, Massachusetts....267
Mackerel fleet of, in 1851....116
Marine salt-works at....273
Whaling fleet in 1880....115
Dartmouth river, Massachusetts....273
Davidson, Captain Thomas....315
Davis, J. D....486
Davis Straits whale fishery....316, 317
Davis, W. B....494
Day & La Salle....369
Day & Shipman....383
Deane's *History of Scituate, Massachusetts*....717
De Champlain, French explorer....132

Page.
Deep creek, Virginia 460
Deep Hole, New York 353
Deering & Donnell, ship-builders 75
Deer island, Maine—
Boat fisheries of 41
History of fisheries of 40
Lobster fishery of 41
Vessel fisheries of 41
Delaware 407–419
Crab shipments from 410
Crab skiff 417
Fisheries of 407–419
Fishery grounds of 410
Fishing towns of 412
Importance of fisheries of 410
Interested in whale fishery in 1846 115
Mackerel fishery off coast of 152
Oyster beds of 410
Physical characteristics of 409
Statistics of fisheries of 410
Delaware bay 396, 398, 409, 412
Delaware river 400, 403
Del Norte county, California 623
Statistics of fisheries of 624
Denise, Rusha 465
Dennis creek, New Jersey 394
Dennis, Massachusetts 116, 238, 243, 729
History of fisheries of 729, 730
Mackerel fleet of, in 1851 116
Salt-works at 127
Dennis Port, Massachusetts 241, 243
Denny's river, Maine 18, 19
Dennysville, Maine, fisheries of 19
De Père, lake Michigan 644
Desiccated fish 148
Detroit, Michigan 660
Detroit river 661
Devil-fish, dried 604
D'Homergue, Louis C 369
Diabasis chrysopterus 493, 507
Dickerson, H. R 353
Dickinson bay, Florida 554, 557
Dighton, Massachusetts 277, 278
Diplectrum fasciculare 507
Diplodus probatocephus 389, 394, 462, 502, 511, 525, 529, 586
Diplodus rhomboides 586
Dip-net fishery 64
Dip-nets 423, 478, 479, 504, 505, 514, 515, 523, 524
Disasters to—
Fishermen 649, 652
Fishing fleet 137
Mackerel fleet 172
Distribution of—
Fishing products 165, 166
Fresh fish 197
Ditrara jacksoni 600
Dividing creek, Virginia 471
Diving-net fishery 398
Dodge, Simeon 185
Dogfish 626, 628, 724, 735
Annoyance to fishermen 150
Fishery 269, 627, 629
Oil 150, 172, 233
Skins, use of 150

Page.
Dog-salmon 627
Donald's cove, Maine 101
Dorchester county, Maryland 437
Dorosoma cepedianum 484
Dory 645
Building 59, 60, 61
Hand-lining 68
Industry of Salisbury 134
Origin of 131, 134
Doten, Samuel H 223
Douglass, Captain Daniel 158
Douglass' *History of North America* 705
Dover bay, lake Erie 668
Dover, Delaware 412
Dower, Augustus 160
Doxsee, Frank 370
Dragging for mackerel 58, 61, 63, 64
Drag-net fishery 487, 488, 609, 610, 611
Drag-seine fishery 480
Drag-seines, statistics of ... 343, 381, 383, 385, 393, 403, 411, 423, 424, 429, 451, 452, 478, 479, 504, 505, 514, 515, 523, 524.
Drake's bay, California 620
Drawbridge, Delaware 414, 415
Dried—
Fish-sounds 22, 67
Shark-fins 598
Shrimp 618
Sounds 73, 78, 93, 94, 95, 109
Sounds for isinglass 119
Squid 604
Sturgeon 79
Drift-net fishery 373
Drop-net fishery 487
Drownville, Rhode Island 288, 318
Drum 502, 525, 529, 574, 586
Bait for 512
Curing of 511
Fishery 425, 426, 511
Salted 487
Drumfish, catch of 411
Drums—
Codfish in 83, 90
For packing cod 135
For packing fish 167, 211, 212
Dry cod in—
Maine 11, 14, 22, 23, 29, 34, 37, 46, 53, 63, 69, 73, 77, 83, 93, 94, 95
Massachusetts ..... 120, 124, 129, 130, 131, 133, 135, 139, 146, 167, 172, 173, 174, 179, 183, 188, 191, 192, 214, 215, 216, 223, 225, 226, 227, 231, 255, 259, 263, 692, 700, 701, 705.
New Hampshire 105, 106
New York 377
Rhode Island 285, 302
Dry cod, methods of curing 681
Dry cusk ..... 22, 29, 37, 53, 66, 73, 77, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 191, 192, 215, 225, 699.
Dry fish—
Exports of 167, 204, 205, 217, 218
For export, mode of packing 167
Gloucester's trade in 146, 148

Dry fish—Continued. Page.
On the Pacific coast.....594, 598, 607, 612, 618, 624
Receipts of, at Boston 192
Trade of Boston 190, 191, 192
Dry haddock 11, 14, 22, 29, 34, 37, 46, 53, 66, 73, 77, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 191, 192, 215, 225
Dry hake 13, 14, 22, 23, 29, 34, 37, 46, 53, 66, 73, 74, 77, 91, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 191, 192, 215, 225, 692
Dry mullet-roes 494, 526
Dry pollock .....14, 22, 29, 37, 46, 53, 66, 73, 77, 91, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 192, 215, 225, 255, 259, 263, 692.
Duck island, Isles of Shoals..... 111
Duck pond, Massachusetts..... 727
Duluth, fisheries of..... 634
Duncan's Mills, California 619
Dunfish at Isles of Shoals..... 681
Dunkirk, New York 670
Dunstan river, Maine..... 96
Durham river, New Hampshire 106, 107
Durrey's island, Connecticut..... 324
Dutch Guiana, exports of fish to 205, 206
Dutch island, Rhode Island 307
Duties—
On imported fish 128
Vessels exempt from..... 122
Duxbury, Massachusetts.....115, 127, 214, 220, 717
Dwyer's river, Virginia 460
Dyer's bay, Maine 27
Dyer's creek, New Jersey 396, 398
Dymer's creek, Virginia 371

E.

Eagle island, Maine 40
Earll, R. E.....5, 379, 401, 421, 475, 499, 519
East bay, Massachusetts 247
East Booth Bay, Maine.....65, 67, 69
East Brewster, Massachusetts..... 239
Eastern bay 442
Eastern Florida and its fisheries 519, 521
Eastern point, cape Ann, Massachusetts 143
East Falmouth, Massachusetts 252
East Greenwich, Rhode Island 285, 305, 306
Eastham, Massachusetts 116, 238, 725
East Haven, Connecticut 324, 330
East Hampton, New York 360, 361
East Harwich, Massachusetts 241
East India, exports of fish to..... 206
East Machias, Maine, fisheries of..... 23
East Marion, New York.....353, 358
East Moriches, New York 364
East Northport, New York 349
Easton, Maryland 427
East Orleans, Massachusetts 239
Eastport, Maine.....12, 15, 88, 145, 162, 173
Boat fisheries of 18
Canning industry of 17
Cod fishery of..... 16
Effect of free trade with Canada 17
Frozen-herring trade 17
Haddock smoking at 17
Mackerel fishery of 16
Magdalen islands, fishery of..... 16

Eastport, Maine—Continued. Page.
Origin of fisheries of 15
Sardine industry of 17
Trade in fishing products 18
Vessel fisheries of..... 18
Eastport, New York 364
East Providence, Rhode Island..... 286
East River, Connecticut 322
East Setauket, New York 350
East Thomaston, Maine..... 54
East Wareham, Massachusetts 264
Ebenecook harbor, Maine 70
Eden, Maine..... 33
Edgartown district—
Review of 258
Statistics of fisheries of 258
Edgartown, Massachusetts..... 258
Boat line-fishery of 260
History of..... 732
Whaling fleet of.....115, 260
Edgecomb, Maine, fisheries of..... 67
Edisto river, South Carolina.....502, 504, 508
Edmonds, R. H 423, 427, 429, 464
Edmunds, Maine 19
Eel fishery at Long Island, New York.....350, 351, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 368, 369, 370, 371, 372, 373, 374, 375
Eel fishery in—
Connecticut.....316, 317, 324
Delaware 419
Maine 64, 67
Maryland 427, 428
Massachusetts...118, 132, 178, 195, 221, 222, 245, 246, 252, 253, 255, 260, 270, 271, 274, 277, 712, 724, 725
New Jersey 388, 396
Rhode Island.294, 298, 303, 304, 305, 306, 307, 309, 310
Eel-pots.....120, 138, 178, 183, 195, 223, 224, 254, 258, 263, 268, 275, 277, 284, 314, 415, 417
Eel river, California 622
Eel River salmon fishery..... 593
Eels 118, 119, 132, 133, 138, 183, 186, 187, 193, 221, 255, 259, 263, 268, 271, 284, 304, 314, 316, 345, 425, 485, 586, 716, 724, 727, 731, 734, 735
Pickled 377
Salted 132
Smoked 377
Egg Harbor, New Jersey 236
Eggmoggin reach, Maine 40
Eggs of sea-birds 614
Elizabeth City county, Virginia, statistics of fisheries of 456
Elizabeth City, North Carolina 484
Elizabeth City county, Virginia 453, 456, 465
Elizabeth isles, Massachusetts 115, 258, 261, 733
Elizabeth river, Virginia 453, 455
Elliott, William, on drum fishery 511
Ellsworth, Maine..... 34, 35
Ellsworth, Tuthill & Co 353
Ellwives 428
Embargo, effect on fisheries 128
Emery, James 210
Enconfina river, Florida..... 553
England—
Imports from..... 137
Exports of fish to 205, 206, 207

Page.
English fishermen 146, 566, 643
Enterprise, Florida 530
Epinephelus Drummond-Hayi 517
Epinephelus morio 517
Erie, Pennsylvania 670
Escambia bay, Florida 567
Escambia county, Florida 566
Escanaba, Michigan 639
Esox americanus 516
Essex county, Virginia 465
Essex Institute historical collections 698
Essex, Massachusetts 115
Clam industry at 140, 694
Fishing-line factory at 140
Growth of fisheries of 693
Mackerel fleet of, in 1851 116
Ship-building at 140
Eulachon 626, 629
Eureka, California 621
Evaporated fresh codfish 148
Excelsior Oil and Guano Company 495
Exeter, New Hampshire, fisheries of, in 1792 679
Exeter river, New Hampshire 106, 107, 111
Export, mode of packing fish for 167
Exports of—
Dried fish, bounty on 128
Fish from Boston in 1633 189
Fish from Plymouth district 217, 218
Fish products from Boston 204–207
Export trade in fish 90, 122, 123, 124, 125, 129, 189, 198, 204, 217, 221, 679, 680, 682, 685, 700, 705, 710

F.

Factory hands in the fishery industry, number of, in—
Delaware 411
Maine 10, 13, 21, 29, 36, 46, 53, 66, 76, 93
Maryland 423
Massachusetts 120, 138, 187, 224, 262, 275
New Jersey 381
New York 343
North Carolina 478
Virginia 451
Fair Haven, Connecticut 326, 442, 468
Fair Haven fishermen 672
Fair Haven, lake Ontario 673
Fairhaven, Massachusetts—
Description of 267
History of whale fishery of 269
Weir-fisheries at 267
Whaling fleet of, in 1846 115
Fair Haven, New Jersey 387
Fair Haven, New York 673
Falcon Oil Works 353
Fall River district 115
Review of 275
Statistics of fisheries of 275
Statistics of oyster interests of 280
Fall River, Massachusetts, menhaden fishery of 276
Falmouth, Maine 76, 79, 81
Falmouth, Massachusetts 252, 732
Faneuil Hall fish-market, Boston 193
Farralone islands, California 608, 609
Farralone Island crabs 613
Farran, Captain Merritt 325
Far Rockaway, New York 373
Farrow, J. H 395
Fat-backs 425, 493
Felisado & Co 577
Felton, Richard 484
Felt's *History of Salem* 695, 702
Fenwick's island, Delaware 418
Fernald's island, Maine 109
Fernandina, Florida—
Boat fisheries of 524
Extent of fisheries of 525
Fertilizer factories 69, 119, 220
Fertilizer, fish for 10, 22, 24, 26, 29, 37, 53, 66, 73, 77, 93, 94, 95, 108, 118, 119, 120, 307, 314, 429, 685, 695, 711
Fertilizers—
From oil refuse 150
From seaweed 69
Herring for 26, 696, 731
King crabs for 393
Manufacture of 213
Marine products for 11, 14, 22, 37, 47, 67, 73, 78, 93, 94, 95
Field, A 443
Field's Point, Rhode Island 289
Finback whales 724
Finhalloway river, Florida 553, 554
Finnan haddies 11, 14, 17, 47, 77, 86, 87
Fire island, New York 352
Fire Island inlet, New York 365, 367
Fire Island oil-works 369
Fish-balls—
Canned 121, 188, 190, 197, 198
Method of canning 198
Fish-box shooks 71
Fish chowder, canned 121, 188, 198
Fish creek, Michigan 639
Fishermen—
Austrian 615
Belgian 643
Boat 46, 53, 66, 68, 72, 76, 93, 94, 95, 108, 117, 132, 138, 178, 182, 184, 215, 224
British provincial 146
Danish 146, 566
Duties of 704
English, of Gloucester 146
French 146, 642, 643
From Mediterranean ports 585
German 566, 642, 643, 646, 647, 649, 665, 669
Greek 608, 615
Irish 146, 220, 566, 642
Italian 615, 621
Morals of 146
Norwegian 642, 643
Oyster 434, 435
Polish 643
Portuguese 146, 214, 231, 608
Profits of 145, 146, 537, 543, 567, 571, 584, 636, 690, 696
Public service of 135
Scotch 146, 566
Spanish 566, 608
Swiss 643

Fishermen—Continued. Page.
Vessel.....46, 53, 66, 72, 76, 93, 94, 95, 108, 117, 120, 132, 138, 178, 182, 187, 215, 224
Fishermen of—
Boston..... 194
California..... 592
Galveston.....145, 585
Isles of Shoals..... 681
Louisiana..... 576
Mobile..... 569
Monhegan island..... 63
Ocklockonee bay..... 557
San Francisco..... 608
Swampscott, Massachusetts..... 186
Texas..... 583
Fishermen, number of, in—
Connecticut..... 313
Delaware..... 411
Eastern Florida..... 523
Georgia.....514, 515
Gulf states.....536, 568, 574, 575, 582
Maine..9, 10, 13, 21, 29, 36, 46, 53, 66, 72, 76, 93, 94, 95
Maryland.....423, 424, 429, 438
Massachusetts.....117, 120, 132, 138, 178, 182, 187, 215, 224, 254, 258, 263, 275
New Hampshire..... 108
New Jersey.....381, 382, 384, 393
New York..... 343
North Carolina.....478, 479
Pennsylvania.....403, 405
Rhode Island..... 284
South Carolina.....504, 505
Virginia.....451, 452
Fishermen, number of, on—
Great lakes.....633, 634, 638, 657, 659, 672
Pacific coast.....592, 593, 594, 599, 602, 607, 618, 624, 625, 630
Fishermen's Widows and Orphans' Aid Society.... 176
Fisher's Island sound..... 317
Fish-glue from fish-skins.....119, 142, 149
Fish-guano.....121, 139, 149, 188, 226, 276, 307
Fish-heads for eel-bait..... 195
Fishing bay..... 442
Fishing island, Maine..... 109
Fish island, Massachusetts..... 267
Fish-lines.....140, 212
Fish-manure..... 284
Fish-oil....11, 14, 17, 22, 37, 47, 54, 67, 73, 78, 90, 93, 94, 95, 109, 121, 129, 130, 131, 133, 134, 139, 146, 150, 151, 172, 173, 174, 176, 179, 180, 183, 255, 259, 264, 276, 284, 302, 569, 592, 625, 630, 633, 639, 657, 663, 665, 694, 702, 707
Fish-skins, utilization of.....149, 150
Fish-sounds.....11, 14, 18, 22, 37, 47, 54, 67, 73, 78, 109, 119, 121, 133, 136, 139, 151, 183, 188, 216, 226
Fish-spawn.....121, 133, 139, 151, 152, 183, 188, 226
Fish-tongues.....145, 154
Fishways at Waldoborough, Maine..... 59
Fithian, William J.....353, 357
Five-Mile river, Connecticut..... 339
Flake-yards for fish-curing.....31, 85, 144
Flat bay, Maine..... 26
Flatfish.....284, 294, 314, 316, 361, 735
Flatfish fishery....245, 307, 317, 351, 355, 359, 360, 361, 363
Flatlands, New York.....373, 374
Flemish Cap, fishery on..... 158
Fletcher's neck, Maine..... 97
Flint river, Florida..... 559
Floating traps.....142, 164, 165, 177
Florida—
Fisheries of..... 535
General characteristics of..... 521
Mullet fisheries of..... 522
Sponge fisheries of.....522, 535
Western..... 535
Western, statistics of fisheries of..... 536
Flounder fishery.....26, 49, 81, 193, 195, 247, 248, 253, 260, 271, 272, 273, 277, 297, 303, 306, 309, 310, 315, 317, 332, 348, 349, 354, 596, 609, 615, 619, 620, 622, 627
Florida, eastern.....519, 521
Principal fishery districts in..... 524
Sea fisheries of..... 523
Statistics of fisheries of.....522, 523
Turtle fishery of..... 522
Flounder fyke-nets..... 81
Flounders.....118, 183, 188, 193, 215, 225, 268, 294, 316, 317, 411, 525, 529, 552, 586, 595, 597, 600, 724, 731, 735
Dried..... 628
For lobster-bait..... 40
Fresh.....119, 133, 138, 172, 178, 255, 259, 263, 276, 284, 314, 376
In San Francisco..... 618
Flushing bay, New York.....345, 346
Flushing, New York..... 345
Flying-fish, catch of..... 597
Fly-tails..... 484
Fogland point, Rhode Island..... 295
Folly cove, cape Ann.....143, 162, 163
Fontenelle, Louisiana..... 579
Ford's river, New York..... 365
Foreign trade in fish..... 167
Fore river, Maine..... 82
Forestville..... 659
Forge river, New York..... 364
Forsyth, Dr. J. B..... 249
Fort Hamilton, New York..... 375
Fort Pond bay, New York.....352, 360
Fort Ross, California..... 619
Fortune Bay outrage..... 162
Foul fish..... 530
Four Bayous, Louisiana..... 579
Four Tree island, New Hampshire..... 109
Fowler, Captain W. M..... 416
Fox island, Maine..... 45, 50
France—
Fish exports to.....705, 706
Oyster culture in..... 472
Frankford, Delaware.....410, 417, 418
Frankfort, lake Michigan..... 652
Franklinville, New York..... 355
Fraser's river..... 629
Fredrica, Delaware..... 413
Freeman, Captain Jesse..... 224
Freeman's *History of Cape Cod* cited.....242, 719
Freeport, Maine..... 79
Freeport, New York..... 372

Page.
Freetown, Massachusetts 278
Free trade, effect of, with Canada 17
French fishermen 642, 643
French fishermen of Gloucester 146
French Guiana, exports of fish to 205, 206
Frenchman's Bay district—
Review of fisheries of 28
Statistics of fisheries of 28, 29
Frenchman's bay—
Lake fishery 28
Herring fishery 28
Lobster fishery 28
Menhaden fishery 28
Fresh fish 22, 29, 138, 284, 486, 607, 634, 657, 660
Catch of, in lake Ontario 672
Distribution of 147, 166
Exports of 206
For bait 37, 46, 53, 66, 73 77, 93, 94, 95, 108, 120
For fertilizer 46, 53, 66, 73, 77, 93, 94, 95, 108, 120
For food 53, 73, 77, 93, 94, 95, 108, 120
For oil 120
Gloucester's trade in 146, 147
Imports of 207, 208, 209
Industry at Pensacola, Florida 567
In Gloucester district 137, 139
In Newburyport district 133
Method of packing 147, 197
Of California 459
Of great lakes 633
Of lake Michigan 639
Products in Maine 19
Statistics for Massachusetts 118, 110
Trade of Boston 193
Trade of Portland 89
Fresh halibut fishery 83, 117
Fresh livers 172
Fresh lobsters in Maine 11
Fresh mackerel 243
Fresh water—
Fish 221, 412, 413, 414, 415, 417, 418, 419, 423, 481, 485, 494, 516, 570, 575, 578
Perch 712
Trout 516, 529
Friendship, Maine, fishery industries of 57, 58, 59
Frogs 376, 613
Frost-fish 317, 710, 724, 735
Catch of, in Massachusetts 118
Fresh 119, 259, 263
Frozen—
Bluefish 195, 197
Fish 633, 639, 654, 657, 660, 666, 672
Herring 176
Herring for bait 154, 163, 164
Herring for cod-bait 155
Herring, receipts of, at Boston 194
Herring trade 12, 17, 18, 19, 145, 161, 162
Mackerel 197
Salmon 195, 197
Shad 197
Smelts 195
Funnel-traps for bass 273
Furber's straits, New Hampshire, oyster fishery 106

Page.
Fur-seal fishery 18, 120, 271, 314, 315, 324, 591, 593, 596, 683
Fyke-net fishery 297, 303, 306, 307, 310, 315, 316, 317, 320, 332, 355, 359, 360, 361, 367, 371, 375, 383, 627, 643, 658, 662, 663, 664, 665, 666, 667, 673
Fyke-net fishery for shad 374
Fyke-nets—
Flounder 81
Statistics of 284, 314, 343, 381, 385, 393, 403, 411, 423, 424, 451, 452, 478, 479, 504, 505, 514, 515, 523, 524
Fykes 22, 29, 66, 77, 93, 94, 95, 277, 419
Fykes in Maine 10, 37, 46, 53

G.

Galeorhinus galeus 598
Gallup & Kenniston 463
Galveston bay, Texas 584
Galveston, Texas—
Apparatus and methods of fisheries of 585
Fishermen of 585
Products of fisheries of 585
Gardiner's bay, New York 351, 354, 361
Gardiner's island, New York 352, 360
Gardiner, W. S 360
Gardner place, Connecticut 319
Gar-fish 484, 530
Gasparilla island, Florida 540, 541
Gaspé Point oysters 293
Gaspé Point, Rhode Island 289
Gay Head, Massachusetts 258
George's bank—
Cod fishery 51, 61, 70, 83, 117, 145, 147, 154, 155, 170, 173, 174, 175, 180, 194, 240, 317, 691, 692
Cod fishery, vessels in 154
Cod-fishing ground 137
Fishery 172
Fishery, losses in 176
Haddock fishery 194
Halibut fishery 117, 157, 158, 194, 691
George's cod fishery, bait for 159
George's island, Maine 55, 56, 63
George's islands, Maine, population in 1630 60
George's men, big fares of 155
George's shoals, geology of 8
Georgetown, Maine 71, 72, 73
Georgetown, Massachusetts 245
Georgetown, South Carolina 501, 504, 506
Georgia—
Fisheries of 499
River fisheries of 514
Statistics of fisheries of 514
Statistics of salt-water fisheries of 515
German—
Fishermen 566, 642, 643, 646, 647, 649, 665, 669
Oystermen 465
Germany, imports from 137
Gerrish island, Maine 109
Gibraltar, exports of fish to 217, 218
Gig harbor, Washington territory 627
Gillett's bay, Connecticut 319

Gill-net— Page.
Bluefish fishery 232, 239, 243
Fishery 162, 244, 256, 306, 315, 319, 388, 389, 397, 460, 462, 483, 518, 555, 557, 561, 576, 584, 596, 597, 600, 605, 634, 635, 636, 637, 639, 640, 641, 645, 646, 647, 648, 649, 651, 652, 653, 655, 656, 657, 658, 659, 664, 666, 668, 673
Fishery for mullet 551
Fishery for shad 374, 484, 517
Fishery for sturgeon 502
Mackerel fishery 134, 135, 232, 234, 463
Gill-nets—
Cod 164
Herring 99
Salmon 195
Statistics of 284, 314, 343, 381, 383, 385, 393, 403, 411, 413, 414, 415, 417, 418, 419, 423, 424, 429, 451, 452, 478, 479, 488, 504, 505, 514, 515, 523, 524
Gill-nets, statistics of—
In boat fisheries of Maine 10, 13, 22, 29, 37, 46, 53, 66, 73, 77, 93, 94, 95
In boat fisheries of Massachusetts 120, 132, 138, 183, 187, 223, 224, 254, 258, 263
In boat fisheries of New Hampshire 108
In vessel fisheries of Maine 10, 13, 22, 29, 37, 46, 53, 66, 73, 77, 93, 94, 95
In vessel fisheries of Massachusetts 120, 132, 138, 178, 183, 187, 215, 224
In vessel fisheries of New Hampshire 108
On great lakes 633, 634, 638, 655, 657, 659, 672
Girella nigricans 596
Gizzard shad 484, 485, 530
Glen Cove, New York 347
Glen Haven, lake Michigan 652
Glen Head, New York 347
Glenwood, New York 347
Globiocephalus intermedius 235
Gloucester county, Virginia 457, 465
Gloucester district—
Fisheries of 119, 137
Statistics of fisheries, 1869 to 1876 139
Gloucester harbor, Massachusetts 143
Gloucester, Massachusetts 115, 116, 124, 127, 143
Bank cod fishery of 170, 171, 173, 174, 175
Banquereau cod fishery of 156
Boat fisheries of 162
Clam industry of 165
Cod fishery in 1844 691
Cod fishery of, from 1765 to 1790 127
Distribution of fishery products from 165
Early history of 686
Emigrations to Maine from 124
Fish boxes and barrels at 166
Fisheries interrupted by war 690
Fisheries, 1821 to 1869 ....691, 692
Fishermen of 145
Fishermen's profits at 690
Fish-glue factory at 149
Fish-oil industry of 150
Fish-sounds at 151
Fish-spawn for bait 151
Fish trade of 146
Gloucester, Massachusetts—Continued. Page.
Floating-trap fishery of 164
Foreign trade of 167, 692
Fresh-fish business of 147
Fresh-halibut fishery of 156
From 1629 to 1663 688
From 1700 to 1779 689
Frozen-herring trade of 161
General description of 143
George's cod fishery of 154, 170, 171, 173, 174, 175
Grand bank cod fishery of 155
Greenland halibut fishery of 158, 170, 172, 173
Halibut fishery of 117, 173, 174, 175
Herring boat fishery 163
Herring fishery of 170, 171, 173, 174, 175
Ice industry of 168
In 1642 688
Inshore fisheries of, 1792 to 1828 691
International difficulties 160
Lobster industry of 165
Losses of life and property 176
Mackerel fishery of 152, 171, 173, 174, 175
Mackerel fleet of, in 1851 116
Mackerel inspection of 117
Menhaden bait fishery of 159
Mutual insurance at 146
Products of fisheries in 1875 172
Provisions used on fleets from 169
Salt industry of 168
Shore vessel-fisheries of 164
Squid-bait fishery of 159
Statistics of fisheries in 1870, 1871, 1872, 1873, 1877, 1878, 1879, 1880, and 1881 170–175
Trade in boneless fish 148
Trade in dry fish 148
Trade in mackerel 149
Trade in pickled fish 148
Trade in smoked halibut 149
Valuation and population of 144
Vessel-fitters of 145
Western Bank cod fishery of 155
Winter haddock fishery of 158, 170, 174
Glover, W. H 353, 357
Glue, fish 119, 142, 149
Glue, fish, manufacture of 145
Goat island, New Hampshire 109
Goleta, California 599
Goode island, Connecticut 337
Good Ground, New York 363
Goodwin, Captain Thomas 159
Gooseberry island, Rhode Island 298
Goose creek, Florida 554
Goose-fish 383
Gosnold, Massachusetts 258, 261
Goss, F. B 226
Gott's island, Maine 33
Gould, A. A 249
Gould, William, cited 81
Gouldsboro' bay, Maine 27
Gouldsborough, Maine—
Hake fishery of 31
Menhaden fishery of 31
Whale fishery of 30
Governor's island, New York 376
Grampus 235, 724, 731

Page.
Grand Bank—
Cod fishery.....28, 32, 35, 39, 41 42 43, 45, 50, 60, 63, 64, 68, 78, 83, 108, 109, 117, 145, 146, 147, 155, 156, 170, 171, 172, 175, 179, 180, 184, 189, 214, 226, 227, 245, 691, 692, 706, 717, 723, 729
Halibut fishery.....11, 157, 158
Grand Haven, lake Michigan..... 652
Grand island, lake Superior..... 637
Grand Manan—
Frozen-herring trade..... 162
Herring fishery.....170, 171, 172, 173, 174, 175
Grand Traverse bay..... 654
Grants of land to fishermen..... 697
Gravelly island, Massachusetts..... 254
Gravesend bay, New York.....373, 374
Gravesend, New York..... 374
Gray, S. H..... 495
Gray's harbor, Washington territory..... 629
Gray trout..... 453
Great Bay, New Hampshire, oyster fishery..... 106
Great bay, New Jersey.....393, 398
Great Choptank river..... 442
Great Deer isle, Maine..... 40
Great Egg Harbor inlet, New Jersey..... 398
Great Egg harbor, New Jersey.....393, 398
Great Egg Harbor river..... 398
Great lakes—
Fisheries of the.....344, 404, 631–673
Statistics of fisheries of the..... 633
Great Neck, New York.....346, 347
Great pond, Massachusetts..... 727
Great pond, Rhode Island..... 299
Great Salt pond, Rhode Island..... 289
Great South bay, New York.....357, 362, 365, 371
Great South pond, Massachusetts..... 221
Greek fishermen.....608, 615
Green Bank cod fishery..... 729
Green Bay city, lake Michigan..... 643
Green bay, lake Michigan..... 639
Greenland bay, New Hampshire.....106, 107
Greenland halibut fishery.....146, 147, 158, 170, 173, 174, 175, 176
Greenport, New York.....159, 353, 357, 359
Green Run inlet, Maryland..... 425
Green turtle.....525, 526, 527, 536, 537, 576, 582, 585
Greenwich bay, Rhode Island.....291, 305
Greenwich, Connecticut, oyster industry of..... 339
Greenwich cove, Connecticut..... 339
Green, William P., & Co..... 353
Grind Stone City, Michigan..... 659
Groton, Connecticut..... 316
Ground-fish.....92, 97, 99, 100, 102, 108, 111, 112, 164, 186, 193, 197
Groupers..... 517, 525, 535, 536, 537, 539, 577
Grunt fishery..... 493, 507, 508, 539, 552
Guadaloupe, California..... 600
Guadeloupe, fish exports to..... 167
Guano—
Factories..... 353
Fish.....121, 139, 147, 149, 167, 188, 226, 276, 307
Menhaden.....53, 61, 65, 69, 118, 276, 285, 297, 314, 324, 353, 354, 383, 398, 458, 460, 461
Guard-house, Connecticut..... 319
Guilford, Connecticut, oyster industry of.....321, 322
Guilford river, Connecticut..... 322

Page.
Gulf of Mexico, fisheries of.....533, 535–587
Gulf of Mexico Oyster Company..... 573
Gulf of Saint Lawrence (*see also* Bay)
Cod fishery.....25, 41, 60, 63, 226, 227, 231
Mackerel fishery.....31, 35, 38, 42, 61, 63, 70, 83, 84, 134, 180, 184, 241, 684, 691
Whale fishery..... 229
Gulf pond, Connecticut..... 334
Gulf states—
Extent of the fisheries of the..... 535
Statistics of fisheries of..... 535
Gull pond, Massachusetts..... 727

H.

Hackensack river, New Jersey..... 384
Hack-traps..... 514
Haddock.....176, 186, 724, 731, 735
Catch of, in Maine..... 9
Catch of, in Massachusetts..... 118
Catch of, in New Hampshire..... 109
Curing..... 31
Dry.....11, 13, 14, 22, 29, 34, 37, 46, 53, 66, 73, 77, 93, 94, 95, 120, 133, 139, 167, 172, 183 188, 191, 192, 215, 225, 255, 259, 263
Early method of curing..... 682
Exports of..... 167
Fishery.....17, 18, 23, 25, 26, 27, 41, 51, 52, 74, 78, 84, 89, 98, 99, 100, 101, 111, 115, 141, 146, 158, 162, 163, 164, 170, 175, 186, 193, 194, 248, 255, 309, 704, 707
Fishery, method of sharing in..... 158
For lobster-bait..... 165
Fresh.....119, 138, 158, 172, 178, 183, 188, 190, 193, 194, 215, 225, 255, 376
Fresh, trade in..... 147
In Charleston market..... 510
Inspection of pickled..... 86
Liver oil..... 150
Pickled, trade in..... 91
Smoked.....11, 14, 17, 18, 47, 77, 86, 87
Smoking, method of..... 87
Smoking, origin of, in America..... 87
Trade in fresh..... 89
Hair-seal..... 601
Hake—
Catch of, in Maine..... 9
Catch of, in Massachusetts..... 118
Catch of, in New Hampshire..... 109
Curing..... 31
Dry.....11, 13, 14, 22, 23, 29, 34, 37, 46, 53, 66, 73, 74, 77, 93, 94, 95, 120, 133, 139, 167, 172, 183, 188, 191, 192, 215, 225, 692
Dry, trade in..... 91
Early method of curing..... 682
Exports of..... 167
Fishery.....14, 17, 18, 19, 23, 26, 27, 28, 30, 31, 35, 41, 51, 58, 65, 68, 74, 84, 85, 98, 99, 100, 101, 111, 162, 163, 193, 194, 227, 228, 294, 507, 691, 704
Fresh.....119, 133, 138, 172, 178, 183, 188, 193, 194, 215, 225
Oil.....150, 172
Sounds.....151, 162, 163, 172
Trade of Portland..... 91

Page.
Hale, Smith D 569
Haley's island, Isles of Shoals 111
Half-Moon bay, California 606, 608
Halfway pond, Massachusetts 221
Halfway Pond river, Massachusetts 264
Halibut 615, 621, 626, 627, 628, 629, 692, 724, 731
Bank 176
Bastard 595
Canned 629
Catch of, in Connecticut 316, 317
Catch of, in Massachusetts 118
Catch of, in New Hampshire 109
Fins, pickled 121, 139, 172, 188
Fishery 61, 83, 89, 231, 316, 317, 609, 629, 692, 694
Fishery, fletched 60
Fishery, George's bank 176, 691
Fishery, Greenland 158, 173, 174, 175, 176
Fishery, vessels in 9, 156
Fletched 176
Former abundance of 157
Fresh 115, 117, 119, 131, 138, 145, 146, 154, 156, 157, 171, 172, 173, 174, 175, 188, 193, 194, 197, 225, 231, 259, 263, 314, 376
Fresh, distribution of 166
Fresh, notable fares of 157
Fresh, trade in 89, 147
Head oil 147, 150, 151
In Charleston market 510
In San Francisco market 618
Napes 172
Salt 139, 146, 231
Smoked 121, 133, 134, 139, 149, 225, 692
Smoked, exports of 167
Haliotis splendens 596
Hall & Pearsall 494
Hall & Thatcher 247
Hallstram, Charles W 210
Hamburg, Germany, imports from 137
Hamilton, Robert 81
Hamlet, California 619, 621
Hamlin, Hannibal, on Massachusetts fisheries 130
Hammonasset river, Connecticut 321
Hammond's bay, lake Huron 657
Hampton boat 111
Hampton, New Hampshire 678
Hampton Roads, Virginia 454, 457
Hampton, Virginia 429, 467
Hancock, Maine, fisheries of 31, 32
Hand-line—
Cod fishery 72, 84, 180, 227
Fishery 388, 390, 395
Hard herring 20
Harding, Captain King 186
Hard-tails, pickled 568
Harlow, George 223
Harper's island, North Carolina 495
Harpswell, Maine—
Canning industry of 79
Clam fishery of 79
Fisheries of 6, 78
Lobster fishery of 79
Menhaden fishery of 78
Harrington, Maine, fisheries of 26
Harrington river, Maine 26
Harwich, Massachusetts— Page.
Condition of fisheries in 1837 242
Mackerel fishery of 241
Mackerel fleet of, in 1851 116
Weir fishery of 241, 242
Harwich Port, Massachusetts 241
Hatchville, Massachusetts 252, 253
Hatteras inlet, North Carolina 497
Haul-seine fishery 316, 354, 388, 395, 463, 484
Haul-seines 10, 13, 22, 29, 46, 53, 66, 120, 132, 223, 224, 254, 258, 263, 275, 284, 314, 413, 414, 415, 417, 418, 460
Havana market 539, 544
Havens, W. S 354
Haverhill, Massachusetts 131
Ship-building at 134
Hawaiian islands, exports of fish to 207
Hawes, Jesse D 236
Hawk-billed turtle 491, 525
Hawkins Brothers & Co 353
Hawley, Wheeler 336
Haycock's harbor, Maine 20
Hay island, Connecticut 337
Hayti, exports of fish to 205, 206, 207, 218
Hazard's *State Papers* 720
Hedges for alewives 67
Hemilepidotus spinosus 612
Hemirhamphus unifasciatus 586
Hempstead bay, New York 347, 362, 372
Hempstead, New York 371
Heptranchias indicus 612
Hernando county, Florida 548
Herring—
As anchovies 11
As fertilizer 14
As sardines 11, 15, 17, 50
Canned 10, 14, 25, 50
Catch of, in Maine 9
Catch of, in Massachusetts 118
Catch of, in New Hampshire 109
Dried 309, 709
Early abundance at Salem 696
Exports of 167
Fisheries of the great lakes 635, 636, 637, 639, 640, 642, 643, 645, 647, 655, 657, 658, 659, 660, 663, 664, 665, 668
For bait 28, 57, 154, 156, 163, 179
For halibut bait 157
For lobster bait 40
Former abundance in Maine 82
Fresh 89, 119, 133, 138, 139, 183, 188, 193, 196, 225, 255, 259, 263, 376, 650
Frozen 12, 17, 18, 19, 155, 161, 162, 164, 176, 194
Gill-nets 99
Gut, Maine 55, 56
Hard 20
In San Francisco 618
Inspection of 86
Method of packing 99
Oil 18, 21, 26, 27, 90, 151, 628
Pickled 11, 13, 16, 17, 19, 22, 29, 33, 37, 42, 47, 54, 55, 67, 73, 77, 93, 94, 95, 106, 121, 133, 139, 167, 172, 173, 183, 187, 191, 192, 225
Pickled, exports of 168, 206
Pickled, imports of 207, 208, 209

Page.

Herring—Continued.
Pomace 18, 26
Salted 16, 618, 640, 656
Smoked 11, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 37, 38, 42, 47, 50, 54, 57, 65, 67, 70, 71, 77, 86, 87, 176, 191, 192, 309, 377, 615, 618, 627, 628
Smoked, exports of 167
Smoke-houses 15, 26, 33, 34, 56, 65, 71
Smoking 12, 20
Trade of Portland 91
Weirs 18, 20, 21, 25, 26, 33, 716
Herring fishery in—
Bay of Islands 170, 171
Connecticut river 319
Delaware 412, 413, 414
Grand Manan 170, 171
Labrador 684
Magdalen islands 16
Maine 12, 14, 15, 17, 19, 20, 23, 24, 25, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 42, 50, 51, 52, 56, 61, 65, 69, 71, 74, 84, 86, 92, 97, 99, 101, 102
Massachusetts ... 130, 134, 136, 142, 145, 161, 170, 172, 173, 174, 175, 176, 177, 186, 193, 196, 214, 238, 240, 252, 260, 268, 692, 720, 724, 735
Newfoundland 170, 171
New Hampshire 111, 112
New Jersey 390
North Carolina 478, 480, 481
Pacific coast 595, 596, 609, 612, 614, 626, 628, 629
Rhode Island 309
Virginia 456
Herring pond, Massachusetts 221, 727
Herring river 234, 729
Herrings, river 458, 459
Hetterick, J. P 481
Hewlett's, New York 373
Hickory shad 517
Hick's island, New York 353
Higgins & Payne 353
Higgins, R. R 201
Higgins, S. R 278
Higginson, John, cited 123
Highland Park, New Jersey 383
Hildreth, Captain George 396, 398
Hiller, L 30
Hillsboro' county, Florida 540
Hingham, Massachusetts 214
Cod fishery of, from 1765 to 1790 127
History of fisheries of 714
Mackerel fleet of, in 1851 116
Hippoglossoides elassodon 627
Hippoglossoides exilis 611
Hippoglossoides jordani 611
Hippoglossus vulgaris 626
Hodgdon, Captain Thomas 137
Hodgdon's island, Maine 69
Hogfish 454, 481, 483, 486, 487
Hog Island, Isles of Shoals 111
Hog Island, Maine 87
Hog Island, Virginia 462
Hog Neck, New York 351
Holbrook, Smith & Co 193

Page.

Holmes' *American Annals* 720
Holmes' Holl, Massachusetts 260, 732
History of 732
Holsteinberg, halibut fishery off 158
Holyoke, Massachusetts, shad fishery 115, 276, 319
Homosassa river 549
Hooks, fish, trade in 212
Hope island, Rhode Island 307
Hopkins' pond, Massachusetts 727
Horn harbor, Virginia 458
Horn island, Piscataqua river 109
Horsefeet 355, 367
Horse island, Massachusetts 234
Horse-mackerel 627
Horse-mackerel, or bluefish 357
Horseshoe crab 724, 725
Horseshoe shoal 248
Horton's Point, New York 351
Housatonic river, Connecticut 328, 332, 334
Houston, James H 569
Howard Brothers 456
Howell, D. Y 663
Hudson's Bay whale fishery 316, 317
Hueneme, California 598
Hull, England, imports from 137
Hull, Massachusetts 198
Early history of 713
Lobster fishery at 213
Mackerel fishery in 1671 714
Present condition of fisheries of 213
Humboldt county, California 622
Statistics of fisheries of 624
Humpback whales 724
Hump-sands, Merrimack river 134
Hungar's creek, Virginia 463
Hunter's point, Florida 542, 543
Huntington bay, New York 349
Huron city 659
Huron, lake Erie 666
Hyannis, Massachusetts—
Bluefish fishery of 247
Boat line-fishery of 247
Present condition of fisheries of 246, 247
Hypomesus pretiosus 627
Hypsurus caryi 604
Hypsypops rubicundus 596

I.

Ice for preserving fish 90, 120, 146, 147, 157, 158, 168, 209, 210, 376, 387
Imports—
Of fish, duties on 128
Of fish products 16, 137, 192, 207, 208, 209
Of fish products into Boston 207–209
India, imports from 137
Indian—
Fishermen 626, 628, 636
Fishing 283, 717, 736
Indian bay, Delaware 416, 417
Indian creek, Virginia 471
Indianola, Texas 584, 586, 587
Indian river, Connecticut 334
Indian river, Delaware 416, 417

Page.
Indian river, Florida 522
Description of 527
Extent of fisheries of 527
Green-turtle fisheries of 527
Indian river, Maine 25
Indian river, Virginia 460
Indian River bay, Delaware 410
Indian River inlet, Florida 516, 527
Indians, fishermen troubled with 123
Ingersoll, Ernest 106, 110, 181, 277, 281, 318, 322, 324, 325, 333, 399, 410, 442, 478
Inspection of—
Mackerel 68, 117, 152, 153, 154, 173
Pickled fish 86, 116, 123, 148
Insurance Company of Wellfleet 235
Insurance on fishing vessels 146, 176, 177, 242
Ipswich Bay fisheries 137, 141, 145, 162, 194, 680
Ipswich bay, Massachusetts 140
Ipswich, Massachusetts 115, 127, 131, 134, 136, 684, 686
Abundance of salmon at 685
Alewife fishery at 686
Clam industry of 136, 686
Cod fishery of, from 1765 to 1790 127
Cod fishery of, in 1641 685
Early fisheries of 685, 686
Early history of 684
Fish as fertilizer at 685
Fishery industries of 136
Fish-weirs at 685
Isinglass industry at 136
Loss of fishing vessels of 685
Salt-works at 685
Shad fishery at 686
Sperling fishery of 136
Ipswich river, Massachusetts 136
Irish—
Fishermen 146, 194, 220, 566, 642
Moss industry 121, 137, 139, 142, 188, 214, 216, 219, 220, 285, 301, 302
Oystermen 465
Isinglass 633, 639, 642, 657, 663, 665, 666
From fish-sounds 136, 142, 151, 685
Manufacture of 119, 137, 141, 142, 211, 213
Isle au Haut, Maine 41, 42
Isle of Wight bay, Delaware 418, 425
Isle of Wight county, Virginia 465
Isle Royale, lake Superior 635
Isles of Shoals 82, 105, 111, 677, 680
Condition of, in 1681 680
Description of 111
Effects of war at 681
Facilities for fishing at 680
Fish-curing at, in 1802 681
Fisheries of 111, 680
Government and religion of 680
Origin of the name 680
Trouble with Indians at 680
Islip, New York 365, 370
Italian—
Fishermen 604, 608, 609, 610, 615, 621, 626
Oystermen 580
Italy, exports to 124
Ives, George N 486
Ivory, walrus and whale 259, 264, 272

J.

Page.
Jack, fishery for 458, 459, 507, 528
Jacksonport, lake Michigan 646
Jacksonville, Florida 528
Fisheries of 529
Shad fishery of 529
Jacobs, Captain Solomon 152, 155
Jamaica bay, New York 373
Jamaica fish 105, 701
Jamesport, New York 351, 355
James River oysters 291, 456, 471
James river, Virginia 457
Jamestown, Rhode Island 286
Jamestown, Virginia 98
Jarnette, Daniel C. De 569
Jefferson county, Florida 553
Jefferson, President, on the fisheries 128
Jeffries' banks, fisheries on 102
Jenkins' island, New Hampshire 109
Jew-fish 548, 595, 600
Jiggers—
For carting fish 166
Style of vessel called 129
Jigging for mackerel 72
Jimmies 493
Job's cove, squid at 160, 161
John's bay, Maine 60, 61
John's river, Maine 60, 61
Jones, Captain Barney 471
Jones, J. Winslow 88
Jonesboro', Maine 23, 24
Jones' creek, Delaware 412, 413
Jonesport, Maine, fisheries of 24, 25, 86
Jordan, Professor D. S 585, 589
Jordan's river, Maine 31
Judith pond, Rhode Island 308
Jurels—
Pickled 568
Salted 564

K.

Kalmbach, M. F 644
Keating, Thomas J 436
Kelley's island, lake Erie 664
Kennebec, early fisheries at 720
Kennebec river, Maine 72, 73, 75
Kennebec salmon 194
Kennebunk district 92
Statistics of fisheries of 94
Kennebunk, Maine 99
Kennebunk Port, Maine 99
Kenosha, lake Michigan 648
Kent county, Rhode Island 303
Ketches, fishing 123, 698, 699, 700, 704
Kettle island, Massachusetts 143
Keweenaw point, lake Superior 636
Key West, Florida—
As a fishing station 537
Baiting up at 539
Boats in market fishery of 538
Fishery for Havana market 539
Fishing vessels of 537
Lay of the fishermen of 537

Key West, Florida—Continued. Page.
Products of fisheries of 539
Seines used at 538
Kickamuit river 277, 287, 291
King crabs 393, 397
Kingfish 268, 294, 369, 411
Kingston, Massachusetts 115, 127, 214, 717
King William county 465
Kits for packing fish 166
Kittery, Maine 102, 677, 678
Kitt's Hammock, Delaware 409, 412, 413
Kitty Hawk bay, North Carolina 481
Knight, George 184
Knight, H. V 24
Knowlton, Moses 140
Kumlien, Ludwig 281, 631
Kuppersmith, F 571

L.

Labrador—
Cod fishery ..16, 20, 21, 32, 33, 41, 43, 61, 65, 68, 69, 70, 71, 78, 83, 129, 130, 131, 134, 683, 684
Cod fishery, methods of 135
Exports of fish to 205, 206, 207
Fishery 49, 50
Herring fishery 134
Salmon 194
Whale fishery 229, 235
Lacosta island, Florida 540, 541
La Fayette county, Florida 553
Mullet fishery of 553
Lagodon rhomboides 529
Laguna Madre, Texas 586
La Have bank—
Cod fishery 194
Fishery 23, 172, 175
Haddock fishery 158
Lake Borgne 578
Lake Erie—
Fisheries of 659
Fisheries of southern shore of 664
Fisheries of western end of 660
Statistics of fisheries of 659
Lake George, Florida 528, 530
Lake Harney, Florida 528, 531
Lake Huron—
Fisheries of 657
Fisheries of the American shore of 657
Statistics of fisheries of 657
Lake Michigan—
Fisheries of 638–656
Fisheries of eastern shore of 650
Fisheries of western shore of 639
Statistics of fisheries of 638
Lake Monroe, Florida 528, 530
Lake Ontario—
Fisheries of 672, 673
Fisheries of the American shore of 672
Statistics of fisheries of 672
Lake Peliot, Louisiana 579
Lake pike, fresh 193
Lake Saint Clair 659
Lake Superior—
Fisheries of 634–638
Fisheries of northwestern shore of 634
Lake Superior—Continued. Page.
Fisheries of southern shore of 635
Statistics of fisheries of 634
Lake's bay, New Jersey 399
Lamoine, Maine, fisheries of 31, 32
Lamphier & Haff 489
Lamprey river, New Hampshire 106, 107
Lancaster county, Virginia 460, 465
Lane, William N 363
Lanesville, Massachusetts, bake fishery at 143, 162
L'Anse, lake Superior 636
La Salle & Day 366
Lavoo & McGraw 667
Lawrence, John 364
Lawrence, New York 373
Laws—
Lobster 214
Relating to clam industry 198
Relating to eel fishery 222
Lawyers 637, 648
Lay, fishermen's 235, 567, 571, 584
Leache's island, New Hampshire 109
Leather from cusk-skins 150
Lebanon, Delaware 412
Leechford's *Plain Dealing* cited 122
Leghorn, exports of fish to 129, 217
Lennox, W. P 71
Leopard sharks 547
Lepidopsetta bilinearis 627
Lepidopsetta bilineata 628
Lepidosteris osseus 484
Leptocottus armatus 612
Leslie, C. C 509
Lewis & Newhall's *History of Lynn* 709
Lewis bay, Massachusetts 247
Lewis, Captain Isaac 484
Lewis, Captain Joshua 491
Lewes, Delaware 413, 415
Lexington, Michigan 659
Libby river, Maine, clam-flats in 96
Liberia, exports of fish to 205
Licenses for oystering 436
Limulus polyphemus 355, 367, 397
Lincoln, Maine 63
Lines, fishing, manufacture of 140
Liostomus xanthurus ..395, 410, 414, 454, 462, 481, 486, 493, 586
Little bay, Massachusetts 250
Little Bay, New Hampshire, oyster fishery 106
Little bay, Virginia 460
Little Choptank river, Maryland 442
Little Compton, Rhode Island 286, 294, 296
Little Creek landing, Delaware 410
Little Deer isle, Maine 40
Little Egg Harbor, New Jersey 393, 398
Little Horn island, Piscataqua river 109
Little Kennebec river, Maine 23
Little Machias bay, Maine, herring-weirs at 23
Little Neck—
Clams 346
Clams, canned 370
Little Neck bay 346
Little Neck, New York 346
Little Point Sable, lake Michigan 653
Little river, Maine, herring fishery at 23
Little Sandy, fishermen of 672

Page.
Little Snamico, lake Michigan 641
Live-fish cars 317
Liverpool, England—
Imports from 137
Salt 44, 168, 169, 210, 234
Salt for curing mullet 559
Salt, importation of 36
Lobster—
Bait 26, 40, 141
Boats 58
Boiling 198
Canneries ..9, 24, 25, 26, 27, 28, 31, 32, 34, 36, 38, 41, 42, 43, 44, 49, 51, 52, 69, 78, 79, 81, 197
Industry of Boston 198
Laws 79, 214
Market, Portland 88
Nets 101
Peddlers 148
Pots 10, 13, 22, 24, 29, 37, 41, 46, 53, 66, 77, 93, 94, 95, 98, 108, 110, 138, 141, 178, 180, 183, 254, 258, 263, 275, 284, 314
Smacks 58, 79, 88
Trade 18, 58, 87
Trade, vessels in 31
Traps 120, 223, 224, 233
Lobster fishery—
Summary, statistics of, in Maine 9, 10
Summary, statistics of, in Massachusetts ..118, 120
Vessels in 10, 13, 22, 29, 37, 46, 53, 77, 120, 183, 187, 263, 284, 314
Lobster fishery at Long Island, New York...351, 357, 358 359, 360, 361, 362, 376
Lobster fishery in—
Barnstable district 223, 227, 229, 231, 232, 239, 240, 241, 245, 246, 248, 253
Bath district 74, 76
Belfast district 45, 46, 47, 48, 49, 51
Boston district 187, 189, 213, 214, 712
Castine district 36, 37, 38, 39, 41, 43
Connecticut 313, 316, 317, 320
Delaware 415
Frenchman's Bay district 28, 29, 31, 33, 34
Gloucester district 137, 141, 143, 165, 177
Machias district 21, 22, 23, 24, 25, 26, 27
Marblehead district 183, 185, 186
Martha's Vineyard 260, 261, 262
Nantucket district 255, 256
New Bedford district 263, 267, 269, 272, 273, 733
New Hampshire 108, 111, 112
New Jersey 388, 391
Passamaquoddy district 13, 14, 15
Plymouth district 215, 219, 222, 223, 733
Portland and Falmouth district 77, 79, 87
Rhode Island...284, 296, 298, 299, 301, 303, 307, 308
Saco, Kennebunk, and York districts....92, 97, 98, 99, 100, 101, 102
Salem and Beverly district 180, 181
Waldoboro' district 52, 53, 56, 57, 58, 60, 61
Wiscasset district 67, 68, 69, 70, 71
Lobstermen, wages of 24
Lobsters—
Early abundance at Salem 696
For bait 262, 269
Lobsters—Continued. Page.
Fresh, in Maine 11, 14, 22, 30, 37, 47, 54, 67, 73, 77, 93, 94, 95
In Massachusetts ..121, 139, 172, 179, 183, 186, 188, 190, 197, 216, 220, 221, 223, 225, 255, 259, 263, 708, 709, 724, 735
Legal length of marketable 87
Live, method of packing 88
Soft-shelled, for canning 88
Lobsters, canned—
Export of 89
In Maine 11, 14, 22, 24, 25, 30, 31, 36, 37, 47, 49, 51, 54, 67, 77, 79, 81, 88
In Massachusetts 197
Origin of, in the United States 17
Lobsters, catch of, in—
Connecticut 314, 316, 317
Delaware 411
Maine 9, 11
Massachusetts 121
New Hampshire 109
New Jersey 382, 385
New York 344
Rhode Island 284, 285, 302, 304
Lobsterville, Massachusetts 261
Locust Point, Ohio 662, 663, 664
Locust Valley, New York 348
Loggerhead turtle 491, 525
Lombard's cove, Massachusetts 260
Lompoc, California 600
Londonners, Isles of Shoals 111
Long Branch, New Jersey 387, 388
Long Island Fish Company 352
Long Island, New York—
Description of 344
Eastern end of 351
North shore of 345
South shore of 362
West end of 373
Long island, South Carolina 508
Long Point beach, New York 353
Long Pond, Massachusetts 221, 267, 727
Loraine 667
Loring, George 244
Los Angeles county, California 595, 596
Statistics of fisheries of 599
Los Angeles river, California 598
Los Pueblos, California 600
Losses of life and property in Gloucester fisheries. 176
Loud's island, Maine 61
Loud's Island oil-works 62
Louisiana—
Crab fishery of 577
Crawfish fishery of 577
Fisheries 575
Fishing apparatus at 576
Oyster culture in 580
Oyster industry of 578
Oytermen of 580
Shrimp fishery of 576
Statistics of fisheries of 575
Turtle fishery of 577
Lovell, Captain Benjamin 245, 246
Lovett, John, & Co 87

Page.
Lower New York bay 383
Lowery, J 414
Lubec, Maine—
Fisheries of 19
Smoked-herring industry at 12
Luce Brothers 318
Ludington, lake Michigan 652
Lutjanus Blackfordii 507
Lycodopsis paucidens 612
Lynde's point, Connecticut 319
Lynn Haven bay, Virginia 453, 454
Lynn Haven river, Virginia 454
Lynn, Massachusetts—
Early history of 709
Fisheries of 115, 116, 182, 185, 186
Pearls found at 710

M.

McDermott, Captain James 359
McDonald, Captain Jerome 157
McDonald, Colonel Marshall 427, 449, 481, 495, 502, 506, 517
McEwan, Thomas 87
McMenamin & Co 456
McQuinn, Captain John S 158
Machias bay, Maine 23
Machias district, Maine—
Fisheries of 21
Review of fisheries of 21
Statistics of fisheries of 21
Machias, Maine, fisheries of 23
Machiasport, Maine, fisheries of 23
Machias river, Maine 23
Mackerel—
Broiled 50
Canned 10, 11, 14, 25, 30, 34, 37, 44, 47, 49, 50, 51, 54, 56, 67, 77, 79, 81, 88, 118, 188, 197, 198
Cannery 69, 79, 81
Dragging 58, 61, 63, 64
Early abundance of, in Massachusetts 708, 724, 731, 735
Exports of 167
Fresh 119, 138, 147, 152, 172, 178, 183, 188, 193, 196, 197, 215, 225, 243, 259, 263, 284, 314, 376
For bait 154, 163
Frozen 197
Gill-net fishery 101, 134, 135, 227, 228, 232, 234, 239, 240, 463
Hand-line fishery 101
Haul-seines 57
Inspection of pickled 68, 86, 234
Jigging 72
Packing at Portland 86
Pickled 11, 17, 22, 29, 37, 47, 54, 67, 73, 77, 93, 94, 95, 106, 117, 121, 130, 131, 133, 139, 146, 149, 152, 154, 167, 172, 173, 176, 179, 183, 186, 188, 192, 225, 226, 243, 314, 692, 702, 707, 715, 727, 729
Pickled, canned 198
Pickled, exports of 206
Pickled, methods of packing 149
Purse-seines 57
Salt for curing 210
Seining prohibited 722
Mackerel—Continued. Page.
Smoked 377
Steamer 54
Taken in weirs 38
Trade in fresh 89
Trade of Portland 91
Mackerel, catch of, in—
Connecticut 314, 316, 317
Maine 9
Massachusetts 118
New Hampshire 109
Rhode Island 284
Mackerel fishery—
Regulated 704
Statistics for 1851 116
Vessels in 152
Mackerel fishery at—
Martha's Vineyard, Massachusetts 260
Nantucket, Massachusetts 256
Mackerel fishery in—
Barnstable district 226, 227, 231, 233, 234, 240, 241, 242, 243, 245, 246, 247, 249, 725, 726, 727, 728, 729, 730
Belfast district 47, 48, 49, 51, 52
Boston district 193, 195, 196, 214, 713, 714, 715
Castine district 38, 39, 40, 41, 43, 44, 45
Connecticut 116, 317
Fall River district 276
Frenchman's Bay district 31, 34, 35
Gloucester district 141, 142, 145, 146, 152, 153, 154, 162, 163, 164, 171, 172, 173, 174, 175, 691, 692
Gulf of Saint Lawrence 38
Machias district 24, 25, 26, 27
Maine in 1851 116
Marblehead district 184, 185, 186, 707
Maryland in 1851 116
Massachusetts, general review of 115, 116, 130, 131
New Bedford district 272
Newburyport district 134, 135, 683, 684
New Hampshire 108, 109, 111, 112, 116
Passamaquoddy district 16
Plymouth district 214, 219, 223, 716, 717, 721, 723
Portland district 80, 83, 84, 85
Rhode Island 116, 294, 297, 298, 309
Saco, Kennebunk, and York districts 97, 99, 101, 102
Salem and Beverly district 180, 702
Waldoboro' district 54, 55, 56, 58, 60, 61, 63, 64, 65
Wiscasset district 68, 70, 71
Mackerel fishing by moonlight 716
Mackinaw boats 635, 650, 655
Maddocks, Luther 61
Madeira, exports of fish to 205, 206, 207, 217, 682
Madison, Connecticut—
Menhaden industry of 322
Oyster industry of 322
Magdalen Islands herring fishery 16, 23, 28, 32, 33, 42, 43, 49, 50, 69, 71, 173
Magnolia, Delaware 412
Magnolia, Massachusetts 143
Mahon's ditch, Delaware 410
Maine—
Cod fishery of, from 1765 to 1790 127
Early history of 678

Maine—Continued. Page.
Extent of coast-line of 8
Fisheries of 7-102
Fishermen of 8, 9
Lobster fisheries of 9
Location and early settlement of 7
Mackerel fleet of, in 1851 116
Oil & Guano Association 61
Origin and growth of the fisheries of 8
Physical characteristics of the coast of 7
Present condition of the sea fisheries of 8
River fisheries of 9, 10
Sardine industry of 10
Statistics of fisheries of 7, 8, 9, 10, 11
Malaga island, Isles of Shoals 111
Malden river, Massachusetts, oyster-beds in 201
Maltby & Co., O. E 456, 457
Maltby & Edwards 484
Maltby, C. S 443
Manatee county, Florida 540
Manchester, Massachusetts, fisheries of 115, 116, 127, 164, 177
Manistee, lake Michigan 652
Manitowoc, lake Michigan 646
Mannasquan, New Jersey 387
Manure, fish for 139, 695, 718
Maracaibo, South America, imports from 137
Marblehead district, statistics of fisheries of 182
Marblehead, lake Erie 664
Marblehead, Massachusetts 115, 688
Cod fishery of 127, 707
Duties of fishermen of 704
Emigrations to Maine from 124
Fisheries of, from 1715 to 1790 704
Fisheries of, from 1815 to 1821 706
Fishery regulations at 704
Fishery statistics for 1856 707
From 1860 to 1865 707
George's cod fishery in 1747 705
History of, 1629 to 1647 702
Mackerel fleet of, in 1851 116
Naval protection for fisheries of 704
Present condition of fisheries of 184
Shell-heaps at 707
Whale fishery of 705
Marennes, France, oyster culture 472
Marennes oysters 278
Marin county, California 619
Statistics of fisheries of 624
Marine—
Railway 69, 145
Salt 259, 264, 594
Salt manufacture 127, 264, 273
Marion county, Florida 548
Marion, Massachusetts—
Fisheries of 265
History of 734
Oyster industry of 265
Whaling fleet of 115
Marquette, lake Superior 637
Marseilles, France, fish exports to 129
Marshall's, California 619
Marston's Mills, Massachusetts 248
Martha's Vineyard, Massachusetts 115
Fisheries of 258, 259
Martha's Vineyard, Massachusetts—Continued. Page.
History of 732
Mackerel fleet of, in 1851 116
Martin, Captain Charles, on squidding at Newfoundland 161
Martinique, fish exports to 167
Maryland—
Alewife fishery of 423, 427
Boats, oyster dredging in 436
Capital invested in oyster trade of 448
Clam fishery of 429
Crab fisheries of 428
Eel fishery of 428
Fisheries of 421-448
Fisheries of bay shore of 426
Fisheries of ocean shore of 425
Mackerel fleet of, in 1851 116
Menhaden fishery of 428
Oyster dredging in 431
Oyster interests of 423, 429
Oyster packing in 443
Oyster runners in 440
Oyster scraping and tonging in 437
Oyster shipments in shell from 441
Oyster trade of 430
Principal fishing centers of 427
Shad fishery of 423, 427
Sheepshead fishery of 427
Spanish mackerel fishery of 427
Maryland, statistics of—
Fisheries of 423
Oyster-boats in 437, 439, 441
Oyster-packing in 445
Persons in oyster trade of 447, 448
Salt-water fisheries of 424
Tailor fishery of 427
Terrapin fishery of 429
Mason's bay, Maine 21, 24
Massachusetts—
Cod fishery of, from 1765 to 1790 127
Cod fishery of, in 1741 124
Districts defined 115
Fisheries, general review of 115-121
Fisheries, history of 121, 126, 127, 129, 130, 682-735
Mackerel fleet in 1851 116
Statistics of fisheries of, for 1859 131
Statistics of fisheries of, for 1879 117-121
Massachusetts bay 115
Massachusetts Bay Company 102
Mastic, New York 364
Matagorda bay, Texas 584
Matamoros, Texas 586
Matanzas market 544
Matanzas river, Florida 525
Mather, Fred 311, 341, 382
Mathews county, Virginia 457, 465
Pound-net fisheries of 458
Maticut 258
Matinicus, fishery off 164
Matinicus islands, Maine—
Fisheries of 52, 55, 56
Herring fishery of 56
Vessel and boat fisheries of 57
Mattapoisett, Massachusetts 266, 734
Matthews, G. H 59

Page.
Mattinicock point, New York 348
Mattituck, New York 351, 355, 361
Maumee river 662
Maurice cove, New Jersey 399
Maybury & Co., J. F 571
Mayfield, California 606
Mayport, Florida, fisheries of 528
Medford, Massachusetts—
Fisheries of 213, 710
Fish trade of 712
Media-luna 596, 597
Medicinal cod-liver oil 110
Method of manufacture 150
Medicine oil 172
Medomak river, Maine 58, 59, 60
Meduncook, Maine 58
Melanogrammus æglefinus 15
Melanson, Captain James 159
Melonville, Florida 530
Melton & Tait 529
Menanah island, Maine 63
Mendocino county, California, statistics of fisheries of 624
Menekaunee, lake Michigan 640
Menemsha bight 260
Menhaden—
At Ocklockonee bay, Florida 556
Bait fishery 159
Canned 370
Carry-away 79
Chum 220
Compost 343, 381
For bait 78, 118, 119, 154, 235, 261, 370
For mackerel-bait 152
Fresh 133, 259, 263, 276
Guano 53, 61, 65, 69, 118, 276, 324, 353, 354, 383, 398, 458, 460, 461
Manure 345
Nets 357
Oil 28, 31, 35, 39, 53, 61, 65, 69, 90, 118, 151, 276, 283, 285, 297, 314, 315, 318, 324, 343, 353, 354, 369, 381, 383, 418, 428, 458, 460, 461
Oil and guano factories 52, 61, 62, 65, 68, 69, 77, 322, 332, 353, 368, 398, 418, 428, 457, 461, 463, 495
Purse-seine 159
Salted, for bait 79
Scrap 285, 297, 314, 343, 353, 354, 360, 369, 381, 418, 428
Slivers 159
Steamers 52, 61, 69, 99
Try-works 28
Vessels 10, 53, 66, 77, 120, 138, 159, 187, 263, 275, 284, 314, 451
Menhaden, catch of, in—
Connecticut 316
Delaware 411
Maryland 424
Massachusetts 118, 188, 225, 259, 263, 268
New Jersey 382
New York 344, 363
Rhode Island 285
Virginia 452
Menhaden fishery in—
Connecticut 313, 315, 316, 317, 319, 324
Menhaden fishery in—Continued. Page.
Delaware 417, 418
Maine 10, 28, 30, 31, 38, 52, 53, 55, 65, 78, 101, 102
Maryland 428
Massachusetts 115, 117, 120, 135, 138, 141, 159, 186, 189, 232, 240, 247, 248, 252, 253, 260, 262, 263, 265, 267, 270, 271, 272, 273, 274, 275, 276
New Jersey 381, 383, 398
New York 343, 345, 346, 348, 349, 351, 353, 354, 355, 357, 358, 360, 367, 370, 371
North Carolina 495
Rhode Island 296, 297, 306, 307, 309
South Carolina 509
Virginia 451, 454, 456, 458, 460, 461, 463
Menhaden industry of—
Connecticut, statistics of 313
Maine 52, 61, 69
Sandy Hook bay 383
Menominee, Michigan 640
Menticirrus alburnus 486, 502, 508, 529, 586
Menticirrus littoralis 585, 586
Menticirrus nebulosus 369
Merhead fishery 462
Merluch' 627
Merrick, New York 372
Merrimack river 131, 134, 677, 682
Merryconeag 78
Merwin, William H 333
Metedeconk neck, New Jersey 390
Metinic, Maine 63
Mianus, Connecticut 339
Michigan city, Indiana 650
Microgadus proximus 612
Micropogon undulatus 493, 502, 525, 529, 586
Micropterus pallidus 484, 516, 529
Middle bank, haddock fishery on 164
Middlesex county, Virginia 460, 465
Middle sound, North Carolina 494
Middletown, Rhode Island 286
Midgett, William 482
Miles grove, Ohio 670
Milford, Connecticut 328
Menhaden industry of 332
Oyster industry of 333
Milford, Delaware 413, 414
Milford Haven, Virginia 458
Milford Point, Connecticut 333
Milk island, cape Ann, trap fishery 142, 164, 165
Millbridge, Maine, fisheries of 25, 26
Mills, W. D 332
Millsboro', Delaware 410, 416
Milner, James 647
Milton, Delaware 413, 414
Milwaukee, Wisconsin, fisheries of 647
Minced fish 190
Miner, N. P 323
Miquelon, exports of fish to 206
Misery island, Massachusetts 698
Misham Point, Massachusetts 273
Mispillion creek, Delaware 414
Mississippi—
Care of fish at 575
Fishermen of 574
Fishing methods of 574

Mississippi—Continued. Page.
Oyster fisheries of 575
Statistics of fisheries of 574
Mississippi City, Mississippi 575
Mississippi sound 576
Mitchell falls, Massachusetts 132
Moahiggan, Maine 62
Mobile, Alabama—
Care of fish at 570
Fisheries of 569
Inside-water fisheries of 570
Oyster business of 571
Statistics of fisheries of 574
Möbius, Professor 434
Mobjack bay, Virginia 457, 458, 459, 571
Monhegan, Maine 52
Early fisheries at 685
Monhegan island, Maine 7, 58
Boat fisheries of 64
Review of fisheries of 62
Monmouth, New Jersey 388
Monomoy flats, Massachusetts 240
Monomoy island, Massachusetts 240
Monomoy weir-fishery 243
Monroe county, Florida 540
Monroe, lake Erie 662
Montauk Point, New York 315, 352, 354, 360
Monterey county, California 603
Statistics of fisheries of 607
Monterey Whaling Company 604
Monument, Massachusetts 249
Monument river, Massachusetts 250
Monument River oysters 202, 252
Moonfish 539, 586
Moore's island, Maine 109
Moore's point, lake Erie 664
Moose-a-bec reach, Maine 24
Moose island, Maine 15
Moratico creek, Virginia 460
Morehead, North Carolina 477
Morehead City, North Carolina 485, 486, 489
Moriches bay, New York 357, 362, 364
Moriches station, New York 365
Mosquito inlet, Florida 526
Mosquito lagoon, Florida 526
Moss Landing, California 604
Mount Desert island, Maine—
Boat fisheries of 34
General description of 33
Jesuit mission at 7
Lobster industry of 34
Vessel fisheries of 33
Mount Desert, Maine—
Glaciers at 7
Herring fishery of 28
Mount Hope bay, Massachusetts 276
Mount Hope bay, Rhode Island 287
Mount Misery point, New York 350
Mount Sinai, New York 351
Mouse island, lake Erie 664
Muckilteo, Washington territory 628
Mud creek, Virginia 460
Mud pike 364
Mugil albula 486, 493, 502, 511, 525, 528, 529, 586
Mugil braziliensis 486, 493, 502, 511, 525, 528, 529
Mullet— Page.
Curing 542, 544, 545, 546, 561
For bait 585
Fresh 477, 486, 559, 562
Gill-net fishery 551
In Savannah market 518
Packing 547
Pickled 545, 546, 562, 568
Roes 494, 495, 561
Roes, curing of 544
Roes, dried 526, 541, 544
Sea 486
Salted 487, 526, 541, 552, 553, 559, 564, 565
Striped, at Fairhaven, Massachusetts 268
Mullet, catch of, in—
Alabama 569
Delaware 411
Eastern Florida 523, 524
Georgia 515
Gulf states 536
Louisiana 576
Maryland 424
Mississippi 574
North Carolina 478, 479, 480
San Diego county, California 595
South Carolina 505
Texas 582
Virginia 452, 453
Western Florida 537
Mullet fishery at Long Island, New York 360
Mullet fishery in—
Alabama 570, 574
Eastern Florida 522, 525, 526, 528, 529, 530
Gulf of Mexico 535
Maryland 425
North Carolina 478, 481, 482, 483, 484, 485, 486, 487, 488, 492, 493
San Diego county, California 595, 596
South Carolina 502, 506, 508, 511
Texas 584, 586
Virginia 462
Western Florida 541, 543, 546, 547, 548, 549, 550, 553, 554, 555, 557, 558, 559, 564, 567
Mullica river, New Jersey 398
Mullin, Nelson 51
Murderkill creek, Delaware 413
Murre eggs 614
Muscongus island, Maine, fisheries of 61
Muscongus sound, Maine 60
Muskeget island, Massachusetts 254
Musquito creek, Virginia 460
Mussel fishery on Long Island, New York 351, 362, 367, 371, 373
Mussel ridges, Maine 55
Mussel Ridges lobster-grounds, Maine 56
Mussels—
Catch of, on Long Island, New York 345, 362, 367, 374
Early abundance of 709, 710, 724, 735
For food 373
For manure 371
In Boston fish market 199
In New Jersey 383
On Pacific coast 594, 599, 607

Page.
Mussels—Continued.
Pearls found in, at Lynn, Massachusetts.... 710
Uses of.... 386
Mustelus canis.... 612
Mya arenaria....24, 89, 726
Myliobatis californicus.... 612
Mystic, Connecticut—
General fisheries of.... 315
Menhaden industry of.... 315
Mystic river, Connecticut.... 316
Mystic river, Massachusetts—
Bass fishery in.... 712
Lobster fishery in.... 712
Oyster fishery in.... 712
Shad and alewife fisheries of.... 710

N.

Nahant, Massachusetts....115, 198, 709
Nannaquacket pond, Rhode Island.... 297
Nannie's island, New Hampshire.... 107
Nansemond county, Virginia.... 465
Nantasket, Massachusetts.... 213
Nanticoke river.... 442
Nantucket district—
Review of.... 254
Statistics of fisheries of.... 254
Nantucket, Massachusetts—
Fisheries of....127, 131, 254, 255, 256
Former importance of whale-fishery of.... 257
Mackerel fleet of, in 1851.... 116
Whaling fleet of, in 1846.... 115
Nantucket Shoal cod fishery.... 242
Napeague bay, New York.... 358
Napeague beach, New York.... 352
Napeague, New York....357, 360
Napes, halibut.... 172
Naples, fish exports to.... 129
Napoleon, seizure of fish by.... 128
Narragansett bay....283, 305
Narragansett Bay oyster-beds.... 199
Narragansett Indians.... 302
Narragansett Pier, Rhode Island.... 308
Narraguagus river, Maine.... 26
Nashawena island, Massachusetts.... 261
Nashua river.... 131
Natica clausa.... 85
Naushon island, Massachusetts.... 261
Neah bay, Washington territory.... 629
Needle-fish.... 586
Negro—
Fishermen....504, 566, 627
Oystermen....464, 466
Negro island, Maine.... 97
Net-making.... 145
Nets, manufacture of.... 213
Neuse river, North Carolina....478, 484
Neutral island, Maine, colony at.... 7
Nevassa Oil & Guano Company.... 496
Newark bay, New Jersey....372, 384
Newark Bay oysters in Boston.... 199
New Bedford district—
Defined.... 115
Review of.... 262
Statistics of fisheries of.... 262

Page.
New Bedford, Massachusetts.... 131
Description of.... 270
Eel fishery of.... 271
Extent of fisheries.... 119
Fisheries in 1870.... 735
Food-fish fishery of.... 271
In 1792.... 735
Menhaden fishery of.... 270
Original settlers of.... 734
Oyster industry of.... 272
Scallop fishery of.... 271
Whale fishery of.... 270
Whaling fleet of, in 1846 and in 1880.... 115
New Berlin, Florida, fisheries of.... 528
New Berne, North Carolina.... 477
Fish trade of.... 485
Shad fishery of.... 484
New Brunswick, frozen-herring trade with ..155, 161, 162
New Buffalo, Michigan.... 650
Newbury Massachusetts—
Early history of.... 682
Ship-building at.... 134
Newburyport district.... 113
Review of fisheries of.... 131
Statistics of fisheries of.... 132
Newburyport, Massachusetts—
Cod-fishery of....127, 134, 135
Early history of.... 682
Fisheries of....115, 131, 133, 682, 683, 684
Fur-seal fishery of.... 683
Labrador cod-fishery from....135, 683, 684
Mackerel fishery of....116, 134, 683
Ship-building at.... 134
Whale fishery of.... 683
New Castle, Maine, fisheries of.... 67
New Castle, New Hampshire, fisheries of 111, 678, 679
New Dorp, New York.... 376
New Dungeness, Washington territory.... 629
New England, historical references to fisheries of.675–737
Newfoundland—
Exports of fish to....205, 206, 207
Fishery.... 172
Frozen-herring trade with....145, 155, 161
Halibut fishery at.... 157
Herring fishery....170, 171, 173, 174
Imports from....207, 208, 209
Squid fishery....160, 180
New Hampshire—
Condition of fisheries of, in 1791.... 678
Early history of fisheries of....677–682
Fisheries of, from 1867 to 1879....103, 105
Mackerel fleet of, in 1851.... 116
Oyster industry of.... 106
Statistics of fisheries of.... 108
New Harbor, Maine....58, 59, 62
New Haven, Connecticut....313, 315
General fisheries of.... 324
Oyster industry of....325–332
New inlet, New Jersey.... 398
New Jersey—
Crabbing interests of.... 391
Crab fishery of.... 381
Fisheries of....379–400

New Jersey—Continued. Page.
Mackerel fishery off 152
Menhaden industry of 381
Oyster industry of 381
Quahaug fishery of 381
Review of the fisheries of 381
River fisheries of 381
Shores of New York bay 382
Statistics of fisheries of 381
New Jersey, northern—
As a fishing district 386
Clam fishery 392
Coast fisheries of 384
Cod fishery of 390
Description of fisheries of 388
Geography of 385
Gill-net fishery of 389
Hand-line fishery of 390
Lobster fishery of 391
Pound-net fishery of 389
Quahaug fishery 392
Seine fishery of 390
Statistics of fisheries of 385
Still-baiting at 388
Trolling for bluefish at 388
New Jersey, southern—
Bluefish fishery of 397
Clamming interests of 398
Cod fishermen of 396
Cod-fishing grounds of 396
Crab fisheries of 399
Eel fishery of 396
Fishery interests of 392
Fishing centers of 394
Geography of 393
Gill-net fishery of 397
Hand-line fishery of 395
Menhaden fishery of 398
Oyster industry of 399
Pleasure-fishing at 395
Pound-net fishery of 397
Rock fishery of 398
Statistics of fisheries of 393
Terrapin fishery of 399
Winter cod fishery of 396
New London, Connecticut 313
Description of 316
Fresh-fish business of 317
Halibut fishery of 317
Lobster fishery of 317
Menhaden fishery of 317
Oyster industry of 318
Vessel-fisheries of 317
Whale fishery of 316
Whaling fleet of 115
New Market, New Hampshire, fisheries of 111
New Orleans, Louisiana—
Fisheries of 576
Fish market of 577
Oyster marts of 581
Oyster shipments from 581
Oyster trade of 578
Statistics of fisheries of 582
New Point, Virginia 456, 457, 458, 459
Newport, California 597

Page.
Newport, Rhode Island 283, 286
Boat-fisheries of 298
Trap-fisheries of 298
Vessel-fisheries of 299
New Shoreham, Rhode Island 286, 302
New Suffolk, New York 356
New Tacoma, Washington territory 626
New Utrecht, New York 375
New York—
Oysters shipped to 442, 468
Review of fishery interests of 343
Statistics of fisheries of 343
Whale fishery from 115
New York and its fisheries 341–377
New York bay, New Jersey shores of 382
New York bay, New York 373
New York city—
Fish-curing at 377
Fishery interests of 376
Market for fresh fish 197
New York harbor 374, 375
Niantic, Connecticut 358
Menhaden industry of 318
Niantic river, Connecticut 318
Nine-Mile Fishing Company 248
Nissequague river, New York 350
Noank, Connecticut 313, 315, 316
Nobleboro', Maine, fisheries 65
Nobscusset Fish Weir Company 243
No Man's Land, Mass., and its fisheries 115, 258, 260, 261
Nonamesset island, Massachusetts 733
Nonesuch river, Maine, clam flats in 96
Nonguit pond, Rhode Island 296
Norfolk county, Virginia 453, 454, 465
Norfolk, Virginia 455, 467
Oyster-packing industry 466
Oysters 204
Oysters at Boston 201, 202
Oysters at Salem, Massachusetts 180
Norman's Woe, Massachusetts 143, 164
North American Oil Company 235
Northampton county, Virginia 461, 465
North Booth bay, Maine 66, 68, 69
North Carolina—
Alewife fisheries of 478
Fisheries of 475–497
Geography of the coast of 477
History of menhaden fishery of 495
Mullet fisheries of 478
Oyster industry of 478
Review of fisheries of 477
Shad fisheries of 478
Statistics of commercial fisheries of 478
Statistics of sea fisheries of 479
Winter bluefish fishery of 496
North Chatham, Massachusetts 240
North Dennis, Massachusetts 243
North Eastham, Massachusetts 238
North Falmouth, Massachusetts 252, 253
North Harwich, Massachusetts 241
North Haven, Maine, fisheries of 45, 50, 51
North Kingston, Rhode Island 286
North Perry, Maine, fisheries of 15
Northport, lake Michigan 654

Page.
Northport, Maine, fisheries of 49
Northport, New York 349
North Truro, Massachusetts, fisheries of 232
Northumberland county, Virginia 460, 465
Northwest, New York 353
Norwalk, Connecticut 332
Oysters 203
Oyster vessels 335
Norwalk river, Connecticut 337
Norway, exports of fish to 205, 206
Norwegian fishermen 640, 642, 643
Norwich River oysters 318
Notorhynchus maculatus 623
Nova Scotia—
Canneries at 197
Exports of fish to 205, 218
Transferred to Massachusetts colony 7
Nubble light, Maine 101

O.

Oak Bluffs, Massachusetts 260
Oakdale, New York 369
Oakland, California 619
Ocean City, Maryland 425
Ocean Grove, Maryland 425
Ocean Springs, Mississippi 575
Ocean View, Delaware 417, 418
Oceanville, New Jersey 396
Ocilla river, Florida 553, 554
Ocklawaha river 529
Ocklockonee bay, Florida 553, 554
Disposition of catch at 558
Fisheries of 556
Fishermen of 557
Fishing apparatus at 558
Gill-net fishing at 557
Seine fishing at 558
Oconto, lake Michigan 641
Ocracoke inlet, North Carolina 484
Odiorne's point, New Hampshire 110, 677
Ogeechee river, Georgia 502, 514
Ogunquit harbor, Maine 100
Oil & Guano Association, Maine 61
Oil—
Blackfish 121, 151, 713
Clothing for fishermen 212
Cod 145, 150, 285, 679, 692, 708
Dogfish 150, 172, 233
Haddock-liver 150
Hake 150, 172
Halibut-head 147, 150, 151
Herring 18, 21, 26, 27, 90, 151, 628
Medicine 172
Pollock-liver 150
Porgy 172
Sea-elephant 314
Seal 592, 594, 602, 626, 630
Shark 150, 151, 547, 594, 597, 598, 599, 605, 607, 623, 624
Sperm 116, 121, 187, 189, 226, 229, 259, 264, 269, 270, 272, 315, 316, 713, 724
Spermaceti 130
Walrus 121
Oil—Continued. Page.
Whale 30, 116, 121, 130, 139, 151, 226, 230, 257, 259, 264, 269, 270, 272, 314, 315, 316, 518, 592, 593, 594, 602, 607, 699
Whale, production of, in 1880 116
Oil, fish—
Imports of 207, 208, 209
In Washington territory 630
Manufacture of 569
On Pacific coast 592
Statistics of, for great lakes ..633, 639, 657, 663, 665
Statistics of, in Maine 11, 14, 22, 37, 47, 54, 67, 73, 78, 90, 93, 94, 95
Statistics of, in Massachusetts 120, 121, 129, 130, 131, 133, 134, 139, 150, 151, 170, 172, 173, 174, 176, 179, 180, 183, 188, 216, 226, 255, 259, 264, 276, 694, 702, 707
Statistics of, in New Hampshire 106, 109, 110
Statistics of, in Oregon 625
Statistics of, in Rhode Island 284, 302
Oil, menhaden, factory 61
Oil, menhaden, in—
Connecticut 314, 324
Delaware 418
Maine 28, 31, 35, 38, 39, 53, 65, 69, 90
Maryland 428
Massachusetts 118, 151, 276
New Jersey 381, 383
New York 343, 353, 354, 369
Rhode Island 283, 285, 297
Virginia 458, 460, 461
Oil-works 230
At Loud's island, Maine 62
Okhotsk Sea cod fishery 593
Old Field point, New York 350
Old Greenwich, Connecticut 339
Old Man's pasture, off cape Ann 163
Old Orchard beach, Maine 96, 97
Old Point, Virginia 457
Oldwives 428
Oliver's island, New Hampshire 109
Olympia, Washington territory 626
Olympic club 370
Onancock, Virginia 461
Oncorhynchus chouicha 626, 627
Oncorhynchus gorbuscha 626
Oncorhynchus keta 626
Oncorhynchus kisutch 626
Oncorhynchus nerka 626, 629
Ontonagon, lake Superior 636
Ontonagon river 636
Oostburgh, lake Michigan 647
Ophiodon elongatus 612
Orange, Connecticut 330
Oregon—
Fishery interests of 624, 625
General fisheries of coast of 625
Statistics of fisheries of 624
Oregon inlet, North Carolina 481, 482
Orient bay, New York 351, 358, 359
Orient, New York 353, 359
Orient point, New York 351, 354
Orland, Maine, fisheries of 44
Orleans, Massachusetts 239
Clam fisheries of, in 1802 725

Orleans, Massachusetts—Continued. Page.
Early history of ... 725
Mackerel fleet of, in 1851 ... 116
Osmerus mordax ... 26
Osmerus thalcichthys ... 612
Osterville, Massachusetts ... 248
Oswego fishermen ... 672
Oswego, New York ... 673
Otis, James, defense of the fisheries by ... 126
Ottawa, lake Erie ... 664
Otter, sea ... 592, 594, 602
Otter-skins ... 62
Overshore island, Connecticut ... 322
Owl's head, Maine ... 55
Oxford, Maryland ... 428, 445, 467
Oyster—
Bedding, method of ... 237
Beds in Boston district ... 199
Beds of Chesapeake bay ... 469
Cannery ... 410
Canning ... 367, 443, 444
Carrying trade ... 223, 224
Culture at New Haven ... 330
Culture in France ... 472
Culture in Taunton river ... 278
Dredging ... 431
Interests of Rhode Island ... 285–294
Licenses ... 436
Packing ... 443, 466, 469
Peddling in Boston ... 199
Runners ... 440, 465
Scraping ... 437
Steamers, introduction of ... 333
Tonging ... 437
Tonging licenses ... 439
Vessels ... 10, 53, 77, 107, 120, 178, 182, 187, 224, 314, 438, 441, 465, 466
Oyster bay, Florida ... 554
Oyster bay, New York ... 348
Oyster fishery in—
Connecticut ... 308, 313, 318
Maine ... 10, 53
Maryland ... 423, 425
Massachusetts ... 118, 120, 178, 187, 223, 224, 234, 248, 249, 253, 272, 275, 712, 719, 725, 727, 731, 733
Mississippi ... 575
New Hampshire ... 110
New Jersey ... 381, 384, 386, 392
New York ... 343, 345, 346, 347, 348
North Carolina ... 481, 487
Rhode Island ... 285
Texas ... 584
Virginia ... 451, 456, 457, 460, 461
Washington territory ... 626, 629
Western Florida ... 552
Oyster industry—
Statistics for Chesapeake bay ... 469
Statistics for Rhode Island ... 294
Oyster industry of—
Alabama ... 571
Connecticut ... 313, 321, 325
Delaware ... 410
France ... 433
Great Britain ... 433
Oyster industry of—Continued. Page.
Louisiana ... 579
Maryland ... 424, 429, 447, 448
Massachusetts ... 117, 181, 264, 265, 277
New Hampshire ... 106, 110
New Jersey ... 399
New London, Connecticut ... 318
New York ... 348
North Carolina ... 478
Pennsylvania ... 403
Philadelphia ... 404
Virginia ... 464–473
Western Florida ... 555, 563, 567
Oyster planting in—
Chesapeake bay ... 471
Connecticut ... 318, 322, 326
Massachusetts ... 239, 247, 248, 250, 266
Narragansett bay ... 287
Virginia ... 469
Oyster Pond point, New York ... 351, 359
Oyster river, Connecticut ... 320, 334
Oyster-shells, utilization of ... 203
Oyster-shucking ... 468
Industry ... 445
Method of ... 181, 182
Oyster trade of—
Boston ... 199, 204
New Orleans ... 578
Wellfleet ... 236
Oystermen—
Of Louisiana ... 580
Of Maryland ... 434, 435, 438
Of Virginia ... 464, 465, 466
Wages of ... 440, 466
Oysters, price of, in—
Alabama ... 571
Western Florida ... 553, 568
Oysters, production of, in—
Alabama ... 569
Connecticut ... 314
Delaware ... 411
Eastern Florida ... 523
Georgia ... 515
Gulf states ... 536
Louisiana ... 576
Maryland ... 424, 442, 448
Massachusetts ... 117, 121, 133, 139, 179, 188, 225, 263, 265, 276, 735
Mississippi ... 574
New Hampshire ... 106, 109
New Jersey ... 382
New York ... 344, 345, 347, 349, 350, 351, 354, 357, 360, 361, 362, 366, 371, 372, 373
North Carolina ... 479, 485
On Pacific coast ... 592, 596, 597, 626
Pennsylvania ... 404
Rhode Island ... 284, 285, 293
South Carolina ... 505
Texas ... 582
Virginia ... 452, 462, 469
Western Florida ... 537, 551, 566
Oysters, receipts of, at Boston ... 190, 193
Oysters, transplanted ... 11, 78
Oysters, transportation of ... 325

P.

Pacific coast— Page.
- Fisheries, general statistics of 591
- Fisheries of the 589–630
- Fur-seal fishery of the 591
- Marine salt industry of the 591
- Salmon fisheries of the 591
- Statistics of fisheries of the 592
- Whale fishery of the 591

Pacific Guano Company 253
Palatka, Florida, fisheries of 529
Palmasola bay, Florida—
- Fisheries of 545
- Mullet-curing at 545

Palmer, L 361
Palmer's river, Rhode Island 287
Palm Key, Florida, fishing and fish-curing at 546
Pamet harbor, Massachusetts 232
Pamlico sound, North Carolina 456
- Fisheries of 482, 483, 484
- Quahaug industry 484, 485
- Terrapin fishery of 484

Panfish 662
Paralichthys dentatus 586
Paralichthys maculosus 595
Paranzella fishery in California 608, 609
Parephippus faber 462
Parker's island, Maine 74
Parmlee, D. D 649
Parophrys vetulus 611, 622, 627, 628, 629
Parsons, Captain Theodore 159
Pascagoula, Mississippi 575
Pasque island, Massachusetts 261
Pass à Goille, Florida 549
Passaic river, New Jersey 384
Passamaquoddy district—
- Herring fisheries in 12
- Pollock fishery in 12
- Review of fisheries of 11

Patchogue, New York 350, 366, 368
Patience island, Rhode Island 305
Pattee, W. L., *History of Braintree and Quincy* 712
Patterson, Carlile P 433
Patuxent river, Maryland 442
Pawcatuck river, Rhode Island 290, 309, 737
Pawtuxet, Rhode Island 304
Pawtuxet river, Rhode Island 737
Peak's Island, Maine, lobster-grounds at 87
Pearls at Lynn, Massachusetts 710
Pearsall's, New York 373
Pebble's island, Maine 109
Pecho Rancho, California 601
Peconic bay, New York 351, 354
Peconic, New York 356
Peconic Oil Works 353
Peddlers, fish 89, 147, 148, 564
Pedee river, South Carolina 508
Pejepscot Falls, Maine 79
Pemaquid, Maine 52
Pemaquid patent, Maine 60, 64
Pemaquid point, Maine 62, 69
Pembroke, Maine, fisheries of 18
Penmaquan river, Maine 18
Pennsylvania—
- Fisheries of 401–405

Pennsylvania—Continued. Page.
- Salt-water fisheries of 404
- Statistics of fisheries of 403

Penobscot bay, Maine 35, 45
Penobscot, Maine, fisheries of 35, 44
Penobscot river, Maine 50
Penobscot salmon 49, 194
Pensacola, Florida—
- Fisheries of 566
- Fishing by pilots 567
- Fresh-fish trade of 567
- Lay of the fishermen 567
- Oyster industry of 567
- Statistics of fisheries of 568

Pensacola Ice Company 567
Pensaukee, lake Michigan 641
Pentagoet, Maine 43
Pent Water, lake Michigan 652
Pequonock river, Connecticut 318
Perca americana 360, 484
Perch—
- Abundance of, in Currituck sound 480
- At menhaden factory 383
- Dried 628
- First appearance of 268
- Fresh 119, 133, 172, 225, 259, 263
- Red 221, 727
- Sea 196
- White 221, 360, 364, 733
- Yellow 360

Perch, catch of, in—
- Delaware 411
- Massachusetts 118
- San Diego county, California 595

Perch fishery in—
- Alabama 570
- California 620
- Delaware 412, 418
- Louisiana 578
- Maryland 425, 426
- Mississippi 575
- New Jersey 390, 398
- North Carolina 480, 481, 484
- Rhode Island 308, 310

Perch in—
- Jacksonville market 529
- Lake Erie 664
- Massachusetts 118, 712, 717, 734, 735
- San Francisco market 618

Perkins cove, Maine, fishing station 100
Perkins, S. S 100
Perry, Maine 7, 15
Persons employed in fisheries, number of, in—
- Alabama 568
- Alaska 630
- California 593
- Connecticut 313
- Delaware 411
- Eastern Florida 523
- Georgia 514
- Great lakes 633, 638, 657, 659, 672
- Gulf states 536
- Louisiana 575
- Maine 10, 13, 21, 29, 36, 46, 53, 66, 72, 76, 33, 94, 95
- Maryland 423

Page.
Persons employed in fisheries, number of, in—Cont'd.
Massachusetts.....120, 132, 138, 178, 182, 187, 215, 224, 254, 258, 262, 275
Mississippi..... 574
New Hampshire..... 108
New Jersey..... 381
New York..... 343
North Carolina..... 478
Oregon..... 624
Pacific coast..... 592
Pennsylvania..... 403
Rhode Island..... 284
South Carolina..... 504
Texas..... 582
Virginia..... 451
Washington territory..... 625
Western Florida..... 536
Pescadero, California.....603, 606
Peshtigo point, lake Michigan..... 640
Petoskey, lake Michigan..... 654
Pettingell, Captain Moses..... 134
Petty, Sylvanus..... 355
Pew, Captain Henry..... 157
Philadelphia—
Fisheries..... 404
Market for fresh fish..... 197
Oysters shipped.....442, 468
Phippsburg, Maine..... 74, 76
Phocæna americana..... 490
Phycis chuss and P. tenuis..... 14
Phycis Earllii..... 507
Piankatank river, Virginia.....457, 458, 460
Pickerel.....221, 354, 360, 648, 734, 735
Fresh.....193, 645
Salt..... 656
Pickled—
Alewives.121, 188, 191, 192, 225, 255, 263, 276, 285, 314
Bluefish.....121, 188, 225, 255, 483, 562, 568
Cod.....121, 139, 172, 188
Cod, inspection of..... 86
Cod-tongues.....121, 139, 172, 188
Cod, trade in..... 91
Eels.....132, 377
Haddock, trade in..... 91
Halibut-fins.....121, 139, 172, 188
Hard-tails..... 568
Jurels..... 568
Mullet.....545, 546, 562, 568
Oysters..... 573
Pompano.....562, 568
Redfish..... 568
Roes..... 172
Salmon.....79, 172, 191, 192
Salmon, exports of..... 167
Sheepshead.....562, 568
Sounds.....121, 139, 172, 188
Spanish mackerel..... 568
Sturgeon.....79, 682
Swordfish....121, 133, 139, 172, 176, 183, 188, 216, 225
Swordfish, inspection of..... 86
Trout..... 172
Pickled fish—
Barrels for packing.....166, 167
Bounty on exports of..... 128
Pickled fish—Continued. Page.
Exports of.....167, 204, 205, 206, 217, 218
Foreign trade in..... 125
In Maine..11, 13, 18, 22, 29, 37, 47, 67, 77, 90, 94, 95, 96
In Massachusetts.....119, 121, 130, 134, 137, 183, 216, 255, 259
In New Hampshire..... 108
In North Carolina.....483, 487
Inspection of..... 148
Markets for consumption of..... 91
Method of preparing, in Florida..... 564
Receipts of, at Boston..... 192
Trade in, at Boston.....190, 191, 192
Trade in, at Gloucester.....146, 148
Pickled herring—
Exports of.....168, 206
Imports of.....207, 208, 209
In Maine.....11, 13, 16, 17, 19, 22, 29, 33, 37, 42, 47, 54, 55, 67, 73, 77, 93, 94, 95
In Massachusetts.....121, 133, 139, 167, 172, 173, 183, 187, 191, 192, 225
In North Carolina..... 481
Method of packing..... 99
Pickled mackerel—
Exports of..... 206
In Connecticut..... 314
In Maine....11, 22, 29, 37, 47, 54, 67, 73, 77, 93, 94, 95
In Massachusetts.....117, 121, 130, 131, 133, 139, 146, 149, 152, 154, 167, 172, 173, 176, 179, 183, 186, 188, 192, 225, 226, 243, 692, 702, 707, 715, 727, 729
Inspection of..... 86
Method of packing..... 149
"Pickpockets", trading vessels called..... 240
Pidgeon, Captain S..... 361
Pierce's island, New Hampshire..... 109
Pigeon cove, Massachusetts..... 141
Pigeon Hill bay, Maine..... 27
Pigfish.....493, 586
Pike.....354, 360, 618, 636, 638, 641, 642, 643, 649, 655, 658, 660, 661, 664, 667, 668, 673
Mud..... 364
Yellow..... 659
Pine island, Connecticut..... 317
Pine island, Massachusetts..... 267
Pine point, Maine..... 97
Fisheries of..... 96
Pine River, Massachusetts, oyster beds..... 201
"Pink-sterns", style of boat called..... 129
Piper, John D..... 24
Piscataqua, New Hampshire, early fisheries of...105, 677
Piscataqua river.....7, 102, 109, 111
Plaice—
Fish..... 361
Fishery..... 196
Fresh..... 193
Platt & Mallory..... 448
Pleasant bay, Maine..... 26
Pleasant river, Maine..... 25
Pleuronectes stellatus.....611, 622, 623, 627, 629
Pleuronichthys cœnosus..... 628
Plummer, John G..... 135
Plump-nets..... 652
Plymouth Company—
Land in Maine granted to..... 7
Maine territory granted to..... 101

Page.
Plymouth district—
Defined 151
Exports of fish from 217, 218
Review of 214
Statistics of cod fishery from 1815 to 1879 216
Plymouth, Massachusetts—
Alewife fishery of 721, 723
Boneless fish at 222
Clam-digging at 222
Cod fishery of 127, 723
Early history of 717
Eel fishery at 724
Fish as manure at 718
Fisheries of 127, 214, 221, 718, 720, 722
Fishery grants at 721
Free liberty to fish at 718, 719
Lobster fishery of 222, 718
Mackerel fishery of 116, 722, 723
Net-fishing at 719
Schools supported by fisheries 721
Shad-spawn at 718
Statistics of fisheries in 1879 ..... 215, 223
Water bayley at 722
Whale fishery of 724
Pocasset, Massachusetts 249, 251
Pocomoke sound, Maryland 434
Pogonias chromis 502, 525, 529, 586
Pohegan fishery 171
Point à la Hache, Louisiana 578
Point aux Barques 659
Point Judith, Rhode Island, the fisheries of 308
Point Magu, California 598
Point of Pines, California 605
Point Reyes, California 609, 619
Point Sable, lake Huron 657
Point San Pedro, California 620
Point Wagoshance 654
Pole harbor, Block island 302
Polish fishermen 643
Pollachius carbonarius 14
Pollock—
Exports of 167
Roe of, for bait 152
Pollock, catch of, in—
Massachusetts 118
New Hampshire 109
Pollock, dry, in—
Maine 11, 13, 14, 22, 29, 37, 46, 53, 66, 73, 77, 93, 94, 95
Massachusetts 120, 133, 139, 167, 172, 183, 188, 192, 215, 225, 255, 259, 263, 692
Trade, at Portland 91
Pollock fishery in—
Maine 12, 14, 15, 17, 18, 19, 23, 24, 84, 85, 98, 100
Massachusetts 164, 239, 246, 255, 691, 704, 708
Rhode Island 294
Pollock, fresh, in—
Connecticut 314
Massachusetts 119, 133, 138, 172, 179, 183, 188, 193, 215, 225, 255
Pollock in—
Massachusetts 176, 724, 735
Washington territory 627
Pollock-liver oil 150
Pomace, herring 18, 26

Page.
Pomadasys fulvomaculatus 493, 586
Pomatomus saltatrix 389, 462, 481, 486, 502
Pomham rocks, Rhode Island 289
Pomolobus vernalis 14
Pomoxys nigromaculatus 516
Pompano—
Catch of, in western Florida 536, 537, 552, 561
Fishery 567, 570, 576
In Boston market 197
In California 600
In Texas 586
Pickled 562, 568
Salted 564, 565
Pond Quogue, New York 363
Pond Village, Massachusetts 232
Pope's island, Massachusetts 267
Popham and Gilbert at Pemaquid, Maine 60
Popham, Sir Francis, in Maine 62
Porgee fishery in Virginia 462
Porgies—
In South Carolina 508
On Long Island, New York 359, 360, 361
Porgy—
Fishery 390, 463, 507
Fresh 284, 314, 376
Oil 172
Porichthys porosissimus 612
Porpoise—
Bass 724
Fishery 296, 490, 547
Gray 724
Streaked 724
Porpoise channel, New York 350
Portage entry, lake Superior 636
Port Blakeley, Washington territory 627
Port Clinton, lake Erie 664
Port Clyde—
Cannery 52
Lobster cannery 56
Porte des Mortes, lake Michigan 646
Port Gamble, Washington territory 628
Port Harford, California 601
Port Hope, Michigan 659
Port Huron, Michigan 659
Port Jefferson harbor, New York 350
Port Jefferson, New York 350
Portland and Falmouth district—
Review of fisheries of 76
Statistics of fisheries of 76
Portland, Maine—
Boat fisheries of 85
Cod fishery of 83
Early fisheries of 81
Fish-curing at 85
Fishery interests of 81
Fresh-fish trade of 89
Haddock fishery of 83, 84
Haddock-smoking at 86
Halibut fishery of 83
Herring fishery of 84
Herring-smoking at 86
Inspection of fish at 86
Lobster industry of 87, 88

Portland, Maine—Continued. Page.
Mackerel fishery of 83
Oysters shipped to 442, 468
Portland, Maine, trade in—
Dry fish at 90
Fish-oil at 90
Pickled fish at 90
Pickled mackerel 91
Provisions and outfits 90
Vessel-fisheries of 83
Portland Packing Company 88
Port Ludlow, Washington territory 628
Port Madison, Washington territory 628
Port Monmouth, New Jersey 383
Port Ontario, New York 672, 673
Porto Rico, fish exports to 167, 205
Port Royal and Beaufort, South Carolina, fisheries of 510
Port Royal sound, South Carolina, drum fishery of. 511
Port Sanilac, Michigan 659
Portsmouth district, statistics of fisheries of 106
Portsmouth, New Hampshire—
Cod fishery of 109
Early fisheries of 679, 688
Early history of 678
Fisheries of 109, 679
Haddock-smoking 87
Mackerel fishery of 109
Oyster industry of 106, 110
Present condition of fisheries of 109
Portsmouth, Rhode Island 283, 286
Menhaden industry of 297
Port Townsend, Washington territory 626, 628
Portugal—
Early trade with 679
Exports of fish to 124, 217, 700
Portugal cove, Newfoundland, squid at 160
Portuguese—
Fishermen 146, 214, 231, 604, 608, 627
Whalemen 601
Portuguese land, California 597
Port Washington, lake Michigan 647
Port Washington, New York 347
Potomac river 460
Oysters 291, 442
Potowomut river, Rhode Island 291
Poultneyville, New York 673
Pound-net fishery in—
Connecticut 317, 319, 321
Massachusetts 272
New Jersey 383, 387, 388, 389, 397, 398
New York 345, 351, 352, 358, 359, 360, 374, 375
North Carolina 481, 489
Rhode Island 295, 297, 298, 303, 304, 306, 307, 309, 310
Texas 585
Virginia 454, 457, 458, 459, 460, 463
Western Florida 548
Pound-net fishery of—
Lake Erie 662, 663, 664, 665, 666, 668
Lake Huron 657, 658
Lake Michigan 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 651, 652, 653, 655
Lake Ontario 673
Lake Superior 635, 636, 637, 638
Pound-nets— Page.
Manufacture of 320
Statistics of 284, 314, 343, 381, 383, 385, 393, 423, 424, 429, 451, 452, 478, 479, 504, 514, 633, 634, 638, 655, 657, 659, 672
Pounds—
Alewife 57
Fish 61, 120, 164
Powaget pond, Rhode Island 289
Pownalboro', Maine 70
Pratt's *History of Eastham, Wellfleet, and Orleans* .. 727
Prawn—
At Fernandina, Florida 525
Catch of, on Pacific coast 594, 618, 624
Fishery 494, 526
For drum-bait 512
In San Francisco market 618
Prawns, English 197
Preston Brothers 383
Price & Co., T. F 353
Price's Neck, Rhode Island 298
Prince Edward island, imports from 207
Prince's *New England Chronology* 720
Princess Anne county, Virginia 453, 465
Privateers manned by fishermen 124
Proctor, George H 172
Products of fisheries, statistics for—
Alabama 569
Alameda county, California 624
Alaska 630
Barnstable district 224
Bath district 72
Belfast district 46
Boston district 187
California 594
Castine district 37
Connecticut 314
Delaware 411
Del Norte county, California 624
Eastern Florida 523
Edgartown district 259
Fall River district 275
Frenchman's Bay district 29
Georgia 515
Gloucester district 137, 138
Great lakes 633
Gulf states 536
Humboldt county, California 624
Kennebunk district 94
Lake Erie 660
Lake Huron 657
Lake Michigan 639
Lake Ontario 672
Lake Superior 634
Louisiana 576
Machias district 22
Maine 10
Marblehead district 183
Marin county, California 624
Maryland 424
Massachusetts 118
Mendocino county, California 624
Monterey county, California 607
Nantucket district 254
New Bedford district 262

Products of fisheries, statistics for—Continued. Page.
Newburyport district 132
New Hampshire 108
New Jersey 381
New York 344
North Carolina 479
Oregon 625
Pacific coast 592
Passamaquoddy district 13
Pennsylvania 403
Plymouth district 215
Portland and Falmouth district 77
Rhode Island 284
Saco district 93
Salem and Beverly district 178
San Francisco county, California 618
San Luis Obispo county, California 602
San Mateo county, California 607
Santa Barbara county, California 602
Santa Cruz county, California 607
Sonoma county, California 624
South Carolina 505
Texas 582
Virginia 451, 452, 454
Waldoboro' district 53
Washington territory 626
Western Florida 536
Wiscasset district 66
York district 95
Products of sea fisheries, statistics for—
Eastern Florida 524
North Carolina 480
South Carolina 505
Promised Land, New York 353, 360
Prospect harbor, Maine 30
Protection of fisheries 126
Prouts Neck, Maine 97
Providence county, Rhode Island 303
Providence, Rhode Island 283, 286, 288, 442
Oysters shipped to 468
Providence river, Rhode Island 283, 287, 305
Provincetown, Massachusetts 226
Bluefish fishery of 228
Cod fishery of 127, 227
Fisheries of 127, 226
General description of 226
Hake fishery of 228
Lobster fishery of 229
Mackerel fishery of 116, 227
Review of fisheries of, 1860 to 1870 230
Whale fishery of 115, 229
Provisions used on vessels 169, 170
Prudence island, Rhode Island 298, 305
Psettichthys melanostictus 611
Pseudorhombus dentatus 525
Public service of fishermen 128
Punta Alones, California 603
Purchase, Thomas, settlement in Maine 79
Purissima, California 606
Purity creek, Florida 554
Purse-seine—
First used by Maine fishermen 65
Fishery for bluefish 239
Fishery for rockfish 482
Invention of 355
Purse-seines— Page.
Mackerel 40, 57, 63
Menhaden 159
Purse-seines, number and value of, in—
Connecticut 314
Maine 10, 13, 29, 37, 46, 53, 66, 77
Maryland 423, 429
Massachusetts 120, 132, 138, 153, 178, 183, 187, 215, 224, 263, 275
New Hampshire 108
New Jersey 381
New York 343
North Carolina 479
Rhode Island 284
Virginia 451, 460
Put-in bay, lake Erie 664
Puyallup river, Washington territory 627

Q.

Quahaug bay, Maine 79
Quahaug fishery in—
Maine 79
Massachusetts 234, 239, 248, 256, 265, 269, 270, 725
New Jersey 381, 388, 392
New York 381
North Carolina 481, 491
Rhode Island 296, 305
Virginia 462
Quahaug fishery, northern limit of 79
Quahaugs—
Canned 484
In Maryland 429
In Massachusetts 121, 199, 225, 255, 259, 263, 267, 724, 734, 735
In New Jersey 383, 393
In Rhode Island 284
Quamquesset harbor, Massachusetts 253
Quartermaster's harbor, Washington territory 627
Quereau Bank halibut fishery 157
Quereau cod fishery 61, 68, 69
Quincy, Massachusetts 213, 712, 713
Quinepiac river, Connecticut 325, 326
Quinnault, Washington territory 629
'Quisset harbor, Massachusetts 253
Quogue, New York 363
Quonochontaug pond, Rhode Island 308

R.

Racine, lake Michigan 648
Rackett, Captain Willard 359
Ragged Edge Oil Works 353
Ragged island, Maine 56
Railways, marine 69
Ramea island, halibut fishery at 157
Ranger Oil Company 353
Rappahannock River oysters 456
Rappahannock river, Virginia 457, 458, 460, 467
Rathbun, Richard 613
Rawlins, D. L 448
Raynor & Co., J. M 353
Razor-clams 367, 374, 596, 725
Razor-fish 199, 268
Razor-shells 724
Red Brook harbor, Massachusetts 251
Red drum, fresh 486

Page.
Redfin fishery 484, 567, 570, 596
Redfish 552, 555, 556, 561, 574, 583, 584, 585, 586, 595, 597, 600
Pickled 568
Salted 564
Red perch 221
Red snappers 510, 517, 518, 525, 535, 536, 548, 577
Catch of, in Alabama 569
Catch of, in gulf of Mexico 536
Catch of, in Louisiana 576
Catch of, in western Florida 537
Fishery 507, 566
In Boston market 193, 196
Redwood City, California 606
Reed, H. G 219
Refrigeration of fish 376, 654, 660
Refrigerator-cars 567, 640
Refrigerators 197
Rehoboth bay, Delaware 409, 416
Rehoboth beach, Delaware 416
Rhode Island—
Early history of 736
Fisheries of 283–310
General review of 283
Mackerel fishery of 116, 716
Oyster interests of 285–294
Statistics of fisheries for 1880 284
Richmond county, Virginia 465
Richmond's island, Maine 81
Ridgewood, New York 372
Riggs, W. K 74
Riggs cove, Maine 74
River bass 664
Riverdale, Massachusetts 143
River fisheries—
Depletion of, in Massachusetts 136
Product of, in New York 344
River fisheries of—
Delaware 411
Eastern Florida 523
Georgia 515
Maine 9, 47, 55, 74, 75, 83, 97, 102
Maryland 423, 424
North Carolina 479
South Carolina 505
Virginia 451, 452, 457
Riverhead, New York 345, 354
Roach 734
Roanoke island, North Carolina—
Fisheries of 481
Terrapin fishery of 482
Roanoke river, North Carolina 478
Robalo 586
Robbinston, Maine, fisheries of 15
Robert Pettis 289
Robinson, Edward 251
Robinson, J. P. & G. C 90
Roccus americanus 360, 547
Roccus lineatus 360, 386, 390, 395, 481
Rochester, Massachusetts 267, 734
Rockaway beach, New York 373
Rockaway, New York 372
Rock bass 268, 274, 735
Rock cod—
Page.
Catch of 600
Fishery 609, 615
Rock fishery in—
Delaware 418
Georgia 516
Maryland 425, 426
New Jersey 390, 398
North Carolina 481, 482, 484
Rockfish 385, 480, 596, 597, 604, 605, 618
Orange 627
Salt 627
Rockfish fishery, in—
California 609, 619
Washington territory 629
Rockland, Maine—
Fisheries of 54, 55
Haddock-smoking 87
Rockport, Maine, fisheries of 49
Rockport, Massachusetts 115, 141, 163
Isinglass industry at 142
Mackerel fleet of, in 1851 116
Rockport, Texas 586
Rock trout 604
Rockville Centre, New York 373
Rocky Point, New York 351, 358
Rocky Point, Rhode Island 305, 308, 309
Roe, fish, for sardine-bait 151, 152
Roe, sturgeon 503, 510, 518
Roes, mullet 494, 495, 541, 544
Rogue island, Maine 24
Rogue River salmon fishery 625
Roncador 595, 597
Roncadore fishery 596
Ronco 586
Roosevelt, Robert B 368
Roslyn, New York 347
Round pond, Maine 59, 61
Rowayton, Connecticut 337
Oyster industry of 339
Rowe, H. C 331
Rowley, Massachusetts, ship-building at 134
Rowley's point, lake Michigan 646
Roxana, Delaware 418
Rudder-fish 735
Rumstick point, Rhode Island 288
Russian river, California 619
Russian sardines 10, 13, 25
Rye, New Hampshire 678

S.

Sabine, Lorenzo, cited 62, 122, 131, 189, 677
Sabine's point, Rhode Island 289
Sable Island cod fishery 70
Sachem's Head, Connecticut 324
Sachnest beach, Rhode Island 297, 298
Sachnest neck, Rhode Island 296, 298
Sackett's Harbor, New York 672, 673
Saco bay, Maine, fisheries of 97
Saco district—
Fisheries of 92
Statistics of fisheries of 92, 93
Saco river, Maine 97
Sacramento River salmon fishery 598

Page.
Saddle-rock oysters 203, 338
Sagadahoc, Maine 52, 60
Sag Harbor, New York 353, 354, 361
Saginaw bay, lake Huron 658
Sagua la Grande 544
Sail-making 145, 241
Sailor's choice 525, 529, 552, 554
Sails, quantity of cotton used for 170
Saint Andrew's bay, Florida—
History of fisheries of 564
Present fisheries of 565
Saint Andrew's bay, New Brunswick 15
Saint Ann's, squidding at 159
Saint Augustine, Florida—
Early settlement of 525
Extent of fisheries of 526
Green-turtle fisheries of 526
Primitive condition of fisheries of 525
Shrimp fishery of 526
Saint Clair river 659
Saint Croix river, Maine 14, 15
Saint George, Maine, fisheries of 52, 54, 55, 60
Saint George river, Maine 55, 57
Saint George's sound, Florida 559
Saint Helena sound 507
Saint James, New York 350
Saint John's, Newfoundland, captured 126
Saint John's river, Florida—
Description of 522
Fisheries of 528
Saint Jones' creek 412
Saint Joseph, lake Michigan 651
Saint Joseph's bay, Florida 561
Saint Louis, market for fresh fish 197
Saint Mark's river, Florida—
Fisheries of 554
Methods of fishing at 554
Mullet-fishing at 555
Oyster-beds in 555
Winter fishing at 555
Saint Mary's river, Florida 525
Saint Michael's, Maryland 467
Statistics of oyster-packing 445
Saint Peter's Bank halibut fishery 157
Saint Pierre, sales of squid at 159, 160
Saint Sebastian river, Florida 525
Saint Simon's, Georgia 518
Saint Simon's sound, Georgia 518
Saint Vincent's sound 559
Sakonnet Point oysters 287
Sakonnet Point, Rhode Island 273, 294, 295
Sakonnet river, Rhode Island 296, 298
Salem and Beverly district—
Fisheries of 178
Statistics of fisheries of 178
Salem, Massachusetts—
Early history of fisheries of 123, 127, 695, 698, 701, 702
Fish and oil at, in 1687 699
Fisheries injured by war 699
Fisheries of 127, 180, 181, 699
Grants of land to fishermen at 697
Mackerel fleet of, in 1851 116
Salem, Massachusetts—Continued. Page.
Oyster industry of 181, 182
Trouble with Indians at 698, 700
Salina, Louisiana 579
Salinas ranch, California 597
Salisbury, Massachusetts—
Boat-building at 131, 134
Mackerel fleet of, in 1851 116
Ship-building at 134
Salisbury point, Massachusetts 134
Salmon—
Canned 591, 592, 625, 629
Catch of, in Massachusetts 118
Catch of, on Pacific coast 591, 625, 626, 630
Dog 627
Former abundance of 132, 685
Frozen, in Boston market 197
Gill-nets 195
Hooped 629
Pickled 79, 172, 191, 192
Pickled, exports of 167
Salt 618, 626, 627
Silver 628
Smoked 377, 618
Sucheye 629
Weirs 48, 76
Salmon fishery in—
California 598, 603, 604, 609, 614, 619
Lake Ontario 673
Maine 14, 15, 45, 47, 48, 49, 74, 79, 80, 97, 102
Massachusetts 130, 132, 136, 273
Oregon 625
Pacific coast 591, 593
Rhode Island 296
Washington territory 626, 627, 628
Salmon, fresh—
In Boston market 193, 194, 197
In Massachusetts 119, 138, 193, 194, 197, 225
In Rhode Island 284
On Pacific coast 618, 625, 626, 630
Trade in, at Portland 89
Salmon river, Labrador 135, 684
Salmon-trout 191, 192, 193, 196, 453, 488, 627
Fishery 487
Salmo purpuratus 627
Salmo salar 14
Salt—
Cadiz 36, 234
Consumption of, in Massachusetts fisheries 120
Fish 494, 633, 634, 636, 638, 639, 657, 660
Fish trade 247, 486, 567
For curing codfish 84, 234
For curing mullet 559
For fish-curing 75, 90, 130, 144, 170, 234, 695, 724
Halibut fishery 146, 147
Imports of 44, 167, 168, 169
Industry 209, 210, 253, 591
Liverpool 36, 234
Manufacture of marine 127, 258, 273, 569, 597, 715, 717, 729, 730, 734
Marine 121, 226, 592, 594
Quantity of, taken on voyages 169
Syracuse 234
Used in the fisheries 129, 210, 211, 242, 694, 698, 707

Page.
Salted—
Anchovies 603
Salmon 626
Salter's island, New Hampshire 109
Salt-works in Alameda county, California 619
Salt-works, marine, in Massachusetts....127, 685, 728 732
Salvelinus malma 627
Samoset, deed of land from Indian 60
San Buenaventura, California 598
Sand beach 659
San Diego county, California 595, 599
San Domingo, exports of fish to 205, 206
Sand, sea, gathered at Salisbury point 134
Sand sharks 268, 547
Sandusky, Ohio 664
Sandwich, Massachusetts 248
Alewife fishery of 249, 730, 731
Early fisheries of 730
Fisheries of, from 1802 to 1862 731
Oyster industry of 249-252, 731
Oysters 202
Whale fishery of 730
Sandy bay, Massachusetts 141, 163, 691
Sandy Hook bay, New Jersey 392
Sandy hook, New Jersey 384, 388
Sandy neck, Massachusetts 245
Sandy point, Rhode Island 306, 309
Sanford, Florida 530
San Francisco, California—
Cod fishery of 593
Fisheries in 1875 614
Fish market 608, 613
Fish shipped to 604, 606, 621
Herring fishery of 615
Prejudice against Chinese at 617
Shrimp fishery of 616
Statistics of fish trade of 618
Sturgeon fishery of 616
Whaling fleet in 1880 115
San Francisco county, California—
Chinese fisheries of 612
Crab fishery of 613
Fishermen of 608
Fishing boats of 608
Paranzella fishing in 609
Rock-cod fishing in 609
Sea-turtle fishery of 613
Shrimp fishery of 612
Statistics of fisheries of 618
Terrapin fishery of 613
San Gregorio, California 606
San Juan, Washington territory 628
San Luis Obispo county, California 599, 601
Statistics of fisheries of 602
San Luis Rey river, California 598
San Mateo county, California 603, 606
Statistics of fisheries of 607
San Pedro, California 597, 619
San Rafael, California 619
San Simeon, California 601
Santa Barbara, California 599, 600
Santa Barbara county, California 599
Statistics of fisheries of 602
Santa Clara county, California 603 606
Santa Cruz county, California 603, 605
Statistics of fisheries of 607
Santa Cruz island, California 599
Santa Monica, California 597
Santa Rosa island, California 599
Santee river, South Carolina 508
Sarasota bay, Florida—
Fisheries of 542
Method of curing mullet roes 544
Mullet-curing at 544
Sarda mediterranea 389
Sardine canneries in Maine 15, 21, 25, 26, 33, 50
Sardine industry of Maine 10, 12, 17, 18, 20
Sardines 595
For bait 609
Herring as 15
Quantity canned in Maine 18
Russian 10, 11, 25
Sargus Holbrookii 507
Satilla River fisheries 502
"Saturday Night", fishing-ground called 163
Saugatuck river, Connecticut 336
Saugers 663, 664
Saugertauk, lake Michigan 651
Saugus river, Massachusetts, clams in 198, 709, 710
Sault de Sainte Marie, lake Superior 637
Saunderstown, Rhode Island 307
Savannah, Georgia 501, 504
As a commercial center 516
As a fishing town 516
Coast fisheries of 516
Fish trade of 517
Fresh-water fisheries of 516
Shad fishery of 516
Shrimp fisheries of 516
Vessel-fisheries of 516
Savannah river, Georgia 502, 514
Saw-fish 527
Sawyer's island, Maine 69
Saybrook, Connecticut 319
Sayville, New York 366, 368
Scale-fish 154, 700
Scallop fishery in—
Massachusetts ...246, 247, 265, 269, 270, 271, 272, 277
New York 347, 348, 351, 353, 354, 355, 356, 357, 358, 360, 362, 373
North Carolina 492
Rhode Island 304, 305, 306
Scallops—
In Boston market 193, 199
In California 597
Statistics of production of....121, 225, 259, 263, 265, 276, 284, 285, 304, 305, 306, 345, 347, 348, 351, 353, 354, 355, 356, 357, 358, 360, 362, 373, 376
Scarboro' beach, Maine, clam-digging at 96
Scarboro' clams 96
Scarboro', Maine 97
Schools, free, supported by fisheries 222, 223
Schooner, origin of 689
Sciæna ocellata 486, 502, 525, 529, 585
Scituate, Massachusetts—
Fisheries of 127, 219
History of 715

Scituate, Massachusetts—Continued. Page.
Irish-moss industry at 214, 219
Mackerel fishery 116, 716, 717
River fisheries of 716
Scomberomorus maculatus 389, 416, 462, 484, 486
Scomber scombrus 24, 88
Sconticut Neck, Massachusetts 267
Scoop-nets 577
Scorpæna guttata 596
Scotch fishermen 566
Of Gloucester 146
Scotland, exports of fish to 207
Scow-banking for mackerel 195
Scranton, Mississippi 573
Scraping oysters 437
Scrawls 390
Scudder, N. & W. 246
Sculpins 612
Sculpins for lobster-bait 40, 141, 165
Scup—
At Fairhaven, Massachusetts 268
In New York 363
Scup, catch of, in—
Connecticut 314, 316
Massachusetts 118, 225, 255, 263
Rhode Island 284
Scup fishery in—
Maine 102
Massachusetts 196, 243, 244, 245, 247, 248, 252, 253, 255, 256, 260, 262, 267, 269, 271, 273, 731, 735
Rhode Island 294, 295, 298, 299, 301, 303, 304, 307, 309
Scup, fresh, in—
Connecticut 314
Massachusetts 119, 193, 225, 255, 259, 263
New York 376
Rhode Island 284
Sea bass 118, 316, 394, 411, 600, 605
Fishery ..247, 248, 253, 258, 260, 262, 307, 390, 403, 404
Fresh 119, 138, 193, 225, 284 314
In San Francisco market 618
Seabright, New Jersey 387
Seabrook, New Hampshire, fisheries of 111
Sea clams 121, 199, 225, 241, 255, 259, 263, 367, 374
Sea-elephant fishery 313, 314, 316
Seaford, Delaware 410, 441, 442, 448
Seaford, New York 372
Sea-gulls for bait 156
Seal—
Fishery 41, 262, 313, 315, 683
Flesh 592, 630
Oil 592, 594, 602, 626, 630
Skins, fur 314, 592, 599, 626, 630
Sealing vessels 120, 263, 314
Sea-lion 601
Seal Island ground 8, 50
Cod fishery on 175
Sea-mullet 486
Sea-otter skins 592, 594, 602, 630
Sea-perch 196
Sea-robin 268
Sears, Captain Edward 127
Sears, Captain John, salt manufacturer 127
Sears, Reuben, salt manufacturer 127
Searsport, Maine, fisheries of 47
Sea trout 304, 567, 583, 584

Page.
Seattle, Washington territory 627, 627
Seatuck cove, New York 364
Sea turtle 596
Seavey's island, Maine 109
Seaweed 69, 121, 133, 137, 142, 179, 183, 188, 216, 226, 259, 264, 268, 383, 592, 594, 603, 607
Sebascodegan island, Maine 79
Sebastichthys melanops 627
Sebastichthys pinniger 627
Sedgwick, Maine, fisheries of 41
Seekonk oysters 290
Seekonk river, Rhode Island 291, 292
Seine fishery 306, 390, 481, 553, 570, 635, 636, 637, 638, 647, 648, 656, 661, 666
Seines—
Cod 135
Haul 10, 13, 22, 29, 46, 53, 66, 120, 132, 223, 224, 254, 258, 263, 275, 284, 314, 413, 414, 415, 417, 418, 460
In fisheries of great lakes 633, 634, 638, 657, 659, 672
Manufacture of 213
Purse 10, 13, 29, 37, 46, 53, 66, 77, 108, 120, 132, 138, 153, 159, 178, 183, 187, 215, 224, 263, 275, 284, 314, 343, 381, 423, 429, 451, 460, 479
Selbyville, Delaware 410
Sellman, Henry 50
Seres 268
Seriola carolinensis 507
Serranus atrarius 390, 394, 493, 502, 506, 507, 511, 525
Setauket harbor, New York 350
Setauket, New York 350
Sewell's Point, Virginia 453
Shack-bait for cod 156
Shad—
Drift-nets 375
Early abundance in Merrimack river 132
Former abundance of 48, 132
Fresh 119, 133, 138, 195, 259, 263, 276, 284, 314, 376, 477
Fresh, in Boston market 193, 195, 197
From bay of Fundy 195
From Saint John river 195
Frozen 197
Fykes 374, 375
Gizzard 484, 485, 530
Hick 517
In San Francisco market 618
In Saugus river 710
Method of packing 319
Pickled 191, 192
Spawning of 320
White 517
Shad, catch of, in—
Connecticut 314
Delaware 404, 411
Eastern Florida 523
Georgia 515, 518
Maryland 424
Massachusetts 118, 188, 225, 263, 276
New Jersey 382, 389
New York 344, 345, 347
North Carolina 479, 495

Shad, catch of, in—Continued. Page.
Rhode Island ... 284
South Carolina ... 504, 505
Virginia ... 452, 458, 459
Shad fishery in—
California ... 605
Connecticut ... 317, 319, 321, 332
Delaware ... 412, 413, 414
Eastern Florida ... 528, 530
Georgia ... 514, 516, 517
Maine ... 74, 75
Maryland ... 427
Massachusetts ... 130, 132, 136, 240, 252, 258, 265, 273, 275, 276, 686, 710, 711, 712, 716, 721, 735
New Jersey ... 383, 384, 390
New York ... 345, 346, 358, 373, 374, 375, 376
North Carolina ... 478, 481, 482, 483, 484, 485, 487, 489, 492
Pennsylvania ... 403
Rhode Island ... 283, 294, 303, 308
South Carolina ... 502, 506, 507
Virginia ... 451, 456, 457, 460, 463
Shagwong point, New York ... 352
Shaler, Prof. N. S., on geology of George's shoals ... 8
Shallops in Massachusetts ... 124
Shapleigh's island, New Hampshire ... 109
Shark-fins ... 594, 599, 607, 614, 618
Dried ... 598
Shark—
Fishery ... 269, 547, 597, 598, 615, 623, 629
Oil ... 150, 151, 547, 594, 597, 598, 599, 605, 607, 623, 624
Shark river, New York ... 385, 391, 392
Sharks ... 570, 578, 585, 605, 735
Black ... 724
Man-eating ... 724
Shovel-nosed ... 724
Sharp-nose sturgeon ... 502
Sheboygan, lake Michigan ... 647
Shedding-troughs ... 428
Sheepscott bay, Maine ... 71
Sheepscott, Maine ... 60
Sheepscott river, Maine ... 68, 69, 70
Sheepshead—
Catch of, in Delaware ... 411
Fresh ... 193
Pickled ... 562, 568
Salted ... 487, 564
Sheepshead fishery in—
Alabama ... 570
Maryland ... 427
New Jersey ... 395
New York ... 347
North Carolina ... 485
Pensacola, Florida ... 567
Virginia ... 454, 462, 463
Sheepshead in—
Alabama ... 574
Eastern Florida ... 525, 529
Georgia ... 517
Maryland ... 427
Massachusetts ... 196, 268, 731, 733, 735
New York ... 389, 394
South Carolina ... 502, 511
Texas ... 583, 584, 586
Sheepshead in—Continued. Page.
Virginia ... 458, 459
Western Florida ... 548, 552, 554, 555, 561
Sheffield pond, Rhode Island ... 307
Shell lobsters ... 34
Shells, oyster, utilization of ... 203
Shelter island, New York ... 351, 358
Shinnecock bay, New York ... 352, 362
Ship-building—
By colonists ... 122
In Maine ... 26, 59, 61, 65, 68, 69, 71, 72, 74, 75, 80, 99
In Massachusetts ... 132, 134, 140, 145, 685
Shoalwater bay, Washington territory ... 629
Shoremen, statistics of ... 451, 452, 479, 504, 505, 514, 515, 523, 536, 568, 574, 575, 582, 592, 594, 624, 625, 630
Shore whale fishery in—
California ... 596, 597, 601, 602, 604
Maine ... 30
Massachusetts ... 230
North Carolina ... 490
Shredded cod ... 377
Shrewsbury, New Jersey, oyster industry of ... 386
Shrewsbury river, New Jersey ... 385, 387, 389, 391
Shrimp ... 492, 516, 518, 525, 535, 624
Canned ... 585
Dried ... 618
In Boston market ... 193, 197
In San Francisco market ... 618
Method of drying ... 612
Shrimp, catch of, in—
California ... 594, 618
Eastern Florida ... 523, 524
Georgia ... 515
Gulf states ... 536
Louisiana ... 576
North Carolina ... 479, 480, 495
South Carolina ... 505
Texas ... 582
Shrimp fishery in—
California ... 608, 612, 616, 620
Eastern Florida ... 526
Georgia ... 516
Louisiana ... 576
North Carolina ... 484, 494
South Carolina ... 504, 509, 511
Texas ... 587
Shucked clams ... 25, 42
Shuckfish for bait ... 307
Shumagin Islands cod fishery ... 593
Siasconsett, Massachusetts ... 255
Sicilian oystermen ... 580
Silver gar ... 554
Simonson & Co., A ... 376
Sinclair, Captain Peter ... 155
Sinnepuxent bay, Maryland ... 425
Sippican, Massachusetts ... 265
Sippican river, Massachusetts ... 734
Siscoes ... 673
Siscowet ... 636, 637
Skate ... 268, 383, 724
In San Francisco ... 618
Skinner, Floyd R. ... 365, 369
Skins, fish—
For glue ... 119, 142
Utilization of ... 149, 150

Page.
Skipjacks 493, 508, 586, 735
Skipper creek, Florida 554
Sladesville, North Carolina 484
Slaughter beach, Delaware 414
Smackmen, lobster 59
Smacks—
Fishing 566
Key West 538
Small point, Maine 69
"Smear", Texas fish called 586
Smelt 188, 193, 259, 263, 595, 716, 731, 735
Canned 121, 188, 197, 198
Fresh 119, 138, 179, 195, 284, 314, 376
Frozen 195
In San Francisco market 618
Smoked 377
Smelt, catch of, in—
California 597, 600
Connecticut 317
Massachusetts 118, 119
Rhode Island 284
Smelt fishery in—
California 596, 604, 609, 615, 619
Connecticut 316, 317
Maine 26, 43, 44, 45, 48, 55, 59, 61, 64, 67, 75
Massachusetts 195, 246, 710
New Jersey 384
Rhode Island 308, 309
Smith & Co., Jonas 353
Smith isles, Isles of Shoals 111
Smith River salmon fishery 593, 623
Smith's point, New York 367
Smithtown bay, New York 350
Smithtown, New York 350
Smithville, North Carolina 493
Smoked—
Alewives 121, 225, 248, 276, 285, 296, 297, 709
Bluefish 121, 255
Eels 377
Haddock 11, 14, 17, 18, 47, 77, 86, 87
Haddock, origin of, in America 87
Halibut 121, 133, 134, 139, 149, 167, 225, 618, 692
Herring, exports of 167
Herring, production of, in Maine 11, 12
Mackerel 377
Salmon 377, 618
Smelt 377
Sturgeon 377, 650, 651, 663, 666, 668, 670
Whitefish 649, 650
Smoked fish—
Exports of 205
In Maine 11, 14, 22, 29, 37, 47, 67
In Massachusetts 119, 121, 130, 137, 139, 191, 225, 276
In New York 377
In North Carolina 485
Production of great lakes fisheries 633, 639, 646, 647, 660
Trade of Boston in 190-192
Trade of Gloucester in 146, 149
Smoked herring in—
Belfast district 47, 50
Boston district 191, 192
California 615, 618
Smoked herring in—Continued.
Castine district 37, 38, 42
Frenchman's Bay district 28, 29, 32, 33, 34
Gloucester district 176
Machias district 22, 23, 26, 27
New York 377
Passamaquoddy district 16, 17, 18, 19, 20, 21
Portland district 77, 86, 87
Rhode Island 309
Waldoboro' district 54, 55, 57, 65
Washington territory 627, 628
Wiscasset district 67, 70, 71
Smoke-houses—
Halibut 149
Herring 19, 20, 21, 33, 34, 56, 65, 70, 71
Smutty Nose island, Isles of Shoals 111
Snapper banks, Florida 567
Snow, Franklin 190
Snow Hill, Maryland 425
Snows, fishing 701, 705
Snuff Box island, New Hampshire 109
Sole fishery 622
Soles in San Francisco 618
Somerset county, Maryland 437, 438
Somerset, Massachusetts 251, 278
Somerset Oyster Company 278
Somerset oysters 277
Sonoma county, California 619, 624
Soquel, California 605
Sounds—
Cod 142, 179, 679, 694, 702, 707
Cod, exports of 167
Fish 11, 14, 18, 37, 47, 54, 67
Fish, dried 22, 73, 78, 93, 94, 95, 119, 121, 133, 136, 139, 142, 151, 183, 188, 211, 216, 226
Hake 142, 162, 163
Pickled 121, 139, 172, 188
Squeteague 285
Trout 489
Weakfish 142
South America, fish imports from 137
Southampton, New York 351, 362
South Bristol, Maine, cod fisheries of 61
South Carolina—
Alewife fishery of 504
Fisheries of 499, 501
River fisheries of 505
Sea fisheries of 504
Shad fishery of 504
Statistics of fisheries of 504
Statistics of sea fisheries of 505
Sturgeon fishery of 504
South Carolina and Georgia—
Boat-fisheries of 502
Description of coast of 501
Sturgeon fishery of 502
Terrapin fishery of 503
South channel cod fishery 154, 194
South channels, fisheries in 129
South Chatham, Massachusetts 240
South Chicago, Illinois 649
South Dartmouth, Massachusetts 273
Southern mackerel fishery 65, 145
South Ferry, Rhode Island 307

Page.
South Freeport, Maine 81
South Georgia islands 316
South Harwich, Massachusetts 241
South Haven, lake Michigan 651
South Kingston, Rhode Island 286
South Norwalk, Connecticut 332
Oyster business of 337
Southold, New York 351, 357
South Orleans, Massachusetts 239
South Oyster bay, New York 362, 371
Southport, Maine 65, 68, 70, 71
South Shetland islands 316
South Side Sportsman's Club 369
South Thomaston, Maine, fisheries of 54, 55
South Truro, Massachusetts, fisheries of 232
Southwest harbor, Maine 34
Southwest pass, Louisiana 579
South Yarmouth, Massachusetts 245
Spain, fish exports to 62, 124, 130, 135, 679, 682, 693, 696, 700, 705
Spanish fishermen 504, 566, 608
Spanish mackerel—
Canned 484
Fresh 193, 486
Pickled 568
Salted 564
Spanish mackerel in—
Boston market 196
Delaware 416
Louisiana 576, 577
Maryland 427
Massachusetts 225, 267, 268, 274
New Jersey 388, 389
New York 357, 358, 359, 360, 361, 363, 369, 371, 373
North Carolina 487
Rhode Island 294, 301, 307
Texas 585, 586
Virginia 457, 458, 459, 462
Western Florida 552, 567
Sparus pagrus 507
Spawn, fish 121, 133, 139, 151, 152, 183, 188, 226
Pickled 172
Speckled trout 586
Speonk, New York 364
Sperling—
Fishery 70, 134, 136
For bait 163
Spermaceti 272
Candles 119
Oil 130
Sperm oil, production of, in—
Barnstable district 226, 229
Boston district 188, 189
Connecticut 315, 316
Edgartown district 259
Massachusetts 121, 713, 724
New Bedford district 264, 269, 270, 272
1854 116
Sperm-whale fishery 229
Spirwink river, Maine, clam-flats in 96
Spit island 664
Sponge fishery 535, 537
Sponges, statistics of 536, 537
Spot—
Page.
Catch of, in Delaware 411
Fresh 486
Salted 486, 487
Spot fishery in—
Delaware 410, 414, 418
North Carolina 481, 483, 485, 487
Virginia 453, 454, 462
Spotted—
Sea-trout 424, 425, 452, 453, 480, 505, 515, 523, 524
Trout 502, 516, 517, 552, 567
Spring creek, Florida 554
Springs, New York 360
Sprite's island, Connecticut 337
Squalus acanthias 626
'Squam river, Massachusetts 143, 165, 689
Squan river, New Jersey 385, 387, 388, 391, 392
Squeteague—
Fresh 119, 225, 284, 314
Sounds 285
Squeteague, catch of, in—
Connecticut 316
Delaware 411
Maryland 424, 425
Massachusetts 118, 259, 263, 268, 733, 734, 735
New Jersey 382
New York 344
North Carolina 479
Pennsylvania 404
Rhode Island 284, 301
Virginia 451, 453
Squeteague fishery in—
Connecticut 316, 319
Massachusetts 253, 267, 269, 274
Rhode Island 294, 296, 298, 303, 304, 306, 307, 308, 309
Squid 121, 139, 160, 161, 179, 268, 724, 735
Bait fishery 159
Dried 604
Fishery 118, 120, 137, 174, 178
Fishery at Cape Breton 159, 160
Fishery at Newfoundland 160, 161, 180
Fishery, vessels in 120, 138, 159, 178
For bait 160, 161
For cod-bait 156
Squidding for bluefish 156
Squirrel-fish 507
Stage island, Maine 97
Stake-net fishery 373
Stake-nets for shad 375
Stamford, Connecticut, oyster industry of 339
Stamford oysters 203
Standard Fertilizer Company 220
Stannard, R. H 321
Staples, G. M 39
Star-fish 486
Stargut island, Rhode Island 289
Star island, Isles of Shoals 111, 112
Stark, William, cited 132
Starvegoat island, Rhode Island 289
Staten island, New York 375, 376
Statistics of—
Commercial fisheries of North Carolina 478
Fishery exports from Boston 204-207
Fishery imports into Boston 207-209

Statistics of—Continued. Page.
Massachusetts fisheries in 1837 and 1840 130
Oyster interests of Fall River district..... 280
Oyster trade of Maryland..... 448
Persons in oyster trade of Maryland.....447, 448
Statistics of fisheries of—
Alaska 630
Barnstable district 224
Bath district 72
Boston district 187
California 593, 594
Castine district..... 36
Connecticut 313
Delaware 411
Eastern Florida 523
Edgartown district..... 258
Elizabeth City county, Virginia 456
Fall River district..... 275
Frenchman's Bay district 29
Georgia 514
Gloucester district.....137, 138, 139
Gloucester from 1870 to 1881 170–175
Kennebunk district..... 94
Lake Erie..... 659
Lake Huron..... 657
Lake Ontario..... 672
Lake Superior..... 634
Louisiana 575
Machias district 21
Maine..... 10
Marblehead district..... 182
Maryland 423
Massachusetts in 1879 117–121
Monterey county, California 607
Nantucket district..... 254
New Bedford district 262
Newburyport district 131
New Hampshire 108
New Jersey..... 381
New York 343
New York bay..... 382
Northern New Jersey 384
Oregon 624
Passamaquoddy district 13
Pennsylvania 403
Plymouth district 215
Portland and Falmouth district..... 76
Rhode Island for 1880..... 284
Saco district 93
San Luis Obispo county, California 602
San Mateo county, California 607
Santa Barbara county, California 602
Santa Cruz county, California..... 607
South Carolina 504
Southern New Jersey 393
Texas..... 582
The great lakes..... 633
Virginia 451
Waldoboro' district..... 53
Washington territory..... 625
Wiscasset district 66
York district 95
Statistics of fish taken in—
Los Angeles county, California..... 597
San Diego county, California 595
Statistics of oyster industry of— Page.
Boston..... 204
Chesapeake bay 469
New Hampshire 107
Rhode Island..... 294
Statistics of oyster-packing in—
Maryland 445
Virginia 467, 468, 469
Statistics of salt-water fisheries of—
Alabama 568
Georgia 515
Maryland 424
Pennsylvania 405
Statistics of sea fisheries of—
Eastern Florida 523
North Carolina 479
Virginia 453
Steamer—
Cannery 49
For gathering marine products..... 44
Mackerel..... 54
Steamers, menhaden.....52, 61, 69, 99
Stearns, Silas 522, 533
Steilacoom, Washington territory 626
Stenotomus chrysops 359, 390, 502, 507
Sterling oil-works 353
Steuben, Maine, fisheries of 25, 27
Stevens' Point fishermen..... 672
Still-baiting in New Jersey 388
Stingaree 586
Stingray point, Virginia 460
Sting-rays 383
Stockton, Maine, fisheries of 47
Stolephorus ringens 612
Stonington, Connecticut—
Fur seal fishery of 313, 315
Whale fishery of.....313, 315
Stony Brook harbor, New York 350
Stony brook, New York..... 350
Stony creek, Connecticut 318, 323
Stony Creek Oyster Company..... 323
Stony point, Lake Erie 662
Stop-fishing in Florida 528
Straight beach, Virginia..... 453
Straight-boat 111
Straits of Belle Isle cod-fishery.....242, 723, 726
Straits of Mackinac 654, 655
Stratford, Connecticut.....332, 334
Streater, G. C., on Salem fisheries..... 695
Striped bass—
Fishery 196, 248, 260, 265, 307
Fresh.....119, 133, 193, 196, 225, 254, 284, 314
Striped bass in—
Connecticut.....316, 320, 332
Delaware 411
Massachusetts.....118, 138, 268, 274
New York 354, 360, 361, 363, 364, 368, 372
Rhode Island..... 284
Striped mullet 268
Stromateus triacanthus 359, 389
Studley, Henry T 63
Sturgeon—
At Victoria, Washington territory 629
Caviar.....503, 505
Dried 79

Sturgeon—Continued. Page.
Early exports of 685
Fishing by Indians 283
Former abundance of 132, 685, 724
Fresh 119, 133, 138, 193, 196, 225, 259, 263, 376, 650
In fisheries of the great lakes .. 640, 647, 648, 649, 650, 658, 659, 662, 666, 670
In New Berne market 485
In San Francisco market 618
In Savannah market 517
Pickled 79, 682
Roe 503, 510, 518
Smoked 377, 650, 651, 663, 666, 668, 670
Trade of Savannah 518
Sturgeon, catch of, in—
Delaware 411
Eastern Florida 523
Georgia 503, 515
Maryland 424
Massachusetts 118
New Jersey 382
New York 344
North Carolina 479, 495
Pennsylvania 404
South Carolina 503, 504, 505
Virginia 452, 458, 459
Sturgeon fishery in—
California 609, 615, 616, 619
Connecticut 332
Delaware 412
Georgia 502, 514
Maine 79, 80
Massachusetts 132, 736
Pennsylvania 403
Rhode Island 294
South Carolina 502, 506
Suckers 618, 639
Sugar bluff, lake Erie 664
Sugar Loaf rock, New York 350
Sullivan, Maine, fisheries of 31
Sullivan's island, South Carolina 508
Sunfish 724
Sun-trout 516
Superior City, lake Superior 635
Surf-fish 597, 605, 609
Surf-fishing 372, 418
Surinam, fish exports to 167, 693
Surry, Maine, fisheries of 28, 34, 35
Susquehanna river 403
Suwannee river, Florida 553, 554
Swampscott, Massachusetts, fisheries of .. 115, 182, 185, 708
Swan, J. G 629
Swansea, Massachusetts 275, 276, 277
Oyster industry of 279
Swan's island, Maine—
Fisheries of 38, 39
Lobster fishery of 39
Mackerel fishery of 39
Vessel-fisheries of 39
Sweden, exports of fish to 205, 206
Swedish fishermen 146, 640, 643
Sweep-seine fishery 245
Swiss fishermen 643

Page.
Swordfish 183, 188, 193, 194, 225, 304
Fresh 119, 133, 138, 172, 255, 259, 263, 284, 314
Pickled ... 86, 121, 133, 139, 172, 179, 183, 188, 216, 225
Swordfish, catch of, in—
Connecticut 317
Massachusetts 118
New Hampshire 109
Swordfish fishery in—
Maine 85, 89
Massachusetts 193, 194, 271, 273
Rhode Island 299, 303
Sycamore drain rocks, Virginia 472
Syngnathus griseolineatus 612
Syosset, New York 349
Syracuse salt for fish-curing 234

T.

Tabb's river, Virginia 460
Tacoma, Washington territory 626
Tailor fishery 427, 457
Tailors, catch of, in Virginia 458, 459
Talbot county, Maryland 437
Talmage, John 361
Tampa bay, Florida—
Fisheries of 546
Mullet fishing at 547
Pound-fishing at 548
Shark and porpoise fishing at 547
Tampa bluffs, Florida 525
Tangier island, Chesapeake bay 427, 434, 442, 463
Tanner's oil 150
Tarpaulin cove, Massachusetts 261
Tarpum in Texas 585
Tar river, North Carolina 478
Taunton river, Massachusetts 115, 275, 276, 283
Oyster interests of 277
Shad and alewife fisheries of 276
Taunton River oysters 287
Tautoga onitis 390
Tautog—
Fresh 119, 138, 259, 263, 284, 314
In Connecticut 317, 324
In Massachusetts 118, 183, 196, 225, 268, 725, 731, 733, 734, 735
Tautog fishery in—
Connecticut 324
Massachusetts 102, 196, 243, 244, 247, 248, 253, 260, 262, 267, 269, 271, 272, 273
New York 347
Rhode Island 284, 294, 299, 301, 303, 304, 305, 306, 307, 308
Taxation, vessels exempt from 122
Taxes on vessels abated 704
Taylor county, Florida 553
Tenant's harbor, Maine 55
Ten Pound island, Gloucester harbor 143
Terrapin—
Abundance of 462
Bucking 503
Culture in North Carolina 482
Hunting with dogs 482
Importation of 196

Terrapin—Continued. Page.
In Boston market 193
In San Francisco market 613
In Savannah market 518
Trade 494
Terrapin, catch of, in—
Delaware 411
Eastern Florida 523, 524
Georgia 515
Maryland 424, 425, 429
New Jersey 383, 385, 393
North Carolina 479, 480, 495
South Carolina 505
Virginia 452, 453
Terrapin fishery in—
Delaware 412, 413, 415, 416, 417, 418, 419
Maryland 429
New Jersey 399
New York 347, 348, 373
North Carolina 481, 482, 485, 487, 491
South Carolina and Georgia 503
Virginia 456, 457, 462
Terry, Albert 363
Terry, J. S 506, 509
Terry, Samuel 482
Terry, W. H 368
Texas—
Fisheries of 582
Fishermen of 583
Fishing boats and seines in 583
General description of fisheries of 583
Lay of the fishermen 584
Oyster fisheries of 584
Oystermen of 583
Statistics of fisheries of 582
Thacher's *History of Plymouth* 723
Thaleichthys pacificus 626, 629
Thames river, Connecticut 316, 317
Thatcher's island, Massachusetts 141
Thaxter, Celia, on Isles of Shoals 112
Thebadau, Captain Peter 159
Thomas, Cary G 569
Thomaston, Maine, fisheries of 54, 55
Thoreau's *Cape Cod* cited 277
Thorny-backs 493
Three-Mile harbor, New York 360
Tinker's island, Maine 33
Tisbury, Massachusetts 258, 260
Tiverton Four Corners, Rhode Island 297
Tiverton, Rhode Island—
Menhaden fishery of 296
Shell-fish at 286
Toad-grunter 735
Toledo, Ohio 662
Tollman, Captain Benjamin 296
Tomales bay, California 609
Tom-cod 246, 268, 612, 615, 618, 627, 712
Tompkinsville, New York 376
Tongues—
Cod 179, 679, 694, 702, 707
Cod, exports of 167
Fish 145, 154
Pickled 121, 139, 172, 188
Too's point, Virginia 458
Topping, S. B 364
Torching— Page.
For sperling 134, 136
Herring 19
Torpedo fish 724
Toussaint, lake Erie 664
Townsend, Maine 63, 68
Trade in canned fish at Boston 197
Trammel-nets 570, 578
Transportation of oysters 466
Trapani salt 168, 169, 210, 234
Trap fish at Elizabeth islands 261
Trap-net fishery 307, 309, 352
Traps 22
Deep-water 67
Floating 164, 165
Travers, Captain Samuel M 442
Traverse City, lake Michigan 654
Treading clams 399
Treat, U. S., began canning industry in the United States 17
Treaty of Washington 153, 161
Treaty, reciprocity 153, 220
Treaty rights 686
Trefethen, C. & H 86
Tremont, Maine 33, 34
Trescott, Maine, fisheries of 20
Triacis semifasciatus 612
Trichurus lepturus 586
Trinidad, fish exports to 167
Trinity bay, squid at 161
Trolling 388
Trout—
Brook 598
Culture in New York 347
Former abundance in Maine 82
Fresh 477, 486, 645, 650, 656, 657
Fresh-water 516
Pickled 172
Preserves 369, 370
Rock 604
Salmon 196, 488
Salted 486, 564, 640, 656
Sounder 489
Sounds 489
Spotted 516
Spotted sea 453, 523, 524
Sun 516
Trout, catch of, in—
Delaware 411
New York 344
Virginia 454, 458, 459
Trout fishery in—
Alabama 570, 574
California 603
Delaware 410, 412, 413, 415
Maryland 427
North Carolina 483, 493
South Carolina 506, 511
Virginia 462, 463
Trout in—
Eastern Florida 425, 528, 529
Lake Erie 660
Lake Huron 659
Lake Michigan 639, 640, 643, 645, 646, 647, 648, 649, 650, 652, 653, 654, 655

Trout in—Continued. Page.
Lake Ontario 673
Lake Superior 635, 636, 637, 638
Massachusetts 735
San Francisco market 618
Western Florida 555
Trout-brooks 106
True, Frederick W 113, 236, 631
Trufant, A. T 79
Truro, Massachusetts, fisheries of 116, 127, 232, 724, 725
Trygon sayi 586
Tuckernuck island, Massachusetts 254
Tucker's island, Maine 34
Tuckerton, New Jersey 394, 396, 397, 399
Tufas island, Connecticut 322
Turtle 376, 539
Canned 484, 527
Catch of 411
Fishery 413, 415, 417, 418, 419, 491, 577, 613
Green 525, 526, 527, 536, 537, 576, 582, 585
Hawk-bill 525
Imports of 196
Loggerhead 485, 525
Sea 596
Turtle Crawl point, Florida 549
Turtle pond, Massachusetts 727
Tuthill & Co., George T 353
Tuthill & Sons, W. M 353
Two Rivers, lake Michigan 646
Tylosurus longirostris 586

U.

Union bay, Maine 28
Union Fishery Company 569
Union Ice Company 209, 210
Union Oyster Company 443
Union river, Maine 35
United States of Colombia, exports to 205, 206
Uraptera binoculata 612
Utsaladdy, Washington territory 628

V.

Vale & Griffin 353, 383
Ventura county, California 595, 598, 599
Venus mercenaria 725
Vermillion, lake Erie 667
Vessel-building 59, 679
Vessel fisheries of—
Bristol, Maine 60
Deer island, Maine 41
Eastport, Maine 18
Portland in 1879 83
Vessel fishermen, number of, in—
Connecticut 313
Maine 10, 21, 29, 36, 46, 53, 66, 72, 76, 93, 94, 95
Massachusetts 120, 132, 138, 178, 182, 187, 215, 224, 254, 258, 262, 275
New Hampshire 108
Rhode Island 284
Vessel fitters of Gloucester 145
Vessels in—
Food-fish fisheries 9, 10, 13, 22, 29, 37, 46, 53, 66, 73, 77, 93, 94, 95, 108, 120, 132, 138, 178, 183, 187, 215, 224, 254, 263, 284
Vessels in—Continued. Page.
Lobster fishery 10, 13, 22, 29, 37, 46, 53, 77, 120, 183, 187, 263, 284, 314
Menhaden fishery 10, 53, 66, 77, 120, 138, 159, 187, 263, 275, 284, 314, 451
Oyster fishery 10, 53, 107, 120, 178, 182, 187, 224, 314, 438, 441, 465, 466
Seal fishery 120, 263, 314
Squid fishery 120, 138, 159, 178
Whale fishery 120, 187, 224, 258, 263, 314, 593
Vessels, statistics of, in fisheries in—
Alabama 568
Bath district 73
Belfast district 46
Boston district 187
California 593, 594, 599, 602, 607, 618, 624
Castine district 37
Connecticut 314
Delaware 411
Edgartown district 258
Fall River district 275
Georgia 514
Gloucester district 138
Great lakes 633, 634, 638, 657, 659, 672
Gulf states 536
Kennebunk district 94
Louisiana 576
Machias district 22
Maine 10
Marblehead district 183
Maryland 423, 424, 441
Massachusetts 120
Nantucket district 254
New Bedford district 263
Newburyport district 132
New Hampshire 108
New Jersey 381, 385, 393
New York 343
North Carolina 478, 489
Pacific coast 592
Passamaquoddy district 13
Pennsylvania 403, 405
Plymouth district 215
Portland district 77
Rhode Island 284
Saco district 93
Salem district 178
South Carolina 504, 505
Virginia 451, 452
Waldoboro' district 53
Washington territory 625
Western Florida 536
Wiscasset district 66
York district 95
Victoria, Washington territory 626, 629
Vinal Haven, Maine 45, 50
Haddock-smoking at 86
Vines, Captain Richard, early expedition to Maine 98
Vineyard Haven, Massachusetts 260
Vineyard Sound squid fishery 159, 160
Virginia—
Alewife fishery of 451
Description of fisheries of, by counties 454
Fisheries of 449–473
Menhaden fishery of 451

Virginia—Continued. Page.
Oyster dredging and tonging in 464
Oyster interests of 464–473
Oyster laws 431
Oystermen of 464
Oystermen, number of 465
Oyster-packing in 466
Oysters 251, 291, 293
Oysters at New Haven, Connecticut 325
Oysters at Salem, Massachusetts 181
Review of the fisheries of 451
River fisheries of 451
Sea fisheries of 452
Shad fishery of 451
Statistics of fisheries of 451, 452
Virgin Rocks cod fishery 180

W.

Waccamaw river, South Carolina 502
Wages of oystermen 435, 440
Wagon fishing 585
Wakulla county, Florida 554
Waldoboro' district—
Fisheries of 52
Menhaden industry of 52
Review of fisheries of 52
Statistics of fisheries of 53
Vessel- and boat-fisheries of 52
Waldoboro', Maine—
Fisheries of 57, 59
Smelt fishery of 59
Walker, George 472
Walker's island, Rhode Island 303
Walrus oil 121
Waquoit bay, Massachusetts 253
Waquoit, Massachusetts 252
Ward's pond, Rhode Island 308
Wareham, Massachusetts 115, 249, 262, 733
Oyster industry of 264
Oysters at 202
Wareham river, Massachusetts 264
Waretown, New Jersey 387, 389
Warren, Rhode Island 283, 286, 287, 304
Warrington, D. N 418
Warwick county, Virginia 465
Warwick cove, Rhode Island 305
Warwick neck, Rhode Island 305
Warwick, Rhode Island 286
Wash Bowl, Rhode Island 297, 298
Washington, District of Columbia 468
Washington, market for fresh fish 197
Washington territory—
Coast fisheries of 626
Fisheries of 625
Statistics of fisheries of 625
Watch Hill, Connecticut 360
Watch Hill, Rhode Island 309
Waterhouse, Charles 528
Water mills, New York 362
Waukegan, lake Michigan 648
Weakfish 358, 362, 389, 395
Fishery 309, 347, 354, 370, 374, 394, 412, 425
Sounds for isinglass 142
Webb, Henry 164
Webb, William 40
Weeweantit river, Massachusetts 251, 265
Weir fishery 15, 234, 238, 239, 240, 241, 242, 243, 246, 247, 252, 260, 267, 268, 352
Weir, for bass 709
Weirs—
Alewife 76, 111, 213, 709
Alewife and smelt 61, 67
At Wellfleet 234
Brush 19, 21, 23, 24, 26, 28, 33, 34, 38
Fish 102, 164
Herring 20, 25, 27, 33, 38, 50, 716
Salmon 76
Salmon and alewife 48
Weirs in—
Connecticut 314
Maine 10, 13, 22, 29, 37, 46, 53, 95
Massachusetts 138, 178, 224, 254, 258, 263, 685, 710, 736
New Hampshire 108
Rhode Island 284
Welaka, Florida, fisheries of 530
Welchman 484, 485
Wellfleet, Massachusetts—
Alewife fishery of 234, 235
Blackfish fishery at 235, 727
Clam fishery at 234
Early history of 726
Fisheries of 116, 127, 232, 234, 726, 727
Mackerel fishery of 116, 234
Oyster industry of 199, 234, 236, 727, 728
Weir-fishery at 234
Whale fishery of 235, 727
Well smacks 168
Wells & Co., Henry E 353
Wells & Sons, D. D 357
Wells bay, Maine 99, 100
Wells Beach, Maine, fishing station 100
Wells, Henry E 357
Wells, Maine, fisheries of 100, 101
Wepawaug river, Connecticut 334
Weskeag river, Maine 55
West Brewster, Massachusetts 239
Westbrook, Connecticut, shad fishery of 320
Westbrook, Maine 79
West Chatham, Massachusetts 240
West Dennis, Massachusetts 244
West de Père, lake Michigan 644
Westerly, Rhode Island 286
Western Bank cod fishery 32, 43, 58, 60, 68, 69, 108, 109, 117, 145, 146, 155, 273, 729
Western Bank fishery 171, 172
West Falmouth, Massachusetts 252
West Florida, statistics of fisheries of 536
West Gloucester, Massachusetts 143
West Gouldsboro', Maine 30
Westhampton, New York 364
West Harwich, Massachusetts 241
West Indies—
Fish exports to 129, 130, 135, 167, 205, 206, 207, 217, 218, 682, 701, 706
Trade with 124
Westmoreland county, Virginia 465

Page.
West Pembroke, Maine 18
Westport, Connecticut, oyster business of 336
Westport, Maine 65, 71
Westport, Massachusetts 115, 262, 267, 273
Westport point, Massachusetts 273
Westport river, Massachusetts 272
West river, Connecticut 330
Weymouth, Massachusetts—
Cod fishery of 127
Fish-fertilizer factory at 213
Isinglass factory at 213
Whalebone—
At Fairhaven, Massachusetts 269, 270
At Nantucket, in 1715 257
Bounty on, in Rhode Island 283
In Georgia 518
Manufacture of 119
Production of, at New Bedford, 1840 to 1875. 272
Production of, in Connecticut 314, 315, 316
Production of, in Massachusetts in 1840... 130, 226, 259, 264
Production of, in Massachusetts in 1879 121
Production of, in 1854 116
Production of, on Pacific coast 592, 593, 594
Whale fishery—
Capital invested in 119
Encouraged by bounty 284, 737
Whale fishery at—
Cushing point, Maine 82
Duxbury, Massachusetts 717
Edgartown, Massachusetts 258, 259, 733
Gloucester, Massachusetts 139
Ipswich, Massachusetts 685
Lynn, Massachusetts 710
Marblehead, Massachusetts 705
Martha's Vineyard in 1775 732
Monhegan, Maine 62
Plymouth, Massachusetts 724
Prospect harbor, Maine 30
Provincetown, Massachusetts 227, 229
Quincy Point, Massachusetts 713
Salem, Massachusetts 696, 699
Sandwich, Massachusetts 249, 730
Stonington, Connecticut 315
Truro, Massachusetts 724
Wellfleet, Massachusetts 235, 726, 727
Whale fishery in—
Connecticut 313, 315, 316
Georgia 514, 518
New Bedford district 262, 263, 265, 267, 269, 271, 273, 276, 735
New York 357
North Carolina 487, 490
Pacific coast 591, 593, 596, 597, 600, 601, 604, 621
Rhode Island 283, 736
Whale fishery, statistics of—
In 1846 115
In 1854 116
Products of 115, 116, 120, 188, 226, 257, 259, 263
Vessels in... 115, 118, 120, 187, 223, 224, 258, 263, 314
Whale oil on Pacific coast 592, 593, 594, 602, 607
Whale oil, production of, in—
Connecticut 314, 315, 316
Georgia 518
Whale oil, production of, in—Continued. Page.
Massachusetts 116, 121, 130, 139, 151, 226, 230, 257, 259, 264, 269, 270, 272, 699
Whaling fleet of—
Connecticut, statistics of 314
New Bedford 272, 276
United States in 1846 115
Whaling fleet, statistics of, in 1880 115
Whaling grounds 115
Of the Pacific 593
Whaling vessels, statistics of 115, 118, 120, 187, 223, 224, 258, 263, 314
Wharves at Gloucester, Massachusetts 144
Wheeler's Point, Massachusetts 143
Wheelwright, John, deed of Isles of Shoals to 111
Wherries, fishing 109
Whitefish—
At Marion, Massachusetts 734
Fresh 193, 376, 645, 650, 656, 657
Salt 638, 640, 644, 656
Smoked 649, 650
Whitefish, catch of, in—
Lake fisheries of New York 344
Pennsylvania 404
Whitefish in—
Connecticut 320
Lake Erie 660, 661, 662, 663, 664, 665, 666, 667, 671
Lake Huron 658, 659
Lake Michigan 639, 640, 641, 642, 643, 645, 646, 647, 648, 649, 652, 653, 654, 655
Lake Superior 635, 636, 637, 638
San Diego county, California 595
Whitefish bay, lake Michigan 640
Whitefish point, lake Superior 637
Whitehall, lake Michigan 652, 659
White island, Isles of Shoals 111
White island, Piscataqua river 109
White Island pond, Massachusetts 221
White perch 221, 284, 351, 360, 364, 547
White rockfish 659
White shad 517
Whitestone, New York 346
Whiting 502, 504, 508, 511, 529, 586, 735
Whiting, Maine, fisheries of 20
Whitman, Levi, *History of Wellfleet* 235
Wickford harbor, Rhode Island 289
Wickford, Rhode Island 306
Wicks, James 370
Wilcox, W. A 92, 96, 97, 99, 100, 103, 105, 113, 281, 311
Willard, E. G 86, 90
Willard's bay, Connecticut 319
Williamson, W. D., *History of Maine* 60, 63
Williamsville, Delaware 409, 418
Willoughby, lake Erie 670
Willoughby point, Virginia 453, 454
Wilmington, California 597
Wilmington, North Carolina 477, 492
Fish markets of 493
Line-fishery of 493
Salt-fish trade of 494
Statistics of fisheries of 494
Trade in fresh fish at 493
Vessel-fishery of 493
Wilson, lake Ontario 672, 673
Windmill point 659

Page.
Window-pane 361
Wing's cove, Massachusetts 265
Winipiseogee river 131
Winslow, Francis 433
Winsor's *History of Duxbury* 717
Winter cod fishery 388
Winter haddock fishery 78, 145, 158, 170
Winter harbor, Maine 30, 31
Winthrop, Massachusetts, oyster-beds at 201
Winyah bay, South Carolina 504, 506
Wiscasset district—
Fisheries of 65
Ship-building at 65
Statistics of fisheries of 66
Wiscasset, Maine, fisheries of 70
Witchcraft at Salem, Massachusetts 123
Wonder-Working Providence cited 122
Wonson, Captain J. F 157
Wood island, Maine, herring fishery at 31, 39, 58, 92, 97, 99
Wood island, New Hampshire 109
Woodsburg, New York 373
Wood's Holl, Massachusetts 252, 253, 732
Woolwich, Maine 71, 73, 75
Wright, Charles R 656
Wrightsville sound, North Carolina 494

Page.
Wyatt, James 413
Wyer Brothers 87

Y.

Yaphank, New York 367
Yarmouth, Maine 79
Yarmouth, Massachusetts—
Fisheries of 116, 127, 244, 245, 730
Salt-works at 730
Yates, Captain Washington 396
Yellow Bluffs, Florida 528
Yellow-fin 586
Yellow-finned trout 502
Yellow perch 193, 284, 360
Yellow-tails 525, 529, 595, 600
York county, Virginia 457, 465
York district, Maine, fisheries of 92, 95
York, Maine, fisheries of 101, 102
York river, Maine, clam-digging in 102
York river, Virginia 457, 458, 471
York spit, Virginia 458
York, T. J 64
Young's *Chronicles of the Pilgrim Fathers* 719

Z.

Zaniolepis latipinnis 612