DEPARTMENT OF COMMERCE AND LABOR

COAST AND GEODETIC SURVEY

O. H. TITTMANN

SUPERINTENDENT

UNITED STATES COAST PILOT

ATLANTIC COAST

PART III

FROM CAPE ANN TO POINT JUDITH

THIRD EDITION

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(1912)

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DEPARTMENT OF COMMERCE AND LABOR,
COAST AND GEODETIC SURVEY,
WASHINGTON, D. C., *March 7, 1912.*

This publication is based mainly upon the work of the Coast and Geodetic Survey, including the results of special examinations and investigations by a party on the Coast and Geodetic Survey steamer *Hydrographer* in 1910, in connection with its preparation.

The system adopted in this publication includes—

I. A tabular description of all lighthouses, light vessels, and fog signals; lists of life-saving stations, and Weather Bureau storm warning display stations; and information regarding tides, tidal currents, variation of the compass, etc.

II. General information concerning the several bodies of water and harbors, including notes relative to pilots and pilotage, towboats, depth of water, draft of vessels entering, harbor and quarantine regulations, supplies, facilities for making repairs, usual or best anchorages, and other matters of practical interest. In each case the information of this nature precedes the sailing directions and is printed in smaller type.

III. Sailing directions, with subordinate paragraphs treating of prominent objects, dangers, aids to navigation, etc. In the arrangement adopted the aim has been to conform, as far as practicable, to the order in which these matters would be considered in practice, and to render available such information as may be wanted promptly.

IV. Appendices.

The first edition of this volume was prepared by Lieut. Edwin H. Tillman, United States Navy, assisted by Mr. John Ross. In the present (third) edition the text has been revised and brought up to date by Mr. Herbert C. Graves, assisted by Mr. C. L. Warwick and Mr. E. Vance Miller, under the direction of J. J. Gilbert, assistant, Coast and Geodetic Survey, inspector of hydrography and topography.

Great courtesy has been shown by local authorities in furnishing information desired for incorporation in this work.

The aids to navigation are corrected to March 7, 1912.

Navigators will confer a favor by notifying the Superintendent of the Coast and Geodetic Survey of errors which they may discover, or of additional matter which they think should be inserted for the good of mariners.

O. H. TITTMANN,
Superintendent.

NOTE.

The courses and bearings given in degrees are *true*, reading clockwise from 0° at north to 360°, and are followed by the equivalent *magnetic* value in points in parenthesis. General directions, such as northeastward, west-southwestward, etc., are magnetic.

All distances and current velocities are in *nautical miles*, except where otherwise stated.

Except where otherwise stated, all depths are at *mean low water*.

In winter when whistling buoys, bell buoys, lighted buoys, can buoys, and nun buoys are in danger of being carried away by ice, they are taken up and replaced by spar or spar-shaped buoys.

It must be remembered that in the thoroughfares and inside passages the aids are colored and numbered for entering from eastward.

All charts referred to in this volume are published by the Coast and Geodetic Survey, and can be obtained at the agencies, a list of which is given on pages 7–8.

SYSTEM OF BUOYAGE ADOPTED IN UNITED STATES WATERS.

In conformity with section 4678 of the Revised Statutes of the United States, the following order is observed in coloring and numbering buoys in United States waters, viz:

1. In approaching the channel, etc., from seaward, RED BUOYS, with EVEN NUMBERS, will be found on the STARBOARD side.

2. In approaching the channel, etc., from seaward, BLACK BUOYS, with ODD NUMBERS, will be found on the PORT side.

3. BUOYS painted with RED and BLACK HORIZONTAL STRIPES will be found on OBSTRUCTIONS, with channel ways on either side of them, and may be left on either hand in passing in.

4. BUOYS painted with WHITE and BLACK PERPENDICULAR STRIPES will be found in MID-CHANNEL, and must be passed close-to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on what side they shall be passed.

Nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side of channels.

Day beacons (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

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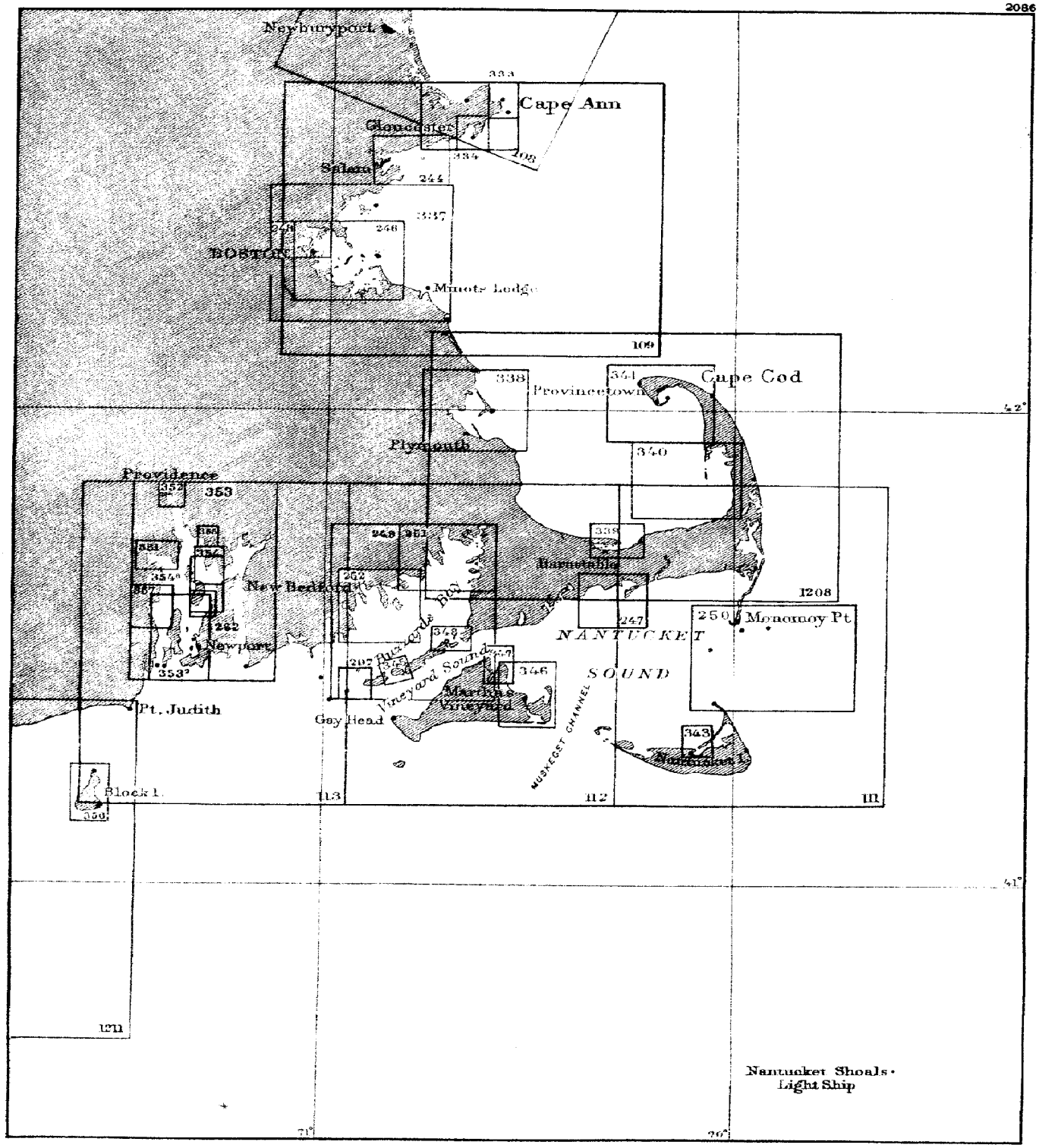
2086
Newburyport
333
Cape Ann
Gloucester
334
108
Salem
244
337
246
BOSTON
Minots Ledge
109
338
341
Cape Cod
Provincetown
42°
Plymouth
340
Providence
352
353
351
354
354a
357
262
Newport
353a
New Bedford
249
251
252
Buzzards Bay
Barnstable
339
1208
247
250
Monomoy Pt
NANTUCKET
SOUND
348
207
Vineyard Sound
346
Martha's Vineyard
Gay Head
Pt. Judith
MUSKEGET CHANNEL
343
Nantucket I.
Block I.
356
113
112
111
41°
1211
Nantucket Shoals
Light Ship
71°
70°

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SITKA: Henry L. Bahrt, jr.
VALDEZ: E. B. Spiers.
WRANGELL: F. Matheson.

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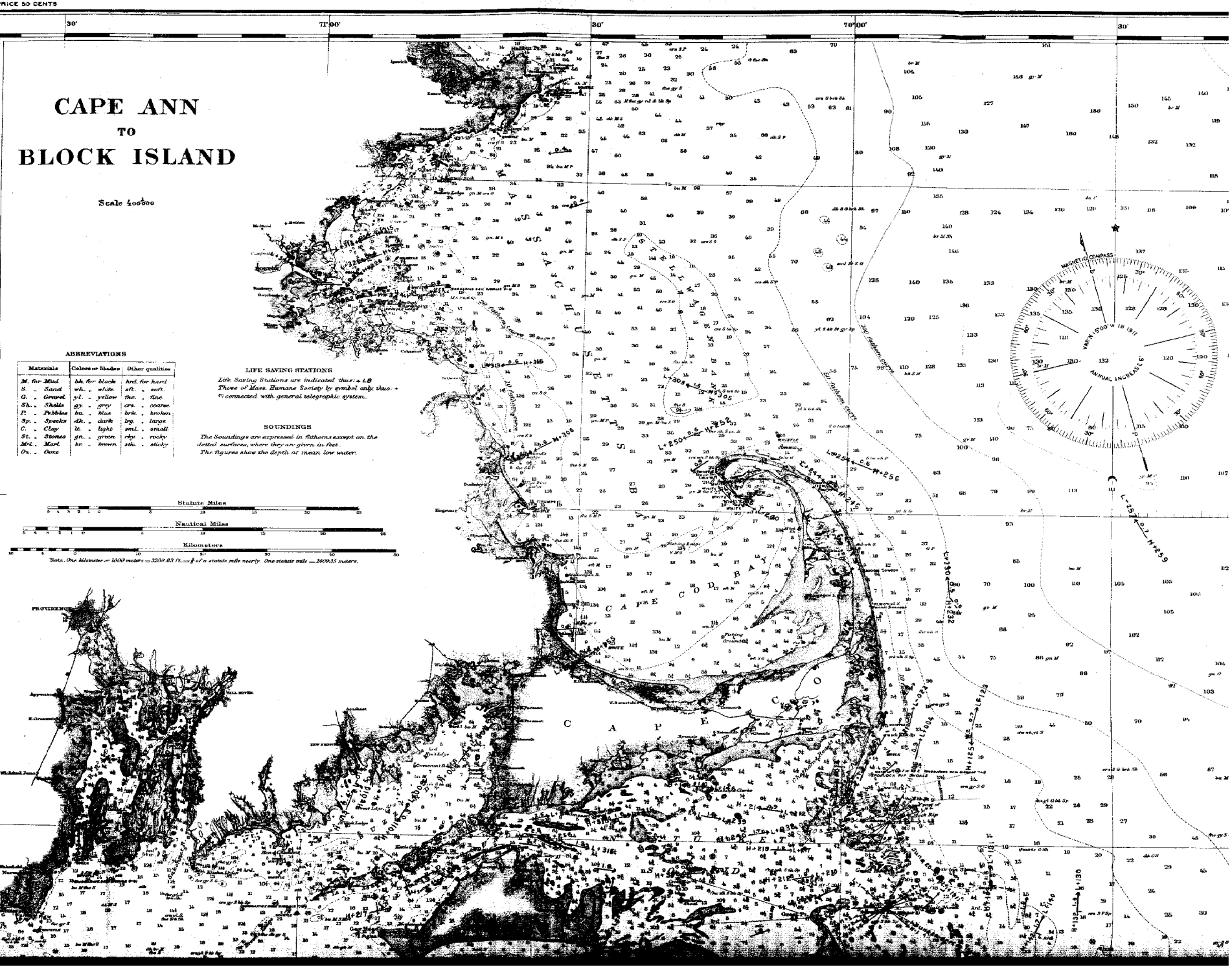
CAPE ANN TO BLOCK ISLAND

Scale $\frac{1}{400000}$



ABBREVIATIONS

Materials	Colors or Shades	Other qualities
M. for Mud	bk. for black	hrd. for hard
S. " Sand	wh. " white	sft. " soft
G. " Gravel	yl. " yellow	fne. " fine
Sh. " Shells	gy. " grey	crs. " coarse
P. " Pebbles	bu. " blue	brk. " broken
Sp. " Specks	dk. " dark	lrg. " large
C. " Clay	lt. " light	sml. " small
St. " Stones	gn. " green	rky. " rocky
Mst. " Mast	br. " brown	stk. " sticky
Oz. " Ooze		

LIFE SAVING STATIONS

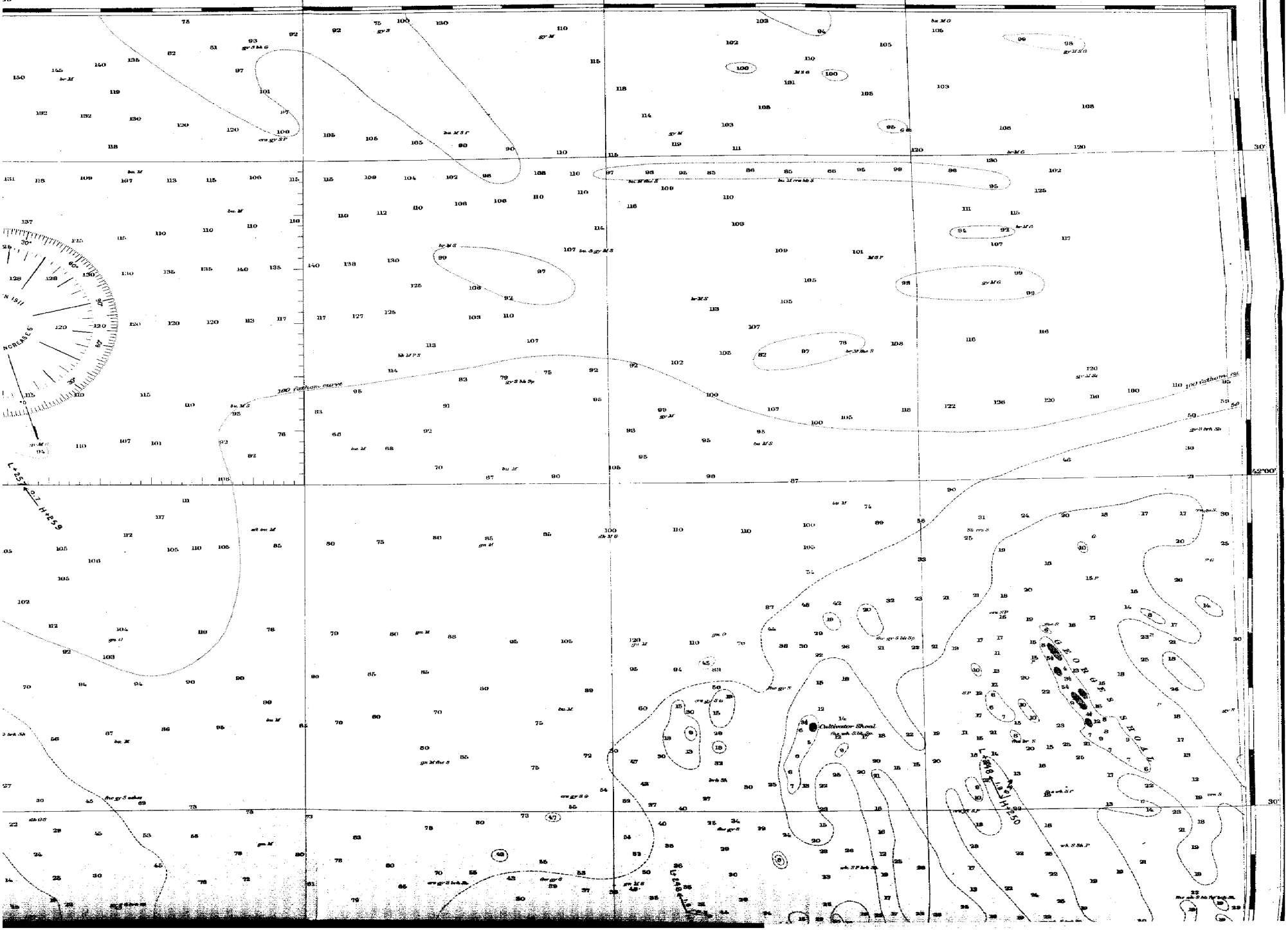
Life Saving Stations are indicated thus:+ LB
Those of Mass. Humane Society by symbol only, thus: +
⊕ connected with general telegraphic system.

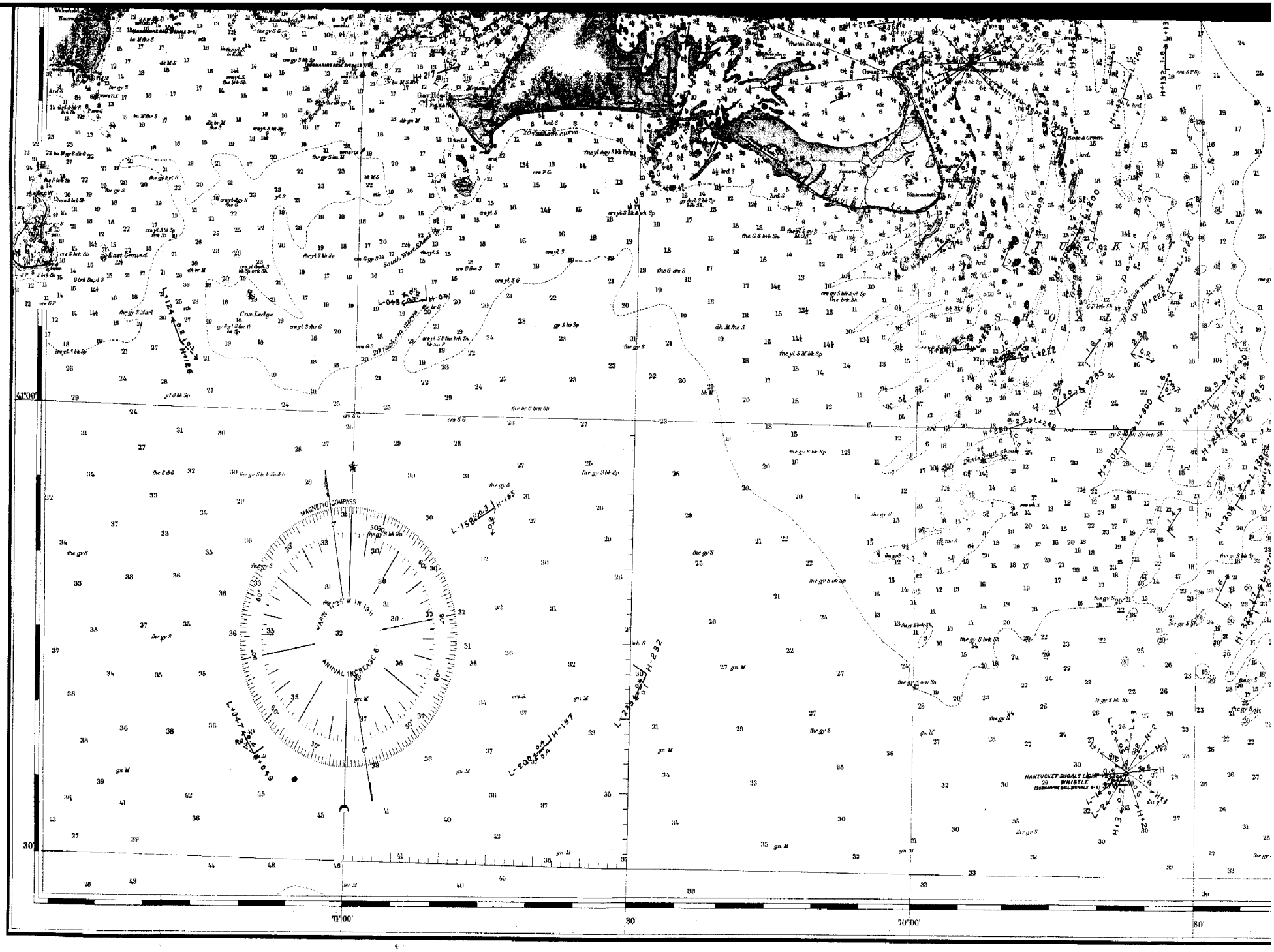
SOUNDINGS

The Soundings are expressed in fathoms except on the dotted surface, where they are given in feet.
The figures show the depth at mean low water.

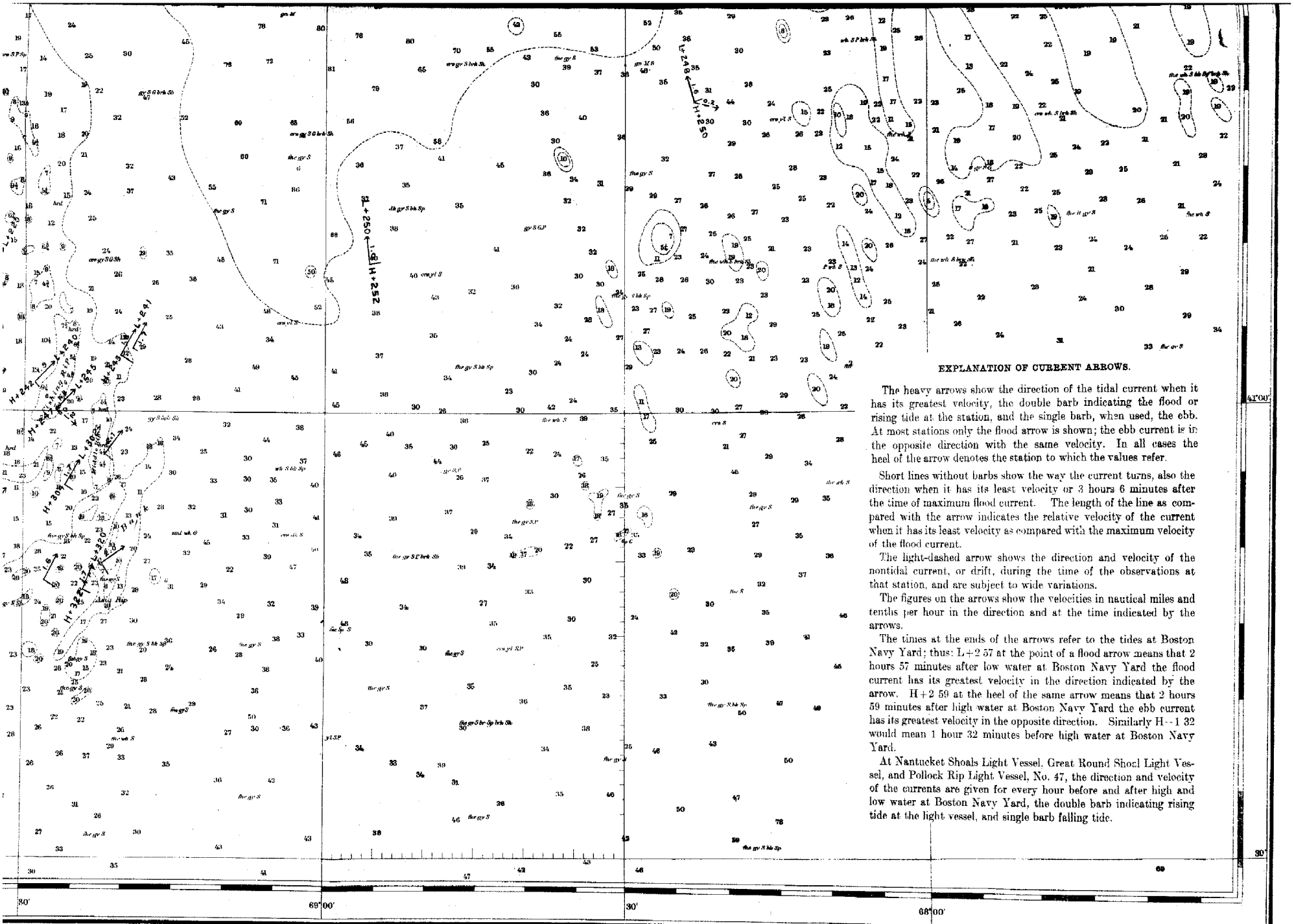
Note. One kilometer or 1000 meters = 3280.83 ft. = ⅝ of a statute mile nearly. One statute mile = 1609.35 meters.

PLATE No. 3064





MAGNETIC COMPASS
VARN 1°25' W IN 1911
ANNUAL INCREASE 6
NANTUCKET SHOALS LIGHT
WHISTLE
Cox Ledge
East Ground
South West Shoal
10 fathom curve
20 fathom curve
41°00'
30'
71°00'
30'
70°00'
30'



EXPLANATION OF CURRENT ARROWS.

The heavy arrows show the direction of the tidal current when it has its greatest velocity, the double barb indicating the flood or rising tide at the station, and the single barb, when used, the ebb. At most stations only the flood arrow is shown; the ebb current is in the opposite direction with the same velocity. In all cases the heel of the arrow denotes the station to which the values refer.

Short lines without barbs show the way the current turns, also the direction when it has its least velocity or 3 hours 6 minutes after the time of maximum flood current. The length of the line as compared with the arrow indicates the relative velocity of the current when it has its least velocity as compared with the maximum velocity of the flood current.

The light-dashed arrow shows the direction and velocity of the nontidal current, or drift, during the time of the observations at that station, and are subject to wide variations.

The figures on the arrows show the velocities in nautical miles and tenths per hour in the direction and at the time indicated by the arrows.

The times at the ends of the arrows refer to the tides at Boston Navy Yard; thus: L+2 57 at the point of a flood arrow means that 2 hours 57 minutes after low water at Boston Navy Yard the flood current has its greatest velocity in the direction indicated by the arrow. H+2 59 at the heel of the same arrow means that 2 hours 59 minutes after high water at Boston Navy Yard the ebb current has its greatest velocity in the opposite direction. Similarly H−1 32 would mean 1 hour 32 minutes before high water at Boston Navy Yard.

At Nantucket Shoals Light Vessel, Great Round Shoal Light Vessel, and Pollock Rip Light Vessel, No. 47, the direction and velocity of the currents are given for every hour before and after high and low water at Boston Navy Yard, the double barb indicating rising tide at the light vessel, and single barb falling tide.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES COAST PILOT.

ATLANTIC COAST—PART III.

FROM CAPE ANN TO POINT JUDITH.[1]

This volume covers the coast from Cape Ann to Point Judith; the coast of the United States westward of Point Judith, as far as Sandy Hook and including Long Island Sound, is covered by Part IV, and that eastward of Cape Ann by Parts I–II, which also contains a general description of the Gulf of Maine.

Within the limits covered by this volume, the natural features of the coast are irregular and varied, as is also the hydrography along it. Between Cape Ann and Plymouth entrance, the coast is rocky, generally bold, with numerous islands, dry rocks, and sunken ledges lying near the shore, with deep channels between. The shores of Cape Cod Bay, the eastern and southern shores of Cape Cod, and Nantucket Island are generally sandy with extensive sand shoals extending out well from the shore in many places; this is notably the case eastward of Monomoy Point and Nantucket Island; see description of Monomoy and Nantucket Shoals. The coast of Marthas Vineyard is mostly sandy with bowlders scattered along the shore in many places. The south shores of the Elizabeth Islands and the coast from the entrance to Buzzards Bay to Point Judith, including Narragansett Bay, are bold and generally rocky, with occasional sand strips, but off the shore numerous rocks, ledges, and shoals, with good channels between them, will be found. The shores of Buzzards Bay have many outlying rocks and ledges; near the head of the bay are extensive shoals.

The principal obstacles and difficulties which menace navigation along this coast are the outlying dangers, variable tidal currents, and fogs; the greatest danger from these being in the vicinity of Monomoy and Nantucket Shoals.

Harbors and anchorages.—The most important harbors are Gloucester, Salem, Boston, Provincetown, Vineyard Haven, New Bedford, Newport, Fall River, and Providence. These and other harbors and anchorages of lesser importance are described under the different headings.

Aids to navigation are numerous, the harbor entrances and most prominent points being marked by lighthouses, and the principal dangers by buoys, beacons, or spindles; light vessels are in position to mark some of the most frequented and difficult channels. The buoyage accords with the system adopted for United States waters. See page 5, and also the table of lighthouses following.

Pilots.—There are State licensed pilots for ports in the States of Massachusetts and Rhode Island; only certain classes of vessels are exempt from the payment of pilotage. For pilotage laws and rates of pilotage see Appendix II.

Towboats are generally used by the larger sailing vessels when entering the harbors of Gloucester, Beverly, Lynn, Boston, New Bedford, Fall River, and Providence. Sailing vessels in ballast between New York and Boston sometimes employ a towboat for the whole distance, being towed through Nantucket and Vineyard Sounds. See also "Towboats" under the different headings.

Harbor control.—Harbor masters are appointed for the harbors in the States of Massachusetts and Rhode Island, and they have charge of the anchorage and berthing of vessels in their respective harbors. For harbor regulations see Appendix II.

Lines within which the Inland Rules of the Road apply.—*Boston Harbor.*—From Eastern Point lighthouse 215° true (**SW ¼ W** mag.), 15¾ miles, to The Graves lighthouse; thence 139¼° true (**SSE ½ E** mag.), 7½ miles, to Minots Ledge lighthouse.

All harbors in Cape Cod Bay, Mass.—A line drawn from Plymouth (Gurnet) lighthouses 77½° true (**E ⅛ S** mag.), 16¼ miles, to Race Point lighthouse.

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[1] These waters fall within the limits of the following charts: **1,000,** Deg. of mid-Lat.=3.7 inches; **51,** Deg. of mid-Lat.=21.3 inches; **7,** scale $\frac{1}{400,000}$, price of each, $0.50; and a number of coast and harbor charts, on a larger scale (see the index map preceding). All charts referred to in footnotes are issued by the Coast and Geodetic Survey, and can be obtained from the agents named in the list preceding. The catalogue of charts and other publications of the Survey can be obtained free of charge on application at any of the sale agencies or to the Coast and Geodetic Survey Office, Washington, D. C.

Nantucket Sound, Vineyard Sound, Buzzards Bay, Narragansett Bay, Block Island Sound, and easterly entrance to Long Island Sound.—A line drawn from Chatham lighthouses, Mass., 146° true (**S** by **E** ⅞ **E** mag.), 4⅜ miles, to Pollock Rip Shoals light vessel, No. 73; thence 142° true (**SSE** ⅛ **E** mag.), 12¾ miles, to Great Round Shoal Entrance gas and whistling buoy (PS); thence 229° true (**SW** by **W** ½ **W** mag.), 14½ miles, to Sankaty Head lighthouse; from Smith Point, Nantucket Island, 265° true (**W** ⅝ **N** mag.), 25½ miles, to southeasterly point No Mans Land; from westerly point No Mans Land, 359° true (**N** by **E** mag.), 5¼ miles, to Gay Head lighthouse; thence 250¼° true (**W** ¾ **S** mag.), 34½ miles, to Block Island southeast lighthouse; thence 250½° true (**W** ¾ **S** mag.), 14¾ miles, to Montauk Point lighthouse, on the easterly end of Long Island, N. Y.

Rules of the Road.—The international and inland Rules of the Road are given in Appendix V.

Quarantine.—The quarantine laws of the States of Massachusetts and Rhode Island govern the ports of those States. Local municipal officers have the power to make quarantine regulations for the ports under their control. See "Quarantine," Appendix II and Appendix IV.

Marine hospital.—There is a United States Marine Hospital at Chelsea (near Boston), and at Vineyard Haven, Mass. There are relief stations of Class III of the United States Public-Health and Marine-Hospital Service at Gloucester, Provincetown, and New Bedford, Mass., and Newport and Providence, R. I.; and emergency relief stations of Class IV at Barnstable, Chatham, Dennis, Edgartown, Hyannis, and Salem, Mass.

Supplies.—Coal can be had at Gloucester, Beverly, Salem, Boston, Provincetown, New Bedford, Newport, Fall River, and Providence. Water, provisions, and some ship-chandler's stores can be obtained at the above places and at many of the smaller cities and towns. A complete line of ship's supplies can be obtained at Boston.

Repairs.—There are docking facilities at Boston, New Bedford, and Providence, where also repairs can be made to the machinery of steamers. Sailing vessels and steamers of large size can be docked only at Boston. See "Repairs" under the headings, Boston, New Bedford, and Providence.

The prevailing winds in summer are southwesterly and in winter northerly.

Fogs are liable to occur at any season, but are more frequent from April to October than at any other time during the year. They are usually brought by easterly and southerly winds and occasionally by southwesterly winds. Westerly and northerly winds clear away the fog. Southwesterly winds are usually accompanied by haze.

Ice.—In severe winters some of the harbors are closed to navigation by ice, and there is more or less drift ice in all the harbors, in Cape Cod Bay, on Monomoy and Nantucket Shoals, and in Nantucket and Vineyard Sounds. In the principal harbors steamers and tugs usually keep a channel open. See "Ice" under the different headings.

Time signals.—In connection with the service over the land telegraph lines, time signals by wireless telegraph are sent daily, Sundays and holidays excepted, from the United States naval coastwise wireless-telegraph stations, at noon of the seventy-fifth meridian time on the Atlantic coast, and at noon of the one hundred and twentieth meridian time on the Pacific coast. The signals begin at 11.55 and continue for 5 minutes. During this interval every tick of the clock is transmitted except the twenty-ninth second of each minute, the last 5 seconds of each of the first 4 minutes, and finally the last 10 seconds of the last minute. The noon signal is a longer contact after this long break.

TIDAL CURRENTS.

The following remarks on currents should be read in connection with the current data on the chart facing page 9.

Nantucket Island and Shoals are the dividing line between the coast tides, those in the Gulf of Maine being about 3 hours later than those along the coast westward of Nantucket Island. The result is that the strength of the tidal current setting to or from the Gulf of Maine occurs at the time of the least current setting to or from the coast westward of Nantucket Island, and vice versa. The combination of these currents produce over a large part of this region rotary currents; that is, the currents are never slack, but change in direction with the hands of a watch all around the compass twice in every lunar day.

At a point probably about 16 miles eastward of Nantucket Shoals light vessel, the current is not only rotary, as is the case at the light vessel and on Nantucket Shoals, but the velocity will be equal at all hours, while the direction will vary uniformly throughout the half tidal day. A similar statement probably holds true for a point about 2 miles east-southeastward (true) of Point Judith.

At other points the currents are also rotary, but the velocity varies, the minimum current occurring 3 hours later than the maximum.

Gulf of Maine.—The times of the strength or maximum velocity of the tidal currents are nearly simultaneous over the region extending from Georges Shoal to Cape Ann, including Massachusetts and Cape Cod Bays. The same is true of the minimum velocities which, off the New England coast, are of more general occurrence than are true slack waters. At Georges Shoal the strength of the flood occurs 2 hours 48 minutes after the time of low water at Boston Navy Yard, and the strength of the ebb 2 hours 49 minutes after the time of high water. The corresponding values or intervals near Cape Ann are 3¼ hours for either stream, at Boston light vessel 3¾ hours, and in Cape Cod Bay about 3 hours.

The strength or maximum velocity of the tidal current is 1.8 miles around Georges Shoal, about 1.5 miles on the shallow portions of Stellwagen Bank, and 0.3 mile at Boston light vessel.

When it is high or low water at Boston, the tidal currents have their minimum velocities over the central region of the Gulf of Maine extending from Stellwagen Bank to the mouth of the Bay of Fundy. The same is true for the vicinity of Cross Rip light vessel, and for a narrow region or strip of water extending about 30 miles southeasterly from the southern coast of Nantucket Island.

Cape Cod Canal.—Computation indicates that, when the canal is completed, the current will turn from west to east 2 hours 35 minutes before Boston low water, and from east to west 2 hours 23 minutes before Boston high water. The west-going stream will have its maximum velocity 40 minutes after the time of Boston high water, and the east-going stream 30 minutes after low water.

Off **Monomoy Point,** just southward of Shovelful Shoal, the eastern or flood stream attains its maximum velocity 60 minutes after the time of high water at Boston, and the ebb stream attains its maximum velocity 62 minutes after the time of low water at Boston; the velocity is 1.8 miles. The corresponding intervals for Pollock Rip light vessel are 53 and 56 minutes, the maximum velocity there being 1.3 miles. In the channel close to Monomoy light, between it and Bearses Shoal, the velocity at the strength of the current is 3 miles.

At **Chatham Bar** and near the coast for 2 or 3 miles southward, the currents are nearly 1¾ hours earlier than off Monomoy Point, the maximum velocities occurring about ¾ hour before the times of Boston high and low waters. Farther northward or farther off shore, the currents become later as indicated upon the current chart.

Westward of Monomoy Island and in Chatham Roads the currents are early and very feeble.

In **Buzzards Bay.**—The currents attain their maximum values at the times of Boston high and low waters, the velocities being less than 0.5 mile.

In **Vineyard Sound** the maximum velocities of the currents occur from 2 to nearly 3 hours after the time of Boston high and low waters, the velocity ranging from 1.5 to 3 miles according to locality. See also Appendix I.

In **Narragansett Bay.**—The currents attain their maximum velocities a few minutes before the times of Boston high and low waters.

Nantucket Island.—The feeble tidal currents along Haulover Beach (when the beach is closed) attain their maximum value about 1½ hours before the occurrence of the maximum value at Great Round Shoal light vessel.

The maximum value of the flood or easterly stream at Great Round Shoal light vessel occurs 2 hours 20 minutes after Boston low water, and the maximum value of the ebb 2 hours 23 minutes after high water.

On the north side of Nantucket Island, between Great Point and Tuckernuck Island, the currents are early and feeble.

Nantucket Shoals.—On the southern edge of Nantucket Shoals the currents are 2 hours later than on the northern edge eastward of Great Round Shoal. The times, velocities, and directions can be seen by consulting the current chart.

Nontidal currents.—The light dashed arrows on the chart indicate the nontidal currents, or drifts, which occurred at the times when the observations were made. With the exception of Pollock Rip light vessel and Great Round Shoal light vessel, the observations covered too short periods of time for giving good determinations of the nontidal currents.

VARIATION OF THE COMPASS.

The magnetic variations for 1915, and annual increase at points mentioned, are as follows:

LOCALITY.	Variation.	Annual increase.
	°	′
Cape Ann whistling buoy	14¾ W.	6
Bakers Island lighthouse, Salem Entrance	14¼	6
Boston lightvessel	14¼	6
Cape Cod Bay	14	6
Off Nauset lighthouse	14¾	6
Handkerchief light vessel, Nantucket Sound	14	6
Nantucket Shoals light vessel	13¼	6
Cape Poge	13¼	6
Gay Head	13	6
Hen and Chickens light vessel, Buzzards Bay	13¼	6
Brenton Reef light vessel, Narragansett Bay Entrance	13	6
Off Bristol, R. I.	13¼	6

UNITED STATES LIFE-SAVING STATIONS.

The following list of life-saving stations is corrected to July 1, 1911. The geographical positions given are approximate and are taken from the Official Register of the service. These stations are furnished with lifeboats, mortars, and all other appliances for affording assistance in cases of shipwreck.[1]

Name of Station.	State.	Locality.	Approximate Position. Latitude, north.			Longitude, west.		
			°	′	″	°	′	″
Straitsmouth	Mass	½ mile west of Straitsmouth light	42	39	30	70	36	00
Gloucester	Mass	Old House cove, westerly side of harbor, 1½ miles from town.	42	35	30	70	41	10
Nahant	Mass	On the neck, close to Nahant	42	25	45	70	56	00
City Point	Mass	Floating station in Dorchester Bay, Boston Harbor						
Point Allerton	Mass	1 mile west of Point Allerton	42	18	20	70	54	00
North Scituate	Mass	2½ miles south of Minots Ledge light	42	14	00	70	45	30
Fourth Cliff	Mass	South end of Fourth Cliff, Scituate	42	09	30	70	42	10
Brant Rock	Mass	On Green Harbor Point	42	05	30	70	38	40
Gurnet	Mass	4½ miles northeast of Plymouth	42	00	10	70	36	10
Manomet Point	Mass	6½ miles southeast of Plymouth	41	55	30	70	32	40
Wood End	Mass	⅛ mile east of light	42	01	15	70	11	30
Race Point	Mass	1⅝ miles northeast of Race Point light	42	04	45	70	13	15
Peaked Hill Bars	Mass	2½ miles northeast of Provincetown	42	04	40	70	09	50
High Head	Mass	3½ miles northwest of Cape Cod light	42	03	55	70	06	50
Highland	Mass	⅞ mile northwest of Cape Cod light	42	02	55	70	04	20
Pamet River	Mass	3½ miles south of Cape Cod light	42	00	00	70	01	15
Cahoons Hollow	Mass	2½ miles east of Wellfleet	41	56	45	69	59	05
Nauset	Mass	1¼ miles south of Nauset lights	41	50	40	69	56	45
Orleans	Mass	Abreast of Ponchet Island	41	45	35	69	55	55
Old Harbor	Mass	½ mile north of Chatham Inlet	41	41	45	69	56	00
Chatham	Mass	1¼ miles south-southwest of Chatham lights	41	39	10	69	57	10
Monomoy	Mass	2¼ miles north of Monomoy light	41	35	25	69	59	10
Monomoy Point	Mass	¾ mile southwest of Monomoy light	41	33	10	70	00	20
Coskata	Mass	2¼ miles south of Nantucket (Great Point) light	41	22	00	70	01	15
Surfside	Mass	2½ miles south of the town of Nantucket	41	14	30	70	06	00
Maddequet	Mass	6 miles west of Surfside	41	16	05	70	12	30
Muskeget	Mass	Near west end of Muskeget Island	41	20	20	70	18	50
Gay Head	Mass	Near light	41	21	04	70	50	08
Cuttyhunk	Mass	Near east end Cuttyhunk Island	41	25	25	70	54	45
Brenton Point	R. I.	On Prices Neck	41	26	58	71	20	10
Narragansett Pier	R. I.	Northern part of the town	41	25	45	71	27	20
Point Judith	R. I.	Near light	41	21	40	71	29	00

[1] Instructions to enable mariners to avail themselves fully of the assistance thus afforded will be sent free of charge upon application to the General Superintendent of the Life-Saving Service, Washington, D. C.

STORM WARNING DISPLAY STATIONS.

Storm warning displays of the United States Weather Bureau are made for the benefit of mariners at the following stations. The signals are described in Appendix III.

Massachusetts:
- Straitsmouth Life Saving Station.
- Gloucester.
- Marblehead.
- Boston C. C. S.[1]
- Boston, city life-saving station.
- Boston, navy yard.
- Hull.
- Wellfleet.
- Provincetown.
- Race Point.
- Cape Cod light.
- Cape Cod light, Navy wireless.
- Chatham.

Massachusetts—Continued.
- Monomoy.
- Nantucket Shoals light vessel.
- Nantucket.[1]
- Cross Rip light vessel.
- Hyannis.
- East Chop.
- Nobska Point light.
- Tarpaulin Cove.
- Cuttyhunk.
- New Bedford.
- New Bedford, yacht club.
- Fall River.

Rhode Island:
- Newport.
- Newport, Torpedo Station.
- Saunderstown.
- Providence.
- Providence, yacht club.
- Point Judith.
- Block Island.[1]
- Block Island, southeast light.

SEACOAST TELEGRAPH AND REPORTING STATIONS.

The following seacoast reporting stations are maintained, from which passing vessels are reported. Vessels can communicate with the stations at Cape Cod light and Block Island southeast light by International Code Signals.

Massachusetts:
- Hull.
- Cape Cod light.
- Chatham.

Massachusetts—Continued.
- Nantucket Shoals light vessel.
- Nobska Point light.

Rhode Island:
- Point Judith.
- Block Island southeast light.

[1] At these stations barometers will be compared with standards.

MASSACHUSETTS HUMANE SOCIETY LIFE-SAVING STATIONS.

No. of station.	Locality of Station.	Remarks.
1	Annisquam	Lifeboat.
3	Rockport	Lifeboat and dory. Hunt gun and apparatus.
4	Emerson Point, Cape Ann	Lifeboat.
5	Brace Cove, Gloucester	Lifeboat. Hunt gun and apparatus.
6	Rocky Neck, East Gloucester	Lifeboat.
7	Stage Fort, Gloucester	Hunt gun and apparatus. Dory.
9	Baker Island, Salem Harbor	Dory.
10	Marblehead	Lifeboat. Hunt gun and apparatus.
13	Nahant	Lifeboat, power-dory and ordinary dory. Hunt gun and apparatus.
14	Deer Island, Boston Harbor	Lifeboat.
15	Boston light	Hunt gun and apparatus.
17, 18	Stony Beach, Hull	Lifeboat. Hunt gun and apparatus.
20	Nantasket Beach (between Point Allerton and Strawberry Hill).	Large lifeboat and small boat.
21	Nantasket Beach, Surfside	Lifeboat and dory. Hunt gun and apparatus.
22	Gun Rock Cove, Cohasset	Lifeboat.
23	Pleasant Beach, Cohasset	Lifeboat. Hunt gun and apparatus.
25, 25A	Glades, North Scituate	Lifeboat. Hunt gun and apparatus.
26	North Scituate	Lifeboat.
27	Scituate light	Lifeboat.
28	Scituate	Hunt gun and apparatus.
29	Bass Cove, Scituate	Large and small lifeboats.
30	Third Cliff, Scituate	Lifeboat. Hunt gun and apparatus.
31	Brant Rock	Lifeboat. Hunt gun and apparatus.
33	Barnstable	Lifeboat.
35	Race Point light	Hunt gun and apparatus.
37	Nauset Harbor	Lifeboat. Hunt gun and apparatus.
40	Monomoy	Lifeboat.
41	Nashawena	Hunt gun and apparatus.
42	Cuttyhunk	Lifeboat. Hunt gun and apparatus.
43	Cuttyhunk (middle south side)	Hunt gun and apparatus.
44	Cuttyhunk light	Lifeboat and dory. Hunt hand gun and apparatus.
50	Nantucket	Lifeboat. Hunt gun and apparatus.
51	Quidnet, Nantucket	Lifeboat. Hunt gun and apparatus.
52	Siasconset, Nantucket	Lifeboat. Hunt gun and apparatus.
54	Forked Ponds, Nantucket	Lifeboat and dory. Hunt gun and apparatus.
55	Hummock Pond, Nantucket	Lifeboat and dory. Hunt gun and apparatus.
57	Tuckernuck, Nantucket	Lifeboat. Hunt gun and apparatus.
60	Vineyard Haven	Lifeboat. Hunt gun and apparatus.
65	Cape Poge, Marthas Vineyard	Lifeboat and dory. Hunt gun and apparatus.
67	Squibnocket, Marthas Vineyard	Lifeboat. Hunt gun and apparatus.
68	Gay Head, Marthas Vineyard	Lifeboat. Hunt gun and apparatus.
69	Horse Neck Point	Lifeboat.

WIRELESS-TELEGRAPH STATIONS.

The following is a list of the U. S. Naval coastwise wireless-telegraph stations covered by this volume, and their call letters, corrected to October 1, 1910. Changes or additions to the stations or in the regulations are published in Hydrographic Office Notices to Mariners issued weekly:

Call letters.	Stations.
N A B	Cape Elizabeth, Me.
N A D	Boston, Mass.
N A E	Cape Cod, Highland light, Mass.
N L A	Nantucket Shoals light vessel.
N A T	Newport, R. I.

The following stations not operated by the Navy Department are open to public service:

Call letters.	Stations.
A U	Chatham, Mass.
B H	Boston, Mass. (Boston Herald).
M S W	Cape Cod, South Wellfleet, Mass.
M C C	Cape Cod, Mass.
M S C	Siasconsett, Mass.
P J	Point Judith, R. I.
P F	Providence, R. I.

Lighthouse Districts, Etc.—The coast and the waters covered by this volume lie within the **Second and Third Lighthouse Districts** of the United States. These districts extend from Hampton Harbor, N. H., to Cape May, N. J. The Light List for the Atlantic and Gulf Coasts of the United States and the Buoy List for the Second and Third Districts give full descriptions of the aids to navigation.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
		° ′ ″			Feet.	
1	**CAPE ANN (N)**	42 38 21 70 34 31	Fixed white (i. o. v.)	1	162	19
2	**CAPE ANN (S)**	42 38 13 70 34 32	Fixed white (i. o. v.)	1	166	19
3	EASTERN POINT	42 34 49 70 39 54	Flashing red every 5 sec	4	57	13
4	GLOUCESTER BREAKWATER	42 34 (57) 70 40 (23)	Fixed white (U.)	Lens lantern.	39	.....
5	TENPOUND ISLAND	42 36 07 70 39 58	Flashing white every 5 sec	6	44	12
	SALEM HARBOR:					
6	BAKERS ISLAND	42 32 12 70 47 11	Fixed white	4	111	16
7	BAKERS ISLAND BEACON	.....	Fixed white	4	91	15
8	HOSPITAL POINT	42 32 48 70 51 23	Fixed white	4	70	14
9	FORT PICKERING	42 31 36 70 52 01	Fixed white	6	28	11
10	DERBY WHARF	42 31 00 70 53 03	Fixed red	6	25	8
11	MARBLEHEAD	42 30 20 70 50 03	Fixed white	6	130	11
12	EGG ROCK	42 26 01 70 53 54	Fixed red	5	90	9
	LYNN HARBOR:					
13	WHITE ROCKS	42 25 (35) 70 57 (15)	Fixed red Fixed white (U.)	Lens lantern.	24 16	.....
14	BLACK ROCKS	42 25 (55) 70 56 (57)	Fixed red (U.)	Post lantern.	20	.....
15	SANDY POINT	42 26 (26) 70 56 (37)	Fixed red (U.)	Post lantern.	20	.....
16	BLACK MARSH CHANNEL	42 26 (53) 70 56 (36)	Fixed red (U.)	Post lantern.	20	.....
17	UPPER TURN	42 27 (12) 70 56 (34)	Fixed white (U.)	Post lantern.	20	.....
	BOSTON BAY:					
18	**THE GRAVES**	42 21 55 70 52 11	White double flash every 6 sec (i. o. v.)	1	98	16
19	RANGE. LOVELLS ISLAND FRONT	42 19 58 70 55 49	Fixed white	4	31	.....
20	RANGE. LOVELLS ISLAND REAR	42 19 55 70 55 52	Flashing red every 5 sec	4	40	.....
21	RANGE. BROAD SOUND CHANNEL INNER FRONT	42 19 40 70 59 03	Flashing white every 5 sec	4	53	.....
22	RANGE. BROAD SOUND CHANNEL INNER REAR	42 19 39 70 59 07	Fixed red	4	70	.....
23	DEER ISLAND	42 20 24 70 57 18	Fixed white varied by red flash every 30 sec.	5	53	13
24	LONG ISLAND HEAD	42 19 49 70 57 29	Fixed white	3½	120	17
25	RANGE. SOUTH BOSTON FRONT	42 19 (58) 71 01 (17)	Two fixed red (U.) (e. a.)	Refl'r.	34 34	.....
26	RANGE. SOUTH BOSTON REAR	42 19 (57) 71 01 (46)	Fixed red (U.) (e. a.)	Refl'r.	45	.....

Gas buoys are omitted from this list

These pamphlets, which are corrected and reprinted annually, are sent free of charge to any shipmaster on application to the Division of Publications, Department of Commerce and Labor, Washington, D. C., or to the inspector of the second lighthouse district, Boston, Mass., and inspector of the third lighthouse district, Tompkinsville, N. Y.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
1	Two gray-stone towers	113	10-inch steam whistle	Whistle sounds thus: Blast 8 sec. Silent 4 sec. Blast 4 sec. Silent 44 sec.
2		113		
3	White, conical tower, coveredway to dwelling.	31	4,000-pound bell struck by machinery.	Bell strikes thus: 2 strokes Silent 20 sec. 2 strokes Silent 20 sec.
4	Brown, square, iron framework, supporting small, white bell house and tower.	.....	1,200-pound bell struck by machinery.	Bell strikes thus: 1 stroke Silent 20 sec. 1 stroke Silent. 20 sec.
5	Brown, conical tower	25	.....	
6	Two white towers; SE'ly tower, conical; NW'ly tower, low octagonal pyramid, coveredway to white dwelling.	54	1st-class compressed-air siren. If siren be disabled a bell will be struck by machinery.	Siren sounds thus: Blast 3 sec. Silent 27 sec. Blast 3 sec. Silent 27 sec. Bell strikes thus: 1 stroke Silent 30 sec. 2 strokes Silent 30 sec.
7		35		
8	White, pyramidal tower	40	.....	Light is more brilliant in center line of main channel, between Bakers Island and Little Misery Island, than on either side.
9	Brown, conical tower, white base; white bridge to shore.	32	.....	In range with Derby Wharf light, clears Haste Shoal.
10	Red, square tower	18	.....	
11	Square, pyramidal, skeleton, iron tower, brown from foundation to gallery floor, black above; white coveredway to dwelling.	100	.....	
12	White, square, pyramidal, brick tower, attached to white wooden dwelling.	32	.....	
13	Black; spindle on pile dolphin	.....	.....	
14	Black; spindle on pile dolphin	.....	.....	
15	Black; spindle on pile dolphin	.....	.....	
16	Black; spindle on pile dolphin	.....	.....	
17	Red; spindle on pile dolphin	.....	.....	
18	Light-gray, conical, granite tower; cylindrical lantern.	.....	1st-class Daboll trumpet	Trumpet sounds thus: Blast 3 sec. Silent 1 sec. Blast 3 sec. Silent 13 sec.
19	White, conical tower	27	.....	
20	White, conical tower	38	.....	
21	White, conical tower	25	.....	
22	White, conical tower	36	.....	
23	Brown, conical tower; on black, cylindrical pier.	.....	Bell struck by machinery	Bell strikes thus: 1 stroke Silent 10 sec. 1 stroke Silent 10 sec.
24	White, brick tower, coveredway to white dwelling.	46	.....	
25	Lanterns 10 feet apart horizontally on white mast.	.....	.....	
26	White mast	.....	.....	

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
	BOSTON BAY—Continued.	° ′ ″			Feet.	
27	RANGE. SPECTACLE ISLAND FRONT	42 19 (41) 70 59 (07)	Fixed red	Refl'r.	29	.....
28	RANGE. SPECTACLE ISLAND REAR	42 19 39 70 59 04	Fixed red	Refl'r.	54	.....
29	***BOSTON LIGHTVESSEL, No. 54***	42 20 (22) 70 45 (26)	Two fixed red	Refl'r.	38 38	12
30	**MINOTS LEDGE**	42 16 11 70 45 35	Flashing white, signaling "143" every 30 sec., thus: 1 flash, eclipse 3 sec.; 4 flashes, eclipse 3 sec.; 3 flashes, eclipse 15 sec. (i. o. v.)	2	85	15
31	**Boston**	42 19 41 70 53 26	Flashing white every 30 sec	2	102	16
32	BOSTON (Auxiliary)	.....	Fixed white between two fixed red sectors; one red sector between 43° and 48°, the other red sector between 57° and 65°.	Refl'r.	34	.....
33	NARROWS	42 19 23 70 55 11	Fixed red	5	45	9
34	WINDMILL POINT	42 18 (10) 70 55 (20)	Fixed red (U.)	Lens lantern.	20	.....
35	SCITUATE BREAKWATER	.....	Fixed red (U.)	Post lantern.	31	.....
	CAPE COD BAY:					
36	RANGE. PLYMOUTH (GURNET)	42 00 12 70 36 04	Fixed white; *obscured between 328° and 351°.* (i. o. v.)	4	102	16
37	RANGE. PLYMOUTH (GURNET) BEACON	.....	Fixed white (i. o. v.)	4	102	16
38	DUXBURY PIER	41 59 15 70 38 57	Fixed red	5	35	9
39	RACE POINT	42 03 45 70 14 37	Fixed white varied by white flash every 90 sec.; *obscured when bearing about 106°.* (i. o. v.)	4	41	12
40	WOOD END	42 01 17 70 11 38	Flashing red every 15 sec	5	45	12
41	LONG POINT	42 01 59 70 10 09	Fixed white	5	36	11
42	MAYO BEACH	41 55 (49) 70 02 (05)	Fixed white	Refl'r.	36	.....
43	BILLINGSGATE ISLAND	41 52 18 70 04 10	Fixed white	4	41	12
44	SANDY NECK	41 43 22 70 16 53	Fixed white	5	48	12
45	**CAPE COD**	42 02 23 70 03 40	Flashing white every 5 secs. (i. o. v.)	1	183	20
46	**Nauset Beach**	41 51 (39) 69 57 (06)	White, triple flash every 10 sec.; flash 0.2 sec., two eclipses 1.4 sec., one eclipse 6.6 sec.	4	97	16
47	**Chatham North**	41 40 18 69 57 01	Fixed white (i. o. v.)	4	80	15
48	**Chatham South**	41 40 17 69 57 01	Fixed white (i. o. v.)	4	80	15

Gas buoys are omitted from this list.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
27	White, octagonal, pyramidal, shingled tower, middle third red.	13	.....	
28	White, octagonal, pyramidal, shingled tower, middle third red.	23	.....	
29	Steam vessel, two masts, schooner rigged; white mastheads, with red, circular, iron cagework daymark at each; red hull with "BOSTON" in white on each side and "54" in white on each bow; black smokestack and fog signal between masts.	.....	12-inch steam chime whistle. Submarine bell. If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast 5 sec. Silent 55 sec. Blast 5 sec. Silent 55 sec. Submarine bell strikes "54", thus: 5 strokes Silent 3 sec. 4 strokes Silent 5 sec.
30	Dark-gray, conical, granite tower	89	Bell struck by machinery	Bell strikes thus: 1 stroke Silent 30 sec. 1 stroke Silent 30 sec.
31	White, conical tower	81	1st-class steam siren	Siren sounds thus: Blast 5 sec. Silent 10 sec. Blast 5 sec. Silent 40 sec.
32	Small, white wooden structure	9	.....	*White* sector marks fairway between Hunt Ledge and Fifteen-Foot Ledge; narrow red sector covers each ledge.
33	Black lantern on white hexagonal dwelling; pile foundation.	45	Bell struck by machinery	Bell strikes thus: 1 stroke Silent 20 sec. 1 stroke Silent 20 sec.
34	White post	.....	.....	
35	Lantern suspended from spar	.....	.....	
36	Two white, octagonal, pyramidal towers, connected by covered way; white dwelling.	34	1st-class Daboll trumpet. If trumpet be disabled a 1,200-pound bell will be struck by machinery.	Range clears Browns Bank. Trumpet sounds thus: Blast 3 sec. Silent 12 sec. Blast 3 sec. Silent 12 sec. Bell strikes thus: 2 strokes Silent 30 sec. 2 strokes Silent 30 sec.
37		34		Life-saving station just inside Gurnet Point.
38	Brown, conical tower	42	1,000-pound bell struck by machinery.	Bell strikes thus: 1 stroke Silent 15 sec. 1 stroke Silent 15 sec.
39	White tower	35	10-inch or 12-inch steam whistle	Whistle sounds thus: Blast 4 sec. Silent 8 sec. Blast 4 sec. Silent 44 sec.
40	White, pyramidal tower	34	1,000-pound bell struck by machinery.	Bell strikes thus: 1 stroke Silent 15 sec. 1 stroke Silent 15 sec.
41	White, square tower	32	Bell struck by machinery	Bell strikes thus: 1 stroke Silent 30 sec. 2 strokes Silent 30 sec.
42	Brown tower	25	.....	
43	White, square tower, covered way to white dwelling.	34	.....	
44	White tower	41	.....	
45	White tower, covered ways to dwellings	55	1st-class Daboll trumpet	Trumpet sounds thus: Blast 8 sec. Silent 30 sec. Blast 8 sec. Silent 30 sec. Signal-display station. *Vessels using* INTERNATIONAL CODE SIGNALS *can communicate with Boston immediately by telegraph.*
46	White, conical, shingled tower, black lantern; white dwellings and barn.	22	.....	
47	Two white, conical towers 100 feet apart, N and S.	43	.....	
48		43	.....	

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
	NANTUCKET SOUND, E'LY ENTRANCE:	° ′ ″			Feet.	
49	***POLLOCK RIP SHOALS LIGHT VESSEL, No. 73.***	41 36 (40) 69 53 (47)	Fixed white (foremast) Fixed red (mainmast) Three lanterns encircling each mast.	Lens lantern.	30 42	11 12
50	***POLLOCK RIP LIGHT VESSEL, No. 47.***	41 32 (05) 69 54 (49)	Two fixed red	Refl'r.	37 37	11
51	**Monomoy Point**	41 33 34 69 59 39	Fixed white with fixed red sector between 255° and 267°. (i. o. v.)	4	47	12
52	***SHOVELFUL SHOAL LIGHT VESSEL, No. 3.***	41 32 (42) 69 59 (17)	Fixed red	Refl'r.	40	12
53	***HANDKERCHIEF LIGHT VESSEL, No. 4.***	41 29 (14) 70 04 (00)	Two fixed white	Lens lantern. Refl'r.	40 40	12
54	***GREAT ROUND SHOAL LIGHT VESSEL, No. 86.***	41 24 (10) 69 54 (55)	Two fixed white; three lanterns encircling each masthead.	Lens lantern.	50 50	13
55	**Nantucket (Great Point)**	41 23 24 70 02 46	Fixed white with a fixed red sector between 84° and 106½°.	3	70	14
56	**SANKATY HEAD**	41 17 01 69 57 57	Fixed white varied by a white flash every minute.	2	166	19
57	***NANTUCKET SHOALS LIGHT VESSEL, No. 85***	40 37 (05) 69 36 (33)	White light 12 sec., eclipse 3 sec.; three lanterns encircling fore-masthead. (e. i.) (*See Remarks.*)	Lens lantern.	50 50	13
58	**GAY HEAD**	41 20 55 70 50 08	Flashing every 10 sec.; white and red; every fourth flash red; *obscured between 342° and 359°.*	1	170	19
	NANTUCKET SOUND:					
59	BRANT POINT	41 17 24 70 05 27	Fixed white	4	26	10
60	RANGE. NANTUCKET HARBOR FRONT	41 17 (24) 70 05 (34)	Fixed white	Lens lantern.	35	.....
61	RANGE. NANTUCKET HARBOR REAR	41 17 (22) 70 05 (33)	Fixed white	Lens lantern.	51	.....
62	NANTUCKET EAST BREAKWATER	41 18 (35) 70 05 (59)	Fixed white (U.)	Lens lantern.	13	.....
63	NANTUCKET WEST BREAKWATER	41 18 (27) 70 06 (11)	Fixed red (U.)	Lens lantern.	12	.....

Gas buoys are omitted from this list.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
49	Flush-deck, steam, schooner-rigged vessel; two masts; red, circular, wire daymark at each masthead; red hull, with "POLLOCK RIP SHOALS" in white on each side, and "73" in white on each bow and each quarter; brown masts, black smokestack and fog signal between masts.	.....	12-inch steam chime whistle..... Submarine bell. If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast Silent Blast Silent 5 sec. 25 sec. 5 sec. 25 sec. Submarine bell strikes "73," thus: 7 strokes Silent 3 sec. 3 strokes Silent 5 sec.
50	Two masts, schooner-rigged; red, hoop-iron daymark at each masthead; red hull, with "POLLOCK RIP" in white on each side, and "47" in white on each bow and on stern; black smokestack and fog signal between masts.	.....	12-inch steam chime whistle..... Submarine bell. If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast Silent Blast Silent 3 sec. 12 sec. 3 sec. 12 sec. Submarine bell strikes "5," thus: 5 strokes Silent 5 sec. 5 strokes Silent 5 sec.
51	Red tower, covered way to white dwelling..	35	.....	N'ly edge of red sector cuts Pollock Rip Slue Northeast Channel whistling buoy, 2B, and its S'ly edge cuts just to N'd of Pollock Rip Broken Part North End gas buoy, No. 1B, and bell buoy, 1A.
52	Two masts, schooner-rigged, red hoop-iron daymark at mainmast head; black hull, with white stripe covering bulwark; "SHOVELFUL" in black on each side, and "3" in black on each quarter.	.....	Bell or horn.....	
53	Two masts, schooner-rigged, black hoop-iron daymark at each masthead; straw-colored hull, with "HANDKERCHIEF" in black on each side, and "No. 4" in black on each quarter; lens lantern at foremast head.	.....	Bell or horn.....	
54	Flush deck, schooner-rigged steamer, lead-colored, circular hoop-iron daymark at each masthead; lead-colored hull, with "GREAT ROUND SHOAL" in black on each side and "86" in black on each bow and each quarter; black smokestack and fog signal between masts.	.....	12-inch steam-chime whistle. Submarine bell. If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast Silent Blast Silent. 5 sec. 55 sec. 5 sec. 55 sec. Submarine bell strikes thus: 2 strokes Silent 5 sec. 2 strokes Silent 5 sec.
55	White tower, covered way to white frame dwelling.	66	.....	Red sector covers Cross Rip and Tuckernuck Shoals. Dependence must not be placed upon red sector as guide to clear Cross Rip Shoal, as light can not be seen at Cross Rip Shoal if weather is at all hazy. Signal station.
56	White tower, with red band in middle.....	62	.....	
57	Flush deck, steam, schooner-rigged vessel; two straw-colored masts, bright topmasts, and wireless-telegraph yard on each mast; red, circular, hoop-iron daymark at each masthead; red hull with "NANTUCKET SHOALS" in white on each side and "85" in white on each bow and each quarter; black smokestack and fog signal between masts.	.....	12-inch steam-chime whistle..... Submarine bell. If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast Silent Blast Silent 5 sec. 25 sec. 5 sec. 25 sec. Submarine bell strikes "66," thus: 6 strokes Silent 3 sec. 6 strokes Silent 5 sec. If electric-light apparatus becomes inoperative, light will show fixed white *without eclipses* and will be *less brilliant* than electric light. Storm warnings of U. S. Weather Bureau are shown from this vessel during *day* time only. Any vessel wishing to be reported from this light vessel should show her distinguishing lights at night, or make her number by day (International Code). At night a white Coston answering signal will be shown from light vessel if signal is understood, but light vessel will make no display if signal is not understood.
58	Red tower, coveredway to dwelling.....	40	.....	*Obscuration of light is caused by high land of No Mans Land; light is occasionally visible through notches in hilltop.*
59	White, cylindrical, shingled tower; footbridge to shore.	26	.....	
60	White, pyramidal, wooden, skeleton tower...	33	.....	
61	White, pyramidal, wooden, skeleton tower...	48	.....	
62	Black post on conical pile of riprap.....	.....	.....	
63	Black post on conical pile of riprap.....	.....	.....	

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
	NANTUCKET SOUND—Continued.	° ′ ″			Feet.	
64	STAGE HARBOR	41 39 32 69 59 03	Fixed white	4	40	12
65	BASS RIVER	41 39 06 70 10 11	Fixed white	5	41	12
66	BISHOP AND CLERKS	41 34 28 70 15 02	Flashing every 30 sec.; white with red sector between 342½° and 16½°.	4	56	13
67	RANGE. HYANNIS	41 38 11 70 17 20	Fixed red	Refl'r.	43	.....
68	RANGE. HYANNIS BEACON	41 38 (00) 70 17 (22)	Fixed red	Refl'r.	22	.....
69	***CROSS RIP LIGHT VESSEL, No. 5***	41 26 (43) 70 17 (29)	Fixed red	Refl'r.	39	12
70	***SUCCONNESSET SHOAL LIGHT VESSEL, No. 6.***	41 31 (56) 70 26 (15)	Fixed white	Refl'r.	40	12
71	CAPE POGE	41 25 (16) 70 27 (06)	Flashing every 5 sec.; white and red, every third flash red. (i. o. v.)	4	54	13
72	***HEDGE FENCE LIGHT VESSEL, No. 41***	41 28 (19) 70 29 (03)	Two fixed white	Refl'r.	34 34	11
73	EDGARTOWN	41 23 27 70 30 13	Fixed white	4	48	12
74	OAK BLUFFS SOUTH BREAKWATER	41 27 (38) 70 33 (25)	Fixed red (U.)	Post lantern.	15	.....
75	OAK BLUFFS NORTH BREAKWATER	41 27 (40) 70 33 (26)	Fixed red (U.)	Post lantern.	15	.....
76	EAST CHOP	41 28 13 70 34 05	Flashing red every 10 sec.	4	79	14
77	VINEYARD HAVEN BREAKWATER LIGHT	.....	Fixed red (U.)	Post lantern.	25	.....
78	WEST CHOP	41 28 51 70 36 01	Fixed white with a fixed red sector between 281° and 331°. (i. o. v.)	4	84	15
	VINEYARD SOUND:					
79	NOBSKA POINT	41 30 57 70 39 20	Fixed white with a fixed red sector between 263° and 289°. (i. o. v.)	4	87	15
80	RANGE. GREAT HARBOR FRONT	41 31 (29) 70 40 (20)	Fixed red (U.)	Lens lantern.	20	.....
81	RANGE. GREAT HARBOR REAR	41 31 (31) 70 40 (29)	Fixed red (U.)	Lens lantern.	28	.....
82	GRASSY ISLAND LEDGE	41 31 (16) 70 40 (30)	Fixed red (U.)	Post lantern.	21	.....
83	MIDDLE LEDGE	41 31 (07) 70 41 (03)	Two fixed red (U.)	Post lantern.	24 18	.....
84	TARPAULIN COVE	41 28 08 70 45 29	Fixed white varied by a white flash every 30 sec.	4	78	15
85	MENEMSHA HARBOR EASTERLY JETTY	41 21 (16) 70 46 (09)	Fixed white (U.)	Lens lantern.	15	.....
86	MENEMSHA HARBOR WESTERLY JETTY	41 21 (15) 70 46 (11)	Fixed white (U.)	Lens lantern.	15	.....

Gas buoys are omitted from this list.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
64	White tower	36		
65	Black lantern on white dwelling	30		
66	Gray-granite tower, lead-colored fog-bell tower attached to W'ly side.	60	Bell struck by machinery	Red sector covers Cross Rip and Tuckernuck Shoals. Bell strikes thus: 1 stroke, Silent 15 sec.; 1 stroke, Silent 15 sec.
67	White tower, covered way to dwelling	20		
68	Lead-colored, small, frame shed	15		
69	Two masts, schooner-rigged; white hoop-iron daymark at each masthead; black hull, with white stripe; "CROSS RIP" in white on each side, and "5" in white on each quarter.		8-inch compressed-air whistle	Whistle sounds thus: Blast 2 sec.; Silent 18 sec.; Blast 2 sec.; Silent 18 sec.
70	Two masts, schooner-rigged; red hoop-iron daymark at mainmast head; straw-colored hull, with "SUCCONNESSET" in black on each side, and "6" in black on each quarter.		Bell or horn	*To be permanently replaced by a gas and bell buoy (occulting white light) on June 15, 1912.*
71	White, conical, shingled tower	34		
72	Two masts, schooner-rigged vessel; red, circular, hoop-iron daymark at each masthead; red hull with "HEDGE FENCE" in white on each side and "41" in white on each bow and each quarter; black smokestack and fog whistle between masts.		12-inch steam whistle Submarine bell. If whistle be disabled the vessel's bell will be rung by hand.	Whistle sounds thus: Blast 5 sec.; Silent 5 sec.; Blast 5 sec.; Silent 45 sec. Submarine bell strikes "41", thus: 4 strokes, Silent 4 sec.; 1 stroke, Silent 6 sec.
73	Black, lantern on white dwelling; bridge, ¼ mile long, to shore.	36	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec.; 1 stroke, Silent 15 sec.
74	Red, iron spindle			
75	Red, iron spindle			
76	Brown tower	35		
77	Red, iron spindle			
78	White, conical, brick tower	51	10-inch steam whistle	Red sector covers Squash Meadow and Norton Shoal. Whistle sounds thus: Blast 3 sec.; Silent 27 sec.; Blast 3 sec.; Silent 27 sec.
79	Brown tower; covered way to brown dwelling.	35	1st-class Daboll trumpet Bell struck by machinery if trumpet be disabled.	Red sector covers Hedge Fence and L'Hommedieu Shoal. Trumpet sounds thus: Blast 2 sec.; Silent 1 sec.; Blast 2 sec.; Silent 1 sec.; Blast 2 sec.; Silent 22 sec. Bell strikes thus: 2 strokes, Silent 30 sec.; 1 stroke, Silent 30 sec.
80	White post			
81	White post			
82	Red, iron spindle with cask on end on top			
83	Black, iron spindle with cask on bilge on top; lanterns, one vertically below other.			
84	White tower	35	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec.; 1 stroke, Silent 15 sec.
85	Red, iron spindle			
86	Red, iron spindle			

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
		° ′ ″			Feet.	
58	**GAY HEAD.** *See No. 58 preceding*					
87	***VINEYARD SOUND (SOW AND PIGS) LIGHT VESSEL, No. 90.***	41 22 (47) 71 00 (00)	Two fixed red; three lanterns encircling each masthead.	Lens lantern.	50 50	12
88	***HEN AND CHICKENS LIGHT VESSEL No. 42.***	41 27 (02) 71 01 (06)	Fixed white	Refl'r.	45	13
	BUZZARDS BAY:					
89	CUTTYHUNK	41 24 52 70 57 01	Fixed white (i. o. v.)	5	61	13
90	DUMPLING ROCK	41 32 18 70 55 19	Fixed white with a fixed red sector between 27° and 43°. (i. o. v.)	5	48	12
91	BUTLER FLATS	41 36 14 70 53 42	Flashing white every 5 sec	5	53	13
92	RANGE. PALMER ISLAND	41 37 37 70 54 35	Fixed red	5	34	9
93	RANGE. WAMSUTTA MILL	41 38 56 70 55 32	Fixed white (U.) (e. a.)		92	
94	NED POINT	41 39 08 70 47 46	Fixed white	Lens lantern.	41	
95	BIRD ISLAND	41 40 10 70 43 04	Fixed white varied by white flash every 80 sec.	5	37	11
96	WINGS NECK	41 40 49 70 39 42	Fixed white	5	50	12
97	SAKONNET	41 27 11 71 12 10	White light 30 sec., followed by three red flashes; interval between flashes 10 sec.	4	68	14
98	***BRENTON REEF LIGHT VESSEL, No. 39***	41 25 (52) 71 22 (36)	Two fixed white	Refl'r.	38 38	12
99	**Beavertail**	41 26 58 71 24 00	Eight white flashes; interval between flashes nearly 2 sec., interval between groups of flashes 15 sec.	4	64	14
	NARRAGANSETT BAY: EASTERN PASSAGE.					
100	CASTLE HILL	41 27 44 71 21 48	Flashing red every 30 sec	5	40	12
101	FORT ADAMS FOG-SIGNAL STATION	41 28 (53) 71 20 (15)				
102	GOAT ISLAND SHOAL	41 28 (57) 71 19 (36)	Fixed white (U.) (e. i.)		12	
103	LIME ROCK	41 28 39 71 19 35	Fixed red	6	28	8
104	NEWPORT HARBOR	41 29 36 71 19 39	White light 15 sec., eclipse 5 sec	4	31	11

Gas buoys are omitted from this list.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
58	.....	.....	.....	
87	Flush-deck, steel, steam, schooner-rigged vessel, no bowsprit; red, circular, hoop-iron daymark at each masthead; red hull with "VINEYARD SOUND" in white on each side, and "90" in white on each bow and each quarter; black smokestack and fog signal between the masts; white houses and boats	.....	12-inch, steam, chime whistle..... Submarine bell If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast 6 sec. Silent 45 sec. Blast 6 sec. Silent 45 sec. Submarine bell strikes "7", thus: 7 strokes Silent 4 sec. 7 strokes Silent 4 sec.
88	Two masts, schooner rigged, no bowsprit; yellow masts; black, circular, hoop-iron daymark at each masthead; black hull, "HEN & CHICKENS" in white on each side, and "42" in white on each bow and each quarter; black smokestack and fog whistle between masts.	.....	10-inch compressed-air whistle.... If whistle be disabled a bell will be rung by hand.	Whistle sounds thus: Blast 3 sec. Silent 4 sec. Blast 3 sec. Silent 50 sec.
89	White, conical, shingled tower white coveredway to white frame dwelling.	40	.....	
90	White, frame tower attached to corner of white frame dwelling.	35	1st-class Daboll trumpet..... If trumpet be disabled a bell will be struck by hand.	SE'ly edge of red sector cuts Mishaum Ledge bell buoy, 3; its NW'ly edge is tangent to Mishaum Point and sector covers Mishaum Ledge. Trumpet sounds thus: Blast 3 sec. Silent 12 sec. Blast 3 sec. Silent 12 sec.
91	Black, cylindrical foundation; white, conical, brick tower with brown watchroom.	.....	Bell struck by machinery.....	Bell strikes thus: 2 strokes Silent 15 sec. 2 strokes Silent 15 sec.
92	White tower.....	34	Bell struck by machinery.....	Bell strikes thus: 1 stroke Silent 10 sec. 1 stroke Silent 10 sec.
93	.....	.....	.....	With Palmer Island Light marks range line to *clear* Butler Flats.
94	White tower, coveredway to white dwelling..	34	.....	
95	White tower.....	31	1,000-pound bell struck by machinery.	Bell strikes thus: 2 strokes Silent 12 sec. 2 strokes Silent 12 sec.
96	White, hexagonal, frame tower, coveredway to white frame dwelling.	33	1,000-pound bell struck by machinery.	Bell strikes thus: 1 stroke Silent 10 sec. 1 stroke Silent 10 sec.
97	White, conical tower; brown cylindrical foundation.	43	.....	
98	Two masts, schooner-rigged; circular, black, cagework daymark at each masthead; straw-colored hull, with "BRENTON REEF, No. 39," in black on each side; black smokestack and two whistles between masts.	.....	12-inch and 6-inch steam whistles.. Submarine bell. If whistles be disabled, a bell will be struck by hand five times in quick succession approximately every 30 sec.	Whistles sound thus: Blast (low tone) 3 sec. Blast (higher tone) 3 sec. Silent 24 sec. Submarine bell strikes "39", thus: 3 strokes Silent 3 sec. 9 strokes Silent 5 sec.
99	Square, granite tower, upper half white, attached to SE'ly angle of white dwelling.	46	1st-class compressed-air siren.....	Siren sounds thus: Blast 4 sec. Silent 10 sec. Blast 4 sec. Silent 50 sec.
100	Conical, granite tower, upper half white, on granite pier.	.....	Bell struck by machinery.....	Bell strikes thus: 2 strokes Silent 18 sec. 2 strokes Silent 18 sec.
101	Square, pyramidal frame tower, base white, upper part shingled, natural color.	.....	Bell struck by machinery.....	Bell strikes thus: 1 stroke Silent 10 sec. 1 stroke Silent 10 sec.
102	Black, 5-pile dolphin.....	.....	Gong struck by electric machinery.	Gong strikes thus: 1 stroke Silent 10 sec. 1 stroke Silent 10 sec.
103	Lantern on NW'ly corner of white dwelling..	13	.....	
104	White, stone tower attached to dwelling.....	29	Bell struck by machinery.....	Bell strikes thus: 1 stroke Silent 15 sec. 1 stroke Silent 15 sec.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
	NARRAGANSETT BAY—Continued. EASTERN PASSAGE—Continued.	° ′ ″			Feet.	
105	ROSE ISLAND	41 29 44 71 20 36	Fixed red	6	48	8
106	GULL ROCKS	41 30 09 71 20 01	Fixed white (E'ly light) Fixed red (W'ly light)	Lens lantern.	42	.....
107	GOULD ISLAND	41 32 03 71 20 37	Flashing white every 10 sec	5	50	13
108	PRUDENCE ISLAND	41 36 21 71 18 14	Fixed white	5	28	11
109	HOG ISLAND SHOAL	41 37 57 71 16 25	Fixed white	4	54	13
110	MUSSEL BED SHOALS	41 38 11 71 15 38	Fixed red	6	33	8
111	BRISTOL FERRY	41 38 34 71 15 39	Fixed white	5	33	11
112	BORDEN FLATS	41 42 16 71 10 30	Flashing white every 10 sec	5	48	12
	WESTERN PASSAGE.					
113	WHALE ROCK	41 26 40 71 25 27	Fixed red	4	71	11
114	DUTCH ISLAND	41 29 48 71 24 17	Red light 5 sec., eclipse 5 sec	4	54	13
115	PLUM BEACH	41 31 49 71 24 20	Flashing white every 5 sec	4	54	13
116	WICKFORD HARBOR	41 34 22 71 26 14	Fixed white	5	50	13
117	CONANICUT ISLAND	41 34 25 71 22 20	Fixed red	5	45	9
118	WARWICK	41 40 01 71 22 43	Fixed white	4	52	13
	PROVIDENCE RIVER:					
119	CONIMICUT	41 43 01 71 20 44	Fixed white with a fixed red sector between 334° and 340°.	4	58	13
120	BULLOCK POINT	41 44 16 71 21 53	Fixed red	6	48	8
121	SABINE POINT	41 45 44 71 22 33	Fixed red	6	49	8
122	POMHAM ROCKS	41 46 40 71 22 12	Fixed red	6	67	8
123	FULLER ROCK	41 47 39 71 22 49	Fixed red	6	26	8
124	SASSAFRAS POINT	41 48 01 71 23 31	Fixed red	6	23	8

Gas buoys are omitted from this list.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
105	Black lantern on white dwelling, with mansard roof.	30	Bell struck by machinery	Bell strikes thus: 2 strokes, Silent 15 sec., 2 strokes, Silent 15 sec.
106	Wedge-shaped, wooden building, shingled, natural color.	33	Bell struck by machinery	Lights above gable ends of building, range about ENE'ly and WSW'ly. Bell strikes thus: 1 stroke, Silent 5 sec., 1 stroke, Silent 5 sec.
107	Conical tower, upper half white, lower half brown.	30	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec., 1 stroke, Silent 15 sec.
108	White, octagonal tower	25	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec., 1 stroke, Silent 15 sec.
109	Black, cylindrical, iron pier, supporting conical, iron tower.		Compressed-air siren	Siren sounds thus: Blast 3 sec., Silent 10 sec., Blast 3 sec., Silent 10 sec.
110	Lantern on gable of small red dwelling, on square granite pier.	19	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 20 sec., 1 stroke, Silent 20 sec.
111	White, square tower; dwelling attached	28		
112	White, conical tower on brown, cylindrical foundation.	35	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec., 1 stroke, Silent 15 sec.
113	White, conical tower on red, cylindrical pier	73	Bell struck by machinery	Bell strikes thus: 2 strokes, Silent 23 sec., 2 strokes, Silent 23 sec.
114	White, square tower attached to dwelling	35	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 15 sec., 1 stroke, Silent 15 sec.
115	Black, cylindrical pier surmounted by conical tower, lower half white, upper half brown; brown lantern.		Bell struck by machinery	Bell strikes thus: 2 strokes, Silent 30 sec., 2 strokes, Silent 30 sec.
116	White, square tower attached to dwelling, on red, iron pier.	42	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 20 sec., 1 stroke, Silent 20 sec.
117	White, square, wooden tower on corner of white frame dwelling.	37	Compressed-air siren	Siren sounds thus: Blast 3 sec., Silent 17 sec., Blast 3 sec., Silent 17 sec.
118	White, square tower on old, stone dwelling	28	Compressed-air siren	Siren sounds thus: Blast 3 sec., Silent 12 sec., Blast 3 sec., Silent 12 sec.
119	White, conical tower on brown, cylindrical foundation.	60	Bell struck by machinery	E'ly edge of red sector cuts Ohio Ledge bell buoy. Bell strikes thus: 1 stroke, Silent 15 sec., 1 stroke, Silent 15 sec.
120	Square tower on white dwelling on rectangular granite pier.	35	Bell struck by machinery	Bell strikes thus: 2 strokes, Silent 15 sec., 2 strokes, Silent 15 sec.
121	White, octagonal tower, on granite dwelling on rock-faced granite pier.	36	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 7 sec., 1 stroke, Silent 7 sec.
122	White, square tower in center of the front of dwelling with red, mansard roof.	37	Bell struck by machinery	Bell strikes thus: 1 stroke, Silent 2.5 sec., 1 stroke, Silent 17.5 sec.
123	White, hexagonal, pyramidal structure on granite pier.	14		
124	White, hexagonal, pyramidal structure on granite pier.	14		

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water.	Distance visible, in nautical miles.
		° ′ ″			Feet.	
125	**Point Judith**	41 21 40 71 28 55	Flashing white every 15 sec. (i. o. v.)	4	65	14
126	**Block Island North**	41 13 40 71 34 35	White light, 5 sec., eclipse 1.5 sec., light 2 sec., eclipse 1.5 sec., light 2 sec., eclipse 1.5 sec. (i. o. v.)	4	58	13
127	**BLOCK ISLAND SOUTHEAST**	41 09 10 71 33 08	Fixed white. (i. o. v.)	1	201	21

Gas buoys are omitted from this list.

1. **Bearings** are given in *degrees true*, reading clockwise from 0° at N. to 360°; bearings relating to visibility of lights are given from seaward.
2. **Distances** are given in *nautical* miles.
3. **Heights** are referred to *mean high water*.
4. **Depths** are referred to *mean low water*.
6. **Names** of lights are printed to indicate their relative importance, as follows:
   a. **PRIMARY SEACOAST LIGHTS.**
   b. **Secondary Lights.**
   c. RIVER, HARBOR, AND OTHER LIGHTS.

Names of lightvessels and other floating lights thus:
   d. ***LIGHTVESSELS.***

7. **Lights, visibility:** *a. Distances* are computed for the height of the observer's eye at 15 feet above the water level, and within which the lights can be seen under ordinary conditions of the atmosphere. These distances may be at times greatly increased by abnormal atmospheric refraction, which usually increases with the height of the barometer and a falling temperature.

b. In the majority of cases the computed distances given are *geographic* ranges. In cases in which the given distances are smaller than would be found by computation, *luminous* ranges have been substituted for the *geographic* ranges, because the lights (principally the lower orders of *fixed red lights*) are not of sufficient power to be seen, under ordinary atmospheric conditions, to the limit of their geographic range.

Number.	Description of station.	Height from base of structure to center of lantern.	Fog signal.	Remarks.
		Feet.		
125	Octagonal, pyramidal tower, lower half white, upper half brown, connected with dwelling.	46	1st-class compressed-air siren.....	Siren sounds thus: Blast Silent Blast Silent 5 sec. 40 sec. 5 sec. 40 sec. Life-saving station and signal-display station about 300 feet N'd of tower.
126	Brown tower on gray granite dwelling.....	46	.....	
127	Red-brick, octagonal, pyramidal tower, attached to red-brick dwelling.	52	1st-class, automatic, compressed-air siren.	Siren sounds thus: Blast Silent Blast Silent 4 sec. 30 sec. 4 sec. 30 sec. Signal-display station here.

c. Sectors in lights should be checked by taking bearings, especially in the case of a colored sector, as the edge will vary some with changes in atmospheric conditions and white lights sometimes appear decidedly reddish.

8. Flashing lights: The interval is reckoned from the *beginning* of one flash to the *beginning* of the next following flash.

9. "(U.)" in the column "Characteristic of light," indicates that the light is *unwatched*.

10. Illuminants other than oil burned in regular service lamps are indicated thus: "(a.)"=acetylene; "(e. a.)"=electric arc; "(e. i.)"=electric incandescent; "(g.)"=gas; "(i. o. v.)"=incandescent oil vapor.

11. Fog signals will, in all cases, be started as soon as practicable after signs of fog are observed, but the fact must never be forgotten that signals sounded in air (steam or compressed-air whistles, sirens, horns, or ordinary bells) may sometimes be sounding close-to, at full capacity, and still not be heard. It must also be remembered that the conditions for hearing a signal will vary at the same station within short intervals of time.

Mariners must not, therefore, judge their distance from a fog-signal station by the force of the sound and must not assume that a signal is not sounding because they do not hear it.

12. Geographic positions of lights which are uncertain by some seconds, not yet having been accurately determined, and those of lightvessels which vary somewhat in position, have the seconds inclosed thus: 41° 53′ (22″). The geographic positions which are given without having the seconds so inclosed are furnished by the United States Coast and Geodetic Survey and have been accurately determined by triangulation.

BEARINGS AND DISTANCES.

The following bearings and distances serve to indicate relative positions of certain aids to navigation. An inspection of the charts will enable the mariner to select from the bearings given the ones which may be used as courses.

Cape Ann lighthouses.—The following are bearings and distances from Cape Ann lighthouses:

	Miles.
Isles of Shoals lighthouse, 354° true (**N** ¾ **E** mag.)	20
Boon Island lighthouse, 8° true (**NNE** mag.)	29¼
Cape Elizabeth light vessel, 22° true (**NE** ¾ **N** mag.)	57¼
Seguin lighthouse, 29° true (**NE** mag.)	73½
Monhegan Island lighthouse, 39° true (**NE** ⅞ **E** mag.)	87½
Mount Desert Rock lighthouse, 53° true (**ENE** ⅛ **E** mag.)	133¾
Seal Island lighthouse, N. S., 77° true (**E** ⅜ **S** mag.)	205¾
Cape Cod lighthouse, 148° true (**S** by **E** ⅝ **E** mag.)	42½
Race Point lighthouse, 157° true (**S** ¾ **E** mag.)	37½
Plymouth (Gurnet) lighthouse, 182° true (**S** by **W** ⅜ **W** mag.)	38
Boston light vessel, 205° true (**SW** ½ **S** mag.)	19½
The Graves lighthouse, 219° true (**SW** ¾ **W** mag.)	21

Race Point lighthouse.—The following are bearings and distances from Race Point lighthouse:

Boston light vessel, 306° true (**NW** ½ **N** mag.)	28
Eastern Point lighthouse, 329° true (**N** by **W** ½ **W** mag.)	36
Cape Elizabeth (west) lighthouse, 1° true (**N** by **E** ⅜ **E easterly** mag.)	90
Cape Elizabeth light vessel, 4° true (**N** by **E** ⅝ **E easterly** mag.)	88
Seguin lighthouse, 12° true (**NNE** ½ **E** mag.)	101
Monhegan lighthouse, 21° true (**NE** ¾ **N** mag.)	110
Matinicus Rock lighthouses, 30° true (**NE** ⅛ **E** mag.)	120
Great Duck Island lighthouse, 35° true (**NE** ½ **E** mag.)	152½
Mount Desert Rock lighthouse, 39° true (**NE** ⅞ **E** mag.)	147½
Cape Sable lighthouse, 68° true (**E** ⅜ **N** mag.)	219¼

Cape Cod lighthouse.—The following are bearings and distances from Cape Cod lighthouse:

Boston light vessel, 300° true (**NW westerly** mag.)	36
Eastern Point lighthouse, 320° true (**NNW** ¼ **W** mag.)	42
Cape Elizabeth (west) lighthouse, 356° true (**N** by **E** mag.)	91¾
Cape Elizabeth light vessel, 359° true (**N** by **E** ¼ **E** mag.)	89
Seguin lighthouse, 7° true (**NNE** mag.)	101
Monhegan lighthouse, 17° true (**NNE** ⅞ **E** mag.)	108
Matinicus Rock lighthouses, 26° true (**NE** ¼ **N** mag.)	117¼
Great Duck Island lighthouse, 32° true (**NE** ¼ **E** mag.)	149
Mount Desert Rock lighthouse, 36° true (**NE** ⅝ **E** mag.)	144½
Cape Sable lighthouse, 67° true (**E** ½ **N** mag.)	212½

Nantucket Shoals light vessel.—The following are bearings and distances from Nantucket Shoals light vessel:

Diamond Shoal light vessel, 219° true (**SW** ¼ **W westerly** mag.)	428½
Cape Charles light vessel, 233° true (**SW** by **W** ⅝ **W** mag.)	356½
Winter Quarter Shoal light vessel, 237° true (**WSW southerly** mag.)	296½
Five Fathom Bank light vessel, 244° true (**WSW** ⅝ **W** mag.)	253½
Barnegat lighthouse, 256° true (**W** ¼ **S** mag.)	213
Fire Island light vessel, 267° true (**W** ¾ **N** mag.)	163
Montauk Point lighthouse, 285° true (**NW** by **W** ⅝ **W** mag.)	106¾
Block Island southeast lighthouse, 290° true (**NW** by **W** ⅛ **W** mag.)	94
Brenton Reef light vessel, 301° true (**NW westerly** mag.)	93¾

Gay Head lighthouse.—The following are bearings and distances from Gay Head lighthouse:

Diamond Shoal light vessel, 209° true (**SW** ½ **S southerly** mag.)	431¼
Cape Charles light vessel, 222° true (**SW** ½ **W** mag.)	342½
Winter Quarter Shoals light vessel, 223° true (**SW** ⅝ **W** mag.)	280
Five Fathom Bank light vessel, 228° true (**SW** by **W** ¼ **W** mag.)	231
Barnegat lighthouse, 237° true (**WSW** ⅛ **W** mag.)	177¼
Fire Island light vessel, 244° true (**WSW** ¾ **W** mag.)	119

TIDES.[1]

Locality.	Lunitidal Intervals.[2]				Rise and Fall (Range).			Rise of highest tide observed.
	High water.		Low water.		Mean tides.	Spring tides.	Neap tides.	
	h.	m.	h.	m.	Feet.	Feet.	Feet.	Feet.
Gloucester Harbor	11	14	4	57	8.9	10.1	7.6	13.1
Salem Harbor	11	16	4	57	9.0	10.3	7.6	13.3
Boston, navy yard	11	28	5	18	9.6	10.9	8.1	14.8
Boston lighthouse	11	18	5	01	9.0	10.3	7.6	13.6
Plymouth Harbor	11	21	5	21	9.6	10.9	8.1	14.6
Barnstable Harbor (Sandy Neck Lt.)	11	27	5	22	9.4	10.8	8.0	14.5
Provincetown Harbor	11	22	5	08	9.2	10.5	7.8	13.3
Monomoy Point	12	00	5	38	3.7	4.4	3.1	5.5
Nantucket (Great Point) lighthouse	12	01	5	32	3.1	3.7	2.5	4.6
Chatham Roads (Stage Harbor)	12	11	5	57	3.9	4.7	3.1	5.2
Nantucket Harbor	12	24	5	53	3.1	3.7	2.4	4.7
Hyannis Harbor	12	16	5	35	3.3	3.9	2.6	5.2
Edgartown Harbor	12	09	5	19	2.0	2.4	1.6	3.0
Vineyard Haven Harbor	11	43	5	03	1.7	2.0	1.4	2.7
Woods Hole	8	26	2	58	1.8	2.1	1.4	2.7
Quicks Hole, south side	7	38	1	00	3.1	3.8	2.5	4.7
Gay Head lighthouse	7	45	1	20	3.0	3.6	2.4	4.6
Cuttyhunk lighthouse	7	36	0	59	3.4	4.1	2.7	5.2
New Bedford Harbor	7	57	1	05	4.0	4.8	3.1	6.3
Bird Island lighthouse	7	55	1	01	4.2	5.0	3.3	6.5
Beavertail lighthouse	7	42	0	50	3.5	4.3	2.5	5.7
Newport Harbor	7	44	0	53	3.5	4.3	2.5	5.6
Fall River Harbor	8	10	1	00	4.9	5.9	3.7	7.0
Providence Harbor	8	12	1	04	4.6	5.6	3.5	6.8

[1] Tide tables for the Atlantic coast of the United States, published annually by the Coast and Geodetic Survey, predicting the times and heights of tides for every day of the year, at all the principal ports, can be obtained from the agents; price $0.15.

[2] The mean lunitidal interval for high water or for low water is the average time from the meridian transit of the moon to the next following high or low water, respectively; it is also called the corrected establishment.

REMARKS ON APPROACHING OR STANDING ALONG THE COAST BETWEEN CAPE ANN AND POINT JUDITH.

Approaching Massachusetts Bay from Sea.—The approach to the coast of Massachusetts north of Cape Cod is through the Gulf of Maine, the body of water lying westward of a line drawn from Cape Cod to Cape Sable. Between these points, and forming the southeastern limit of the gulf, lie Nantucket Shoals, Georges Bank, and Brown Bank, areas over which there is a depth of less than 50 fathoms. Nantucket Shoals and Georges Bank, on account of their many shoal spots and the strong tidal currents setting over them, are a menace to navigators approaching the coast or standing from Canadian ports to New York.

As far as the navigator is concerned Brown Bank need not be avoided; it may even assist, from soundings, to approximately locate a vessel's position.

Georges Bank, for a distance of 75 miles in a west-southwesterly direction and a width of about 40 miles, has depths of less than 20 fathoms, and numerous scattered spots with depths ranging from 2 to 10 fathoms, among which are *Georges Shoal* and *Cultivator Shoal*. This part of Georges Bank, lying between latitude 41° 05′ N. and 42° 00′ N. and longitude 67° 17′ W. and 68° 35′ W., should be avoided; in heavy weather the sea breaks on the spots, with 10 fathoms or less, and strong tide rips are encountered, the latter, however, not always indicating shoal water. The tidal currents have a maximum velocity of about 2 miles per hour over the shoaler parts of the bank; the flood sets northward and ebb southward, the times of their turning corresponding very nearly with the time of high and low water at Boston.

Vessels passing south of the dangerous part of Georges Bank should not shoal the water to less than 25 fathoms. Approaching this part of the bank from eastward or southward the water shoals gradually. Approaching from westward the depths are irregular and the water shoals abruptly in places to 20 fathoms or less. On the north side of Georges Bank, between longitude 66° 00′ W. and 68° 00′ W., the 100-fathom and 50-fathom curves are but a few miles apart, and when approaching the dangerous part of the bank from northward, 50 fathoms may be taken as a good depth to avoid the shoals.

For *Nantucket Shoals* see pages 32 and 63. Nantucket Shoals light vessel, the leading mark for vessels passing southward of Nantucket Shoals, is moored in 30 fathoms off the southern end of the shoals.

The only outlying dangers in the Gulf of Maine to be avoided by vessels bound to ports in Massachusetts are *Ammen Rock*, with 4 fathoms, and *Sigsbee Rock*, with 5 fathoms. The latter is in latitude 42° 53′ N. and longitude 68° 55′ W., and is 4 miles southwestward from Ammen Rock. These are a part of *Cashe Ledge*, which is about 6½ miles long in a north-northeast direction, with depths less than 30 fathoms.

Vessels from ports in northern Europe or the British Provinces and bound to ports in the United States north of Cape Cod, approach the coast passing between Cape Sable and Georges Bank, between latitude 42° 00′ N. and 43° 10′ N. If bound to Boston they cross Brown Bank, and shape the course for Boston light vessel.

Vessels approaching the Gulf of Maine from southward, endeavor to make the 50-fathom curve on the southern edge of Georges Bank in latitude 40° 20′ N. and longitude 69° 00′ W.; then stand 0° true (**N** by **E** ¼ **E** mag.) on soundings of over 30 and less than 50 fathoms for about 50 miles; and then shape a 323° true (**NNW** mag.) course, taking care to keep in a greater depth than 20 fathoms until the course is laid to sight Cape Cod lighthouse. This lighthouse, the wireless telegraph skeleton towers about 9 miles southward of it, and the Pilgrim Monument at Provincetown are the most prominent marks on Cape Cod.

The passage across Georges Bank between the easternmost of the Nantucket Shoals and the westernmost shoal spots of Georges Bank, about 30 miles wide, has been called *Great South Channel.*

Or, vessels coming from Cape Hatteras, Chesapeake Bay, Delaware Bay, or New York, make Nantucket Shoals light vessel. (See the sailing directions between Cape Ann and Point Judith following.)

Vessels of less than 24 feet draft may, when coming from southward or alongshore, enter the Gulf of Maine through Vineyard and Nantucket Sounds. This route avoids Nantucket Shoals, and is the one followed by vessels in the coasting trade. Gay Head and No Mans Land, at the western entrance to Vineyard Sound, are the landfalls for vessels approaching from sea.

Approaching Vineyard Sound, Buzzards Bay, or Narragansett Bay from sea.—The approach to the above waters in clear weather requires no special caution, as the land, or at night the lights, will be made and recognized in time to fix the vessel's position so as to avoid danger and set a course for the vessel's destination. Vessels from eastward generally sight No Mans Land and pass southward of it; Cape Poge light is visible on some bearings from seaward, and care should be taken not to mistake it for Gay Head light. Vessels from westward generally sight Montauk Point and Block Island, passing south of the latter.

In thick weather the greatest caution is necessary as soundings can not be depended on for locating the vessel's position, but inside a depth of 30 fathoms the lead must be constantly used to prevent too close an approach to danger. Coming from the vicinity of Nantucket Shoals light vessel, the depth should not be shoaled to less than 15 fathoms, and it is advisable to remain offshore in a depth of over 20 fathoms. Coming from southward, or southwestward, to insure clearing the shoals off Montauk Point and Block Island, the usual route followed by coasting vessels is to stand in for the south shore of Long Island anywhere between Montauk Point and Shinnecock lighthouse, sounding frequently, until in a depth of 15 to 16 fathoms, when the vessel will be from 3½ to 4½ miles from the beach. A 67° true (**E** by **N** mag.) course made good, and keeping the lead in use so as not to shoal the water to less than 15 fathoms, will then lead along the beach at a distance of about 4½ miles and about 5 miles southward of Montauk Point lighthouse. Continuing on the 67° true (**E** by **N** mag.) course, the water will gradually deepen to 24 and 26 fathoms, and then begin to shoal again until a depth of 10 to 12 fathoms is struck on the bank which extends about 5 miles southeastward from Block Island. The distance the vessel should have made in a greater depth than 15 fathoms should be about 13 miles. When the water deepens to more than 15 fathoms, after crossing the bank, and does not again shoal, the vessel will have cleared Block Island. Approaching Block Island from southward, a depth of less than 10 fathoms indicates less than ¾ mile from the shore.

The *tidal currents* have an estimated velocity of about 1¼ miles between Montauk Point and Block Island, and about 1 mile between Block Island and Gay Head; their greatest velocity is close to Montauk Point, where it is estimated at 2 to 3 miles. The flood has a general northerly set and the ebb a southerly set of about equal duration.

With southwesterly or northwesterly gales the following route is used to some extent by tows to get smoother water and to avoid the very heavy sea that makes into the westerly entrance of Vineyard Sound to abreast Quicks Hole. Bound westward the same route is used, and if the wind is southward of west and the sea is too heavy to proceed, anchorage is made in Buzzards Bay eastward of Penikese Island.

Passing 1¼ miles southward of Montauk Point lighthouse steer 55° true (**ENE** mag.) for 3 miles. Then make good a 42° 30′ true (**NE** ⅞ **E** mag.) course for 21 miles to Point Judith gas and whistling buoy, passing 1¼ miles northwestward of Block Island north lighthouse and about ½ mile northwestward of Block Island North Reef bell buoy. From Point Judith gas and whistling buoy make good a 72° 30′ true (**E** ⅜ **N** mag.) course for 21½ miles to Hen and Chickens light vessel, and then reverse the directions for Quicks Hole. On these courses the currents have their greatest velocity between Montauk Point and Block Island, where they set northwestward on the flood and southeastward on the ebb.

STANDING ALONG THE COAST BETWEEN CAPE ANN AND POINT JUDITH.—The lighthouses and other aids to navigation are sufficiently numerous to enable a stranger to run either at night or the daytime in clear weather. In thick weather it is advisable to haul offshore, or, if in the sounds, to anchor until the weather clears. There are numerous anchorages where a vessel with good ground tackle can ride out any gale. Of these, Provincetown Harbor is the harbor of refuge most frequently used by vessels approaching Massachusetts Bay from seaward. Newport Harbor and Dutch Island Harbor are the best anchorages for vessels approaching the coast from seaward between Gay Head and Block Island. Menemsha Bight and the anchorage in Buzzards Bay eastward of Penikese Island are also used to some extent, the former in southerly and easterly winds, and the latter in southerly and westerly winds.

The navigator when crossing the banks and when approaching the coast should not neglect to take soundings at frequent intervals.

SAILING DIRECTIONS BETWEEN CAPE ANN AND POINT JUDITH.

With the aid of the chart courses can be selected from the table of bearings and distances preceding. Courses from the principal coast points to the entrances of the bays and ports are given in the directions for those waters. Directions from Cape Cod lighthouse through Nantucket and Vineyard Sounds are given under those headings.

From Boston light vessel a 115° true (**SE** ½ **E** mag.) course made good for 36 miles will lead close to the gas and whistling buoy off Peaked Hill Bar, and to a position 3 miles northeastward of Cape Cod lighthouse.

The *tidal currents* may be expected to cause a slight westerly set on this course for the greater part of the flood, and a stronger northerly and easterly set on the last of the flood and greater part of the ebb.

The following courses, for deep-draft vessels, if made good should lead outside of Nantucket Shoals in a depth of not less than 20 fathoms:

From a position 4 miles east-northeastward of Cape Cod lighthouse make good a 148° true (**S** by **E** ½ **E** mag.) course for 54 miles to a position 27½ miles 87° true (*E* by *S* mag.) from Sankaty Head lighthouse. Then make good a 166° true (**S** mag.) course for 33 miles, and then a 245° true (**W** by **S** mag.) course for 22 miles to Nantucket Shoals light vessel.

Steamers of about 18 feet or less draft with a smooth sea can cross the shoals, as follows: From a position 3 miles east-northeastward of Cape Cod lighthouse make good a 151° true (**S** by **E** ¼ **E** mag.) course for 52 miles to a position 23 miles 87° true (*E* by *S* mag.) from Sankaty Head lighthouse. Then make good a 191° true (**SSW** ¼ **W** mag.) course for 42 miles to Nantucket Shoals light vessel.

Cape Cod, Nauset Beach, and Chatham lighthouses, the light vessels at Pollock Rip Slue, and Great Round Shoal entrance gas and whistling buoy may be seen in clear weather, but the courses lead outside of the range of visibility of Sankaty Head lighthouse. Steamers, unless sure of their position by making some of these aids or Nantucket Shoals light vessel, and sailing vessels at all times, should pass outside the shoals, on account of the strong tidal currents, variable both in direction and velocity, for which it is impracticable to make proper allowance.

The *soundings* on the sailing lines are very irregular, and are of but little use in determining the position. When rounding Nantucket Shoals in thick and foggy weather, safety may be insured by taking frequent soundings, and hauling offshore when a sounding of less than 25 fathoms is obtained; such a means will, however, take a vessel farther offshore than the sailing lines given above. In thick weather, keeping in a greater depth than 20 fathoms will insure giving the eastern side of Cape Cod a berth of 2½ miles.

The *tidal currents* on and near Nantucket Shoals are never slack, but change in direction with the hands of a watch all around the compass twice in every lunar day. The velocity varies with the direction of the current (stage of the tide), and considerable change in velocity may also be experienced by a small change in position relative to the shoals. A velocity at strength of 2½ miles or more an hour is common in places on the shoals, and 1½ miles or more in the deeper water near them. The greatest periodical velocity of the current occurs at the strength of the flood and ebb setting to and from the Gulf of Maine, about three hours after high and low waters at Boston, and the direction at strength is in the direction of the length of the individual banks on the shoals.

In general, on the courses between Cape Cod and Nantucket Shoals light vessel, the greatest easterly set (away from the shoals) may be expected from about two hours after low water to high water at Boston, and the greatest westerly set (toward the shoals) from about two hours after high water to low water at Boston.

GLOUCESTER HARBOR [1]

is the most important fishing port in the United States and an important harbor of refuge; it lies 5 miles southwestward of Emerson Point, the easternmost point of Cape Ann. The entrance is marked on its eastern side by Eastern Point lighthouse. There is an outer and an inner harbor, the former with a general depth of 5 to 6 fathoms and the latter 2½ to 4 fathoms.

A breakwater extends 750 yards northwestward from the shore near Eastern Point lighthouse, and is marked at its end by **Gloucester Breakwater light.** The entrance westward of the breakwater is about ⅝ mile wide; but Round Rock Shoal lies nearly ¼ mile westward of the end of the breakwater, leaving a channel 250 yards wide and 3¾ to 4 fathoms deep eastward of the shoal, and ⅜ mile wide and 4¾ to 9 fathoms deep westward of the shoal. During heavy southeast gales the sea, at times, breaks nearly the whole distance across the entrance.

Southeast Harbor is the cove in the eastern part of Gloucester Harbor, northward of Black Bess Point and southward of Tenpound Island. It has good anchorage in about 5 fathoms.

Western Harbor is the cove, of semicircular shape, in the northern part of Gloucester Harbor, northward of Tenpound Island. It has good anchorage in from 4 to 5 fathoms, taking care to give the shore a berth of 300 yards, but is not much used. A part of the town of Gloucester is built on its northern shore.

A dredged channel 6 feet deep and 50 feet wide, with a least width of 40 feet through the bridges, leads from Western Harbor to **Annisquam River;** vessels of as much as 10 feet draft are taken through at high water to Ipswich Bay. The tidal currents have considerable velocity through the bridges. Local knowledge is necessary for its navigation.

Inner Harbor, the northeasterly part of Gloucester Harbor, has a length of over ½ mile to Fivepound Island, a width of 300 to 450 yards, and depths of 2½ to 4 fathoms. The head of the harbor is shoal above Fivepound Island. **Harbor Cove**, on the northerly side of Inner Harbor, has a depth of 10 feet. **Smith Cove**, on the southerly side of Inner Harbor, is mostly shoal, but has depths of 12 to 15 feet at its entrance.

The best **anchorage** in the outer harbor for vessels coming in for shelter or bound to Gloucester is Southeast Harbor, which has clay bottom, good holding ground. This portion of the harbor is commonly known as **Pancake Ground.** Vessels of 15 feet or less draft anchor almost anywhere in the inner harbor, not less than 150 feet from any wharf. (See Appendix II.)

Wharves.—There are a number of wharves at Gloucester, several of which have depths alongside of 10 to 16 feet. There are several public landings for small vessels; large vessels have to pay wharfage.

Pilots.—A pilot may be had by making signal outside the entrance. State pilotage is compulsory for certain classes of vessels. (See Appendix II.)

Towboats can be obtained at Gloucester, and generally go outside to meet large vessels sighted coming in; such vessels are usually towed in and out.

Harbor regulations are given in Appendix II. There are no special harbor dues.

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[1] Shown on charts **109**, scale $\frac{1}{80,000}$, price $0.50; **243**, scale $\frac{1}{20,000}$.

Quarantine regulations are established from time to time by the board of health of Gloucester, and are enforced under the direction of the board.

Marine hospital.—See page 10.

Marine railway.—Gloucester has several marine railways, which are capable of taking out small vessels only, the limit of size being about 100 feet long on keel and 200 gross tons. Boston is the nearest place where large vessels can be docked.

Supplies.—Provisions and ship-chandler's stores can be obtained; also anthracite and bituminous coal for steamers, put on board either at the coal wharves or by lighters. Fresh water is supplied by water boats or may be taken at the wharves. Most of the tugs working in this harbor carry fresh water to supply shipping.

Storm warning displays are made at the customhouse.

Communication.—Gloucester is on the line of the Boston & Maine Railroad, and has also steamboat communication with Boston.

Ice seldom extends outside Tenpound Island, at the entrance to the Inner Harbor. The tugs and steamers keep the Inner Harbor open.

Tides.—The highest tides result when easterly and southeasterly gales occur at full and change. (See table, p. 29.)

Tidal currents.—The tidal currents do not to any great degree interfere with the movements of vessels, as they set directly in and out of the harbor, and their velocity is comparatively small. In the narrows, however, between Fort Point and Rocky Neck, the current is stronger, especially at half ebb, and the ebb sets on to Black Rock. Vessels coming out on the ebb favor the northwestern side of the channel in passing between Fort Point and the spindle on this rock. The ebb also sets on to Tenpound Island.

SAILING DIRECTIONS, GLOUCESTER HARBOR.

The directions in section 2 lead in a least depth of 5 fathoms to the anchorages in the Outer Harbor, and a least depth of 19 feet into the Inner Harbor. Those in section 2 A lead in a least depth of 3¾ fathoms eastward of Round Rock Shoal. In heavy southeasterly gales the sea breaks across the eastern side of the entrance from the breakwater to Round Rock Shoal, and at times breaks nearly the whole distance across to Norman Woe Rock.

1. Approaching.—Passing 1 mile or more eastward and southeastward of Cape Ann lighthouses steer 233° true (**WSW** mag.). Give the shore eastward of Eastern Point lighthouse a berth of ¼ to ½ mile, and pass close to Eastern Point whistling buoy, lying nearly ⅝ mile southward from the lighthouse. Then follow the directions of section 2 or 2A.

Approaching from southwestward bring Eastern Point lighthouse to bear northward of 42° true (**NE** by **E** mag.) and steer for it; or, coming from Salem, bring Baker Island lighthouses astern on a 64° true (**E** by **N** mag.) course heading for Eastern Point lighthouse. When Tenpound Island lighthouse bears 30° 30′ true (**NE** mag.) steer for it and follow the directions in section 2; or, when Tenpound Island lighthouse bears 19° 30′ true (**NE** by **N** mag.) steer for it, pass 200 yards westward of Gloucester Breakwater light, and follow the directions of section 2A.

Dangers.—**The Londoner** is a ledge about ⅜ mile long in a northeast direction, and lies ½ mile east-southeastward from Cape Ann lighthouses. Its southerly end is dry at low water and is marked by a red spindle with cage.

The dangers southward and eastward of Baker Island are described under the heading Salem Harbor.

2. Entering westward of Round Rock Shoal.—Steer 30° 30′ true (**NE** mag.) for Tenpound Island lighthouse until Eastern Point lighthouse bears 75° 30′ true (*E* mag.) and Norman Woe bell buoy is 350 yards on the port beam. Then steer 25° true (**NE ½ N** mag.) and pass 75 to 100 yards westward of Tenpound Island Ledge gas buoy. When Tenpound Island lighthouse is abeam steer 47° true (**NE** by **E ½ E** mag.) for the middle of the entrance to Inner Harbor, and when Black Rock is passed steer about 53° true (**ENE** mag.) keeping near midharbor. Anchor in the broad part of the harbor below Fivepound Island.

Or, from Eastern Point whistling buoy steer 306° true (**NW ½ N** mag.) until Tenpound Island lighthouse bears 30° 30′ true (*NE* mag.). Then steer 25° true (**NE ½ N** mag.) as in the preceding paragraph.

To anchor in Southeast Harbor, steer the 25° true (**NE ½ N** mag.) course of the preceding paragraphs until Eastern Point lighthouse bears 120° 30′ true (*SE* mag.). Then steer 53° true (**ENE** mag.) and anchor in about 5 fathoms anywhere southward of Tenpound Island, giving the island a berth of 250 yards, and the shore southeastward of it a berth of not less than 350 yards.

Dangers.—Eastern Point Ledge, with depths of 8 to 12 feet, makes off 375 yards southwestward from Eastern Point lighthouse, and is marked off its end by a buoy (spar, red, No. 2). **Webbers Rock**, with 8 feet over it, is on the end of the ledge, 150 yards eastward from the buoy.

Dog Bar is occupied by the breakwater; the bar has 15 feet over its outer part, and is marked at its westerly end by a buoy (spar, red, No. 4) which lies about 75 yards northwestward from the light on the end of the breakwater.

Round Rock Shoal has 13 to 18 feet over it, is about 250 yards long in a northeast direction and about 100 yards wide. The shoal lies in the middle of the entrance, 400 to 550 yards west-northwestward from the light on the end of the breakwater; its south end is marked by a buoy (spar, black, No. 1).

Norman Woe Rock, a high, dark, rocky islet, lies about 350 yards from the western shore, with ledges between. A ledge with 13 feet over its outer part extends 300 yards southeastward from the islet, and is marked at its outer limit by a black bell buoy.

Tenpound Island Ledge, a rock with 8 feet over it, lies 650 yards southwestward from Tenpound Island, and is marked on its west side by a buoy (spar, red, No. 6). A ledge with 14 feet over it, lying 200 yards southwestward from the rock, is marked at its west end by Tenpound Island Ledge gas buoy No. 6A (occulting red light). A ledge with 13 feet over it lies 400 yards southwestward from Tenpound Island. A rock with 11 feet over it lies 200 yards westward of Tenpound Island, and is marked on its southwest side by a buoy (spar, red and black horizontal stripes). These ledges and rocks are to be removed to a depth of 18 feet.

A ledge with 16 feet at its end extends 200 yards southwestward from **Tenpound Island**, and there is a depth of 4 feet on the ledge about 100 yards from the island.

Field Rocks extend 450 yards from the western shore abreast Tenpound Island Ledge; several of them are bare at low water, and their south end is marked by a buoy (spar, black, No. 3).

Prairie Ledge, with 18 feet over it, lies eastward of Field Rocks and 350 yards north-northwestward from Tenpound Island Ledge gas buoy, and is marked on its eastern side by a buoy (spar, red and black horizontal stripes). This ledge is to be removed to a depth of 25 feet.

Babson Ledge, with 14 feet over it, lies ¼ mile northward from Tenpound Island lighthouse, and is marked on its southeast side by a buoy (spar, black, No. 5).

Black Rock, dry at half tide, lies 100 yards from the western end of Rocky Neck, and is marked by a red spindle with cage. Shoals extend from here southward to the eastern side of Tenpound Island.

2A. Entering eastward of Round Rock Shoal.—Steer 19° 30′ true (**NE** by **N** mag.) for Tenpound Island lighthouse and pass 200 yards westward of the light on the end of the breakwater. Or, from Eastern Point whistling buoy steer 323° true (**NNW** mag.) until the light on the end of the breakwater is abeam, and then haul northward and pass 200 yards westward of it.

Pass 200 yards westward of the light on the end of the breakwater and steer 5° true (**N** by **E** ¾ **E** mag.) to a position 75 to 100 yards westward of Tenpound Island Ledge gas buoy. Then steer 25° true (**NE** ½ **N** mag.) until Tenpound Island lighthouse is abeam. Then steer 47° true (**NE** by **E** ½ **E** mag.) for the middle of the entrance to Inner Harbor, and when Black Rock is passed steer about 53° true (**ENE** mag.) keeping near mid-harbor. Anchor in the broad part of the harbor below Fivepound Island.

To anchor in Southeast Harbor, pass 200 yards northwestward of the light on the end of the breakwater and steer 30° true (**NE** mag.). Anchor anywhere southward of Tenpound Island, giving the island a berth of 250 yards, and the shore southeastward of it a berth of not less than 350 yards.

For dangers see section 2.

MANCHESTER HARBOR [1]

is about 5 miles westward of Gloucester Harbor, and is formed by an arm of the bay extending behind Gales Point in a northeasterly direction for 1 mile to the village of Manchester. The entrance to the outer harbor is northward from Baker Island lighthouses, between **House Island** (partly wooded) on the east and Great Misery Island on the west.

There is anchorage in the outer harbor inside Great Misery and House Islands. Vessels desiring to anchor for the night or in head winds may here find fair holding ground and good shelter except in southerly gales. The anchorage is ¾ mile wide, and has from 3 to 6 fathoms.

The dredged channel leading up to Manchester from the outer harbor is 100 to 200 feet wide and 6 feet deep as far as the railroad bridge, above which it has 4 feet to the town wharves. The draft of vessels going to Manchester averages about 7 feet, deepest draft about 10 feet. The dredged channel is marked by private aids during the summer.

Pilots are usually taken by strangers bound up to the town, vessels anchoring in the harbor below until pilots come down in response to signals.

Towboats can be had from Beverly, and are used in towing barges up and down.

[1] Shown on charts **109**, scale $\frac{1}{80,000}$, price $0.50; **244**, scale $\frac{1}{20,000}$, price $0.25.

Supplies.—Fresh water can be obtained at Manchester; supplies and some ship-chandler's stores from Salem and Beverly. The nearest customhouse is at Gloucester.

Tides.—The mean rise and fall of tides is about 9 feet.

SAILING DIRECTIONS, MANCHESTER HARBOR.

With Baker Island lighthouses bearing between 244° true (**W** by **S** mag.) and 284° true (**NW** by **W** ½ **W** mag.) steer for them. Pass ¼ to ⅜ mile northward of Baker Island, and then bring the lighthouses astern on a 351° true (**N** ½ **E** mag.) course; on this course pass 350 to 400 yards westward of Whales Back spindle, and 75 to 100 yards eastward of Sauli Rock buoy. Anchor about ¼ mile east-southeastward from Chubb Islet and the same distance from the northern shore, in 3 to 4 fathoms.

Dangers.—Off the shore eastward of Manchester Harbor entrance, between Gloucester entrance and House Island, are a number of islands, rocks, and ledges, which extend about ¾ mile from shore. The farthest outlying ones, named in order from eastward, are: **Kettle Island** (grass-covered and rocky), **Great Egg Rock** (high and bare), **Paddock Rock**, **Boo-hoo Ledge** (bare at low water), **Salt Rock** (shows at high water), **Picketts Ledge** (bare at low water), **Gales Ledge**, and **Pilgrim Ledge**.

Paddock Rock, with 13 feet over it, lies 650 yards west-southwestward from Great Egg Rock.

Gales Ledge, 1¼ miles 49° true (**NE** by **E** ⅝ **E** mag.) from Baker Island lighthouse, has 5 feet over it and is marked on its south side by a buoy (spar, red, No. 2). Spots with 10 to 12 feet over them lie ¼ mile northward and northeastward from Gales Ledge.

Pilgrim Ledge, with 18 feet over it, lies 400 yards westward from Gales Ledge.

Whales Back is a dangerous ledge lying in the entrance of the outer harbor of Manchester. It is about 400 yards long east and west, and 200 yards wide. Near the middle of its northern side is a rock bare at low water, which is marked by a red spindle with cage. There is a clear channel 300 yards wide between the ledge and House Island; the channel westward of the ledge is ¼ mile wide.

Sauli Rock, bare at half tide, lies 300 to 400 yards eastward from the northeast end of Great Misery Island, and is marked on its south side by a buoy (spar, red and black horizontal stripes).

White Ledge, bare at low water, lies 300 yards northward of House Island, and is marked on its northwest side by a buoy (spar, red, No. 2). A rock, covered at half tide, lies 250 yards north-northeastward from White Ledge, and is marked off its northwest side by a buoy (spar, red, No. 4).

Chubb Islet, bare and rocky, lies 300 yards from the north shore of the outer harbor of Manchester, and should be given a berth of over 200 yards.

SALEM HARBOR [1]

is at the western end of a large, irregular indentation in the shore of Massachusetts Bay, 11 miles soutwestward of Cape Ann, and 12 miles northeastward of Boston Harbor entrance. **Gales Point** is the northern, and **Marblehead Neck** the southern, point at the entrance to this large indentation, which includes within its limits the harbors of Manchester, Beverly, Salem, and Marblehead, the distance between the two points being 4 miles. This wide space is studded with islands, bare rocks, and sunken ledges, through which lead the several channels into the harbors.

Salem Harbor is much used as a harbor of refuge, particularly during the autumn. It is especially convenient for vessels seeking shelter bound eastward and met by an easterly gale, as the direction of the harbor is such that a foul wind for proceeding is a fair wind into the harbor, and a fair wind for proceeding is also a fair wind out. Strangers should not attempt to beat into Salem Harbor on account of the numerous ledges and shoals.

Between the northern shore and the islands and rocks obstructing the entrance, there is good anchorage in what may be termed the outer harbor. This anchorage is about 2 miles long east and west, and from ½ to 1¼ miles wide.

Salem Harbor proper is about 1½ miles long in a southwest direction and ⅜ to ¾ mile wide. The channel, with depths of 3 to 4 fathoms, is quite narrow and lies nearer the eastern shore. Extensive flats fill the head of the harbor and make off from the western or town side.

South River is only 50 yards wide in places between the wharf lines, and has been dredged to a depth of 8 feet; it separates Salem and South Salem. At the mouth of the river is **Derby Wharf**, which is nearly 600 yards long, and is marked at its southeast end by **Derby Wharf lighthouse**; this with Fort Pickering lighthouse forms a range for approaching the Inner Harbor.

The city of **Salem** has some trade by water, principally coal. The deepest draft of vessels entering the harbor is 20 feet; there is a depth of 15 feet alongside the coal piers, and 8 to 10 feet in places at the wharves in South River.

Prominent objects.—Approaching from eastward, **Baker Island**, with two lighthouses on its northern end and numerous houses scattered over the island, and **Great Misery Island**, the high, grassy island, with a clubhouse and water tank near its highest part, lying northward of Baker Island, are the most prominent. Westward of these islands is **Bowditch Ledge beacon**, a large granite beacon with black staff and cage on top. **Hospital Point lighthouse** is on the north shore nearly 3¼ miles west-northwestward from Baker Island lighthouses, and is the guide for standing in from eastward. On the north side of the entrance to the Inner Harbor is **Fort Pickering lighthouse**.

[1] Shown on charts **109**, scale $\frac{1}{80,000}$, price $0.50; **244**, scale $\frac{1}{20,000}$, price $0.25.

Approaching from southward, **Halfway Rock**, a bare rock about 15 feet high, with a beacon on it, will be seen about 1⅞ miles south of Baker Island. Southward of Baker Island lie two high, rocky islets, **North** and **South Gooseberry Islands**, and 1¼ miles southwestward of these is **Cat Island**, long and narrow with a number of houses near the northern end. **Marblehead Neck** is high and rocky, and has many summer houses; **Marblehead lighthouse** is on its northern point.

Channels.—Three principals lead into Salem Harbor, which are equally good for entering in the daytime in clear weather. These channels come together in the outer harbor, northward of Little Haste, and from there into Salem Harbor proper the depth is 3½ to 5 fathoms.

Main Ship Channel, the most northerly channel, has a least depth of over 5 fathoms until up to Little Haste; its entrance lies between Baker Island and Great Misery Island.

Cat Island Channel, the middle channel, having its entrance near Halfway Rock, leads in a northwesterly direction, between Cat Island on the south and Eagle Island on the north; and has a least depth of 4 to 4¾ fathoms when entering northward of Gooseberry Ledge, a least depth of 3¾ fathoms when entering between Gooseberry Ledge and Satan Rock, and a least depth of 4¾ fathoms when entering between Satan Rock and Cat Island.

Marblehead Channel, the westerly channel, leads in a northerly direction, between Cat Island and Marblehead, and has numerous spots with depths of 19 to 27 feet over them, over which the sea breaks in easterly gales. By avoiding these spots the channel is good for a least depth of about 5 fathoms. It and Cat Island Channel are also channels for approaching the entrance to Marblehead Harbor.

South Channel, a branch from Marblehead Channel, leads along the northerly shore of Marblehead Peninsula, and southward of the numerous rocks and ledges lying eastward of the immediate entrance to Salem Harbor. South Channel is less than 100 yards wide in its narrowest part and has a depth of 15 feet if closely followed.

Anchorages.—There is good anchorage in 5 to 7 fathoms westward of Bowditch Ledge and northward or eastward of Little Haste, also off the entrance to Beverly Harbor. The quarantine anchorage lies within the following limits: Beginning at Eagle Island and running northwesterly to Coney Island, from Coney Island in a more northerly direction to Great Haste, from there easterly to Bowditch Ledge, and thence southwesterly to Eagle Island. In Salem Harbor the best anchorage is just inside of Naugus Head on the eastern side of the harbor.

Pilots can be obtained from a Boston pilot boat and from Gloucester. State pilotage is compulsory for certain classes of vessels in the ports of Massachusetts. (See Appendix II.)

Towboats can be obtained from Beverly by making signal after getting in past Baker Island.

Quarantine regulations are established from time to time by the Board of Health of Salem. For anchorage of vessels subject to quarantine, see "Anchorages."

Marine hospital.—(See p. 10.)

Supplies.—Provisions and some ship-chandler's stores can be obtained. Coal, either anthracite or bituminous, can be obtained at the wharves. Water can be had through hose alongside the wharves, and from a water boat from Beverly.

Repairs.—There are no facilities for repairs except to small craft.

Ice.—The head of the harbor on the flats is usually closed by ice every winter during the months of January and February; but the formations rarely extend beyond the coal pier except in unusually severe winters, when they have been known to reach as far out as The Haste, and occasionally as far as Eagle Island.

Northerly and northwesterly winds are most favorable to local formations in Salem Harbor. Winds from southward and westward, during light formations, have a tendency to carry the ice off to sea, while those from eastward usually break up the formations both in the harbor and its approaches.

For **tides** see table, page 29.

The **tidal currents** in Salem have little velocity.

SAILING DIRECTIONS, SALEM HARBOR.

For depths that can be taken through the several channels into Salem Harbor, see description of channels preceding.

Unless the night is clear, so that the buoys can be seen, a stranger should enter by the Main Ship Channel.

1. Through Main Ship Channel.—With Baker Island lighthouses bearing between 244° true (**W** by **S** mag.) and 284° true (**NW** by **W** ½ **W** mag.) steer for them; or, coming from Gloucester bring Eastern Point lighthouse astern on a 244° true (**W** by **S** mag.) course heading for Baker Island lighthouses.

Pass ¼ mile northward of Baker Island lighthouses, steer 276° 30′ true (**WNW** ¼ **W** mag.) for Hospital Point lighthouse, and pass 250 to 300 yards southward of Little Misery Island.

On this course Hospital Point lighthouse will be in range with a tall, slender church spire in Beverly; at night Hospital Point light is more brilliant when on the sailing line than if northward or southward of it, and vessels should keep in its brightest ray.

Pass 300 yards northward of Bowditch Ledge beacon, steer 262° 30′ true (**W** ⅝ **N** mag.) for Old Hospital Point (south side at entrance of Beverly Harbor), and pass northward of spar buoys Nos. 5 and 7, which mark the northeasterly and northerly ends of the shoals making off from Great Haste. When buoy No. 7 is 100 yards on the port beam, and Fort Pickering and Derby Wharf lighthouses are in range, stand in on the range. Or, at night continue the 276° 30′ true (**WNW** ¼ **W** mag.) course of the preceding paragraph for Hospital Point light until Fort Pickering and Derby Wharf lights are in range, and then stand in on the range. Derby Wharf light is hard to pick up in the daytime, as it is small and about the same color as the buildings back of it.

Steer 232° true (**SW** by **W** ⅞ **W** mag.) for Fort Pickering lighthouse in range with Derby Wharf lighthouse until Old Hospital Point bears 301° true (*NW* mag.). Then steer 219° true (**SW** ¾ **W** mag.), pass 200 yards northwestward of Middle Ground buoy and 200 to 300 yards southeastward of Fort Pickering lighthouse, and anchor in mid-harbor off the Philadelphia and Reading coal pier, in 3½ to 4½ fathoms, soft bottom.

Dangers.—Gales Ledge and Whales Back are described on page 35.

Southeast Breakers, ¼ mile long with 3 to 17 feet over them, lie 1¾ miles 140° true (**SSE** ¼ **E** mag.) from Baker Island lighthouses, and are marked at the south end by a buoy (nun, red, No. 2). **Newcomb Ledge**, with 18 feet over it, lies ¼ mile eastward from the buoy.

Middle Breakers, partly bare at low water, lie 1⅜ miles 135° true (**SSE** ¾ **E** mag.) from Baker Island lighthouses, and are marked by a black spindle with wheel and pendants.

Inner Breakers, partly bare at low water, lie ¼ mile west-northwestward from Middle Breakers. From Inner Breakers ledges extend northwestward nearly to Baker Island and westward to the Gooseberry Islets. The northeast end of the ledges is marked by **Searle Rock** buoy (spar, black, No. 1) which lies 600 yards east-southeastward from Baker Island.

A ledge with 16 feet over it lies ½ mile 11° true (**NNE** ¼ **E** mag.) from the spindle on Middle Breakers, and 1⅛ miles 114° true (**SE** ⅝ **E** mag.) from Baker Island lighthouses.

Baker Island Shoal extends 300 yards northward and about 500 yards westward from Baker Island. The northerly end of this shoal is marked by a buoy (spar, black, No. 3).

A ledge extends 150 yards southwestward from **Little Misery Island,** and is marked off its southwest end by a buoy (spar, red, No. 4).

House Ledge, with 10 feet over it, lies ⅜ mile east-southeastward from Bowditch Ledge beacon and nearly ⅜ mile southwestward from Little Misery Island; it is marked on its northeast side by a buoy (spar, red and black horizontal stripes).

Bowditch Ledge, 1⅛ miles west-northwestward from Baker Island lighthouses, is marked by a granite beacon with black staff and cage. A spot, with 14 feet, lies 300 yards east-southeastward from the beacon. A rock with 16 feet over it lies 350 yards south-southeastward from the beacon, and is marked on its southerly side by a buoy (spar, red, No. 2), which is a guide for the channel between it and Hardy Rock Shoal.

A group of rocks with a least depth of about 10 feet lies ⅜ to ½ mile westward of **Great Misery Island,** and there is foul ground between them and the north end of the island. Two red spar buoys are placed to mark the southerly edge of the group, and lie about ¼ mile northward of Bowditch Ledge beacon.

Great Haste is a bare rock surrounded by ledges. **Little Haste,** a rock bare at low water, lies close northwestward of Great Haste, and is marked by a black spar beacon with cask. **Haste Rock,** with 7 feet over it, lies near the eastern end of the ledge which extends ¼ mile eastward from Great Haste. **Haste Shoal,** with depths of 16 to 21 feet, extends ⅜ mile northeastward from Great Haste, and with depths of 12 to 14 feet extends 400 yards northward from Little Haste; the northeasterly and northerly ends of the shoal are marked by black spar buoys Nos. 5 and 7.

A small spot, with 17 feet over it, lies nearly 300 yards northward from buoy No. 7, and is marked on its eastern side by a buoy (spar, red and black horizontal stripes). The sailing line leads southward of this spot where the depth is 21 to 22 feet; there is deeper water in the channel northward of the spot.

An extensive shoal, with 17 feet at its end, makes out from the northern shore at the entrance to Beverly Harbor. Its south end is marked by a buoy (spar, red, No. 10), which lies ⅜ mile southward from Hospital Point lighthouse.

Middle Ground extends ⅞ mile west-southwestward from Great Haste to Great Aqua Vitae; it is awash in places at low water, and is marked at its western end by a buoy (spar, black, No. 9).

Great Aqua Vitae is a reef bare at low water at the southwest end of the Middle Ground, and is marked by a stone beacon with black staff and cage; its western end is marked by a buoy (spar, black, No. 11) which lies 150 yards westward from the beacon.

Abbott Rock, bare at low water, is near the easterly end of a shoal which extends nearly ¼ mile from shore, and lies 600 yards northeastward from Fort Pickering lighthouse; it is marked by a stone beacon with staff and square red cage. A 14-foot shoal lies 300 yards northeastward from the beacon, and another with 18 feet over it lies the same distance south-southwestward from it.

Halftide Rock is marked off its southeast side by a red spar buoy, which is in a depth of 12 feet 400 yards east-northeastward from the end of the Philadelphia & Reading coal pier.

1A. THROUGH CAT ISLAND CHANNEL.—Steer for Halfway Rock on any bearing from 244° 30′ true (**W** by **S** mag.) through west and north to 42° true (**NE** by **E** mag.), and give the rock a berth of 200 yards to ½ mile. Then bring it astern on a 301° true (**NW** mag.) course with Coney Island a little on the port bow, pass about midway between Gooseberry Ledge buoy and Satan Rock and between Brimbles spindle and Martin Rock buoy, and pass westward of Midchannel Rock buoy; the course leads near a 3¾ fathom spot lying 300 yards northeastward from Satan Rock.

Then bring the eastern end of Cat Island astern on a 329° true (**N** by **W** ½ **W** mag.) course, and pass about ¼ mile eastward of the black buoys marking Coney Ledge and Coney Island Rock. Pass about 100 yards eastward and northward of spar buoy No. 5, northeastward of Great Haste, steer 267° true (**W** by **N** mag.), and pass 100 yards northward of spar buoy No. 7, northward of Great Haste. Then stand in on the range of Fort Pickering and Derby Wharf lighthouses and follow the directions in the last paragraph of section 1.

To enter northward of Gooseberry Ledge.—Pass about ¾ mile eastward of Halfway Rock, and from a position ¼ mile southward of Southeast Breakers buoy (nun, red, No. 2) steer 290° true (**NW** by **W** mag.), passing about 150 yards southward of Davis Ledge buoy and the same distance northward of the black can buoy at the easterly end of Gooseberry Ledge; Brimbles spindle should be in range with the middle of Coney Island on this course. When South Gooseberry Islet is in range with the middle of Baker Island, Gooseberry Ledge will be passed. Pass southward and westward of Brimbles spindle, giving it a berth of over 300 yards, pass westward of Midchannel Rock buoy, and proceed as directed in the preceding paragraph.

Remarks and dangers.—**Halfway Rock**, lying in deep water off the entrance to this channel, is a prominent bare rock marked by a pyramidal frame beacon with keg and stone foundation. The nearest dangers are over ¾ mile northeastward, northward, and northwestward from it. Southeast Breakers are described under section 1.

North and **South Gooseberry** are high, rocky islets on the western end of the extensive ledges southward of Baker Island. **Dry Breakers**, the southerly part of the ledges, show at high water as a low, bare ledge. **Davis Ledge**, with 12 feet over it, is southward of Dry Breakers and a little over ¾ mile northward from Halfway Rock; Davis Ledge is marked on its south side by a buoy (nun, red, No. 4). A buoy (spar, red, No. 6) marks the end of the ledge which extends 350 yards southwestward from South Gooseberry.

Gooseberry Ledge, lying ⅜ to ½ mile southward and south-southwestward from South Gooseberry, is an area 400 yards in diameter, on which are spots with least depths of 15 to 18 feet. The eastern end of the area is marked by a buoy (can, black, No. 1), and its western end by a buoy (spar, red and black horizontal stripes).

Satan Rock is a small, bare rock marked by a red spindle with black cage; it lies ½ mile eastward from Cat Island beacon, and should be given a berth of 150 yards on its eastern and western sides and 275 yards on its north side.

Martin Rock has 11 feet over it, and lies 350 yards eastward from the north end of Cat Island; it is marked on its easterly side by a buoy (spar, black, No. 3). The eastern shore of Cat Island southward of this buoy should be given a berth of over 200 yards.

Brimbles is a rock bare at low water lying nearly ⅜ mile south-southeastward from Eagle Island. It is marked by a black spindle with four arms (the two arms facing Cat Island Channel are red); the spindle should be given a berth of over 125 yards.

Eagle Island is small, grassy, and rocky, and lies ⅝ mile north-northeastward from the north end of Cat Island.

Mid-Channel Rock is a part of a ledge which extends ¼ mile westward from Eagle Island, the southwest end of which is marked by a buoy (spar, red, No. 8). **Eagle Bar** is an extensive shoal which extends over ⅜ mile northwestward from Eagle Island, and is marked at its northwest end by a buoy (spar, red, No. 10).

Chappel Ledge, with 16 to 19 feet over it, lies 350 yards east-southeastward from Grays Rock and is marked on its south side by a buoy (spar, red and black horizontal stripes). **Grays Rock** is about 10 feet high.

Coney Ledge, the higher parts of which are covered at high water, is an extensive ledge extending southeastward and southward from Coney Island, and is marked at its easterly end by a buoy (spar, black, No. 5).

Coney Island is a low, grassy islet with a hut near its middle. **Coney Island Rock**, with 11 feet over it, lies 250 yards northeastward from the islet, and is marked on its easterly side by a buoy (spar, black, No. 7).

Haste Rock, Great Haste, and Haste Shoal are described in section 1.

1B. THROUGH MARBLEHEAD CHANNEL.—The following courses made good will lead to the bell buoy just eastward of Outer Breakers off Great Pig Rocks:

A 334° 30′ true (**N** by **W** mag.) course with Boston light vessel astern.

Or, 15° true (**NNE** ⅝ **E** mag.) with The Graves lighthouse astern.

Or, 60° true (**ENE** ⅝ **E** mag.) with Egg Rock lighthouse astern.

1. Vessels of 20 feet or less draft.—Pass about 200 yards eastward of the bell buoy off Outer Breakers and steer 26° true (**NE** ⅜ **N** mag.) for Baker Island lighthouses, passing nearly ½ mile eastward of Tinker Island and ¼ mile eastward of Volunteer Rock buoy. The course leads between spots with 3¾ and 4 fathoms over them, and care should be taken to make it good. When the south end of Marblehead Rock is in range with the north end of Marblehead

Neck, steer 315° true (**NNW ¾ W** mag.) for Peach Point and pass 250 to 300 yards eastward of Marblehead Rock.

Then bring Marblehead Rock beacon astern on a 4° true (**N** by **E** ⅝ **E** mag.) course, and pass about 100 yards westward of Archer Rock buoy and to a position about 300 yards eastward of Chappel Ledge buoy. Then steer 337° true (**N ¾ W** mag.) and pass about 300 yards eastward of the black buoys marking Coney Ledge and Coney Island Rock. Pass about 100 yards eastward and northward of spar buoy No. 5, northeastward of Great Haste, steer 267° true (**W** by **N** mag.) and pass 100 yards northward of spar buoy No. 7, northward of Great Haste. Then stand in on the range of Fort Pickering and Derby Wharf lighthouses and follow the directions in the last paragraph of section 1.

II. Vessels of less than 15 feet draft with a smooth sea.—Pass about 200 yards eastward of the bell buoy off Outer Breakers, steer 14° true (**NNE ½ E** mag.), and pass about ¼ mile eastward of Tinker Island and the spindle on Tom Moores Rock and 250 to 300 yards eastward of Marblehead Rock. Then bring Marblehead Rock beacon astern on a 4° true (**N** by **E** ⅝ **E** mag.) course, and proceed as directed in the preceding paragraph.

Dangers.—Tinker Island, low, with several huts, lies ⅜ mile southward from the south end of Marblehead Neck, to which it is joined by a bar with little water over it.

Outer Breakers, with 8 feet over them, lie 1½ miles southward from the south end of Marblehead Neck, and are marked off their southeast side by a red bell buoy. Northwestward of this buoy lie **Southwest Breakers, Great Pig Rocks** (show at high water), **Dolphin Rock, Middle Ground, Sammy Rock, Ram Islet, Little Pig Rocks** (awash at high water), and a number of detached rocks with 3 to 15 feet over them, extending in a broken line to the shore. Some of them are marked by buoys which are colored and numbered for vessels bound westward, but no stranger should attempt to pass inside the bell buoy.

Roaring Bull, bare at low water, and marked by a red spindle with cross, lies about 400 yards southwestward from Tinker Island. There is a small detached 16-foot spot about 500 yards southwestward from the spindle.

Volunteer Rock, with 18 feet over it and marked on its south side by a buoy (spar, red and black horizontal stripes), lies ¾ mile 171° true (**S ½ W** mag.) from Marblehead Rock, and ⅜ mile southeastward from the spindle on Tom Moores Rock. This rock is surrounded by depths of 20 to 24 feet.

Tom Moores Rock, bare at one-third ebb, is the outer part of a ledge which extends 400 yards from the eastern shore of Marblehead Neck, and lies ½ mile south-southwestward from Marblehead Rock. It is marked by a black spindle with cask.

Marblehead Rock is a high, bare rock surmounted by a beacon painted white and black in perpendicular stripes, and lies 400 yards off the northeast end of Marblehead Neck.

Archer Rock, with 10 feet over it, lies 600 yards westward from the north end of Cat Island. It is marked on its south side by a buoy (spar, red and black horizontal stripes).

Cat Island is ⅜ mile long, and will be recognized by the houses near its north end. At the south end of the island is a high, rocky knob, marked by a black spar beacon with cask. There are several large, bare rocks on the ledges which extend 300 yards off the western side of the northern half of the island. Ledges also extend 200 yards northward and 300 yards northwestward from the north end of the island.

Chappel Ledge, Coney Ledge and Coney Island Rock are described under section 1A, preceding.

1 C. Through South Channel.—Follow the directions in section 1 B until up with Marblehead Rock, and pass 250 to 300 yards eastward of it. Then steer 330° 30′ true (**N** by **W** ⅜ **W** mag.) for Hospital Point lighthouse to a position 100 yards eastward of Kettlebottom spindle (black, with spherical cage). Then steer 305° true (**NW ⅜ N** mag.) to a mid-channel position between spar buoys Nos. 7 and 4. Then steer about 256° true (**W** mag.) and pass southward of buoy No. 6, and then steer northwestward and pass northward of buoy No. 9. Then steer 264° true (**W ¾ N** mag.) for the end of the Philadelphia & Reading coal pier, pass southward of buoys Nos. 8 and 10, and give the shore a berth of 250 yards. Anchor in mid-harbor off the coal pier, in 3½ to 4½ fathoms, soft bottom.

There are dangers on both sides of the channel, and the buoys are the principal guides.

BEVERLY HARBOR.[1]

This small harbor lies north of Salem Neck, at the west end of Salem outer harbor, and is formed by the confluence of Danvers River, Beverly Creek, and North River. On the north shore of the harbor is the town of **Beverly**. The harbor is about ⅜ mile in diameter, but has extensive flats and shoals. It is crossed at its west end by two drawbridges (width of draws 32½ and 40 feet).

The channel is marked by buoys and beacons, and has a depth of 18 feet and a least width of 250 feet to the wharves. The deepest draft of vessels entering the harbor is about 24 feet. From 12 to 16 feet is found at the ends of the wharves at low water, and about 24 feet at the oil company's wharf.

[1] Shown on charts **109**, scale $\frac{1}{80,000}$, price $0.50; **244**, scale $\frac{1}{20,000}$, price $0.25.

The best anchorage is between Rams Horn and Lobster Rocks beacons, a little southward of a line joining them, in 3 to 4 fathoms. Small vessels can anchor on the southerly side of the channel below the bridge, about 150 yards off the wharves, in about 16 feet.

Danversport, about 2 miles above Beverly, is at the head of navigation on **Danvers River.** Vessels of 11 to 15 feet draft are taken up to the wharves at Danversport.

North Salem, on the **North River**, is about 1 mile above Beverly. The deepest draft taken to North Salem is 10 feet.

Beverly Creek has a dredged channel 9 feet deep, and vessels of 13 to 17 feet draft are taken to the wharves on the creek.

Pilots.—The master of the towboat is the only pilot available. State pilotage is compulsory for certain classes of vessels (see Appendix II).

Towboats are generally taken by vessels bound to Beverly, and can be had at the wharves, or by signaling for one when approaching the entrance of the harbor.

The **quarantine ground** is the same as for Salem Harbor.

Supplies.—Provisions and some ship-chandler's stores can be obtained; also anthracite and bituminous coal for steamers, put on board alongside wharves or in lighters. Water can be obtained alongside wharves through pipe and hose, and from a water boat.

Tides.—The mean rise and fall of tides are about the same as at Salem.

The **tidal current** has considerable velocity, and sets athwart the channel in places; during the first half of the ebb it sets across Monument Bar.

SAILING DIRECTIONS, BEVERLY HARBOR.

Strangers of over 15 feet draft should not enter without a pilot, as the channel is narrow and crooked in places, and, although well marked by aids, requires some local knowledge to keep in the best water. No attempt should be made to enter at night.

Follow the directions in section 1, 1 A, or 1 B, Sailing Directions, Salem Harbor, and pass 100 yards northward of spar buoy No. 7, northward of Great Haste, on a 262° 30′ true (**W** ⅝ **N** mag.) course heading for Old Hospital Point. Pass southward of buoy No. 10, southward of Hospital Point lighthouse, and pass 150 yards eastward of spar buoy No. 1, eastward of Old Hospital Point. Then steer about 301° true (**NW** mag.) and leave spar buoy No. 3 about 100 feet on the port hand. Then haul westward and southward, following the curve of the channel, and leave spar buoys Nos. 2 and 4 about 200 feet on the starboard hand.

Pass about 200 feet westward of Monument Bar beacon and steer about 188° true (**SSW** mag.) with Rams Horn beacon on the starboard bow. When nearly up with buoy No. 6, steer about 229° true (**SW** by **W** ⅝ **W** mag.) and pass 100 feet eastward of buoys Nos. 6 and 8. Then haul gradually westward, steer about 323° true (**NNW** mag.), and leave Lobster Rocks beacon about 100 yards on the port hand and the easternmost wharves 60 to 75 yards on the starboard hand. Then follow the wharves at a distance not greater than 100 yards.

Dangers.—The northerly and westerly sides of the channel up to Rams Horn beacon are marked by spar buoys Nos. 2, 4, 6, and 8, and by a pile dolphin westward of Monument Bar beacon. Spar buoy No. 3 is on the northeasterly end of a middle ground, which has a least depth of 14 feet. There is a black spar buoy on the edge of the flat about 175 yards northeastward from **Monument Bar beacon.** The latter is a pyramidal, stone structure with black staff and cage; the edge of the channel is 25 yards westward of it. The channel has its least width of 250 feet from buoy No. 6 to buoy No. 8. **Rams Horn beacon** is a square stone structure with black staff and cone, and lies on the flats near the easterly side of the channel 450 yards south-southwestward from Monument Bar beacon. **Lobster Rocks beacon** is a square stone cribwork, and lies on the northeast side of the shoals opposite the wharves. The southerly edge of the channel is 60 yards northeastward from it.

MARBLEHEAD HARBOR [1]

is about 1 mile long and ⅜ mile wide, and is formed on the east and south by Marblehead Neck and a narrow strip of land called **Marblehead Beach** connecting the south end of the neck with the mainland. **Marblehead lighthouse**, at the north end of Marblehead Neck, marks the easterly point at the entrance.

Marblehead Harbor is an excellent anchorage, and is much used by yachts during the summer. The depths in the harbor up to Skinners Head are 4 to 5 fathoms, and vessels up to about 20 feet draft can enter. There is 8 to 11 feet alongside the wharves. The greater part of the head of the harbor southward of Skinners Head and Boden Point

[1] Shown on charts 109, scale $\frac{1}{80,000}$, price $0.50; 244, scale $\frac{1}{20,000}$, price $0.25.

is shoal. The town of **Marblehead**, on the northwest side of the harbor, has communication with Salem and Boston by steam and electric roads.

The anchorage is anywhere in the middle of the harbor in 24 to 30 feet, good holding ground, and is sheltered from all but northeasterly winds; with good ground tackle vessels have no difficulty in riding out a northeaster.

Towboats are not generally used, but can be obtained from Beverly, Boston, or Gloucester in case of necessity.

Quarantine regulations are established by the local board of health and enforced under the direction of the board. Vessels subject to quarantine are not permitted to come inside of Fort Sewall until boarded by a health officer.

Marine hospital.—See page 10.

Supplies.—Provisions can be had in Marblehead; water can be obtained from water boats.

Repairs.—There are railways and other facilities for repairing small craft.

Storm warning displays of the United States Weather Bureau are made at Marblehead.

Ice.—This harbor is rarely obstructed by ice to such an extent as to become a hindrance to navigation. Fishermen have made it a refuge when it was impossible to get into Gloucester, Salem, or Lynn Harbors. The formation of ice in Marblehead Harbor is entirely local, and remains but a short time.

Tides.—The mean rise and fall of tides is 9 feet. The tidal currents are weak.

SAILING DIRECTIONS, MARBLEHEAD HARBOR.

FROM NORTHEASTWARD.—Follow the directions in section 1 of the sailing directions for Salem Harbor, and pass northward of the black buoy off the north side of Baker Island Shoal on a 276° 30′ true (**WNW** ¼ **W** mag.) course for Hospital Point lighthouse. When the east end of Great Misery Island bears 346° true (*N* mag.), steer 216° true (**SW** ½ **W** mag.) for the northwest end of Cat Island, and pass 300 yards southeastward of Hardy Rock buoy and beacon. When about ¼ mile eastward of Eagle Island, steer 236° true (**WSW** ¼ **W** mag.) with Baker Island lighthouses astern, pass 200 yards southward of Eagle Island, and to a position about 400 yards southeastward of Chappel Ledge buoy. Then steer 225° true (**SW** by **W** ¼ **W** mag.) for the middle of the entrance to Marblehead Harbor, and anchor off the town, favoring if anything the westerly side of the harbor, in 4 to 5 fathoms, soft bottom.

FROM SEAWARD.—Detached rocks and ledges with 3¼ to 5¼ fathoms over them lie off the entrance of Marblehead Harbor. By avoiding these spots a least depth of about 6 fathoms can be taken to the entrance northward of Marblehead lighthouse. A good course in the daytime is to bring Halfway Rock beacon astern on a 271° true (**WNW** ⅝ **W** mag.) course heading for Marblehead Rock beacon. When about ¼ mile from Marblehead Rock, and Bowditch Ledge beacon opens westward from the north end of Cat Island, bearing 10° true (*NNE* ⅛ *E* mag.), steer about 323° true (**NNW** mag.) and pass ¼ mile or more northeastward of Marblehead lighthouse.

FROM SOUTHWESTWARD.—Follow the directions of section 1B, page 38, and pass 250 to 300 yards eastward and northeastward of Marblehead Rock beacon. Then steer 312° true (**NW** by **N** mag.), and round the north end of Marblehead Neck, giving it a berth of over 300 yards. Then steer 225° true (**SW** by **W** ¼ **W** mag.) up the middle of the harbor, and anchor off the town, favoring if anything the westerly side of the harbor, in 4 to 5 fathoms, soft bottom.

Dangers.—Baker Island Shoal is described on page 37.

Hardy Rock, bare at low water, lies ⅝ mile westward of Baker Island lighthouse, and is marked by a black spar beacon with triangles, and at its northeast end by a buoy (spar, black, No. 1). **Rising States Ledge**, with 11 feet over it, extends ¼ mile west-southwestward from Hardy Rock, and is marked on its northwest side by a buoy (spar, black, No. 3).

Popes Head is a rugged, bare rock, surrounded by ledges to a distance of 150 yards; the west end of the ledges is marked by a black spar buoy. The rock lies ⅜ mile westward from the south end of Baker Island, and 300 yards northwestward from the high, rocky islet called **North Gooseberry**.

Cutthroat Ledge, with 6 feet over it, is near the end of a shoal which extends ⅜ mile northeastward from **Eagle Island** and is marked at its northeast end by a buoy (spar, black, No. 5). Spots with 17 and 18 feet over them lie 400 yards southeastward from the buoy.

Brimbles and Chappel Ledge are described in section 1A, and Cat Island and Archer Rock in section 1B, of the sailing directions for Salem Harbor.

Ledges, with 15 to 16 feet on the outer parts, extend about 250 yards off the north end of **Marblehead Neck**, and are marked at the northeast end by **Lasque Ledge** buoy (spar, black, No. 1), and at the north end by **Gordon Rock** buoy (spar, black, No. 3).

Boden Rock, with 9 feet over it, is a part of sunken ledges which extend 200 yards from the southeast side of Marblehead Harbor, ½ mile inside of Marblehead lighthouse. The northeast end of the ledges is marked by a buoy (spar, black, No. 1).

COAST FROM MARBLEHEAD TO BOSTON HARBOR.[1]

From Tinker Island to Phillips Point, a distance of 3 miles, the coast consists of rocky points with beaches between, and has numerous houses. The broad bight between these points has numerous islets and ledges which extend off to Outer Breakers. Some of them are marked by buoys which are colored and numbered for vessels bound westward, but no stranger should attempt to pass inside the bell buoy. The principal ones are:

Tinker Island and Roaring Bull are described on page 39.

Little Pig Rocks, awash at high water, lie 1 mile westward of Tinker Island and ⅜ mile from shore.

Ram Islet (rocky with some grass) lies 1¼ miles westward of Tinker Island and ½ mile from shore. Foul ground extends nearly ⅜ mile westward from it.

Sammy Rock, bare at low water, lies 600 yards southwestward of Ram Islet, and is marked by a buoy (spar, red, No. 6).

Middle Ground, with least depths of 5 and 9 feet over it, is an extensive sunken ledge lying 350 to 900 yards southward of Ram Islet, and is marked at its south end by a buoy (spar, red, No. 4).

Eight-Foot Spot, marked by a buoy (spar, red and black horizontal stripes), lies about midway between Middle Ground and Great Pig Rocks. Spots with 12 and 15 feet on them lie ¼ and ⅜ mile eastward of Eight-Foot Spot.

Dolphin Rock, with 6 feet over it, lies ½ mile south-southwestward from Ram Islet, and is marked by a buoy (spar, red, No. 10).

Great Pig Rocks, a group of bare rocks surrounded by ledges, lie 1½ miles southwestward of Tinker Island. **Southern Shoal Rock** and **Southwest Breakers,** awash at low water, are parts of sunken ledges which extend 400 yards southward and southwestward from Great Pig Rocks, and are marked by two red spar buoys, No. 6 at the south end and No. 8 at the southwest end.

Outer Breakers, with 8 feet over it, is marked at its eastern end by a red bell buoy, which lies nearly ⅝ mile east-southeastward from Great Pig Rocks.

Phillips Point is high and rocky, and its western and higher part is wooded. A rock with 12 feet over it lies 600 yards eastward from **Grass Head,** the eastern end of the point. A reef with bare heads extends 350 yards southward from Phillips Point, and **Dread Ledge,** bare at half tide and marked by a red spindle with cask, lies 500 yards southward from the point.

Nahant Bay is 2 miles wide between Phillips Point and Nahant, and about the same long to Lynn Beach. The village of **Swampscott** is on its northern shore westward from Phillips Point, and the eastern part of the city of Lynn is on its northwest side. Temporary anchorage, exposed to easterly and southerly winds, can be had in the bay, in 3 to 6 fathoms, but it is little used. The usual anchorage is off Swampscott, southwestward or westward from the southern end of Fishing Point. Small craft can anchor westward of the point in 8 to 15 feet. The bay is clear; 18 feet is found ½ to ¾ mile from its northwest side, shoaling thence to the shore. **Fishing Point, Blaneys Rock,** and **Red Rock** are rocky points on the northern side of Nahant Bay.

Lynn Beach is a narrow strip of sand separating Nahant Bay from Lynn Harbor, and is about 1 mile long in a southerly direction to **Little Nahant,** a high, grassy head with several houses. Little Nahant is joined to Nahant by a strip of beach nearly ½ mile long, called **Little Nahant Beach.**

Egg Rock, about 60 feet high and marked by a lighthouse, lies on the southern side in the entrance of Nahant Bay ⅝ mile northeastward from Nahant. The eastern and northern sides of the rock should be given a berth of over 200 yards. A rock with 3¼ fathoms over it lies ⅜ mile 161° true (**S ½ E mag.**) from Egg Rock lighthouse; and another with 8 feet over it lies 236° true (**WSW ¼ W mag.**) from the lighthouse and 400 yards from the shore of Nahant.

Broad Sound is about 4 miles wide between Nahant and Deer Island, and about the same long. The dangers on the south side of the sound are described in section 1 of the sailing directions for Boston Harbor. Shoals extend about 1 mile off the westerly shore of the sound.

Nahant is a high peninsula, about 1⅜ miles long, with bluff seaward faces. It is occupied by the town of Nahant, a popular summer resort, to which steamers ply regularly from Boston in summer. The landings are on the south and west sides. The large cove on the south side of Nahant is called **Nahant Harbor.** Entering between Joe Beach Ledge buoy and Bass Rock spindle, temporary anchorage can be selected off the wharf, in 3 to 4 fathoms, hard bottom.

Shag Rocks are a group of bare rocks which extend 300 yards southward from the southeast end of Nahant. A ledge, awash at lowest tides, extends 100 yards southward from the southernmost Shag Rock.

Joe Beach Ledge, about 200 yards long and with a least depth of 2 feet at its northeast end, is marked at its southwest end by a buoy (spar, red, No. 2).

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[1] Shown on charts **109,** scale $\frac{1}{80,000}$; **337,** scale $\frac{1}{40,000}$; price of each $0.50.

Bass Rock, bare at low water and marked by a red spindle with cage, lies ⅜ mile southeastward from Bayley Hill, the western point of Nahant Harbor. There is broken ground with depths of 14 to 16 feet between the rock and hill.

Flip Rock, with 13 feet over it, lies ⅞ mile 147° true (**S** by **E** ⅝ **E** mag.) from Bass Point, the southwest end of Nahant. The rock is marked by a buoy (spar, red and black horizontal stripes).

Lynn Harbor, the northerly end of Broad Sound, is full of shoals, largely bare at low water, through which channels have been dredged to the principal wharves. The channel is 300 feet wide and 15 feet deep up to the turning basin of the same depth and 500 feet square near the wharves at **Lynn.** The entrance is marked by buoys, and lights mark the sides of the channel, but local knowledge is necessary for its navigation. A small vessel can select anchorage in the wider part of the channel below Sand Point, and otherwise there is no anchorage for vessels above the entrance. Eastward of the turning basin, an anchorage basin 6 feet deep has been dredged for small craft. A pilot can be obtained from a Boston pilot boat, and sailing vessels generally take a towboat. Coal, water, and general stores can be obtained at the wharves. Ice forms in the harbor in severe weather. The tidal currents set in the general direction of the channel, and have some velocity during part of the ebb.

The city of **Lynn** occupies the north shore of the harbor. On the south and southwest the city is bounded by extensive salt marshes, which extend from ¼ mile to 1¼ miles back from the shore. On the southwest these marshes extend to **Saugus River,** which empties into Lynn Harbor between Tree Point on the north and Point of Pines on the south. The entrance to this river is ¼ mile wide, but the channel is very narrow and the best water is close to Point of Pines. About 6 feet at mean low water may be carried above the Boston & Maine Railroad bridge. The width of the draws in the three bridges is 34 to 50 feet.

The higher parts of the southwest side of Broad Sound are occupied by the towns of **Revere** and **Winthrop.** At Revere a breakwater has been built out from the shore on **Cherry Island Bar,** forming an anchorage, with a depth of about 6 feet, for small craft in summer.

Grover Cliff is a prominent, bare, yellow bluff.

Winthrop Head, a hill 103 feet high, and thickly built up in part, is marked by a prominent, large, silvered standpipe, which is the best mark in this vicinity.

Shirley Gut, separating Point Shirley from Deer Island, is a channel less than 80 yards wide and about 9 feet deep, which is used by steamers plying between Boston and Nahant.

Deer Island, which separates Broad Sound from Boston Harbor, is nearly 1 mile long and grass-covered. A large brick building, with a high cupola, is near its northwest end. The spit, bare at low water, extending 600 yards southward from the island, is marked near its south end by **Deer Island lighthouse.**

BOSTON HARBOR.[1]

The entrance to Boston Harbor, between Point Shirley on the north and Point Allerton on the south, is about 4¾ miles wide. A group of islands and shoals lies in the entrance, of which **Great Brewster,** with an elevation of 104 feet, is the highest and is marked by a prominent bluff at its north end. **Boston lighthouse** is at the south end of the group.

The **channel** into Boston Harbor between Boston lighthouse and Point Allerton and through **The Narrows** to President Roads has a depth of 27 feet and a width of 1,000 feet, except in The Narrows where the least width with this depth is 650 feet. This channel is easy of access in the daytime, and also at night for vessels equipped with searchlights to pick up the buoys. It is generally used by pilots in thick weather.

Broad Sound South Channel has its entrance in Broad Sound northward of The Graves, and leads into President Roads. It has a width of 1,200 feet and a depth of 30 feet. It is marked by lighted buoys and by range lights, and is easy of access both day and night.

Broad Sound North Channel leads from Broad Sound to President Roads, and is being improved by dredging to a width of 1,500 feet and depth of 35 feet. The dredging across Great Faun and Little Faun Bars is completed for the full width of the channel, with the exception of numerous spots on which the least depth was 32 feet in January, 1912. The channel is marked by buoys, some of which are lighted.

Main Ship Channel leads from President Roads to Boston, and is being improved by dredging to a width of 1,200 feet and a depth of 35 feet. In 1911 the channel had been completed for a width of 540 feet, except the upper end where the depth was 31 feet.

Nantasket Roads is a good anchorage westward of the southerly entrance to The Narrows and southward of **Georges Island,** occupied by Fort Warren (earthwork and some stone). The depths in the roads range from 8 to 12 fathoms, but

[1] Shown on charts **109,** scale $\frac{1}{80,000}$; **337,** scale $\frac{1}{40,000}$; **246,** scale $\frac{1}{20,000}$; **248,** scale $\frac{1}{10,000}$; price of each $0.50.

on the westerly side of Georges Island the depths range from 4 to 6 fathoms, and better bottom and shelter will be found here in easterly winds. This anchorage is frequently used by vessels seeking shelter in easterly gales.

To enter Nantasket Roads, follow the directions of section 1A for Boston Harbor to a position nearly ½ mile southward of Boston lighthouse. Then steer 258° 30′ true (**W** ¼ **N** mag.), and pass 250 to 300 yards northward of Hunt Ledge buoy (nun, red and black horizontal stripes). Then bring Boston lighthouse astern on a 234° true (**WSW** mag.) course; at night this course will lead in the white sector of Boston (auxiliary) light, which is 70 feet from Boston light and will be in range with it on this course. The course leads southward of red spar buoys Nos. 2 and 4; the former marks a spot with 16 feet over it lying 300 yards southward of Georges Island Rocks gas buoy, and the latter marks a spot with 14 feet over it lying 400 yards westward of the 16-foot spot. When the eastern end of Georges Island closes on the west end of Lovells Island, haul westward and anchor south of Georges Island, keeping Narrows lighthouse open southward of the island.

Vessels of less than 18 feet draft can anchor westward of Georges Island by following the preceding directions until Deer Island lighthouse is in range with the west end of Gallups Island, bearing 326° true (**N** by **W** ¾ **W** mag.). Then steer this course, pass between Georges Island and the black buoy northeastward of Hospital Shoal, and anchor anywhere westward of Georges Island and southward of Gallups Island, in 4 to 6 fathoms.

Georges Island is fairly bold on its west side, and **Gallups Island** on its south side; the latter is the site of the quarantine hospital, under the control of the Board of Health. **Rainsford Island,** nearly 1 mile westward of Georges Island, is occupied by buildings of city institutions, and has a wharf on its south side. Extensive shoals lie southward and southwestward from Rainsford Island; a black buoy marks the end of a shoal which extends nearly ¼ mile southeastward from it. **Hospital Shoal,** with a least depth of 7 feet, lies ¼ to ½ mile eastward from Rainsford Island. A 15-foot spot, lying 300 yards northeastward from Hospital Shoal and ⅜ mile westward from Georges Island, is marked by a black buoy.

There is a channel 250 yards wide between Georges Island and **Gallups Island** leading into The Narrows. A black pile dolphin with cask is placed near the end of the shoal at the southeast end of Gallups Island. This channel is suitable only for a quick-working vessel, on account of the sharp turn into The Narrows.

The **Nubble Channel,** with a width of 300 feet and depth 14 feet, leads between Nix Mate and the northern end of Long Island into President Roads. The eastern and western sides of the channel are marked at both ends by a red buoy and a black buoy. The course through the channel is 335° true (**N** by **W** mag.), passing midway between the buoys and heading a very little westward of Deer Island lighthouse. This channel is generally used by local vessels bound through Nantasket Gut.

Sculpin Ledge Channel leads between Long Island and Spectacle Island, and is good for vessels of about 8 feet draft to Hingham Bay by the passage southward of Peddock Island. The deeper water favors Long Island, and in coming from President Roads the island should be followed at a distance of about ¼ mile until up with the red buoy off the easterly end of Sculpin Ledge. Pass close eastward of the buoy, and round the southwesterly end of Long Island at a distance of about 400 yards. **Long Island** is 1½ miles long, and is marked at its northern end by Long Island Head lighthouse. **Spectacle Island** is two islands connected by a gravel spit. There is a guano factory with iron stack on the southern island. On the north end of the northern island are the lights of the **Broad Sound Channel** inner range and **Spectacle Island range**.

President Roads, a wide and good anchorage, lies between Deer Island lighthouse and the easterly end of Governors Island Flats. The shoals on the northwest side of the Roads are marked by buoys. The depths in the roads range from 5 to 10 fathoms with Deer Island lighthouse bearing about 87° true (**E** by **S** mag.) distant ¼ to 1¼ miles. The quarantine anchorage, on the north side of the Roads, is defined by the harbor master (see Appendix II). The Main Ship Channel leads along the southern side of the Roads.

Governors Island Channel is well buoyed but is suitable only for steamers. It leads from President Roads between Governors Island Flats and Apple Island Flats, and then turns sharply southward between Governors Island and Bird Island Flats to the Main Ship Channel. The channel is good for a depth of 17 feet, but is crooked and narrow at its western end. From its western end a narrow channel with a depth of about 10 feet, marked by buoys, leads northward of Bird Island Flats, and then follows the wharves of East Boston. **Apple Island Channel** is narrow, has a depth of about 10 feet, and is not marked. It leads from Governors Island Channel north of Apple Island along the southern edge of Noddle Island Flats. At the eastern end of Governors Island Channel is a channel about 200 yards wide which leads toward Shirley Gut and through the northern part of Boston Harbor toward Orient Heights; this part of the harbor is frequented only by small pleasure craft, and by the steamers running through Shirley Gut to Nahant in summer.

To pass through Governors Island Channel, steer 306° true (**NW** ½ **N** mag.) with Long Island Head lighthouse astern until red spar buoy No. 2 is about 300 yards distant on the starboard beam; and then steer 329° true (**N** by **W** ½ **W** mag.) for Apple Island and pass about 100 yards westward of red spar buoy No. 4, on the Middle Ground, and about 100 yards northeastward of black spar buoy No. 1, on the easterly end of Governors Island Flats. Or, vessels

can pass over 100 yards eastward of buoys Nos. 2 and 4, where the depth is 15 feet or more, and steer 292° true (**NW** ¾ **W** mag.) with Deer Island lighthouse astern, passing 300 yards northward of buoys Nos. 2 and 4 and nearly 200 yards northward of black spar buoy No. 1, on the easterly end of Governors Island Flats.

Continue the 292° true (**NW** ¾ **W** mag.) course with Deer Island lighthouse astern, which leads for red spar buoy No. 8, at the southwest end of Apple Island Flats. Pass about 50 yards southward of this buoy, steer 305° true (**NW** ⅜ **N** mag.), and pass about 100 yards northward of black spar buoy No. 3 at the north end of Governors Island Flats. When past the buoy haul sharply southward, course about 200° true (**SW** by **S** mag.), pass about 75 yards westward of **Glade Flats beacon** (black pile dolphin with barrel), and pass midway between buoys Nos. 12 and 5 into the Main Ship Channel.

From the south side of the Main Ship Channel nearly ¾ mile northwestward of Castle Island, a dredged channel, 200 feet wide and 20 feet deep, and marked by buoys, extends ⅜ mile in a 224° true (**SW** by **W** ⅛ **W** mag.) direction to the eastern end of the **Reserved Channel**. The latter leads to the wharves of a part of South Boston, and has been dredged 300 feet wide and 20 feet deep below L Street Bridge, and 400 feet wide and 12 feet deep above the bridge.

The **City of Boston** includes within its limits **East Boston, Charlestown, South Boston, Roxbury, Dorchester,** and **Neponset**. East Boston is on the northeastern side of the harbor, and is separated from the city of Chelsea by Chelsea River. Chelsea is separated from Charlestown, on the western side of the harbor, by the Mystic River, and Charlestown from Boston proper by the Charles River. The **United States Navy Yard** occupies a large part of the deep water front of Charlestown. South Boston is on the peninsula southeast of the city proper, from which it is separated by South Bay and Fort Point Channel.

Fort Point Channel and **South Bay** separate Boston proper from South Boston. In a distance of 1 mile from its entrance in Boston Harbor, Fort Point Channel is crossed by eight bridges, the least width in the draws of these bridges being 41 feet 5 inches. The upper bridge (Dover Street) has a width of 40 feet in the draw. A dredged channel 175 feet wide and 23 feet deep leads from the entrance to Dorchester Avenue Bridge, a distance of nearly ¾ mile. From the latter bridge to the head of South Bay the depth is 12 feet. Sailing vessels employ towboats if bound into Fort Point Channel or South Bay, under a special agreement to tow through the bridges. The draws are closed during certain hours.

Charles River, on the western side of the harbor between Boston proper and Charlestown, is the approach by water to the city of **Cambridge** and **Watertown**. The entrance of the river to the first bridge has been dredged for its full width to a depth of 35 feet. Thence to the **Charles River Dam**, a distance of ½ mile, the river is crossed by six bridges; the least width in the clear of the draws in the bridges is 36 feet. The draws are closed during certain hours. The lock in the Charles River Dam is 350 feet long between gates, with a clear width of 45 feet, and has a depth of 17 feet at low water on the lower sill; the upper sill has 21 feet over it at the level of the river above the dam. Charles River above Charles River Dam is maintained at a height of 7.4 feet above mean low water; a depth of 14 feet can be taken 3 miles above the dam to Western Avenue Bridge, thence 2¼ miles to Arsenal Street Bridge 13 feet, thence 2 miles to the head of navigation at the dam at Watertown 9 feet. The West Boston (Cambridge) Bridge has no draw, and precludes the passage of masted vessels; it is 29 feet in the clear above the water.

Mystic River, entering the north end of Boston Harbor from northwestward, is crossed near its mouth by Chelsea Bridge, connecting Charlestown with Chelsea. A channel 300 feet wide and 30 feet deep has been dredged up to the mouth of Island End River, ½ mile above Chelsea Bridge; a channel about 25 feet deep leads in **Island End River** to the wharf of the New England Coal & Coke Co. A channel 6 feet deep has been dredged in Mystic River to a point 1 mile above the upper railroad bridge, and 4 feet deep for a distance of 1¾ miles farther to the head of navigation at the stone bridge at **Medford**. From Mystic River a channel 12 feet deep at high water has been dredged 1½ miles up **Malden River** to the head of navigation at Medford Street Bridge at **Malden**. The width of the draw in Chelsea Bridge is 60 feet and Malden Bridge (the next) is 50 feet. The draws are closed during certain hours.

Chelsea River, entering the north end of Boston Harbor from eastward, is crossed just above its mouth by Meridian Street Bridge, connecting East Boston with **Chelsea**. A channel 1,200 feet wide and 35 feet deep is to be dredged up to this bridge. The river has a depth of 18 feet in the channel for a distance of ¾ mile above Meridian Street Bridge to Chelsea Street Bridge. Thence for about 1 mile to the head of navigation at the Boston & Maine Railroad bridge there is a depth of 18 feet at high water in the channel. The width of the draws in the bridges is 59 to 60 feet.

Anchorages.—Nantasket Roads and President Roads are the usual anchorages for vessels in the lower bay.

The anchorage for vessels and yachts in the inner harbor is limited, but good holding ground in 3¾ to 5 fathoms will be found on both sides of the channel above Governors Island within the limits prescribed by the harbor master. (See Appendix II.) The anchorage for deep draft vessels is on the northeasterly side of the channel, where a part of Bird Island Flats has been removed to a depth of 5 fathoms.

Pilots cruise in pilot boats which are designated by the numbers painted in black figures 4 feet in length on the mainsail and jib. Three of the pilot boats are required to cruise in Boston Bay outside of the inner station boat.

The rates of pilotage for Boston, and extracts from the laws and regulations relating to pilots and pilotage, are given in Appendix II.

Towboats are constantly cruising in Boston Bay and Harbor, and may be obtained by hailing or by signal. They may also be obtained by applying at the various towboat offices. The greater number of these towboats have an established schedule of charges. Pilotage charges, if incurred, are paid by the vessel being towed.

Fire and wrecking tugs are to be obtained, and will take tows to or from any point on the Atlantic coast between Nova Scotia and the Gulf of Mexico. Steam lighters can be obtained.

Harbor regulations are given in Appendix II.

Quarantine regulations for the port of Boston are issued from time to time by the board of health for the guidance of the port physician, harbor master, pilots, and all vessels. (See Appendix II.) The quarantine station is on Gallups Island, and vessels are boarded in President Roads. Vessels undergoing quarantine are anchored in President Roads, as directed by the port physician.

Marine hospital.—There is a marine hospital at Chelsea. The service has an office and dispensary in Boston where out-patients are treated by an officer of the service, who is also the proper person to whom to apply for admission to the hospital. Extracts from the regulations for the government of the United States Public Health and Marine-Hospital Service are given in Appendix IV.

Docking facilities.—There are a number of dry docks and marine railways. The dimensions of the largest dock, not owned by the Government, are: length 465 feet, width 66 feet, depth over sill 18 feet 8 inches; of the largest marine railway: length 245 feet, draft forward 14 feet, draft aft 16 feet, capacity 2,000 tons.

Repairs.—There are excellent facilities for repairing hulls of iron and wooden vessels and the machinery of steamers at Boston and Quincy Point.

Storm warning displays of the United States Weather Bureau are shown from the post office building at Boston, Navy Yard at Charlestown, the city life-saving station at South Boston, and on Nantasket Hill at the entrance to the harbor. The signals are described in Appendix III.

A **United States Branch Hydrographic Office** is established at Boston. Bulletins are posted here giving information of value to seamen, who are also enabled to avail themselves of publications pertaining to navigation, to take barometer comparisons, and to correct their charts from standards. No charge is made for this service.

A **time ball** is dropped daily, Sundays and legal holidays excepted, at Boston at 12 h. 00 m. 00 s. of seventy-fifth meridian time, 5 h. 00 m. 00 s. Greenwich mean time. The ball can be seen from the harbor.

Ice rarely forms in the main channels. Occasionally during severe winters the greater part of the harbor is frozen, but towboats and steamers keep the main channels open. The Charles, Mystic, and Chelsea Rivers, and the minor passages in the harbor are sometimes frozen during severe weather. When ice is prevalent, the buoys may be displaced or even carried away by it.

For **tides**, see table, page 29, also the tide tables for the Atlantic Coast of the United States, in which the tides are predicted for every day of the current year.

TIDAL CURRENTS, BOSTON HARBOR.

In *Broad Sound* the currents are somewhat rotary in character. In most localities the velocity at strength is less than 0.5 mile, increasing to about 1 mile on approaching the entrances of the channels leading into Boston Harbor.

In *Hypocrite Channel* slack water occurs 8 minutes before the times of Boston high and low waters. The velocity at strength is 1.1 miles.

In the inner part of *Broad Sound South Channel,* northward of Ram Head, slack water occurs 13 minutes after the times of Boston high and low waters. The velocity at strength is 1.8 miles.

Between Deer Island light and Long Island Head slack water occurs 15 minutes after the times of Boston high and low waters. The velocity at strength is 2 miles.

In the *Main Ship Channel* northward of Spectacle Island the velocity at strength is 1 mile; off the entrance of the Reserved Channel slack water occurs 36 minutes after the times of Boston high and low waters, and the velocity at strength is about 1 mile. Between Boston and East Boston the velocity at strength is somewhat less than 1 mile.

Between Boston light and Point Allerton, near the middle of the channel, slack water occurs 17 minutes after the times of Boston high and low waters; the velocity at strength is 1.9 miles. On the northern side of the channel, southward of Great Brewster Spit, the current turns nearly 30 minutes earlier than in the middle of the channel, and the velocity is scarcely one-half as great.

In the middle of *Nantasket Roads* the velocity at strength is 1.5 miles.

In *Nantasket Gut* slack water occurs 2 minutes before the times of Boston high and low waters. The velocity at strength is 2.8 miles.

In *Black Rock Channel* slack water occurs 3 minutes after the times of Boston high and low waters; the velocity at strength is 1.2 miles. The flood sets southwestward through the channel and the ebb in the opposite direction,

and should be kept in mind when passing through *The Narrows*. The flood sets westward through the channel between Georges and Gallups Islands, and the ebb in the opposite direction.

Between Gallups Island and Long Island Head the flood current sets southward or southwestward, and the ebb in the opposite direction; the velocity at strength is about 0.6 mile.

Between Moon Head and Long Island the flood current sets northwestward with a velocity at strength of about 0.6 mile.

Between Thomsons Island and Spectacle Island the flood current sets northwestward with a velocity of about 0.6 mile.

In *Shirley Gut* slack water occurs 25 minutes before the times of Boston high and low waters. The velocity at strength is 2 miles or more.

At the western end of *Deer Island Flats* the tidal currents are rotary, in the direction of the hands of a watch, the velocity ranging from 0.2 to 0.5 mile. The flood current sets northeastward between Deer Island Flats and Apple Island Flats.

In *Apple Island Channel* the velocity at strength is 0.4 mile; the flood sets westward.

In *Governors Island Channel* the flood sets westward, and sets southward in the channel between Governors Island and Bird Island Flats.

GENERAL REMARKS ON APPROACHING BOSTON HARBOR.

General remarks on approaching and standing along the coast are given on pages 29–31.

APPROACHING FROM CAPE ANN.—The soundings in the vicinity of Cape Ann are very irregular and can not be depended on to locate even approximately the vessel's position. The southern end of *Jeffrey Ledge*, with depths of 19 to 30 fathoms, extends 15 miles eastward from Cape Ann, and depths of over 50 fathoms are found a few miles eastward and a short distance southward from the edge of the bank. A 229° true (*SW* by *W* ⅝ *W* mag.) line drawn from the spindle on The Londoner just clears the offshore dangers between Cape Ann and Nahant.

At night a number of lights will be visible, and they are sufficiently numerous to locate the position readily by cross bearings. In clear weather the course should be shaped to pass northward of The Graves lighthouse, and enter through the Broad Sound South Channel.

APPROACHING FROM CAPE COD.—Approaching the easterly side of the cape, soundings of 20 fathoms indicate a distance of 2 to 3½ miles from the shore, but off the north side of the cape the 20-fathom curve draws closer inshore and the soundings are not so regular. Vessels standing for Boston light vessel will cross the southwesterly end of *Stellwagen Bank* in depths of 12 to 15 fathoms; this bank, with depths of less than 20 fathoms on it, begins 5 miles northward of the north end of Cape Cod and extends in a northerly direction for 17½ miles, its width varying from 8 miles at its southerly end to about 2 miles near its northerly end. Soundings on Stellwagen Bank can not be depended on to locate a position on the bank except in the case of soundings in a depth of 9½ fathoms, the shoalest water, which is found near its extreme southwest end. The prevailing depths over the shoaler parts of the bank are 12 to 15 fathoms.

As the entrance to Boston Harbor is approached, after crossing Stellwagen Bank, soundings of 20 fathoms or more (at low water) insure a distance of 5 miles or more from the shore and well outside of outlying rocks. Inside the depth of 20 fathoms the soundings are very irregular and they can not, as a rule, be depended on to keep a vessel out of danger.

At night, in clear weather, Minots Ledge and The Graves lights will be sighted shortly after the lights on Cape Cod (Cape Cod and Race Point lights) are dropped. The course should be shaped for Boston light vessel to avoid the rocks and shoal spots lying eastward and northward of Minots Ledge, and on which the sea breaks in heavy gales.

TIDAL CURRENTS.—For some distance northwestward of Cape Cod the tidal currents have a slight set southward into Cape Cod Bay on the flood and eastward out of the bay on the ebb. Along the north shore of Massachusetts Bay the flood sets in a general westerly or northwesterly direction, and the ebb in a southerly or southeasterly direction. The velocity of the currents is influenced greatly by the force and direction of the wind. Off the entrance to Boston Harbor the flood sets westward and ebb eastward, increasing slightly in velocity as the entrance is approached.

FOGS.—In thick weather Boston light vessel should be steered for when approaching from either Cape Ann or Cape Cod, and the water should not be shoaled to less than 20 fathoms unless the fog signal of the light vessel is heard and the vessel located. From the light vessel a course may be laid for Boston lighthouse, and the fog signal of the latter with a frequent use

of the lead will enable a vessel to reach an anchorage inside of Point Allerton. Unless the light vessel is located no attempt should be made to enter the harbor, and the water should not be shoaled to less than 20 fathoms.

Vessels when in the vicinity of Cape Cod, if overtaken by fog or thick easterly weather, may find it convenient to anchor in Provincetown Harbor, or on the west side of the cape south of Provincetown, where there is a good lee and holding ground in 7 to 11 fathoms.

SAILING DIRECTIONS, BOSTON HARBOR.

1. Entering through Broad Sound South Channel to President Roads.—From a position 1 mile southeastward of Cape Ann lighthouse make good a 224° 30′ true (**SW** by **W** ¼ **W** mag.) course for 22 miles to the gas and bell buoy No. 2 and gas buoy No. 1 at the entrance of Broad Sound South Channel. The course leads 1½ miles southeastward of Eastern Point lighthouse, ¾ mile northwestward of Northeast Grave whistling buoy, and nearly 1 mile northwestward of The Graves lighthouse.

Or, from Boston light vessel steer 298° true (**NW** ¼ **W** mag.) for 5 miles, and pass ¼ mile northeastward and northward of Northeast Grave whistling buoy. Then steer about 239° true (**WSW** ½ **W** mag.) for 1¾ miles to the gas buoys at the entrance of Broad Sound South Channel.

Steer 215° true (**SW** ⅜ **W** mag.) keeping the lights of the Lovells Island range in line ahead, and pass midway between the gas buoys marking the sides of the outer section of Broad Sound South Channel. The black buoys on the southeasterly side of the channel show occulting white lights, and the red buoys on the northwesterly side occulting red lights. When between gas buoys Nos. 5 and 6 steer 250° true (**W** ½ **S** mag.) keeping the lights of the Broad Sound Channel inner range in line ahead, pass midway between the buoys marking the sides of the channel, and pass ¼ mile southward of Deer Island lighthouse and ¼ mile northward of Long Island Head lighthouse. Then follow the directions in section 2.

Remarks and dangers.—Broad Sound South Channel is 1,200 feet wide and 30 feet deep. The entrance buoys lie about 1¼ miles westward from The Graves lighthouse. On the southeasterly side of the channel are Commissioners Ledge, Devils Back, Aldridge Ledge, and Ram Head. Farther eastward are **Roaring Bulls** (higher parts are well bare at low water), **Green Island** and surrounding bare ledges (greatest elevation about 30 feet), **Little Calf** and **Calf Islands**, and **Outer, Middle,** and **Great Brewster Islands.** Some of the passages among the islands and ledges lying eastward of Broad Sound South Channel between The Graves and Boston and Narrows lighthouses are used by those well acquainted with the dangers, but they should be avoided by strangers.

The material from the dredged channels in Boston Harbor is dumped in Broad Sound 1 to 2 miles northeastward and north-northeastward from The Graves lighthouse. A gas buoy and bell buoy, painted white and marked "DG," are maintained on the dumping ground, and are moved to indicate the locality where dumping is in progress. The only place where marked shoaling has occurred lies 1½ miles 20° true (**NE** by **N** mag.) from The Graves lighthouse, and this shoal has been removed to a least depth of 7 fathoms.

The Graves are a group of bare rocks and ledges about ½ mile long in a northeasterly direction, and are marked near the southwest end by **The Graves lighthouse. Northeast Grave** is a rock bare at low water 700 yards northeastward from the lighthouse. A whistling buoy is moored about ⅜ mile northeastward of the ledge and ¾ mile northeastward from the lighthouse.

Commissioners Ledge, two small spots with 13 and 16 feet over them, lies ½ mile northwestward from Green Island, and is marked on its western side by gas buoy No. 3.

Devils Back, 400 yards long, is bare at low water only at its northeasterly end. There are depths of 19 to 21 feet between Devils Back and Aldridge Ledge.

Aldridge Ledge is 600 yards long, and has a least depth of 3 feet at its westerly end where it is marked by gas buoy No. 5.

Ram Head is the extensive reef and shoal which extend ⅝ mile northeastward and nearly ⅜ mile northward from **Lovells Island**. A large part of the reef is bare at low water only. It is marked at its northeasterly end by gas buoy No. 7 and on its northerly side by spar buoy No. 9.

Between Broad Sound South and North Channels there are shoals with depths less than 18 feet in numerous places, and with least depths of 9 and 12 feet. The southeasterly edge of these shoals bordering Broad Sound South Channel is marked by three gas buoys, No. 4 abreast the northeasterly end of Devils Back, No. 6 at the turn in the channel, and a gas buoy (red and black horizontal stripes) off the southwesterly end of the shoals at the junction of the Broad Sound South and North Channels.

Great Faun Bar and **Little Faun Bar** extend eastward from Deer Island to Broad Sound North Channel. There are least depths of 6 to 12 feet on the bars near the northwesterly edge of the channel, and vessels should not pass westward of the red buoys marking the channel. A square stone beacon with red spindle and cage is placed on Great Faun Bar, 650 yards northwestward from Broad Sound North Channel, and near the easterly end of the part of the bar that is bare at low water.

Deer Island Point is a long spit bare at low water extending southward from Deer Island to **Deer Island lighthouse.** Shoals extend 125 yards southward and 300 yards eastward from the lighthouse, and northeastward to Little Faun Bar.

Nix Mate is a large reef lying northward of Gallups Island, with shoals and little water between. Near the middle of the reef is a low grassy islet, marked by a stone beacon with a wooden pyramid on top. The northeast end of the shoal is marked by gas and bell buoy No. 7 (occulting white light), and its northwest end by a black spar buoy.

1A. Entering through The Narrows to President Roads.—The following courses and distances made good will lead to Boston light vessel:

From Cape Ann whistling buoy steer 211° true (**SW** mag.) for 20½ miles.

From a position 3 miles northeastward from Cape Cod lighthouse steer 295° true (**NW** ½ **W** mag.) for 36 miles, passing close to the gas and whistling buoy off Peaked Hill Bar.

From a position 1 mile southwestward of Wood End lighthouse steer 309° true (**NW** ¾ **N** mag.) for 31¾ miles.

I. From Boston light vessel.—Steer 258° 30′ true (**W** ¼ **N** mag.) for 6 miles, passing about 300 yards northward of Thieves Ledge whistling buoy, 400 yards northward of Point Allerton Bar buoy, and to a position nearly ½ mile southward of Boston lighthouse.

From a position nearly ½ mile southward of Boston lighthouse steer 266° true (**W** ⅞ **N** mag.) for Georges Island Rocks gas buoy, and pass about 250 yards southward of the buoys marking Nash and Kelly Rocks. When Deer Island light is in range with Narrows light, change course gradually to 295° true (**NW** ½ **W** mag.) for the eastern end of Gallups Island, and pass about 175 yards southwestward of Narrows lighthouse. Care should be taken not to be set off the course by the tidal currents setting to or from Black Rock Channel and the passage between Georges and Gallups Islands. When past the southerly end of Lovells Island steer 312° true (**NW** by **N** mag.) with Deer Island lighthouse a little on the port bow, and pass midway between Gallups Island and Lovells Island, and about 200 yards northeastward of Nix Mate gas and bell buoy. When past this buoy change course gradually to 250° true (**W** ½ **S** mag.), keeping the lights of the Broad Sound Channel inner range in line ahead, and pass ¼ mile southward of Deer Island lighthouse and ¼ mile northward of Long Island Head lighthouse. Then follow the directions of section 2.

II. Alongshore from southeastward.—When Minots Ledge lighthouse is made steer so as to pass ¾ to 1 mile northeastward of it on any course westward of 323° true (**NNW** mag.). From a position ¾ to 1 mile northeastward of Minots Ledge lighthouse steer 298° true (**NW** ¼ **W** mag.) for 4½ miles to a position midway between the buoys marking Thieves and Harding Ledges. Then steer for Boston lighthouse in range with Deer Island lighthouse, course 284° true (**NW** by **W** ½ **W** mag.) for about 1¼ miles, until The Graves lighthouse bears 357° true (*N* by *E* mag.). Then steer 258° 30′ true (**W** ¼ **N** mag.) for 1 mile, and pass 400 yards northward of Point Allerton Bar buoy and to a position nearly ½ mile southward of Boston lighthouse. Then follow the directions in the preceding paragraph.

Remarks and dangers.—The directions, if closely followed, lead in a least depth of about 25 feet in The Narrows.

Three and One-half Fathom Ledge is small and has a least depth of 3¼ fathoms. It lies 1¼ miles southeastward from The Graves lighthouse, and is marked on its southerly side by a buoy (nun, red, No. 2).

Martin Ledge is small and has 17 feet on it, but less depth is reported. It lies ¾ mile eastward from Outer Brewster, and is marked on its easterly side by a buoy (nun, red, No. 4).

Boston Ledge is small and has 18 feet on it, but less depth is reported. It lies nearly 1¼ miles 67° true (**E** ¾ **N** mag.) from Boston lighthouse, and is marked on its southeasterly side by a buoy (nun, red, No. 6). There are rocks with 14 feet over them between the ledge and Shag Rocks.

Thieves Ledge, with 4½ to 6 fathoms over it, is ¾ mile long and about ¼ mile wide. It is dangerous in heavy easterly gales, when the sea breaks on it. The ledge is marked northward of its shoalest part by a whistling buoy, which lies 2⅝ miles 92° true (**ESE** ½ **E** mag.) from Boston lighthouse. There are spots with 5¾ fathoms over them lying ½ mile eastward and 1⅛ miles southeastward of the buoy, upon which the sea sometimes breaks in heavy easterly gales.

The dangers near Minots Ledge lighthouse are described with the coast on page 54.

Harding Ledge, bare at low water, is about 400 yards long and is marked near its westerly end by a black spindle with wheel and pendants. A black bell buoy and a gas buoy (occulting white light) are placed nearly ¼ mile northeastward of the ledge. A rock bare at low water lies 300 yards southwestward of the spindle, and broken ground with 15 to 18 feet on it in places lies between the ledge and Point Allerton.

Ultonia Ledge, with 3½ to 5 fathoms over it, is the eastern end of the rocky, broken ground which extends 1⅜ miles 65° true (**E** by **N** mag.) from **Point Allerton.**

Shag, or Egg, Rocks are bare, rugged ledges lying ¼ to over ½ mile eastward of Boston lighthouse, and should not be approached from southward closer than ¼ mile.

Broken ground with 14 feet on it extends 400 yards southward from **Boston lighthouse.**

Point Allerton Bar extends ⅜ mile eastward and northward from Point Allerton. It is marked on its northern side by a buoy (can, black, No. 3); near the end of the bare part of the bar, about 300 yards northward of the point,

there is a stone beacon with shaft and cone. From the bar to Hunt Ledge the south shore should be given a berth of over ⅜ mile. A spot with 3¾ fathoms over it lies ⅜ mile westward of buoy No. 3 and ⅝ mile southward from Boston lighthouse.

Nash Rock Shoal, with 20 feet over it, lies ⅜ mile southwestward from Boston lighthouse, and is marked near its shoalest part by a buoy (spar, red, No. 8).

Hunt Ledge, with 10 feet over it, lies nearly ¾ mile southeastward from Narrows lighthouse, and is marked by a buoy (nun, red and black horizontal stripes). The buoy should be given a berth of over 200 yards when northward of it. There is a depth of 21 feet between Hunt Ledge buoy and the black buoy southward of it.

Great Brewster Spit and Kelp Ledges extend from Narrows lighthouse to Boston lighthouse on the north side of the channel. At low water the whole of the bar shows bare; near its western end is **Narrows lighthouse**, eastward and southward of which are two stone beacons placed on the dry part of the spit. The easternmost is known as **False Spit beacon** and the one near the lighthouse as **Spit beacon**.

Kelly Rock, with 3¾ fathoms over it, lies 300 yards southward from False Spit beacon, and is marked on its southerly side by a buoy (spar, red, No. 8½).

Georges Island Rocks extend 600 yards southeastward from **Georges Island**, and are marked at the southeast end by a gas buoy, No. 5 (occulting white light). A large part of the shoal on the easterly side of Georges Island bordering The Narrows is dry at low water.

A black pile dolphin with cask is placed near the end of the shoal at the easterly end of **Gallups Island**. A shoal extends along the westerly side of The Narrows from the easterly end of Gallups Island to the gas buoy off Nix Mate.

Lovells Island, on the easterly side of The Narrows, has a buoy-depot wharf on its southwest side, and Lovells Island range lights on its north end. **Seventy-four Bar**, partly bare at low water, extends northward from Lovells Island, and is marked off its westerly side by a buoy (nun, red, No. 10).

2. President Roads to Boston.—From a position on the Broad Sound Channel inner range line about ¼ mile north-northwestward of Long Island Head lighthouse, steer 268° true (**W** by **N** mag.), with Nix Mate gas and bell buoy in range with the north end of Great Brewster astern, and pass 500 yards northward of Spectacle Island. When the westerly end of Spectacle Island bears 200° true (*S W* by *S* mag.), steer 290° true (**NW** by **W** mag.) for the middle of Fort Independence, the stone fort on Castle Island; gas buoy No. 9 A will be nearly ahead on this course.

Pass 100 yards eastward of buoy No. 9 A, steer 308° true (**NW** ⅝ **N** mag.) with the structure of the Broad Sound Channel inner range rear light astern, and leave gas buoy No. 9 B and the black buoy at the entrance of the Reserved Channel, which mark the southwesterly edge of the completed channel, 100 yards on the port hand. This course leads in the completed part of the dredged channel until abreast the wharves of East Boston. Then steer more northward, keeping near the middle of the harbor. The anchorage in the inner harbor is on either side of the channel abreast Bird Island Flats, as directed by the harbor master. See "Anchorages" in the description preceding, and Appendix II.

The directions of the first paragraph preceding lead near the middle of the channel which is 1,200 feet wide and 35 feet deep. The directions of the second paragraph lead in the straight section of the part of the channel which is practically completed for a width of 540 feet. This part of the channel, when completed for its full width of 1,200 feet, will have a 310° 30′ true (**NW** ⅞ **N** mag.) direction to abreast the northwest end of Governors Island, and then 301° true (**NW** mag.) to abreast pier No. 4 in South Boston. It is proposed to establish lighted buoys shortly to mark the completed part of the channel, and these will be moved to conform with the progress of the work. The South Boston and Spectacle Island ranges do not lead in the best water.

Remarks and dangers.—The sailing line, if closely followed, carries a least depth of over 30 feet. Steam vessels are not permitted to pass within 100 yards of any wharf at a greater speed than 5 miles.

Shoals extend 225 yards northward from Long and Spectacle Islands.

Lower Middle is a shoal, partly bare at extreme low water, lying northward of the Main Ship Channel for a distance of 1 mile southeastward of Governors Island. Its eastern end, with depths less than 18 feet, is marked by a red nun buoy. The depths in President Roads increase gradually to 5 fathoms in a distance of ⅜ mile eastward of the buoy at the eastern end of Lower Middle, and there are depths of 23 to 24 feet southward of the buoy to the dredged channel. The southwesterly side of Lower Middle is marked by gas and bell buoy No. 8 (occulting red light) and red spar buoys Nos. 10 and 12. Above buoy No. 12 there are depths of 18 feet in places near the northeast edge of the Main Ship Channel until up with the black spar buoy which marks the narrow channel westward of Governors Island leading from Governors Island Channel.

The **Main Ship Channel** leads close to the wharf at the northeasterly end of Castle Island, and for a distance of ½ mile below and ¾ mile above Castle Island there is little depth in places on the flats bordering the southwest side of the channel. The edge of the completed part of the channel is marked by gas buoys Nos. 9A and 9B (occulting white light), lying respectively below and above Castle Island. Above the channel leading to Reserved Channel there are depths of 16 to 19 feet close southward of the dredged channel, and much less nearer shore, until up with the wharves of South Boston.

Bird Island Flats, large parts of which are bare at low water, lie between the wharves of East Boston and Governors Island. A part of the flats has been removed to a depth of 5 fathoms to form an anchorage for deep draft vessels, and the southwesterly edge of the flats is nearly on a line from the red buoy at their southeasterly end to the ends of the wharves at the southwesterly end of East Boston.

DORCHESTER BAY[1]

extends southwestward from President Roads between Spectacle and Thomson Islands on the east and South Boston on the west. The bay is filled by extensive flats, large areas of which are nearly bare at low water and rise abruptly from the edge of the channel. A channel 175 feet wide and 18 feet deep is dredged up to Commercial Point. The principal traffic is in coal and building material, which is brought by barges and other vessels that are towed to Commercial Point, Neponset, and Milton Mills. Vessels can select anchorage in the channel of Dorchester Bay below buoy No. 6, the best place being northwestward of Thomson Island and east-northeastward from the buoys marking the northerly end of the dredged cuts. Above buoy No. 6 there is scant swinging room for anchorage for vessels of a greater draft than 8 feet.

Old Harbor, on the south side of South Boston, is filled by flats with little water over them. Two anchorage basins for yachts have been dredged on the north side of the harbor; the easterly one has a depth of 9 feet, and the westerly one 6 feet.

Commercial Point is on the west side at the entrance of Neponset River. On the north side of the point is an anchorage basin with depths of 9 to 22 feet mostly used by small yachts. A middle ground, 400 feet wide and with 1 to 4 feet over it, lies on the easterly side of the basin, between it and the dredged channel; a buoy (spar, red and black horizontal stripes) is placed on the westerly side of the dredged channel at the northerly end of the middle ground.

Neponset River is ¼ mile wide at the entrance, and narrows to 100 yards at **Milton Mills,** the head of navigation. A channel 100 feet wide and 15 feet deep has been dredged for a distance of 1¼ miles above Commercial Point to the highway bridge at **Neponset,** and is buoyed to this point. Thence to Milton Mills, a distance of 2¼ miles, the channel has been dredged 75 to 100 feet wide and 6 feet deep. Two draw bridges cross the river at Neponset, and another crosses 1 mile farther up.

Pilots are generally taken by strangers, and may be had by making signal off Thomson Island, anchoring there if necessary; they are not always taken by light-draft vessls bound to Neponset. Pilotage is not compulsory; the rates for the lower part of Neponset River are given in Appendix II.

Towboats are taken by most vessels in going up and down Neponset River, the master of the tug doing the piloting below Neponset Bridge, where, if bound for Milton, a special pilot is taken and the vessel being towed pays his pilotage.

SAILING DIRECTIONS, DORCHESTER BAY.

The following directions are good for a draft of 8 feet to the anchorage basin northward of Commercial Point.

From President Roads pass about ¼ mile northward of Spectacle Island and steer 238° true (**WSW** ⅜ **W** mag.) for the red spar buoy lying ⅜ mile westward of Spectacle Island. Pass close eastward of the buoy and continue the course passing about 400 yards northwestward of Thomson Island and heading for the buoys marking the northerly end of the dredged cuts. Pass between the buoys and steer 216° true (**SW** ½ **W** mag.) with buoy No. 6 on the starboard bow. As the buoy is approached, haul westward, pass 100 feet southward of it, and steer 256° true (**W** mag.) for a red and black horizontally striped spar buoy.

Pass northward of this buoy on a 267° true (**W** by **N** mag.) course, and anchor in the anchorage basin westward of the middle ground. The westerly edge of the middle ground is marked by a range of two white beacons on the northerly side of Commercial Point, bearing 179° true (*S* by *W* ⅛ *W* mag.); the front beacon is a pile, and the rear one a circular daymark on a shed. The dredged channel to Commercial Point leads eastward of the middle ground, and is marked by a black spar buoy and by a range of two beacons (white, diamond-shaped daymarks) on the wharf on the easterly side of Commercial Point.

QUINCY BAY[1]

indents the southerly shore of Boston Harbor between the peninsula of Squantum and Hough Neck. The general depths in the bay are 8 to 10 feet, but shoals partly bare at low water extend ½ to ¾ mile from its southerly side. **Hangmans Islet,** small and rocky, lies near the middle of the entrance to the bay; the reef extending over ¼ mile southwestward from the islet is marked near its end by a black spindle with cask. A ledge with 5 feet over it lies ⅜ mile northward from Hangmans Islet, with foul ground between. **Sunken Ledge,** dry at low water, lies ⅝ mile northeastward from Hangmans Islet, and is marked by a stone beacon with staff and cage.

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[1] Shown on chart **246,** scale $\frac{1}{20,000}$, price $0.50.

Wollaston Channel, near the westerly end of the bay, has been dredged 60 feet wide and 3 feet deep to the yacht club houses at **Wollaston.** The easterly side of the channel is marked by two black dolphins, the inner one being at the turn in the channel.

Eastward of Squantum and connected with it by a causeway lies **Moon Head,** which is recognized by the grassy hill and bluff on its easterly end. The entrance to Quincy Bay from westward is between Moon Head and Long Island, and is good for a depth of about 8 feet at low water. From here the Back or Western Way leads in a northerly direction between Spectacle Island and Thomson Island to the Main Ship Channel, and the Sculpin Ledge Channel in a northeasterly direction along the northwesterly shore of Long Island into President Roads.

Hough Neck is marked at its northeasterly end by a green hill 100 feet high, called **Quincy Great Hill,** which is mostly settled. **Nut Islet,** marked by a power station, lies 300 yards northward of Quincy Great Hill, with a causeway between. There is a channel into Hingham Bay between Nut Islet and Peddock Island.

HINGHAM BAY[1]

is that part of Boston Harbor lying southeastward of Peddock Island. It is the approach to Weymouth Fore River, Weymouth Back River, Hingham Harbor, and Weir River. The easterly part of the bay is shoal, and extensive shoals make out from the southerly shore and surround the islands in the bay. The principal entrance is through Nantasket Gut, but there is also an entrance southward of Peddock Island that is sometimes used by vessels bound into Weymouth Fore or Back Rivers.

Nantasket Gut is a narrow channel between Peddock Island and Windmill Point, and leads into the bay from Nantasket Roads. The tidal currents have considerable velocity, but generally follow the direction of the channel; the flood sets southward and ebb northward.

Windmill Point is marked on its southerly side by a light. Prominent on Windmill Point is a large hotel with a steamboat landing southward of it, which is the terminus of the Nantasket Beach Railroad. Eastward, on the slopes of the hill, are the town of **Hull** and the Hull yacht club houses. The usual and best anchorage is off the steamboat landings at Hull.

Weymouth Fore River has its entrance on the southwest side of Hingham Bay between Hough Neck and Grape Island, and is the approach by water to Quincy Point, Weymouth, East Braintree, and a number of landings. The channel has been improved by dredging, and has a width of 300 feet and depth 18 feet for a distance of 2½ miles from the entrance to the Fore River Ship and Engine Co.'s shipyard at **Quincy Point.** Thence for a distance of about 2 miles to the head of navigation at **East Braintree** there is a narrow channel with a depth of 6 feet. The river is crossed at Quincy Point by Quincy Bridge (width of draw 100 feet) and at East Braintree by Braintree Bridge (width of draw 35 feet).

Town River Bay, on the northwesterly side of Weymouth Fore River northward of Quincy Point, has a narrow channel between extensive shoals and is not safe for strangers. There is a depth of 9 feet in the channel to the deep hole about ⅜ mile inside the entrance. Thence to the wharves at **Quincy,** a distance of nearly 1 mile, a channel has been dredged 100 feet wide and 4 feet deep.

Weymouth Back River lies just eastward of Weymouth Fore River and southward of Grape Island. The channel from Weymouth Fore River to the wharf of the fertilizer works on Eastern Neck, a distance of 1¼ miles, is buoyed, and has a least width of 200 feet and depth 12 feet. A depth of 5 feet can be carried ¾ mile above the fertilizer works to Hingham Bridge (width of draw about 35 feet). Strangers desiring to enter the river should take a pilot or towboat. There is good anchorage at the entrance, ¼ to ⅜ mile westward of Grape Island.

Hingham Harbor and **Weir River** are shallow and lie in the southeasterly end of Hingham Bay. Their common entrance lies close westward of Bumkin Island. The channel, 250 yards wide with a depth of over 3 fathoms, leads for ½ mile in a southeasterly direction from the westerly end of Bumkin Island, and then divides. The branch leading eastward takes the name of Weir River. The channel leading to Hingham Harbor trends southward, is narrow, and has a depth of 18 feet up to Crow Point (Downer Landing), the entrance of the harbor.

Hingham Harbor is a cove 1 mile long, with an average width of about ⅝ mile. At low water it is a dry flat, through which a narrow and tortuous channel winds, with a depth of 6 feet to the wharves at the town of **Hingham.**

Weir River leads to the wharf at **Nantasket,** near the southerly end of Nantasket Beach. It is filled by extensive flats, mostly bare at low water, between which is a channel with a least width of 100 feet and depth 10 feet. The channel is used by steamers running from Boston to Nantasket, and is marked by lights on piles during the summer; the piles remain in position until carried away by ice.

Pilots are always taken by vessels going up Weymouth Fore River above Quincy Bridge, and are obtained either at Nantasket Gut or at Quincy Point; in the former case, after making signal, vessels anchor between Nantasket Gut and Sheep Island, if it is necessary to wait for a pilot.

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[1] Shown on chart 246, scale $\frac{1}{20,000}$, price $0.50.

Towboats are employed by all large vessels entering the tributaries of the bay, being generally taken from Boston.

Repairs.—The shipyard at Quincy Point has facilities for the construction and repair of the largest ships and engines of steamers.

Tides.—The mean rise and fall of tides is about 9 feet.

SAILING DIRECTIONS, HINGHAM BAY.

1. Entering through Nantasket Gut.—The directions of this section lead in a least depth of about 16 feet at low water.

From Nantasket Roads pass through Nantasket Gut on a course about 154° true (**S** by **E** mag.), passing 150 yards westward of Windmill Point. When through Nantasket Gut good anchorage will be found about ¼ mile southward of Windmill Point in 4½ to 7½ fathoms. A pilot can be had here for the tributaries of the bay, or proceed as directed in Paragraph I or II following.

I. To Weymouth Fore River.—When through Nantasket Gut bring the large hotel on Windmill Point astern on a 202° true (**SW** ¾ **S** mag.) course, and pass between the red and black buoys off Harrys Rock. When Sheep Island is in range with the south side of Bumkin Island, bearing 93° true (*ESE* ½ *E* mag.), steer 157° true (**S** ¾ **E** mag.) for the westerly end of Grape Island open from the easterly side of Lower Neck, and pass 100 to 150 yards eastward of spar buoy No. 2A. Then steer 208° true (**SW** ¼ **S** mag.) with the high water mark at the west end of Sheep Island in range with the summit of the hill at Hull astern; the standpipe on Nantasket Hill will be seen eastward of Hull. On this course pass about 300 yards westward of the red spar buoy at the entrance to Weymouth Back River, 100 yards westward of Jackknife Ledge buoy (spar, black, No. 1), and 100 yards eastward of red spar buoy No. 2. On approaching the red and black horizontally striped buoy marking Channel Rock, haul westward and pass 100 yards southward of it. Then steer 264° true (**W** ¾ **N** mag.) and anchor in the channel 250 yards westward of Channel Rock buoy. Above this point the channel is too narrow to afford anchorage for vessels of any size.

Dangers.—A shoal extends about 150 yards from Peddock Island on the westerly side of **Nantasket Gut**. A spot with 16 feet over it lies near the middle of the channel of Nantasket Gut about 120 yards from Windmill Point.

Harrys Rock, a cluster of bowlders showing at low water, is a part of a shoal which extends nearly 700 yards southeastward from Peddock Island, and is marked at its end by a buoy (spar, red, No. 2). **Prince Head**, a grassy island with bluff sides, is on the same shoal ¼ mile southwestward of Harrys Rock; the south end of Prince Head should be given a berth of over 150 yards.

Eastward of Harrys Rock is a shoal with 14 to 16 feet over it, and marked at its westerly end by a buoy (spar, black, No. 1), which lies 150 yards southeastward from Harrys Rock buoy.

Sheep Island is surrounded by a shoal with 8 feet near its edge, which extends about ⅜ mile northeastward and northward and 400 yards westward from the island.

Extensive shoals extend ¾ mile eastward from **Quincy Great Hill**. There is a depth of 6 feet near the easterly edge of the shoal, which is marked by a buoy (spar, red, No. 2A). **Pig Rock**, on the northerly edge of the shoal, is marked by a granite beacon with staff and cage.

The channel in Weymouth Fore River has shoals on both sides, and narrows gradually from 600 yards abreast Grape Island to 200 yards just below **Channel Rock**. The channel is about 100 yards wide at Channel Rock, and widens to 225 yards just above it. With the aid of the chart and the buoys the channel is not difficult up to Quincy Point.

II. To the entrance of Hingham Harbor and Weir River.—From Nantasket Gut steer 154° true (**S** by **E** mag.), passing 150 yards westward of Bumkin Island Shoal buoy (can, black, No. 1). When the high-water mark on the northerly side of Sheep Island is in range with the summit of Quincy Great Hill, bearing 252° true (*W* ⅜ *S* mag.), steer 131° true (**SE** ⅞ **S** mag.). Pass 200 yards westward of Bumkin Island and 100 yards westward of Bumkin Island buoy (can, black, No. 3); continue the course nearly ½ mile past this buoy, and anchor 150 yards north-northeastward from Crow Point Flats buoy (spar, red, No. 2); marking the entrance to Hingham Harbor.

Dangers.—**Bumkin Island Shoal** extends nearly ¾ mile in a north-northwesterly direction from Bumkin Island and is marked at its northerly end by a buoy (can, black, No. 1).

Crow Point Flats are very shoal and extend 1¼ miles in a northerly direction from Crow Point, their eastern edge forming the western edge of the channel into Hingham Harbor; the eastern edge of the channel is formed by extensive flats which extend ½ mile from shore. These shoals rise abruptly from the channel which leads between them.

1 A. Entering southward of Peddock Island.—The directions of this section are good for about 8 feet at low water.

From Boston by the Back or Western Way.—Pass eastward of Castle Rocks gas buoy, lying east-southeastward from Castle Island, and steer 160° true (**S** ½ **E** mag.) for the easterly end of Moon Head. When midway between the northerly ends of Spectacle and Thomson Islands steer 142° true (**SSE** ⅛ **E** mag.) with Fort Independence (on Castle Island) astern. On this course leave a black buoy northeastward of Thomson Island 200 yards on the starboard hand, a red buoy southward of Spectacle Island 200 yards on the port hand, a red buoy 200 yards off the southwesterly end of Long Island 100 yards on the port hand, Sunken Ledge beacon 350 yards on the port hand, and Wreck Rock red buoy 250 yards on the starboard hand. Continue the course to a position 350 yards northeastward from Nut Island, and then steer 93° true (**ESE** ½ **E** mag.) for Sheep Island in range with the southerly side of Bumkin Island, passing about 350 yards northward of Pig Rock beacon. When about ⅜ mile from Sheep Island steer 157° true (**S** ¾ **E** mag.) for the westerly end of Grape Island open from the easterly side of Lower Neck, and proceed as directed in section 1, paragraph I, for Weymouth Fore River.

To the entrance of Hingham Harbor or Weir River.—Follow the directions preceding, and bring Pig Rock beacon astern on a 45° true (**NE** by **E** ¼ **E** mag.) course, heading for the standpipe on Nantasket Hill until up with the black spar buoy off Harrys Rock. Then steer 76° true (**E** mag.) for Bumkin Island Shoal buoy (can, black, No. 1) until 200 yards from it. Then steer 154° true (**S** by **E** mag.) and proceed as directed in Paragraph II, section 1, preceding.

COAST FROM BOSTON TO PLYMOUTH.[1]

Point Allerton is a grassy hill, covered with houses, and the base of the sea face is protected by a sea wall. Point Allerton Bar, Ultonia Ledge, Harding Ledge, and other dangers lying northward and eastward from the point are described in section 1 A of the sailing directions for Boston Harbor.

Nantasket Hill, nearly 1 mile westward of Point Allerton, is marked by an old earthwork and standpipe on its summit, and storm warnings are displayed on the hill. The town of **Hull** is on the lower hill southwestward of Nantasket Hill.

From Point Allerton the coast trends southward for 3 miles, and is called **Nantasket Beach**. The beach is occupied by summer cottages, and at its southerly end is **Nantasket**, a popular summer resort. There are three grassy hills on the beach, the most prominent of which is **Strawberry Hill** (about 1 mile southward of Point Allerton), marked at its summit by a prominent standpipe; the other two hills southward are **White Head** and **Sagamore Head**.

From Nantasket Beach the coast, presenting a general hilly appearance, trends 3 miles east-southeastward to Cohasset Harbor. Rocks and sunken ledges extend ½ mile from shore in places. **Black Rock** and **Little Black Rock** are rocky islets, the inner one high.

Cohasset Harbor is a large, shallow cove lying southwestward of Minots Ledge lighthouse and 5 miles southeastward from Point Allerton. It is of little commercial importance and is not available for strangers, but is the resort of a number of small yachts. Anchorage in 8 to 10 feet can be had in the so-called outer harbor. A dredged channel, 60 feet wide and 6 feet deep, and marked by buoys, leads to the inner harbor. The latter is sheltered by a breakwater which extends 400 yards northward from near the westerly end of **Barsons (Bassing) Beach** at the entrance. An anchorage basin 6 feet deep has been dredged in the inner harbor, and a channel 100 feet wide and 4 feet deep leads from it to the town landing.

Numerous rocks and ledges lie in Cohasset Harbor and extend off to **Minots Ledge lighthouse**, built on the Outer Minot. The most prominent inside the lighthouse are **East** and **West Shag Rocks**, which show at high water. There are three channels, the entrances to which are marked by buoys; the Western or Brush Island Channel enters between Brush Island Ledge and Chittenden Rock; Gangway Passage, leading between West Hogshead Rock and The Grampuses; and Eastern Channel, which leads between Enos Ledge and West Willies.

The following ledges lie outside of Minots Ledge lighthouse:

Davis Ledge, with a least depth of 13 feet, lies over ⅜ mile eastward from Minots Ledge lighthouse, and is marked on its northeast side by a buoy (can, black, No. 1). Vessels should pass well eastward of the buoy.

Jason Shoal, a spot with 5½ fathoms over it, lies 1¼ miles northeastward from Minots Ledge lighthouse. The sea breaks on this ledge during heavy gales, and also over **Sylvester Rock**, with 4½ fathoms over it, lying ½ mile northeastward from the lighthouse.

A small, rocky patch with 3½ fathoms over it, lies 2⅜ miles 82° true (**E** ½ **S** mag.) from Minots Ledge lighthouse, and is marked on its northeast side by a buoy (can, black, No. 1).

Stellwagen Ledges is the name applied to the large number of rocks and sunken ledges which fringe the coast from Minots Ledge to Scituate Harbor. Some of these sunken ledges lie over 1 mile from shore, and have from 7 to

[1] Shown in parts on charts **109, 1208**, scale $\frac{1}{80,000}$, price of each $0.50.

14 feet over them in surrounding depths of 4 to 9 fathoms. When in this vicinity strangers should keep over 1¼ miles from the shore.

A ledge with 5 fathoms on it, which has not been closely developed, lies 1¾ miles from shore and 2½ miles 130° true (**SE ¾ S** mag.) from Minots Ledge lighthouse.

Scituate Harbor, lying 4½ miles southward from Minots Ledge lighthouse, is suitable only for small craft with local knowledge and a smooth sea. It is a shallow cove largely bare at low water, and is partially protected by breakwaters which have been built out from the points at the entrance. A channel about 100 feet wide and 7 feet deep has been dredged from the entrance to an anchorage basin of the same depth which is 350 by 400 feet in extent, and from the basin a channel 100 feet wide and 3 feet deep has been dredged to the town of Scituate. The channels are liable to shoal.

Cedar Point, on the north side of Scituate Harbor, is marked by a disused, white light tower, and on the southerly end of the breakwater making out from the point is **Scituate Breakwater light**, which marks the north side at the entrance. On the high land about 2 miles 267° true (**W** by **N** mag.) from the entrance of Scituate Harbor is a prominent high tower with pointed top, which can be seen for many miles seaward.

Four conspicuous, yellow bluffs with low beaches between extend 2½ miles southward from Scituate Harbor. There is a lookout on **Second Cliff**, and houses on all except **Fourth Cliff**.

North River and **South River** have their common entrance through New Inlet, which is on the north side of Fourth Cliff and is nearly dry at low water at its inner end. There is practically no navigation of the rivers other than by boats and launches. A channel, not less than 100 feet wide, has been cleared of bowlders in North River for a distance of 10 miles above its entrance to the village of Hanover; the depth to this point is about 3 feet at low water or 9 feet at high water, except on the bar at the entrance.

Brant Rock is a post village and summer resort on **Green Harbor Point**, 7¾ miles southward from Scituate Harbor. There are a prominent tank and wireless telegraph pole at the village. **Green Harbor River** has its entrance on the south side of the point.

Southward of Scituate Harbor the coast is fairly bold, and 4 fathoms will be found as close as ½ mile (and closer in places) to the shore. About 2 miles northward from Green Harbor Point shoals extend ⅝ mile from shore.

Bartlett Rock, bare at low water and with depths of 7 to 18 feet around it, lies ⅝ mile southeastward from Green Harbor Point. It is marked on its easterly side by a buoy (spar, red, No. 2).

Howland Ledge, with 7 feet over it, lies 1⅛ miles east-southeastward from Green Harbor Point and 4½ miles 352° true (**N ½ E** mag.) from Gurnet lighthouse. It is marked on its easterly side by a buoy (spar, red, No. 4) and by a red bell buoy in summer. Strangers should not attempt to pass inshore of Howland Ledge. Broken ground with 4 fathoms over it and which has not been closely developed extends ⅞ mile north-northeastward from Howland Ledge and 1½ miles eastward from Green Harbor Point.

High Pine Ledge, bare at lowest tides, is marked on its easterly side by a buoy (spar, red, No. 6) which lies ⅞ mile from shore and 2 miles 353° true (**N ⅝ E** mag.) from Gurnet lighthouse. The ledge extends from the buoy nearly to the shore and vessels should not attempt to pass westward of the buoy.

PLYMOUTH HARBOR,[1]

the most northern and western harbor in Cape Cod Bay, affords excellent and safe anchorage, and is composed of three different harbors—Duxbury Bay, Kingston Bay, and Plymouth Harbor proper. The common entrance is just southward of Gurnet Point (marked by Plymouth lighthouse and beacon), and is 17 miles southward from Minots Ledge lighthouse and 16¼ miles westward from Race Point lighthouse.

Captains Hill, on the peninsula between Duxbury and Kingston Bays, is about 200 feet high and on its top is Standish Monument, which shows prominently from all directions when approaching the harbor. **Manomet Hill**, about 5 miles southward of Gurnet Point, is over 390 feet high, heavily wooded, and is a conspicuous landmark in approaching the entrance.

Duxbury Bay is contained between Duxbury Beach on the east, Saquish Neck on the south, and the mainland on the west. It is about 3 miles long, with an average width of 2 miles; but is full of flats, mostly dry at low water, intersected by numerous narrow channels, which are not navigable without a pilot. A narrow channel, 40 to 80 feet wide, which has shoaled to 1 foot in places, leads up to the wharf at Duxbury. Another channel leads along the western shore of Clark Island, and thence gradually approaches Duxbury Beach, which it skirts for some distance, and enters a narrow and shoal stream called **Back River**. About 7 feet at low water may be taken up to **Powder Point** (the western point at entrance to this river), but not more than 4 feet above that point. The channel is narrow and intricate and is not fit for strangers.

[1] Shown on charts **1208**, scale $\frac{1}{80,000}$, price $0.50; **338**, scale $\frac{1}{40,000}$, price $0.25.

Cowyard is a good anchorage in the southerly part of Duxbury Bay. The anchorage with best swinging room is 300 to 400 yards westward of Duxbury beacon and thence northward to buoy No. 9, in 4 to 10 fathoms. The channel leading north-northeastward in the Cowyard has a width of about 200 yards and is not marked. Shoals with little water in places rise abruptly on both sides, and at low water the edges of the shoals show by discolored water. Small vessels can pass about 50 yards westward of buoy No. 6, lying 250 yards north-northwestward from Duxbury beacon, and steer 14° true (**NNE ½ E** mag.) through the Cowyard. Anchor with the south end of Clark Island bearing about 99° true (**ESE** mag.), distant 650 yards; the width of the channel at the anchorage is about 350 yards.

Kingston Bay, contained between the mainland and the western point of Duxbury Bay, has a diameter of about 1½ miles, but is so full of flats as to render it unfit for navigation except with a pilot and at high water. The village of **Kingston** is built upon its western shore (about ¾ mile back from the water) on a small stream called **Jones River.** The bay is of little importance as a harbor or port.

Several channels lead between the flats of this bay, but they are narrow and crooked. The northernmost and deepest is **Miles** or **South Channel**, and by it about 8 feet at low water can be taken to the wharf on the western side of the peninsula between Duxbury and Kingston Bays.

From the southerly end of the Cowyard westward of Duxbury Pier lighthouse, a channel has been dredged to the **Plymouth Cordage Co.'s wharf,** with a turning basin at the wharf. The channel is 250 feet wide and 20 feet deep through the bar at the entrance from the Cowyard, and is marked by buoys. The upper part of the channel for a distance of ¾ mile below the wharf is 150 feet wide and 18 feet deep; the curve in this part of the channel is marked on its southerly side by black pile dolphins maintained by private parties.

Plymouth Inner Harbor is about 1 mile wide at its northern end, gradually narrowing for 2¼ miles to its southern end. The larger part of the harbor is dry at low water, and its narrow channels are unfit for navigation except for steamers, or at high water for vessels having pilots.

The principal channel, leading to **Plymouth,** is marked by buoys, has a depth of 10 feet, and is 250 feet wide up to buoy No. 10 and about 150 feet wide from thence through the straight channel to the wharves. An anchorage basin 150 to 300 feet wide has been dredged off the wharves southward from Long Wharf. Yachts anchoring in the basin must keep on the easterly side. The anchorage with best swinging room in the harbor is on the westerly side of Long Beach between buoy No. 6 and the old beach wharf just southward of it, but this is suitable only for small vessels of about 10 feet or less draft.

Channels.—The channel from the entrance to the southerly end of the Cowyard has a depth of about 21 feet, and a width of ¼ to ⅜ mile except near Duxbury Pier lighthouse where it narrows to 300 yards. The deepest draft of vessels going to Plymouth is about 17 feet, which is taken in near high water.

Anchorage.—The best anchorage is in the Cowyard, but small light-draft vessels often find good anchorage under the lee of **Long Beach,** in 3 to 4 fathoms, hard bottom.

Pilots.—There are regular pilots and one can be had by making signal if going beyond the Cowyard.

Towboats may be had at Plymouth.

Supplies.—General supplies can be had from Boston by rail. Coal, water, and cordage can be obtained at Plymouth.

Tides.—See table, page 29.

The **tidal currents** have considerable velocity, the greatest velocity being between Gurnet Point and Duxbury Pier and at the entrance to the Cowyard. The set is generally in the direction of the channel; but the ebb sets southward and eastward across Browns Bank, while the flood sets northward and westward above Saquish Head and sweeps strongly around Duxbury Pier northward into the Cowyard.

Ice.—Beginning about the middle of January this harbor is usually closed to navigation for a few weeks every winter by local ice; when there is ice in the harbor the Cowyard is not a safe anchorage. In winter the safest anchorage from ice is in the channel southward or eastward of Saquish Head, and vessels sometimes go to sea on account of drift ice at this anchorage. Westerly winds have a tendency to carry the ice out in fields.

SAILING DIRECTIONS, PLYMOUTH HARBOR.

The following directions for approaching will lead to Gurnet Point whistling buoy which lies ⅝ mile 109° true (*SE* by *E* mag.) from Plymouth (Gurnet) lighthouses. In approaching, Plymouth lighthouse may be steered for on any course between 183° true (**S** by **W ½ W** mag.) through west to 312° true (**NW** by **N** mag.) until within 1 mile of it.

FROM BOSTON.—Steer 104° true (**SE** by **E ½ E** mag.) with Boston lighthouse in range with Deer Island lighthouse astern until midway between the buoys marking Thieves Ledge and Harding Ledge. Then steer 118° true (**SE ¼ E** mag.) for 4½ miles to a position ¾ to 1 mile northeastward of Minots Ledge lighthouse. Then steer 143° true (**SSE** mag.) for 4½ miles to a position with Scituate Breakwater light abeam distant 1¾ miles. Then steer 155° true

(**S** by **E** mag.) for 9 miles, taking care to pass over 1½ miles eastward of Green Harbor Point, to a position ¾ mile eastward of Howland Ledge buoy. Then steer 174° true (**S** ¾ **W** mag.) for 5 miles to Gurnet Point whistling buoy.

FROM CAPE ANN.—From a position 1 mile east-southeastward of Cape Ann lighthouses a 182° 30′ true (**S** by **W** ½ **W** mag.) course made good for 38 miles will lead to Gurnet Point whistling buoy. Manomet Hill should be made ahead on this course.

FROM CAPE COD.—Passing about 1½ miles northward of Cape Cod and 2 miles northward of Race Point lighthouse, a 249° true (**W** ⅝ **S** mag.) course made good for 15¾ miles will lead to Gurnet Point whistling buoy.

Or, having come from Provincetown, from a position ¾ mile southward of Wood End lighthouse a 268° true (**WNW** ⅞ **W** mag.) course for 17½ miles will lead to Gurnet Point whistling buoy.

From Gurnet Point whistling buoy bring Duxbury Pier lighthouse to bear 256° true (**W** mag.) and in range with the right-hand tall smokestack of the Plymouth Cordage Co.'s factory (there are two tall smokestacks on the large red-brick factory). Steer for Duxbury Pier lighthouse on this range, which leads about 100 yards southward of buoy No. 4 and 75 yards northward of buoy No. 3.

From abreast buoy No. 3 steer 245° true (**W** by **S** mag.) for Pierhead beacon (an openwork granite pyramid with staff and cap, close to the north end of Long Beach) until up with buoy No. 5. Pass 50 yards northward of this buoy, steer 274° true (**WNW** ⅜ **W** mag.), and pass 175 to 200 yards southward of Duxbury Pier lighthouse. When the lighthouse is abeam haul gradually northward so as to pass at least 100 yards westward of Duxbury beacon. Anchor 300 to 400 yards westward or northwestward of Duxbury beacon in 4 to 10 fathoms.

Remarks and dangers.—The dangers between Boston and Plymouth are described with the coast preceding, and those southward of the entrance are described with Cape Cod Bay following. Plymouth (Gurnet) lighthouse and beacon in range, bearing 303° true (**NW** ⅛ **N** mag.) clears the easterly end of Browns Bank.

The range of Duxbury Pier lighthouse and the right-hand one of the two tall smokestacks leads in a least depth of 19 feet just southeastward of buoy No. 4. Deeper water will be found by keeping about 100 yards southward of the range until abreast buoy No. 4. Vessels should then keep close on the range to give the northerly edge of Browns Bank eastward of buoy No. 3 a good berth. Otherwise the directions lead in a least depth of about 21 feet to the anchorage.

Gurnet Rock is a detached ledge near the end of the shoals making 600 yards eastward and southeastward from Gurnet Point; it has 4 feet over it and is marked by a buoy (spar, red, No. 2).

The shoals extending southward from Gurnet Point are marked at the southerly end by a buoy (spar, red, No. 4), lying ⅜ mile southward of the lighthouse. There is a depth of 12 feet just inside the buoy, and **Bass Rock**, with 4 feet over it, lies farther northwestward. There is a depth of 19 feet 150 yards southeastward from the buoy.

The bight between Gurnet Point and **Saquish Head**, the bluff, sandy head 1½ miles westward, is shoal, and shoals extend from Saquish Head to Duxbury Pier lighthouse; these shoals have little water over them in places.

Browns Bank is the extensive shoal, bare in places at low water, which extends 2¾ miles eastward from Long Beach and forms the southerly side of the channel westward of Gurnet Point. The northerly edge of the bank rises abruptly from the deep water of the channel and is marked by four black buoys, a can (No. 1) on the north side at its easterly end, and spars (Nos. 3, 5, and 7). **Dicks Flats**, bare at low water, is the shoal at the westerly end of Browns Bank and is marked on its northerly side by buoy No. 7, which also marks the entrance to the buoyed channel leading southward to Plymouth.

Muscle Bank is the extensive shoal making southwestward from Clark Island, and is marked at its southerly end by Duxbury Pier lighthouse. Near the westerly edge of the bank northwestward of the lighthouse are Duxbury beacon (granite structure with a granite post) and a buoy (spar, red, No. 6).

Captain Flat is the large shoal lying on the westerly side of the Cowyard and extending to Duxbury Point. Along the edge of the channel the depths on the flat range from 4 to 11 feet, but the greater part of it, lying nearest the shore, is dry at low water. The southeasterly point is marked by a buoy (spar, black, No. 9), which marks the westerly side of the entrance to the Cowyard.

CAPE COD BAY [1]

is contained between the peninsula of Cape Cod on the east and south and the mainland of Massachusetts on the west. Between these limits it is about 20 miles in diameter with deep water, the soundings varying from 10 to 27 fathoms except close to the shore and in its southeasterly part. **Race Point**, the northwesterly extremity of Cape Cod, is the eastern, and Gurnet Point the western point at the entrance. Within the limits of Cape Cod Bay are embraced several harbors—those of Plymouth and Duxbury on the western shore, Barnstable and Yarmouth on the southern, and Wellfleet and Provincetown on the eastern shore.

[1] Shown on charts 7, scale $\frac{1}{400,000}$; 1208, scale $\frac{1}{80,000}$, price of each $0.50.

Cape Cod is a long peninsula, forming the easterly extremity of Massachusetts. It makes out from the mainland, first in an easterly direction for 31 miles, and then northward for a little over 20 miles—this latter portion forming what is usually termed the Hook of the Cape. It is composed almost entirely of sandy lands, with high, bare sand hills, and low, nearly level plains, and is well settled. Cape Cod Bay is on its northern side, and Nantucket Sound on its southern. The name Cape Cod is also generally applied to the south coast of Massachusetts between Monomoy and Falmouth.

Rocky Point lies 3¼ miles southward from Gurnet Point, with a large, open bay called Plymouth Bay between. **Warren Cove,** at the southwest end of Plymouth Bay, can be used as a temporary anchorage in southerly winds, in 3 to 5 fathoms, sandy bottom. A reef with 16 feet at its end extends ½ mile northward from Rocky Point.

Between Rocky Point and Manomet Point, a distance of 2½ miles, there are a number of outlying rocks which will be avoided by giving the shore a berth of ½ mile. The shore is backed by high, wooded hills, the most conspicuous of which is **Manomet Hill,** 390 feet high. **Manomet Point** is a bluff and is marked by a water tank. **Manomet** is a post office and summer resort near the point.

Mary Ann Rocks, two rocks bare at low water, lie ¾ and ⅞ mile southeastward from the northerly end of Manomet Point, and are marked on the easterly side by a buoy (spar, red, No. 8).

Stone Horse Rocks, bare at low water, lie southwestward of Mary Ann Rocks, and are a part of a reef that extends ¾ mile southeastward from Manomet Point.

Stellwagen Rock, with 6 feet over it, lies 1¾ miles southward from Manomet Point and ⅞ mile from shore.

From Manomet Point to **Peaked Cliff**, a distance of 7 miles, the shore is a line of high bluffs backed by woods. Just southward of Center Hill Point, shoals with little water in places extend ¾ mile from shore. From Peaked Cliff the shore trends southeastward and is low.

Cape Cod Canal is under construction from Cape Cod Bay at Sandwich through Monument River to Buzzards Bay, and is expected to be opened in 1913. From deep water in Cape Cod Bay to the mouth of Monument River, a distance of 7 miles, the canal will have a depth of 25 feet, a surface width of 250 feet, and bottom width 100 feet, with passing places at both ends and about halfway through. There are no locks, and the bridge openings are 160 feet wide in the clear. From the mouth of Monument River the canal will be connected with deeper water in Buzzards Bay westward of Wings Neck lighthouse by a partly dredged channel 4½ miles long, 250 feet wide, and 26 feet deep.

The entrance from Cape Cod Bay is protected on its north side by a breakwater ½ mile long, built out from the shore to a depth of 6 fathoms. Sandwich Breakwater gas and bell buoy (occulting white light) is moored about ¾ mile off the end of the breakwater. Approaching from northward the shore should be given a berth of 1½ miles. Coming from Boston vessels can follow the directions for Plymouth to a position ¾ mile eastward of Howland Ledge buoy. Then steer 157° true (**S** ¾ **E** mag.) for 10½ miles to a position ½ mile eastward of Mary Ann Rocks buoy. Then steer 170° true (**S** ⅜ **W** mag.) for 8 miles to Sandwich Breakwater gas and bell buoy.

Sagamore is a post office on the canal 1½ miles inland, and **Sagamore Beach** is a summer resort 1¾ miles northwestward of the breakwater.

Sandwich is a village 1¼ miles southeastward from the breakwater and ½ mile inland. The shore is low and composed of marshes faced by a sand beach called "Town Beach." The entrance to **Sandwich Harbor** is narrow, and can only be entered at high water. It is used only by boats and launches.

From Sandwich Harbor, **Spring Hill Beach** extends 2¼ miles southeastward to Scorton Harbor; it is backed by lowlands, cultivated and settled. At **Scorton Harbor** a jetty has been built and a narrow channel for boats dredged to mean low water at the entrance. There is a water tank on Scorton Neck ¾ mile south-southeastward from the entrance of Scorton Harbor. From this harbor **Scorton Neck** and **Sandy Neck** extend 7 miles east-southeastward to Sandy Neck lighthouse, which is on the west side at the entrance of Barnstable Harbor. The shore from Sandwich Breakwater nearly to Barnstable Harbor is free from outlying dangers and can be approached as close as ½ mile.

Barnstable Harbor [1] is obstructed by a shifting bar with 7 feet over it at low water. The harbor is nearly filled by flats and shoals, which also extend 2 miles off the entrance from the shore eastward of the lighthouse. The channel is marked by buoys, but is narrow and difficult for a stranger. Few vessels enter the harbor, the greatest draft being 12 feet. Strangers should make signal and remain well outside the bar until a pilot comes out, keeping in a depth of over 6 fathoms. With northerly winds a heavy sea makes on the bar, and vessels bound to Barnstable should anchor in Plymouth or Provincetown until the weather moderates. Ice generally obstructs the harbor during a part of the winter.

The town of **Barnstable** and village of **Yarmouthport** are on the south shore of the harbor. The approach to Yarmouthport is by a narrow, shallow slough making through the flats which are bare at low water. Barnstable is an energency relief station of Class IV of the United States Public Health and Marine-Hospital Service.

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[1] Shown on chart 339, scale $\frac{1}{20,000}$, price $0.20.

Between Barnstable and Wellfleet there are a number of creeks that are used at high water by local boats and launches, but all of them are dry at low water. The 3-fathom curve is from ¼ to ⅜ mile from shore between North Dennis and Sesuit Harbor, but eastward of the latter it is ½ to 1½ miles from shore.

North Dennis, a village 3½ miles eastward of Sandy Neck lighthouse, is marked by a water tank and hotel. **Scargo Hill**, southeastward of North Dennis, is 170 feet high and the highest in the vicinity; there is a stone lookout tower on the hill.

Sesuit Harbor, 2½ miles eastward of the water tank at North Dennis, has a jetty on its east side; the entrance is bare at low water. **East Dennis** is a village ½ mile inland.

Wellfleet Harbor is described below.

Pamet River, 4½ miles southeastward from Long Point lighthouse, leads to the village of Truro and is used only by boats and launches. A shoal extends 1 mile off the entrance. There is a prominent water tank on **Corn Hill**, on the north side of the entrance, and a prominent gray spire on the hill 1⅝ miles southward of the tank.

Ice in Cape Cod Bay.—Plymouth, Barnstable, Wellfleet, and other shallow harbors of Cape Cod Bay are usually closed to navigation a part of every winter. Instances are on record of this ice, and that forming in the shallower parts of Cape Cod Bay in severe winters, being driven by the winds out into the bay, where it masses into heavy fields or windrows, sometimes as much as 10 feet or more thick, making the navigation of parts of the bay unsafe or impracticable at times. The prevailing northerly winds drive it down to the southern end of the bay, but occasionally, at intervals of years, it has been known to obstruct Provincetown Harbor for a few days. The movements of the ice are dependent largely on the winds, the tidal currents apparently having little or no effect on it.

WELLFLEET HARBOR [1]

is on the western side of the hook of Cape Cod, near its southern end. Extensive shoals lie in the entrance and extend about 5½ miles westward from **Billingsgate Island lighthouse**, which marks the western side of the entrance to the harbor; **Mayo Beach lighthouse** is at the head of the harbor. The channel into the harbor leads between the shoals and is narrow in places, but it is marked by buoys so as to be easily followed in the daytime in clear weather; it has a least depth of 14 feet until above Smalley Bar.

The town of **Wellfleet**, at the head of the harbor, can only be reached by vessels at high water. It is of no commercial importance, but has railroad communication with Provincetown and Boston. Storm warnings are displayed.

Strangers intending to enter Wellfleet Harbor generally take a pilot, and should always do so. It is usual to go into Provincetown Harbor first and telegraph to Wellfleet for a pilot, who then joins the vessel at Provincetown. In going directly to Wellfleet entrance, if signal is made when off Billingsgate Island, a pilot will come out from the town, the vessel anchoring meanwhile, if desirable, in the channel off the shoals.

The greatest draft of vessels entering Wellfleet Harbor is about 12 feet; the usual draft averages about 8 feet. Vessels do not enter this harbor in winter. Towboats can be had from Boston.

Anchorages.—The best anchorage is in the inner harbor, where the depth ranges from 10 to 15 feet. The anchorage in the outer harbor is somewhat exposed in westerly winds; the depth ranges from 14 to 31 feet between Billingsgate Island and Smalley Bar, and from 14 to 18 feet between Stony Bar and Billingsgate Island. In northerly gales vessels that have fallen to leeward of Provincetown sometimes anchor on the lee side of Billingsgate Shoal in 3 to 8 fathoms, the shoal breaking the sea so that vessels with good ground tackle can ride out a heavy gale from northward.

There are no special harbor regulations.

Tides.—The tides are about the same as at Plymouth. (See table, p. 29.)

The tidal currents are weak.

SAILING DIRECTIONS, WELLFLEET HARBOR.

The directions are good for vessels of 8 feet draft, in daylight, with a favorable wind and clear weather, and lead to an anchorage in 14 to 19 feet just northward of Smalley Bar buoy. Strangers of over 8 feet draft should take a pilot at Provincetown or after coming to anchor south of Billingsgate Shoal.

The following courses and distances made good will lead ½ mile westward of black can buoy No. 1 marking the end of Billingsgate Shoal:

121° true (**SE** mag.) for 21½ miles from Gurnet Point whistling buoy.

138° true (**SSE ½ E** mag.) for 37 miles from a position 1 mile eastward of Minots Ledge lighthouse.

166° true (**S** mag.) for 15 miles from a position ¾ mile westward of Race Point lighthouse.

[1] Shown on charts **1208**, scale $\frac{1}{80,000}$, price $0.50; **340**, scale $\frac{1}{50,000}$, price $0.20.

185° true (**S** by **W** ¾ **W** mag.) for 12¾ miles from a position ½ mile eastward of Long Point lighthouse.

Pass ¼ mile southward of buoy No. 1 and steer 79° true (**E** ¼ **S** mag.) for 4¼ miles heading for the tall church spire at Eastham until Billingsgate Island lighthouse bears 8° true (*NNE* mag.); Bibb Rock buoy should then be 1 mile distant on the starboard bow. Then steer 39° true (**NE** ¾ **E** mag.) for 1¾ miles to buoy No. 3 and pass about 50 yards eastward of it. Then steer 2° true (**N** by **E** ½ **E** mag.) for about ¾ mile, and then about 312° true (**NW** by **N** mag.) for nearly ½ mile to buoy No. 2. Pass about 25 yards westward of buoy No. 2 and steer about 345° true (**N** mag.) to a position about 50 yards westward of buoy No. 4. Then steer 33° true (**NE** ¼ **E** mag.) for 1⅜ miles; pass about 50 yards eastward of buoy No. 5 and steer about 2° true (**N** by **E** ½ **E** mag.). Anchor in 16 to 20 feet of water about ¼ mile above this buoy, and if bound to the wharves await high water and a pilot.

To anchor southward of Billingsgate Shoal.—Pass ¼ mile southward of buoy No. 1, steer 67° true (**E** ¾ **N** mag.), and when the water shoals to 5 fathoms anchor with Billingsgate Island lighthouse bearing about 42° true (**NE** by **E** mag.), distant about 3 miles.

At night, to avoid the end of Billingsgate Shoal, keep Wood End light bearing a little eastward of 357° true (*N* by *E* mag.) until Billingsgate Island light bears 56° true (*ENE* ¼ *E* mag.). Steer for Billingsgate Island light on a 47° true (**NE** by **E** ½ **E** mag.) course with Sandy Neck light astern, and anchor when the water shoals to 5 fathoms.

Remarks and dangers.—A stranger approaching Wellfleet from northward and being uncertain of his distance westward of Billingsgate Island can tell when the shoals are cleared by using the lead. The water shoals gradually on the north side of Billingsgate Shoal, and when the depth is about 4½ fathoms it is advisable to stand southwestward until the buoy on the end of the shoal is made. At night the lights on Race Point, Wood End, Long Point, Sandy Neck, and Billingsgate Island may all be seen at one time. If on a line between Sandy Neck and Billingsgate Island lights, a course for the latter passes about ⅞ mile southward of Billingsgate Shoal buoy. In approaching the light care should be taken to avoid the southern edge of the shoal, which rises abruptly from deep water.

Billingsgate Shoal commences about 4½ miles northward of Billingsgate Island lighthouse and extends 8½ miles in a southwesterly direction from the shore of Cape Cod and about 5½ miles in a west-southwesterly direction from the lighthouse. It is marked at its western end by a buoy (can, black, No. 1) which lies 5½ miles 236° true (**WSW** ¼ **W** mag.) from Billingsgate Island lighthouse. The water shoals gradually on the northern side of the shoal, but on its southern side the shoaling is abrupt.

Bibb Rock, with 8 feet over it, lies 2⅝ miles 165° true (**S** mag.) from Billingsgate Island lighthouse; it is marked by a buoy (spar, red and black horizontal stripes).

Billingsgate Flat is bare at low water for a distance of nearly 1 mile southward of Billingsgate Island lighthouse, and is marked at its southeast end by a buoy (spar, black, No. 3), which lies 1⅜ miles south-southeastward from the lighthouse.

Lieutenant Island Bar extends from the eastern shore toward Billingsgate Island, leaving a channel 100 yards wide with a least depth of 14 feet between its western end and the shoals that make eastward from Billingsgate Island. The eastern edge of this channel is marked by two buoys (spars, red, Nos. 2 and 4).

Smalley Bar makes eastward from the west shore about 1⅝ miles northward of Billingsgate Island. It is marked at its eastern end by a buoy (spar, black, No. 5), eastward of which the channel is about 200 yards wide.

A large area of the **flats** which extend from the eastern shore toward the channel is partly bare at low water.

PROVINCETOWN HARBOR [1]

is formed by a turn in the northern end of the Hook of Cape Cod, and has a diameter of about 2 miles. It is one of the best harbors on the Atlantic coast, being of sufficient capacity for large fleets and having anchorage in 3 to 10 fathoms, with excellent holding ground. Coasters and fishermen seek shelter here from gales from any direction.

The approach and entrance are free from danger and are marked by three lighthouses: **Race Point lighthouse,** on the northwestern point of Cape Cod; **Wood End lighthouse,** on the southern end of the Hook, where it turns eastward; and **Long Point lighthouse,** on the western point at the entrance to the harbor. At night Cape Cod lighthouse will show over the land westward of it when approaching the entrance on certain bearings.

Herring Cove, about ¾ mile southward of Race Point lighthouse, affords a temporary lee from easterly winds; small vessels sometimes anchor well inshore in from 10 feet to 4 fathoms, according to draft. The **Naval Trial Course** (1 mile long) is between Race Point and Wood End lighthouses, and is marked by range beacons on shore and by white buoys which lie ⅝ to 1 mile from shore.

Provincetown, on the northwestern side of the harbor, is the home port of many vessels engaged mainly in the cod, mackerel, and whale fisheries, and to a limited extent in the coasting and foreign trade. The carrying trade of the port that is done by strangers is confined mostly to the transportation of coal, salt, lumber, and wood.

[1] Shown on charts **1208,** scale $\frac{1}{80,000}$, price $0.50; **341,** scale $\frac{1}{50,000}$, price $0.20.

Prominent objects.—In making the northern part of Cape Cod in clear weather, the most prominent feature is Pilgrim Monument, a stone structure about 350 feet high above the sea; a tall standpipe and several high church spires in Provincetown will also be seen. It is frequently difficult to recognize natural landmarks on Cape Cod when approaching from seaward owing to a lack of distinctive features. The life-saving stations and the lighthouses are about the only well-defined marks in places; of the latter, Cape Cod lighthouse is the most important, being the chief guide for this part of the coast. The four wireless telegraph towers northward of Nanset Beach lighthouse are the most prominent daymarks southward of Pilgrim Monument.

The depth of water at the entrance and in Provincetown Harbor is ample for vessels of deep draft, and there are no outlying dangers. There are a number of wharves, but their use is confined to vessels of less than 13 feet draft. The principal ones are the steamboat wharf and the one belonging to the railroad. At mean low water the depth at the outer ends of these two is 8 feet for the former and 7 feet for the latter. The other wharves run dry or nearly dry at low water.

Pilots are not necessary and are rarely taken by strangers in entering. Extracts from the pilotage laws of the State are given in Appendix II.

Towboats are not much used. During the stormy season towboats from Boston are generally to be found here; by telegraphing one can be called from there in six hours.

There are no special harbor regulations. The customhouse is near the head of the steamboat wharf.

Marine hospital.—See page 10.

Supplies, provisions, and some ship-chandler's stores can always be obtained. Coal can not, as a rule, be had for steamers; only a limited quantity is kept on hand. Fresh water is furnished by a water boat; it can also be obtained at the railroad wharf.

Storm warning displays of the United States Weather Bureau are made at Provincetown from High Pole Hill or Town Hill. The signals hoist 130 feet above the sea and are visible from all directions in approaching the coast. They are also made at Race Point and Cape Cod lighthouse.

Communication.—Provincetown has railroad communication and steamers run daily during the summer to Boston.

Ice forms in Provincetown Harbor in severe winters only, and then only for short periods. Instances are on record of fields of heavy ice from the shallow harbors of Cape Cod Bay being driven northward by the wind and into the harbor, closing it to navigation for a few days. Such conditions are abnormal, occurring only at intervals of years, and under ordinary conditions the harbor is not obstructed by ice during the winter.

For **tides**, see table, page 29.

Currents.—Off Race Point the tidal currents have considerable velocity; the flood sets southwestward and the ebb in the opposite direction, and tide rips occur during heavy weather when the wind opposes the current. Westward of the stretch of coast forming the western side of the harbor the currents are nearly as strong; here the flood sets in a southeasterly direction, the ebb sets northwesterly. At the entrance and in the harbor the tidal currents have little velocity. With spring tides, at half flood the current has somewhat greater velocity at the entrance and then sets westward, inside Long Point, and toward the western side of the harbor.

SAILING DIRECTIONS, PROVINCETOWN HARBOR.

These directions are good for vessels of the deepest draft. In thick weather great caution is required, as the lead can not always be depended on to give warning of too close an approach to the end of Cape Cod from westward on account of the abrupt shoaling of the water from 20 fathoms to 3 fathoms.

FROM BOSTON LIGHT VESSEL a 129° true (**SE** ¾ **S** mag.) course made good for 31¾ miles will lead to a position 1 mile southwestward of Wood End lighthouse.

FROM CAPE ANN WHISTLING BUOY a 161° true (**S** ⅜ **E** mag.) course made good for 36¼ miles will lead to a position ¾ mile westward of Race Point lighthouse.

APPROACHING FROM EASTWARD AROUND CAPE COD give the northerly shore of the cape a berth of about 1½ miles until Race Point lighthouse bears southward of 210° true (*SW* mag.) to avoid Peaked Hill Bar. Race Point lighthouse can be approached as close as ½ mile, but the shore between it and Wood End should be given a berth of about 1 mile to avoid Shank Painter Bar. The following courses can be used at night:

Passing 2 miles or more northeastward of Cape Cod lighthouse steer 300° true (**NW** mag.) for 5 miles until up with Peaked Hill Bar gas and whistling buoy. Then bring the buoy astern on a 267° true (**W** by **N** mag.) course. When about 4½ miles from the buoy and Race Point lighthouse bears southward of 199° true (*SW* by *S* mag.), steer 210° true (**SW** mag.) for about 3 miles and pass ¾ mile or more northwestward and westward of Race Point lighthouse. Then steer 143° true (**SSE** mag.), giving the shore a berth of 1 mile or more, until Long Point light is

open southward of Wood End lighthouse. Then steer for Cape Cod lighthouse on any bearing northward of 75° true (**E** mag.), pass southward of the black bell buoy lying ½ mile southwestward of Wood End lighthouse, and give the shore eastward of the lighthouse a berth of ⅜ mile.

Follow the trend of the shore between Wood End and Long Point lighthouses, giving it a berth of ⅜ mile, and pass southward and eastward of Long Point lighthouse, giving it a berth of at least ⅜ mile until it bears southward of 255° true (*W* mag.). Then stand northwestward in the harbor and anchor according to draft with the lighthouse bearing eastward of 165° true (*S* mag.); do not approach the eastern or northeastern shores of the harbor nearer than ¾ mile on account of extensive flats. Toward the northern shore the shoaling is gradual; toward the western shore it is abrupt from 9 to 2 fathoms.

In thick weather.—Lay courses that will lead farther offshore than the preceding, and pay particular attention to the fog signal at Race Point. After rounding Race Point care must be taken to stand far enough southward to clear Wood End; if the fog signal at Wood End lighthouse is not heard, and it is known that the vessel is southward of it, stand eastward, using the lead, until the vessel is in 11 fathoms. Then haul northward and northwestward, keeping in this depth, until Long Point fog signal is heard. Anchor north of this fog signal in 8 fathoms.

Or, if the wind is easterly, a good lee will be found in 8 to 10 fathoms on the westerly side of Cape Cod for a distance of 5 miles south of Provincetown Harbor.

Caution.—From a high bridge, Long Point light is visible at a number of points across Cape Cod when bearing between 208° true (*SW* ¼ *S* mag.) and 233° true (*WSW* mag.).

Dangers.—**Peaked Hill Bar** commences about 3 miles northwestward of Cape Cod lighthouse and extends along the shore 2¾ miles, its distance from the beach being about ¾ mile. The depth over the shoal ranges from 14 to 18 feet and in heavy weather it is marked by breakers. A gas and whistling buoy (occulting white light) is placed about 2 miles off Peaked Hill Bar and 5½ miles north-northwestward from Cape Cod lighthouse.

Shank Painter Bar makes off ⅝ mile from the shore about midway between Race Point and Wood End lighthouses. The bar rises abruptly from a depth of 20 fathoms and the depth near its edge is 11 to 15 feet. At its western edge it is marked by a buoy (spar, black, No. 1), and fish stakes usually extend out on it some distance from the shore.

Long Point Bar, with 7 to 16 feet over it, extends ¼ mile eastward and southeastward from Long Point lighthouse, and is marked on its easterly edge by a buoy (spar, black, No. 3).

COAST OF CAPE COD FROM RACE POINT TO MONOMOY.[1]

From Race Point the shore curves northeastward, eastward, and then southeastward to the Highlands, a total distance of about 9 miles, and is composed of bare, sand hillocks of various heights. On approaching the Highlands the sand hills begin to be covered with a brownish-looking growth of grass and the land is higher. The pitch of the cape at this point shows a high bluff, on which stands **Cape Cod lighthouse** and a wireless telegraph mast. In coasting several life-saving stations are seen, and just northward of the lighthouse is the signal station. Vessels passing this station can communicate with Boston by using the international code signals. At the Highlands the shore may be safely approached as close as ½ mile, but the water shoals somewhat abruptly and care must be taken not to go inside of 5 fathoms. About 3 miles northwestward of Cape Cod lighthouse, and nearly ¾ mile offshore, is the eastern end of Peaked Hill Bar, described above. From Cape Cod lighthouse to near Chatham entrance the coast should not be approached closer than ½ mile.

From the Highlands to Nauset Beach lighthouse, about 12 miles southward, the shore has a slight curve and is steep sand bluffs of various heights, with narrow valleys at intervals. On a bluff 3¼ miles northward of **Nauset Beach lighthouse** and close to the shore are four, high, wireless-telegraph, skeleton towers, which are the most prominent daymarks on Cape Cod southward of Pilgrim Monument.

Southward of Nauset Beach lighthouse the coast turns gradually southward to Chatham, a distance of 10½ miles. It gradually becomes lower, less steep, slopes gently back from the beach, and is covered with a scanty growth of grass. A few houses appear at long intervals. About 3¾ miles below Nauset Beach lighthouse is the entrance to **Nauset Harbor**, which may be known by the thickly clustered houses in the villages on the summit of The Ridge, a rising ground somewhat higher than the land northward. Thence to **Chatham** the coast shows a low, sandy shore covered with small hillocks and backed by higher lands. Storm warnings are displayed near Chatham lighthouses.

Chatham Bar, the northern entrance to Chatham, is about 10½ miles southward of Nauset Beach lighthouse, and 1¼ miles northward of Chatham lighthouses. This bar is a shifting one, and the depths over it are liable to change. It extends ¾ mile from shore, and is marked off its eastern end by a red nun buoy, and about ½ mile eastward of the latter is a red whistling buoy. This bar is dangerous in thick weather, and when in its vicinity the depth should not be shoaled to less than 8 fathoms.

[1] Shown on charts 7, scale $\frac{1}{400,000}$; 1208, 111, scale $\frac{1}{80,000}$, price of each $0.50.

Monomoy Beach extends 4½ miles in a southwesterly direction from Chatham Bar to Monomoy Island. In passing along this beach the town of Chatham and Chatham lighthouses can be seen over it.

Monomoy Island is a low narrow spit covered with sand hillocks, and forms the northern side of the entrance to Nantucket Sound. Its eastern shore is foul, having many sand shoals off it. Vessels sometimes anchor off this shore in 4 to 6 fathoms and wait for a fair tide to beat through the sounds. As a general rule the shore should not be approached nearer than 1 mile for a distance of 4 miles southward of Chatham lighthouses. The southern end of Monomoy Island is called **Monomoy Point**, and nearly 1¼ miles above its southerly extremity stands **Monomoy Point lighthouse**, which marks the northern point at the entrance to Nantucket Sound. Storm warnings are displayed on Monomoy Point. Shoals make off nearly 5 miles in a general east-northeast direction from the end of Monomoy Point.

Currents.—See page 10 and the chart facing page 9.

MONOMOY AND NANTUCKET SHOALS.[1]

Eastward and southeastward of the eastern entrance to Nantucket Sound are Monomoy and Nantucket Shoals. Owing to the great extent and distance of some parts of these shoals from the land, and to the strong and baffling tidal currents which set over them, their navigation in thick or foggy weather is hazardous. In clear weather the lighthouses, light vessels, and buoys render the navigation of the two principal channels comparatively easy. The deeper channel leads through these shoals in an easterly direction from Nantucket (Great Point) lighthouse, and for the purpose of description will be considered as the dividing line between Nantucket and Monomoy Shoals, which are briefly described under separate headings.

MONOMOY SHOALS

consist of numerous detached shoals extending about 5½ miles in an easterly and 9½ miles in a southeasterly and south-southeasterly direction from Monomoy Point. Many parts of these shoals, separated from others by narrow slues, have special names and are briefly described below. It should be remembered that the shoals are shifting in character, and are subject to change both in location and depth.

Bearse Shoal is the western, and **Pollock Rip** the eastern, part of the shoal extending 3¾ miles eastward of Monomoy Point lighthouse. These shoals are a series of sand shoals and ridges, with little water in places for a distance of 2 miles eastward of the lighthouse, and 9 to 18 feet farther eastward. The northeast and southeast ends of the shoals, with depths of 18 feet or less, are marked by red buoys which are guides for Pollock Rip Slue.

Broken Part of Pollock Rip, with depths of 15 to 18 feet over it, lies eastward of Pollock Rip, and is separated from it by Pollock Rip Slue. The black buoy at the northwest end of these shoals marks the entrance to Pollock Rip Slue.

Twelve-foot Shoal, southward of the Broken Part of Pollock Rip, has 14 to 18 feet over it and lies 5¼ miles southeastward from Monomoy Point lighthouse.

Broken Rip, with depths of 7 to 18 feet over it, lies just southward of Twelve-foot Shoal.

Stone Horse Shoal, **Little Round Shoal**, and **Great Round Shoal** are portions of a continuous series of sand shoals and ridges, with depths of 5 to 18 feet over them, lying directly eastward of the entrance to Nantucket Sound and between the two main channels. Stone Horse Shoal and Little Round Shoal lie on the south side of the deep-water channel between them and Pollock Rip. Great Round Shoal lies from 6 to 9 miles in a south-southeast direction from Monomoy Point lighthouse; southward and eastward of this shoal there are numerous shoal spots, including Orion Shoal, with depths of 17 to 18 feet over them.

Shovelful Shoal, extending over 1 mile south-southwestward from Monomoy Point, is bare in places and rises abruptly from the deep water of Butlers Hole. The shoal is extending south-southwestward, and strangers should not attempt to pass between the buoy at its southwest end and Monomoy Point. The narrow buoyed channel leading northward between Shovelful Shoal and Handkerchief Shoal has strong tidal currents, is subject to change from the action of the sea, and should not be used by strangers.

NANTUCKET SHOALS

is the general name of the numerous different broken shoals which lie southeastward of Nantucket Island and make this one of the most dangerous parts of the coast of the United States for the navigator. These shoals extend 23 miles eastward and 39 miles southeastward from Nantucket Island, are shifting in their nature, and the depths vary from 3 and 4 feet on some to 4 and 5 fathoms on others, while slues with depths of 10 fathoms or more lead between those farthest offshore. The easterly edge of the shoals has depths of 4 and 4½ fathoms in places, and trends 166° true

[1] Shown on charts **7**, scale $\frac{1}{400,000}$; **51**, Mercator projection, degree of latitude=21.4 inches; **111**, scale $\frac{1}{80,000}$, price of each $0.50; and in part on chart **250**, scale $\frac{1}{40,000}$, price $0.20.

(S mag.) from latitude 41° 18′ N., longitude 69° 29′ W., to latitude 40° 57′ N., longitude 69° 22′ W. Asia Rip, the southeasternmost danger, has a least depth of 6 fathoms in latitude 40° 48′ N., longitude 69° 22′ W. Deep draft vessels should pass southward and eastward of Asia Rip, and eastward of the easterly edge of the shoals as defined above. For a distance of 15 miles eastward and southeastward and 18 miles southward from Nantucket Island the shoals have depths less than 16 feet, and this area should be avoided by all vessels. The tidal currents are strong, and variable in direction, forming extensive rips and broken water over the shoals.

Nantucket Shoals light vessel, the leading mark for vessels passing southward of Nantucket Shoals, is moored in 30 fathoms off the southern end of the shoals. Day storm warnings are displayed. A vessel, showing her distinguishing lights at night, or making her number by day (International Code), will be reported from Nantucket Shoals light vessel. At night a white Coston answering signal will be shown from the light vessel if the signal is understood.

McBlair Shoal, the most northerly of the Nantucket Shoals, lies 9¼ to 11¼ miles eastward from Nantucket lighthouse, and consists of numerous sand spots with depths over them ranging from 15 to 22 feet. Near the northeasterly extremity of the shoal is buoy No. 5, and near its northwesterly extremity is buoy No. 7, both on the southerly side of Great Round Shoal Channel.

Rose and Crown, a number of detached shoals with depths of 4 to 18 feet over them, lie about 10 miles eastward of Sankaty Head lighthouse. They form a part of the shoals which extend in a broken line for a distance of over 15 miles southward from McBlair Shoal, and are not more than 2 miles wide. **Great Rip** is a part of these shoals, and lies southward of Rose and Crown; it has depths of 12 to 18 feet over it.

Bass Rip, lying about 2½ miles eastward of the southeastern end of Nantucket Island, has 3 to 18 feet over it, is nearly 4 miles long, and not over ½ mile wide.

Old Man Shoal consists of a long, narrow shoal, with several spots off its southwestern end, extending about 5 miles in a general southwesterly direction from a point about 1 mile off the southeast end of Nantucket Island. The depths on this shoal range from 7 to 18 feet.

Old South Shoal is a number of shoal spots with 7 to 18 feet over them, extending nearly 4 miles in a general northeast and southwest direction, about 12 miles southeastward from Nantucket Island.

Davis South Shoal is 3 miles long and about 1 mile wide, with depths of less than 5 fathoms, and has a number of spots with 15 to 18 feet over them; the shoal lies 18 miles southward from the southeasterly end of Nantucket Island and 24 miles northward from Nantucket Shoals light vessel.

Davis Bank, lying 18 miles eastward and southeastward from Nantucket Island, is about 15 miles long and has a general depth of about 5 fathoms; it lies 3 to 4 miles eastward of Rose and Crown and Great Rip, with 10 to 18 fathoms between. On its northern part, 15 miles 83° true (E ⅝ S mag.) from Sankaty Head lighthouse, there is a spot with only 16 feet over it. For a distance of 3 miles northward of this spot there are depths of 4 fathoms.

Channels.—There are two principal channels leading from eastward into Nantucket Sound, the northerly one through Pollock Rip Slue and Butlers Hole, and the southerly one through what is generally called Great Round Shoal Channel.

The channel through **Pollock Rip Slue** and **Butlers Hole** has a least depth of about 26 feet at low water, this depth being found at the northern entrance and on lumps about halfway between Pollock Rip and Shovelful Shoal light vessels. The shoals are shifting in character, and in recent years the northern entrance of Pollock Rip Slue has been narrowed by their extension. In 1910, when the last survey was made, the channel at this point was ¼ mile wide with depths of 24 to 28 feet. Otherwise the channel has a least width of about ½ mile. The passage is marked by light vessels, lighted buoys, and fog signals, and is generally used. The deepest draft of the vessels using the passage is about 22 feet at high water. In the slue the sea is flattened out to some extent by the outlying shoals and the comparatively shoal water in its northern approach, and vessels generally have no difficulty in using it even in heavy northeasterly weather.

Great Round Shoal Channel is marked by lighted buoys and Great Round Shoal light vessel. By this channel a depth of 5 fathoms can be carried into Nantucket Sound.

NANTUCKET AND VINEYARD SOUNDS[1]

lie between the south coast of Cape Cod and the Elizabeth Islands on the north, and Nantucket Island and Marthas Vineyard on the south; their combined length from Monomoy Point to Cuttyhunk is about 43 miles. At the eastern entrance of Nantucket Sound are Monomoy and Nantucket Shoals, and in the sounds are numerous shoals; but well-marked channels lead between them, making the navigation of these waters, in clear weather and with a fair wind, comparatively easy westward of Monomoy Shoals.

The sounds are a thoroughfare for coasting vessels bound to ports east of Cape Cod and returning bound southward, many thousands of vessels passing through both ways each year. The depth of water in the channel westward of Cross Rip is sufficient for the largest vessels, but at Cross Rip and eastward of it a draft of 27 feet requires careful piloting to

[1] Shown in parts on charts 111, 112, scale $\frac{1}{80,000}$, price of each $0.50. See also footnote on p. 63.

prevent grounding at low water. This route is more direct, for vessels bound along the coast, than outside of Nantucket Shoals. The aids are colored and numbered for passing through the sounds from eastward.

Nantucket Island, on the south side of Nantucket Sound, is about 13 miles long, hilly, highest (about 100 feet) in its eastern part, and partly wooded, with steep sand bluffs on its southern and eastern sides. **Great Point**, marked by **Nantucket lighthouse**, is the north point of a long sand beach which is separated from the main part of the island by Nantucket Harbor. The most prominent feature on the easterly side of the island is **Sankaty Head lighthouse**, located on the top of a bluff about 90 feet high. **Siasconset** is a summer resort on the southeast end of Nantucket Island; it has communication by wireless telegraph, and with Nantucket by a railroad. Nantucket Harbor is described under a separate heading.

Westward of Nantucket Island, and separated from each other only by sand bars, are **Tuckernuck**, **Gravel**, and **Muskeget Islands**.

Muskeget Channel is an opening nearly 6 miles wide between Muskeget Island and Chappaquiddick Island. It is full of shifting shoals, the best water being close eastward of Wasque Shoal, and a little eastward of the eastern shore of Chappaquiddick Island. This channel is partly buoyed, but should never be attempted by strangers, as the currents have great velocity and make the navigation of it dangerous. **Wasque Shoal** lies southward of **Wasque Point** (the southeastern point of Chappaquiddick Island) and rises abruptly on its southern and eastern sides from depths of 3 and 8 fathoms to 2 and 4 feet; on its eastern edge is a small, sand island, called **Skiffs Island**, which almost disappears at times.

Marthas Vineyard and **Chappaquiddick Islands** have a combined length of 18 miles, the islands being separated by Edgartown Harbor, Katama Bay, and the narrow slue connecting them. Marthas Vineyard is well settled, especially along its northern shore, and has cable communication with the mainland at Woods Hole. The principal towns are Edgartown, Vineyard Haven, and Oak Bluffs (Cottage City), the last being an important summer resort. Edgartown Harbor and Vineyard Haven are described under separate headings.

Lake Anthony, which is at Oak Bluffs (Cottage City), has depths of 5 to 9 feet except its northern end and near the shores, and affords anchorage for small craft. Its entrance is 150 feet wide between two stone jetties, and through it a depth of about 6 feet at low water could be carried in 1911. The entrance is marked by **Oak Bluffs South** and **North Breakwater lights**, on the ends of the jetties, and lies ¾ mile southward of East Chop lighthouse. The two large wharves, lying about 400 yards southward and northward, respectively, of the entrance of Lake Anthony, have depths of about 12 feet at their ends.

Nortons Point and **Cape Higgon** are prominent bluffs on the northwest side of Marthas Vineyard, about 3 and 8 miles southwestward of West Chop lighthouse.

Menemsha Bight, on the northerly side of the westerly end of Marthas Vineyard 2 to 3 miles eastward of Gay Head lighthouse, affords shelter from southerly and easterly winds for vessels of any size, in 6 to 10 fathoms, sticky bottom. There are no dangers in the bight if the shore be given a berth of ¼ mile. **Menemsha Inlet**, on the southeasterly side of Menemsha Bight, is an opening between two jetties into the northerly end of Menemsha Pond. A channel 75 feet wide and 6 feet deep has been dredged through the entrance, and an anchorage basin of the same depth 200 feet by 150 feet just inside. The inlet is used by local fishermen. The entrance is marked by lights on the ends of the jetties.

Gay Head, the westerly end of Marthas Vineyard, is a prominent, high bluff, on the summit of which is a lighthouse.

No Mans Land is a prominent, high, rocky island lying 5 miles southward from Gay Head. Several sunken ledges lie in the passage between No Mans Land and Marthas Vineyard, through which is a buoyed channel about ¾ mile wide that may be used by small vessels in the daytime.

The north shore of Nantucket Sound, between Chatham and Succonnesset Point, is generally low and sandy, backed by low, wooded hills, and is well settled. The principal towns and villages west of Chatham and near the coast are: Harwichport, Dennisport, West Dennis, West Yarmouth, Hyannisport, Centerville, Osterville, Cotuit, and Falmouth. These have small craft engaged in fishing, and but little commerce. Shoals extend out in some cases for a distance of 2 miles from the shore. Surrounding Bishop and Clerks lighthouse are a number of shoal spots with 13 to 18 feet over them with channels between, but a vessel of over 14 feet draft should not use the channels along the north shore of the sound unless well acquainted with the locality.

Chatham Roads and Stage Island Harbor are described under a separate heading.

Bucks Creek, lying 1¾ miles northwestward of Stage Harbor lighthouse, is used only at high water by boats of local fishermen. Its entrance is 100 feet wide between two jetties, and has been dredged to mean low water.

Witchmere Harbor, 4¾ miles eastward of Bass River lighthouse, has an entrance 100 feet wide between two jetties, through which a depth of about 4 feet at low water can be carried into a pond with greater depth at Harwichport.

Herring River lies 2½ miles eastward of Bass River lighthouse, and leads to **Dennisport** and **West Harwich**. Its entrance is protected by jetties and has a depth of about 1½ feet on the bar.

Bass River, lying 1¼ miles westward of Bass River lighthouse, has a depth of 1 to 3 feet on the bar outside the entrance, and a greater depth between the entrance jetties and in the river. The villages of **South Yarmouth** and **West Dennis** are on the river 1¼ miles above the entrance.

On the easterly end of **Dogfish Bar** southwestward of Bass River lighthouse there is a small breakwater, just northward of which is an anchorage for small craft. The anchorage has a depth of 9 feet and is marked on its southerly side by a black spar buoy at the entrance and a red spar beacon with keg on a sunken pier.

Hyannis Harbor and Centerville Harbor are described under separate headings.

Cotuit Anchorage is an anchorage for small craft between the shoals making off from the shore about 6½ miles westward of Point Gammon. It is exposed to southerly winds and is seldom used except by local craft. The channel is marked by buoys, and vessels of less than 6 feet draft should experience no difficulty in keeping in the best water. Anchorage can be had close northward of buoy No. 4, in a depth of 10 feet; or from buoy No. 4 steer 346° true (**N** mag.) and anchor in 7 to 12 feet, ½ to ¼ mile from shore. Approaching from westward the channel between Succonesset Shoal and Wreck Shoal is frequently used.

West Bay, on the northerly side of Cotuit Anchorage, has an entrance 200 feet wide between jetties, and a depth of about 4 feet at low water can be taken through the narrow channel leading to the northern half of the bay. This depth can also be taken through the narrow channel from West Bay to Great Bay.

Cotuit Bay, northwestward of Cotuit Anchorage, is entered through a dredged channel 200 feet wide and 6 feet deep, and there is a greater depth in the bay except its southern end. A depth of about 4 feet can be taken through the narrows from Cotuit Bay to **Great Bay**; the latter has depths of 6 to 18 feet. Local knowledge is necessary for the navigation of these bays. **Cotuit** is a village on the western side of Cotuit Bay, and **Osterville** is a village on the eastern side of Great Bay.

Waquoit Bay has general depths of 5 to 8 feet, and an entrance about 250 feet wide. The channel into the bay is crooked and difficult, and is subject to change. There is a depth of 2 to 3 feet in the channel over the bar outside the entrance, and about 4 feet over the bar inside.

Falmouth Heights is a prominent yellow bluff on the summit of which are numerous houses and a large hotel; it lies just eastward of the village of **Falmouth** and about 3 miles east-northeastward from Nobska Point lighthouse.

Bowmans (Deacons) Pond, westward of Falmouth Heights, has an entrance 150 feet wide between jetties, with a depth of 7 feet to an anchorage basin of the same depth which has been dredged nearly the full width of the pond for a distance of 500 yards inside the entrance. The greater part of the pond has depths of 2 to 3 feet.

Falmouth Harbor is the open roadstead on the north shore of the sound from 1 to 3 miles eastward of Nobska Point lighthouse. It is frequently used by vessels with good ground tackle, who prefer the anchorage here to the one in Vineyard Haven on account of the crowded condition of the latter in bad weather. It affords a lee in northerly winds, and in southerly winds the sea is somewhat broken by L'Hommedieu Shoal, so that vessels with good ground tackle can ride out a gale in comparative safety.

The anchorage in Falmouth Harbor is about ¾ mile from shore in 4 to 6 fathoms, and small vessels can anchor closer to shore in 15 to 18 feet; the bottom is generally sticky and good holding ground, shoaling gradually toward the shore. At night, if less than 2 miles eastward of Nobska Point, West Chop light bearing eastward of 167° true (**S** mag.), vessels should anchor just before Nobska Point light comes in range with Tarpaulin Cove light; if farther eastward vessels should keep well southward of this range. Vessels can enter from southward on a 344° true (**N ¼ W** mag.) course with West Chop light astern, and pass about ¼ mile westward of New Shoal buoy (can, black, No. 19). Or, pass ⅜ to ½ mile eastward of Nobska Point light on a north-northeasterly course, and when Tarpaulin Cove light is nearly in range with Nobska Point light stand eastward to an anchorage.

Little Harbor, Great Harbor, and Woods Hole are described under a separate heading.

Tarpaulin Cove is a bight about ½ mile in diameter in the south shore of Naushon Island, about 5 miles west-southwestward of Nobska Point lighthouse; it affords shelter from northerly and westerly winds and is frequently used. The western point at the entrance is marked by Tarpaulin Cove lighthouse, and two buoys are placed to guide clear of rocks near the western shore of the cove. Good anchorage in 16 to 18 feet, good holding ground, will be found in the cove with Tarpaulin Cove lighthouse bearing between 212° true (**SW** mag.) and 189° true (**SSW** mag.); deep-draft vessels should anchor farther out in 6 fathoms or more. The shores of the cove should be given a berth of 200 yards, and the western end over 300 yards. Storm warning displays are made at the cove.

Robinsons Hole is a narrow passage from Vineyard Sound to Buzzards Bay, leading between Naushon Island and Pasque Island; the southern entrance lies 2½ miles westward of Tarpaulin Cove. This passage is buoyed, but is narrow, full of rocks and ledges, has strong tidal currents, and should never be attempted by a stranger; local fishermen sometimes pass through it.

Quicks Hole is described under a separate heading.

GENERAL INFORMATION.

Channels.—The two principal channels leading into Nantucket Sound from eastward are described on page 64. Extending across Nantucket Sound is an irregular line of shoals, through which are two well-marked channels.

North Channel leads near Bishop and Clerks lighthouse and follows the south shore of Cape Cod northward of the principal shoals in the sound. It is mostly used in northerly winds and in winter, when the prevailing northerly winds keep the south shore of Cape Cod free from drift ice. The least depth in this channel is about 16 feet, and it is not recommended for a greater draft than about 14 feet except with local knowledge.

Main Channel leads through an opening in the shoals near the middle of the sound and is marked by Cross Rip light vessel. With care a least depth of 5 fathoms can be carried through this channel.

Near the western end of the sound are three shoals, between which are four good channels which unite at the entrance to Vineyard Sound and may be used by vessels passing through.

Westward of West Chop the channel follows the shores of the Elizabeth Islands; shoals lie off the shore of Marthas Vineyard westward of West Chop. There are three passages from Vineyard Sound into Buzzards Bay between the Elizabeth Islands; these are known as Woods Hole, Robinsons Hole, and Quicks Hole.

Anchorages.—Vessels working through the sounds against a head wind usually anchor during the night, or if becalmed and drifting toward the shoals, it is best to anchor and wait for a favorable tide or change of wind. There are no anchorages for vessels of over 10 feet draft that afford shelter from all winds, except Nantucket Harbor, Hyannis Harbor, the inner harbor of Edgartown, and Woods Hole. Vineyard Haven, the anchorage most used by coasters, is exposed to northeasterly winds. *In northerly winds* the best anchorages are off Dennisport, Hyannisport, along the north shore, and in Tarpaulin Cove. The anchorage off Falmouth is used in all winds by vessels with good ground tackle. *In easterly winds* vessels sometimes anchor in smooth water westward of Handkerchief Shoal or inside Great Point; good shelter is then also found in Chatham Roads and Edgartown outer harbor. *In southerly winds* Edgartown Harbor and Vineyard Haven are the best anchorages; **Menemsha Bight** affords shelter and is sometimes used by vessels in the western end of Vineyard Sound. *In westerly winds* Edgartown, Vineyard Haven, and Tarpaulin Cove are good anchorages. These harbors can be entered by a stranger assisted by the chart or following the directions under the different headings. Nantucket Harbor can be entered by vessels of about 12 feet draft with smooth water on the bar.

Pilots and pilotage.—State pilotage is not compulsory for vessels passing through the sounds; it is only compulsory for certain vessels entering or clearing from the ports. (See laws relating to "Pilots and Pilotage" in Appendix II.) Pilots for the sounds or Monomoy and Nantucket Shoals can be found at Provincetown or Boston by vessels coming from northward, or at Tarpaulin Cove, or Vineyard Haven, coming from westward.

Towboats.—Vessels towing usually take a towboat from the port of their departure. A powerful tug may generally be found at Woods Hole or Vineyard Haven during the winter to assist vessels that may be aground or in trouble.

Repairs.—There is a marine railway at Vineyard Haven for small craft under 60 feet in length. The nearest place at which light repairs to the machinery of steamers can be made is at New Bedford.

Supplies.—Coal, in limited quantity, can be obtained at Nantucket, Edgartown, and Vineyard Haven. Provisions and some ship chandler's stores can be had at these places.

Storm warning displays.—See page 12.

Fogs are liable to occur at any time, but are more frequent from April to October than during the remainder of the year. They come more frequently with easterly and southerly winds; northerly winds clear them away. Southwesterly winds are usually accompanied by haze.

Ice.—In mild winters ice interferes but little with the movements of vessels in Nantucket and Vineyard Sounds. In severe winters drift ice accumulates and renders the movements of sailing vessels hazardous, and sometimes almost completely obstructs their progress for periods of as much as six weeks. During northerly winds, which prevail in winter, the passage along the north shore through Nantucket Sound will be clear when other parts of the sound are unsafe. Steamers force their way through the ice. Sailing vessels, if caught in a floe while entering by Pollock Rip Slue and Butlers Hole, are almost certain to be carried on the shoals.

It should be borne in mind that the buoys and even light vessels are liable to be moved out of their positions by drift ice.

GENERAL REMARKS, NAVIGATION OF NANTUCKET AND VINEYARD SOUNDS.

The numerous shoals, strong tidal currents, at certain seasons thick fog, and the large number of sailing vessels which are often encountered beating through the narrower parts of the channels, call for more than the ordinary attention of the navigator. In clear weather, in the daytime or in the night, the aids are readily distinguished and sufficiently numerous to enable a stranger to follow the channel without difficulty.

In clear weather sailing vessels with a favorable current, and with some local knowledge, beat through the sounds against a head wind, and when they find they are losing ground,

come to anchor on either side of the sailing line or under the lee of one of the shoals or in one of the harbors, until the wind or current changes. The strongest currents will be encountered in Pollock Rip Slue, between Pollock Rip and Handkerchief light vessels, off East and West Chop, and in Vineyard Sound (see the current diagram in Appendix I); in some places the current sets directly on the shoals and in a calm sailing vessels are sometimes obliged to anchor to prevent getting aground. Most of the shoals rise abruptly from deep water, and the soundings are very irregular in depth and can not everywhere be depended on alone for warning of too close an approach to danger.

In thick weather or fog when the aids can not be seen, sailing vessels and steamers in the vicinity of Pollock Rip Slue desiring to anchor are cautioned against anchoring in the channel or near the buoys or light vessel. The large number of steamers and tows passing through the slue in thick weather, depending entirely on the sound signals of the aids (making it necessary for them to pass close to the latter), increases the probability of collision for vessels at anchor close to them, and as there is seldom a necessity for such action, sailing vessels should avoid doing so; there is no excuse for a steamer anchoring near the aids.

Vessels when in the vicinity of Pollock Rip Shoals light vessel, or when between the light vessel and the gas buoy on the Broken Part of Pollock Rip, and desiring to anchor (wind and sea permitting), should first be sure of their position, and then stand westward and anchor about 1¼ miles westward of Pollock Rip Shoals light vessel in 5 to 6 fathoms.

A vessel in the vicinity of Pollock Rip light vessel should anchor about ¾ mile southward or southwestward from the light vessel in 4½ to 6 fathoms. The tidal currents here have considerable velocity and the bottom is generally sand or gravel.

When in the vicinity of Shovelful Shoal light vessel, steer 121° true (**SE** mag.) for 1½ miles from the light vessel and anchor in 3½ to 4½ fathoms and about ¾ mile southward of the sailing line. The water is deep and currents strong in Butlers Hole, and a vessel should not anchor here except in case of necessity.

Vessels when between Butlers Hole and Handkerchief light vessel, or when in the vicinity of the latter, can anchor anywhere southwestward of Stone Horse Shoal in 4¼ to 6½ fathoms, taking care to be 1 to 1¼ miles southward of the sailing line. Or, they may anchor northwestward of Handkerchief light vessel and on the west side of the shoal.

See also anchorages, preceding.

Great Round Shoal Channel is used mostly by the very deep draft vessels passing through the sounds, and sometimes by sailing vessels that are headed by the wind so as to prevent their working through Pollock Rip Slue. In thick weather a vessel may anchor (wind and sea permitting) anywhere in this channel and wait for clear weather; the bottom is generally sand, gravel, pebbles, or a combination of these. The tidal currents are not as strong as in Pollock Rip Slue or Butlers Hole, nor is the danger from collision as great as in the former. The sound signals are not as numerous as in Pollock Rip Slue and Butlers Hole.

Note.—Easterly winds make high tides and strong westerly currents. Westerly winds make low tides and strong easterly currents.

SAILING DIRECTIONS, NANTUCKET AND VINEYARD SOUNDS.

The directions in section 1 are good for a draft of 18 feet, and in section 1A for a draft of 25 feet at low water.

1. From Cape Cod lighthouse through Pollock Rip Slue to Cross Rip light vessel.—Give the northerly shore of Cape Cod a berth of over 2 miles, and from a position about 3 miles east-northeastward of Cape Cod lighthouse make good a 157° true (**S ¾ E** mag.) course for nearly 13 miles to a position about 2½ miles eastward of Nauset Beach lighthouse. Then make good a 175° 30′ true (**S ⅞ W** mag.) course for 11¼ miles; Chatham lighthouses should then bear 256° true (*W* mag.) distant nearly 3½ miles, and Chatham Bar whistling buoy should be distant 1 mile nearly in line with the lighthouses. Then steer 190° true (**SSW ⅛ W** mag.) for 4½ miles to Pollock Rip Shoals light vessel.

Leaving the light vessel close-to on either hand, steer 190° true (**SSW ⅛ W** mag.) for 3 miles to Pollock Rip gas and bell buoy (occulting white light), passing about ⅜ mile westward of the whistling buoy which lies 1¼ miles northeastward of the gas and bell buoy; in a heavy sea it is well to pass close to the whistling buoy, and then steer for the gas and bell buoy. Pass westward of the gas and bell buoy at a distance not greater than about 200 yards, and steer 183° true (**S by W ½ W** mag.) for 1½ miles to Pollock Rip light vessel. A gas buoy (occult-

ing red light), lying ⅜ mile northwestward of Pollock Rip light vessel, marks the southeasterly end of Pollock Rip.

Pass Pollock Rip light vessel on either hand and with it astern steer 281° true (**NW** by **W** ¾ **W** mag.) for 3½ miles to Shovelful Shoal light vessel. A gas buoy (fixed white light), lying 600 yards southward of Shovelful Shoal light vessel, marks the northerly end of Stone Horse Shoal. Pass preferably southward of Shovelful Shoal light vessel and steer 227° 30′ true (**SW** by **W** ½ **W** mag.) for 5 miles to Handkerchief light vessel. Then steer 254° true (**W** ¼ **S** mag.) nearly 8 miles to a position ¼ mile southward of Halfmoon Shoal gas and bell buoys (occulting white light). Then steer 268° true (**W** by **N** mag.) for 2½ miles to a position 300 yards northward of Cross Rip light vessel. Then follow the directions in section 2.

From Handkerchief light vessel directions through the sounds along the north shore are given on page 71.

Remarks and dangers.—The eastern shore of Cape Cod, and the dangers on both sides of Pollock Rip Slue and Butlers Hole are described on pages 62–63.

There are no dangers near the sailing line until approaching Pollock Rip Slue, which leads between Pollock Rip and Broken Part of Pollock Rip. The shoaler water is generally marked by rips or breakers.

Pollock Rip, Bearse Shoal, and Shovelful Shoal are northward of the sailing lines westward of Pollock Rip light vessel, and Little Round Shoal and Stone Horse Shoal are southward of the sailing lines.

Handkerchief Shoal is the extensive shoal, with from 3 to 18 feet over it, lying southwestward of Monomoy Point. It is about 4¼ miles long and its greatest width is about 2 miles. Its southern end, which rises abruptly from a depth of 8 fathoms to 12 feet, is about ½ mile northward of Handkerchief light vessel, and is marked by a buoy (nun, red, No. 10). Its northern end, rising gradually from 3½ fathoms to 15 feet, lies about 3 miles west-northwestward from Monomoy Point lighthouse, and is marked by a buoy (spar, black, No. 3). On the eastern edge of the shoal are buoys, which mark the edge of the narrow channel between it and Shovelful Shoal and Monomoy Point.

Halfmoon Shoal is the detached shoal at the southeasterly end of Horseshoe Shoal. It is about 1½ miles long, has 14 to 18 feet over it, and is marked at its southerly end by a bell buoy and gas buoy (No. 12, occulting white light), which lie 2½ miles 78° true (**E** ⅛ **S** mag.) from Cross Rip light vessel, nearly on the range of the light vessel and Cape Poge lighthouse.

Horseshoe Shoal is the name of the extensive shoals lying in the west central part of Nantucket Sound. It extends about 8½ miles in a general northwesterly direction, but there are narrow slues with depths of 3 to 8 fathoms crossing it, thus cutting it into a number of shoal patches. The depth on the shoals is very irregular; the southeasterly part has least depths of 8 to 12 feet, while its northwesterly part is bare in places at lowest tides. The southerly edge of the shoal lies ¾ mile north-northeastward from Cross Rip light vessel and rises abruptly; it is marked by a red spar buoy which lies 1¼ miles west-northwestward from Halfmoon Shoal buoy. The northwesterly end of Horseshoe Shoal is marked by a black spar buoy (No. 9), which lies 2⅜ miles 83° true (**E** ⅝ **S** mag.) from Succonesset Shoal light vessel. From the buoy an arm of the shoal extends eastward 4 miles; on its northern side it rises abruptly to depths of 8 to 16 feet, and is marked by a buoy (spar, black, No. 7), which lies 2⅝ miles west-southwestward from Bishop and Clerks lighthouse.

There are several spots with 11 to 14 feet over them lying just southward of Cross Rip light vessel.

1A. From Cape Cod lighthouse through Great Round Shoal Channel to Cross Rip light vessel.—Give the northerly shore of Cape Cod a berth of over 2 miles, and from a position about 3 miles east-northeastward of Cape Cod lighthouse make good a 157° true (**S** ¾ **E** mag.) course for nearly 13 miles to a position 2½ miles eastward of Nauset Beach lighthouse. Then make good a 163° true (**S** ¼ **E** mag.) course for 27 miles to Great Round Shoal Channel entrance gas and whistling buoy (occulting white light).

From this buoy steer 254° true (**W** ⅛ **S** mag.) for 9 miles to Great Round Shoal light vessel. Pass on either side of the light vessel and steer 304° true (**NW** ¼ **N** mag.) for 3½ miles to a position ¼ mile northeastward of Point Rip gas and bell buoy. Then steer 274° 30′ true (**WNW** ⅜ **W** mag.) for 11½ miles to a position ¼ mile southward of Halfmoon Shoal gas and bell buoys (occulting white light). Then steer 268° true (**W** by **N** mag.) for 2½ miles to a position 300 yards northward of Cross Rip light vessel. Then follow the directions in section 2.

To pass through the sounds along the north shore.—From a position ¼ mile northeastward of Point Rip gas and bell buoy, steer 307° true (**NW** ½ **N** mag.) for 5 miles to Handkerchief light vessel, and follow the directions on page 71.

Remarks and dangers.—The 163° true (**S** ¼ **E** mag.) course leads 5¾ miles eastward of Chatham lighthouses, and 4½ miles eastward of Pollock Rip Shoals light vessel. General descriptions of Monomoy and Nantucket Shoals are given on page 63.

Great Round Shoal Channel between the entrance buoy and light vessel is marked on its northerly side by a nun buoy and three gas buoys (occulting white light), and on its southerly side by black can buoys.

Point Rip is a shoal that extends 3¾ miles east-northeastward from Great Point, and has little water over it for a distance of 2 miles from the point. Farther eastward the shoal has depths of 12 to 18 feet over it, and is marked

on its northerly side by two black spar buoys. A shoal with 19 to 22 feet over it extends northward from these buoys, and is marked at its northerly end by Point Rip gas and bell buoy (occulting white light), which lies 3¾ miles 49° true (**NE** by **E** ⅝ **E** mag.) from Nantucket lighthouse.

2. From Cross Rip light vessel through Vineyard Sound.—From a position about 300 yards northward of Cross Rip light vessel steer 278° true (**WNW** ⅛ **W** mag.) for 8¾ miles to Hedge Fence light vessel; West Chop lighthouse will be ahead on this course and Hedge Fence light vessel a very little on the starboard bow.

Pass preferably southward of Hedge Fence light vessel and steer 286° 30′ true (**NW** by **W** ⅜ **W** mag.) for 7½ miles to Nobska gas and bell buoys (occulting white light), which lie ¾ mile south-southeastward from Nobska Point lighthouse. This course leads ⅞ mile north-northeastward of West Chop lighthouse, and Nobska Point lighthouse will be a little on the starboard bow.

From Nobska gas and bell buoy steer 237° true (**WSW** ¼ **W** mag.) for 11 miles to Nashawena gas and bell buoys (occulting white light). This course leads ⅞ mile southward of Tarpaulin Cove lighthouse, and then leads ⅝ mile from the shore of Naushon Island; the shore is bold, and depths of 5 to 9 fathoms will be found 300 yards from it until abreast Robinsons Hole. The higher parts of the south shore of Elizabeth Islands are bare bluffs.

From Nashawena gas and bell buoys steer 257° true (**W** mag.) for 6⅝ miles to Vineyard Sound light vessel. From the light vessel courses can be shaped as follows:

Bound into Buzzards Bay.—Steer 349° true (**N** ⅛ **E** mag.) for Hen and Chickens light vessel and follow the directions for entering Buzzards Bay from westward. Quicks Hole is generally used by vessels between Vineyard Sound and Buzzards Bay, and Woods Hole is available for vessels of 10 feet or less draft. See the directions for these passages.

Bound into Narragansett Bay.—Steer 280° true (**WNW** mag.) for 17¼ miles to Brenton Reef light vessel and follow the directions for entering Narragansett Bay from eastward.

Bound to Long Island Sound.—A 259° true (**W** ⅛ **N** mag.) course will lead to The Race, passing 3 miles southward of Point Judith lighthouse; the distance from Vineyard Sound light vessel to Race Rock lighthouse is 48 miles.

Or, a 264° true (**W** ⅝ **N** mag.) course made good for 21½ miles will lead to Point Judith gas and whistling buoy (occulting white light), which lies 1¼ miles southward of Point Judith lighthouse.

Bound to sea.—A 237° true (**WSW** ¼ **W** mag.) course for 29 miles from Vineyard Sound light vessel will lead about 2 miles southward of Block Island Southeast lighthouse.

Or, from Nashawena gas and bell buoy a 237° true (**WSW** ¼ **W** mag.) course for 36 miles will lead about 4 miles southward of Block Island Southeast lighthouse.

Note.—With southerly or westerly gales there is a heavy sea in the westerly entrance of Vineyard Sound, and a heavy, ugly sea occurs at times in Vineyard Sound off the entrance of Quicks Hole. To avoid this sea tows, especially, frequently use Quicks Hole.

Dangers.—The shoals on the south side of the main channel from westward of Cross Rip to East Chop are covered by a red sector in West Chop light, and Hedge Fence and L'Hommedieu Shoal are covered by a red sector in Nobska Point light.

Norton Shoal and **Hawes Shoal** are parts of the shoals lying between Cross Rip light vessel and Cape Poge and southward of a line joining them. Norton Shoal has 9 to 17 feet over it and Hawes Shoal 4 to 15 feet, and the shoals rise abruptly in places. The northerly edge of the shoals with less than 18 feet over them is marked by black buoys.

Cape Poge Flats extend ¾ mile eastward and northward, and 1½ miles northeastward from Cape Poge; a buoy (spar, black, No. 15) is placed nearly 1½ miles northeastward of Cape Poge lighthouse to guide clear of the flats.

Squash Meadow, with its northwestern end lying 1¾ miles east-southeastward from East Chop lighthouse, extends a little over 1 mile in a southeasterly direction, is less than ¼ mile wide, has 5 to 13 feet over it, and is marked by two black can buoys, No. 19 at its southeastern extremity and No. 21 at its northwestern extremity. A shoal with about 21 feet over it extends about 2 miles east-southeastward from Squash Meadow; the easterly end of the shoal has 18 to 20 feet over it, and lies 1⅞ miles 335° true (**N** by **W** mag.) from Cape Poge lighthouse.

Hedge Fence is the shoal lying on the north side of the channel nearly 2 miles northeastward of East Chop lighthouse. This shoal is 3½ miles long in a 290° true (**NW** by **W** mag.) direction, is only about 300 yards wide, has 3 to 13 feet over it, and has 6 to 9 fathoms close-to all around it. It is marked by two buoys (both red and black in horizontal stripes), a nun off its northwest end and a spar off its southeast end, and Hedge Fence light vessel is moored nearly ½ mile southward from its southeast end. Between it and L'Hommedieu Shoal there is a passage with depths of 3 to 11 fathoms and a least width of 1 mile.

The shoals extending ⅜ mile northeastward from **East Chop** and ¼ mile northward from **West Chop** are marked on their northerly sides by black spar buoys Nos. 23 and 25, respectively.

Middle Ground is a narrow shoal about 4½ miles long in a westerly direction, its easterly end lying about ¼ mile northwestward from West Chop and its westerly end about 1¼ miles from the southerly shore of Vineyard Sound.

The greater part of the shoal has depths of 4 to 8 feet over it. The shoal is marked by three buoys, a can (red and black horizontal stripes) at its easterly and westerly ends, and a can (black, No. 25½) on its northerly side.

Lucas Shoal is a narrow shoal with 14 to 16 feet over it, lying about 2½ miles southward of Tarpaulin Cove lighthouse and nearly in the middle of the sound. The shoal is about 1 mile long in a west-southwesterly direction, and is marked at its western end by a buoy (can, red and black horizontal stripes). A shoal with 13 feet over it lies ¾ mile southwestward of the buoy, with broken ground between.

About 1 mile south of Pasque Island and midway between Robinsons Hole and Quicks Hole is a spot with 27 feet over it.

Devils Bridge is a reef making out ¾ mile in a northwest direction from Gay Head; it has 2 feet over it about ⅜ mile offshore and 17 feet at its end. The reef is marked off its northwest end by a buoy (can, black, No. 27).

Sow and Pigs Reef extends 1⅜ miles in a west-southwest direction from Cuttyhunk. It is in part dry or awash at low water and has an average width of about 400 yards; at its westerly end it has a depth of 15 feet, and is marked by a buoy (nun, red, No. 2), which lies about 1½ miles northeastward from Vineyard Sound light vessel.

SAILING DIRECTIONS, NANTUCKET AND VINEYARD SOUNDS ALONG THE NORTH SHORE.

This passage has broken ground with depths of 16 and 17 feet in places, and is not recommended at low water for a greater draft than about 14 feet. Strangers should not attempt it at night.

To pass southward of Bishop and Clerks.—From Handkerchief light vessel make good a 293° true (**NW ¾ W** mag.) course for 11¾ miles, passing 1½ miles southwestward of Bishop and Clerks lighthouse and ¾ mile northeastward of Broken Ground buoy (spar, black, No. 7); Hyannis lighthouse and beacon should then be in range, and Bishop and Clerks lighthouse should bear 74° true (*E ⅛ N* mag.). Then steer 254° true (**W ⅛ S** mag.) for 6¼ miles with Bishop and Clerks lighthouse astern to Succonnesset Shoal light vessel.

To pass northward of Bishop and Clerks.—From Handkerchief light vessel make good a 307° true (**NW ½ N** mag.) course for 10 miles, and pass northeastward and northward of Bishop and Clerks lighthouse, rounding it at a distance of ¾ mile. Then steer 262° true (**W ½ N** mag.), pass about ⅜ mile southward of Hallets Rock buoy, ½ mile northward of Hyannis Middle Ground buoy, and ½ mile southward of West Southwest Ledge bell buoy. When the bell buoy is in range with Hyannis lighthouse steer 239° true (**WSW ½ W** mag.) for 4 miles to a position ⅜ mile northward of the buoy on the northwest end of Horseshoe Shoal. When Succonnesset Shoal light vessel bears 254° true (**W ¼ S** mag.), steer this course for 2¼ miles to the light vessel.

Pass close to on either side of Succonnesset Shoal light vessel and steer 267° true (**W ⅞ N** mag.) for 7 miles, passing 300 yards northward of Smalls Shoal buoy, about ⅜ mile northward of the western part of L'Hommedieu Shoal, and about ¼ mile southward of Davis Neck Shoal buoy. When about ¾ mile westward of the latter buoy, and West Chop lighthouse bears 184° true (*S* by *W ½ W* mag.), steer 237° true (**WSW ¼ W** mag.) for 2½ miles to Nobska gas and bell buoys (occulting white light), passing about 300 yards northward of black can buoy No. 19. For directions through Vineyard Sound from Nobska gas and bell buoys see section 2 preceding.

Note.—About June 15, 1912, Succonnesset Shoal light vessel will be permanently replaced by a gas and bell buoy, No. 16A, showing an occulting white light.

Dangers.—A shoal with a least depth of about 15 feet lies 3½ miles 129° true (**SE ¾ S** mag.) from Bishop and Clerks lighthouse.

Bishop and Clerks is the extensive shoal lying off the northern shore and marked (near its center) by Bishop and Clerks lighthouse. On an arm of the shoal extending nearly ⅞ mile southward from the lighthouse and marked at its end by a buoy (spar, red, No. 12), there are several rocks awash at low water; but that part of the shoal eastward, northward, and northwestward of the lighthouse has from 13 to 18 feet over it.

Hallets Rock is described in the sailing directions for Hyannis Harbor. Along the north shore, between Point Gammon and Succonnesset Point there are a number of shoals, but the sailing line leads well southward of them.

Middle Ground, with 14 to 18 feet over it, lies westward of Bishop and Clerks lighthouse. A 12-foot spot on this shoal is marked by a buoy (spar, red and black horizontal stripes), which lies 1¾ miles 269° true (**WNW ⅞ W** mag.) from the lighthouse and west of the shoal spot.

Broken Ground, with 16 to 18 feet over it, lies southwestward from Bishop and Clerks, and extends in spots to the northeastern end of Horseshoe Shoal. The northern side near a depth of 15 feet is marked by a buoy (spar, black, No. 7).

Horseshoe Shoal is described under section 1 preceding.

Wreck Shoal has 8 to 17 feet over it with 4 to 5 fathoms around it, is ¼ to ⅜ mile wide, and 1¾ miles long. Its western end is about 300 yards northeastward from Succonnesset Shoal light vessel. A buoy (spar, red, No. 16) is on the southern edge of the shoal.

Eldridge Shoal, lying ¾ mile southward of Wreck Shoal, has 5 to 18 feet over it, is less than ¼ mile wide, and is about 1 mile long. It is marked at its northeast end by a buoy (spar, black, No. 11). The sailing line leads about midway between Wreck Shoal and Eldridge Shoal. Between the latter shoal and the northwestern edge of Horseshoe Shoal there is a passage over 1 mile wide.

Succonnesset Shoal extends southward and eastward from Succonnesset Point, is about 2 miles long in an easterly direction, has an average width of about ¼ mile, and the depth over the greater part of it is from 3 to 5 feet. It is marked at its southeastern extremity by a buoy (spar, red, No. 18) which lies about ⅜ mile northward from Succonnesset Shoal light vessel. A channel 500 yards wide with a depth of 5 fathoms leads between Succonnesset Shoal and Wreck Shoal.

Smalls Shoal, a spot with 9 feet over it, lies 1⅜ miles westward from Succonnesset Shoal light vessel, and is marked on its northern side by a buoy (spar, red and black horizontal stripes).

Shoals make out about ⅝ mile from the northern shore from Succonnesset Point to westward of Falmouth Heights, and in some places 6 to 9 feet will be found ⅜ mile offshore. **Davis Neck Shoal**, a part of these shoals with 14 feet near its edge, is marked by a buoy (spar, red, No. 20) lying 1⅛ miles southeastward from Falmouth Heights.

L'Hommedieu Shoal is 4½ miles long, about ½ mile wide, and has depths from 2 to 12 feet. It is marked at its easterly end by a buoy (spar, black, No. 13), lying 2 miles west-southwestward from Succonnesset Shoal light vessel, and by a buoy (spar, black, No. 15) near its western end.

New Shoal, westward of L'Hommedieu Shoal, is ¾ mile long, has 10 feet over it, and is marked on its northerly side by black spar buoy No. 17 and black can buoy No. 19.

A shoal with 11 feet over it lies 1¼ miles eastward from Nobska Point lighthouse, and is marked by a buoy (nun, red and black horizontal stripes). The channel between this shoal and New Shoal is reported to be shoaling.

NANTUCKET HARBOR[1]

is near the middle of the northern shore of Nantucket Island. The entrance is between two jetties, which extend northward and are only partly visible at high water; **Nantucket East** and **West Breakwater lights** are on piles of rocks at the ends of the jetties. A channel 200 feet wide and 13 to 17 feet deep has been dredged between the jetties; in October, 1911, the least depth on the Nantucket Harbor range line was 16 feet. Shoaling is liable to occur on a bar which forms just outside the ends of the jetties.

Nantucket Harbor proper lies at the entrance to a large, shallow lagoon which extends 5 miles northeastward to the eastern shore of the island. Secure anchorage can be selected 200 to 300 yards off the southerly side of Brant Point, or about the same distance off the wharves, in 12 to 17 feet, sticky bottom. The town of **Nantucket** is on the western shore of the harbor; storm warning displays are made. There is communication by steamer with other points in Nantucket Sound and with New Bedford. There is a railroad from Nantucket to **Siasconset**, a summer resort on the easterly end of the island.

Brant Point lighthouse is on the west side at the entrance of the harbor. On the point westward of the lighthouse is a disused light tower, just eastward of which are the two lights of the **Nantucket Harbor range.**

Ice.—Except in severe winters, the harbor is seldom closed by local formations of ice, but is frequently closed by drift ice from the sound, which packs and remains across the entrance during northerly winds.

SAILING DIRECTIONS, NANTUCKET HARBOR.

The following directions are good for a draft of 12 feet with smooth water on the bar:

From Handkerchief light vessel steer 189° true (**SSW** mag.) for a little over 10 miles to the bell buoy at the entrance. Or from Cross Rip light vessel steer 120° true (**SE ⅛ E** mag.) for 5 miles to a position ¼ mile northeastward of the bell buoy at the eastern end of Tuckernuck Shoal, and then steer 144° true (**SSE** mag.) for 6½ miles to the bell buoy at the entrance.

When close to the bell buoy steer 163° true (**S ⅜ E** mag.) on the Nantucket Harbor range, and follow the black buoys which mark the easterly edge of the channel at a distance of about 100 feet. When about 300 yards past the last one (No. 11) and the same distance from the beach, steer 130° true (**SE ¾ S** mag.) and round Brant Point at a distance of about 75 yards. Then stand southwestward in the harbor and anchor with Brant Point lighthouse bearing about 9° true (*NNE* mag.)

Dangers.—**Tuckernuck Shoal** extends about 6¾ miles in a northeasterly direction from Muskeget Island. It has depths over it varying from 3 to 18 feet, the ruling depths being 8 to 10 feet. The easterly extremity of the shoal is marked by a buoy (bell, black, No. 7) lying about 6¾ miles 276° true (**WNW ¼ W** mag.) from Nantucket lighthouse; this buoy is a Nantucket Sound buoy and should be left on the starboard hand by vessels approaching Nantucket entrance.

The northerly side of Nantucket Island is fringed with shoals to a distance of about 1 mile. For a distance of about 1 mile eastward and westward of the entrance of Nantucket Harbor the edge of the shoals is marked by spar buoys, black buoys eastward and red buoys westward.

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[1] Shown on charts **111**, scale $\frac{1}{80,000}$, price $0.50; **343**, scale $\frac{1}{10,000}$, price $0.25.

CHATHAM ROADS AND STAGE HARBOR.[1]

Chatham Roads is at the northeast end of Nantucket Sound, between the extensive shoals which extend northwestward from the northern end of Monomoy Island and the shoals extending 1⅝ miles from the south shore of Cape Cod at **Harwichport**, 3 miles westward of Stage Harbor lighthouse. It is a good anchorage in 3½ to 5 fathoms, with good holding ground, but is insecure for small craft in heavy southwesterly gales.

Stage Harbor is a small, well-sheltered anchorage used by fishermen and small local craft. It is entered from Chatham Roads through a narrow, crooked channel which has a depth of 4 feet at low water and is marked by buoys, but a stranger should not attempt to enter without a pilot. The town of **Chatham**, on the northeastern side of the harbor, has no commerce except some vessels engaged in the fisheries, and occasionally a cargo of coal is brought in small coasting vessels. There is an approach over Chatham Bar from the eastern side of Cape Cod, but the channel depth is uncertain and the approach is now from Stage Harbor.

Stage Harbor and Chatham lighthouses are the guides for entering Chatham Roads and to the entrance of the buoyed channel into Stage Harbor. The western edge of **Common Flat**, the shoal on the eastern side of the roads, is marked by buoys.

Storm warning displays of the United States Weather Bureau are made near Chatham lighthouses and near Monomoy Point lighthouse.

Marine hospital.—See page 10.

SAILING DIRECTIONS, CHATHAM ROADS.

The directions are good for a draft of 18 feet. In heavy southwesterly gales the anchorage is insecure for small craft. Vessels of 7 feet draft can be taken into Stage Harbor at high water, but it requires local knowledge. No stranger should attempt to pass between Shovelful and Handkerchief Shoals, as the channel, though buoyed, is narrow with strong tidal currents, and is subject to change from the action of the sea.

FROM HANDKERCHIEF LIGHT VESSEL.—Pass ¼ mile westward of the buoy at the southerly end of Handkerchief Shoal and steer 346° true (**N** mag.) for 2 miles, or until Monomoy Point lighthouse bears 65° true (*E* by *N* mag.). Then steer 15° true (**NNE** ½ **E** mag.) for about 6½ miles, passing nearly ¾ mile westward of the buoy on the north end of Handkerchief Shoal, until Stage Harbor lighthouse is in range with Chatham lighthouses, bearing 63° true (**ENE** ¾ **E** mag.). Then stand in on the range for about 2½ miles until nearly up with Mid-channel buoy (spar with bush). Anchor northward of this buoy in about 4¾ fathoms, soft bottom.

FROM CROSS RIP LIGHT VESSEL.—When close northward of the light vessel steer 88° true (**E** by **S** mag.) for 2½ miles to a position ¼ mile southward of Halfmoon Shoal gas and bell buoys. Then steer 37° true (**NE** ½ **E** mag.) for about 14 miles until Stage Harbor lighthouse is in range with Chatham lighthouses, and then stand in on the range as directed in the preceding paragraph.

FROM WESTWARD.—Vessels of 14 feet or less draft can pass ¾ mile northward of Bishop and Clerks lighthouse and steer 76° true (**E** mag.) for 6½ miles; Bass River lighthouse should then bear 312° true (*NW* by *N* mag.) and Kill Pond Bar buoy should be ¾ mile distant on the port beam. Then steer 63° true (**ENE** ¾ **E** mag.) for about 5½ miles heading for Stage Harbor lighthouse in range with Chatham lighthouses until nearly up with Mid-channel buoy (spar with bush). Anchor northward of this buoy in about 4¾ fathoms, soft bottom.

Or, from a position 1¼ miles southward of Bishop and Clerks lighthouse steer 60° true (**ENE** ½ **E** mag.) for 7 miles to a position ¾ mile southward of Kill Pond Bar buoy, and proceed as directed in the preceding paragraph.

Dangers.—The western edge of **Handkerchief Shoal** extends 4¼ miles in a north-northeasterly direction, and has from 4 to 16 feet over it. The shoal rises abruptly on this side and care should be taken not to be set eastward on to it. It is marked at its southern end by a buoy (nun, red, No. 10), which lies ½ mile north- northwestward of Handkerchief light vessel. The northern end of the shoal is marked by a buoy (spar, black, No. 3), lying 3 miles west-northwestward from Monomoy Point lighthouse.

Rodgers Shoal has 13 to 18 feet over it, is about 1 mile long in a northwesterly direction, and is ¼ mile wide. It lies northeastward of Handkerchief Shoal, and is marked at each end by a buoy (spar, red and black horizontal stripes). There is a channel on either side of the shoal as shown on the chart.

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[1] Shown on chart 111, scale $\frac{1}{80,000}$, price $0.50.

Shoals extend 1 to 2¾ miles from the western shore of Monomoy Island and northward to Stage Harbor lighthouse. **Common Flats**, the shoal lying westward and northward of the north end of Monomoy Island, has ruling depths of 1 to 4 feet, and rises abruptly from 4 fathoms on its northern and western edges, but is well marked by buoys.

Harwich Flats is an extensive shoal, with 5 to 17 feet over it, making off 1⅝ miles southward from the shore between South Harwich and Harwichport. It is on the northwestern side of Chatham Roads and protects the anchorage in northwesterly winds.

Kill Pond Bar has 4 to 7 feet over it and makes off 2 miles from the shore eastward of Bass River lighthouse; the end is marked on its south side by a buoy (spar, red, No. 6) and on its east side by a buoy (spar, black, No. 1).

HYANNIS HARBOR [1]

is a bight in the south shore of Cape Cod, north-northwestward from Bishop and Clerks lighthouse. It is much used as a harbor of refuge by small coasting vessels of 14 feet or less draft, which anchor behind the breakwater where there is a limited area sheltered from all winds. The depth in the channel up to the breakwater is 15 to 16 feet. Behind the breakwater there is an area nearly ⅜ mile in diameter that has been dredged to a depth of 15½ feet. The approach is somewhat obstructed by shoals, marked by buoys. Bishop and Clerks light and Hyannis light and range light are the principal guides at night. The disused light tower on **Point Gammon**, the eastern point at the entrance, is prominent in the daytime.

Lewis Bay, large and shallow, extends northeastward from Hyannis Harbor. A channel 6 feet deep and 150 feet wide has been dredged through the entrance and to the landings at the town of Hyannis at its northern end. For marine hospital see page 10.

Hyannisport, on the northerly side of Hyannis Harbor, is a terminus of a railroad. The railroad wharf has a depth of 10 feet at its end, but it is out of repair and not used. Storm warning displays are made near Hyannis lighthouse.

Ice seldom interferes with the movements of vessels, the prevailing northerly winds keeping the harbor clear. (See Ice, p. 67.)

SAILING DIRECTIONS, HYANNIS HARBOR.

The following directions are good for vessels of 14 feet draft.

FROM EASTWARD.—Pass about ¾ mile northeastward of Bishop and Clerks lighthouse, steer about 279° true (**WNW** mag.); and pass 200 yards or more southward of Hallets Rock buoy. Then bring Bishop and Clerks lighthouse astern on a 318° true (**NNW ½ W** mag.) course until Hyannis lighthouse and beacon (front light) are in range.

Stand in on the range of Hyannis lighthouse and beacon (front light), course 11° true (**NNE ⅛ E** mag.); the range leads about 60 yards eastward of the easterly end of the breakwater, and care should be taken to go nothing westward of the range when passing it. Anchor 100 to 500 yards northeastward of the breakwater in 15 to 20 feet, soft bottom; vessels of 14 feet draft should anchor about 300 yards northeastward from the easterly end of the breakwater. Small craft can anchor farther northward toward the boat landing at Hyannisport, in 6 to 12 feet.

FROM WESTWARD.—Passing close southward of Succonnesset Shoal light vessel (see page 80) steer 74° true (**E ¼ N** mag.) for 2½ miles heading for Bishop and Clerks lighthouse, and pass southward of Wreck Shoal buoy and well northward of the buoys marking Eldridge Shoal and the northwest end of Horseshoe Shoal. Then steer 59° true (**ENE ½ E** mag.) for 4¾ miles to a position about ⅜ mile southeastward of the bell buoy (No. 14). When Hyannis lighthouse and beacon (front light) are in range steer for them, course 11° true (**NNE ⅛ E** mag.), pass eastward of Southwest Ground buoy (No. 1), and enter as directed in the preceding paragraph.

Dangers.—Hallets Rock, marked by a buoy (spar, red and black horizontal stripes), is a small spot with 12 feet over it, lying nearly 1¼ miles 331° true (**N by W ⅜ W** mag.) from Bishop and Clerks lighthouse.

Senator Shoal, marked at its southern edge by a buoy (spar, red, No. 8), is the southern part of the shoal which extends over 1 mile southeastward from Point Gammon. Near the edge of this shoal and a little northwestward of the buoy there is a depth of 11 feet.

Gazelle Rock buoy (spar, red, No. 10) is at the south end of the reef, partly bare at low water, that extends ½ mile southward from Point Gammon.

An extensive shoal, with numerous rocks, lies on the western side of the channel leading into Hyannis Harbor, between it and the channel into Centerville Harbor. Off its eastern side this shoal is marked by a buoy (spar, black, No. 1), which is a little westward of the range of Hyannis lighthouse and range beacon.

A red bell buoy (in summer) is placed nearly ¾ mile south-southwestward from buoy No. 1, and on the range of the east end of the breakwater and Hyannis lighthouse.

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[1] Shown on charts 111, 112, scale $\frac{1}{80,000}$, price of each $0.50; 247, scale $\frac{1}{20,000}$, price $0.25.

Great Rock is a bare rock on the western edge of the flats which make westward from Point Gammon; it lies ½ mile south-southeastward from the easterly end of the breakwater, and is marked by a red spindle with cage. **Gardiners Rock**, with 8 feet over it, lies 300 yards southwestward of Great Rock; a buoy (spar, red, No. 2) is placed 300 yards westward of Great Rock.

The edge of the shoal on the east side of the harbor eastward of the breakwater is marked by a buoy (spar, red, No. 4).

CENTERVILLE HARBOR [1]

is a bight 2 miles wide in the south shore of Cape Cod, westward of Hyannis Harbor. The approach to the anchorage is obstructed by rocks and shoals, through which a buoyed channel, with a depth of 10 feet at low water, leads to the anchorage, which has a depth of 15 to 21 feet and good holding ground. Vessels seldom anchor here for shelter, as the harbor is exposed to southerly winds; the shoals off the entrance somewhat break the force of the seas from southward, but not sufficiently to make it a safe anchorage. The deepest draft entering is about 12 feet. Ice closes the harbor in winter.

The village of **Centerville** is inland from the head of the harbor; a church spire in the village is prominent and is used as a guide for entering the harbor.

East Bay, on the west side of Centerville Harbor, has depths of 2 to 4 feet. Its entrance is 250 feet wide between jetties, through which a channel has been dredged 100 feet wide and 4 feet deep.

SAILING DIRECTIONS, CENTERVILLE HARBOR.

These directions lead over a least depth of 10 feet. Strangers should not enter except in the daytime with clear weather.

FROM EASTWARD.—Passing ¾ mile northward of Bishop and Clerks lighthouse steer 268° true (**W** by **N** mag.), which will lead about ¼ mile southward of Hallets Rock buoy, West Southwest Ledge bell buoy, and Hodges Rock buoy. From a position ¼ mile southwestward of Hodges Rock buoy, with Centerville tall white church spire bearing 341° true (*N* ½ *W* mag.), steer 330° true (**N** by **W** ½ **W** mag.), pass eastward of Gallatin Rock buoy, about midway between Channel Rock buoy and Bearse Rock buoy, and westward of Gannet Ledge buoy. Anchor about ½ mile from shore in 15 to 21 feet, soft bottom.

FROM WESTWARD.—Passing close southward of Succonnesset Shoal light vessel (see page 80) steer 74° true (**E** ¼ **N** mag.) for 2½ miles heading for Bishop and Clerks lighthouse, and pass southward of Wreck Shoal buoy and well northward of the buoys marking Eldridge Shoal and the northwest end of Horseshoe Shoal. Then steer 40° true (**NE** ¾ **E** mag.) for 4 miles, heading for the westerly end of Hyannis Breakwater, to a position ¼ mile southeastward of Gallatin Rock buoy, with Centerville tall white church spire bearing 345° true (*N* ⅛ *W* mag.). Then steer 330° true (**N** by **W** ½ **W** mag.) into the harbor being guided by the buoys as in the preceding paragraph.

Dangers.—Hodges Rock has 6 feet over it and lies 2 miles southward from Hyannis Point; it is marked off its southern side by a buoy (spar, red and black horizontal stripes).

Collier Ledge is awash at half tide and lies near the southern edge of the shoals making southward from the western side of Centerville Harbor; it is marked by a square wooden beacon with red cubical structure on top.

Gallatin Rock has 4 feet over it, lies ¾ mile 88° true (**E** by **S** mag.) from Collier Ledge beacon, and is marked on its southerly side by a buoy (spar, black, No. 1).

Channel Rock, with 4 feet over it, lies ¼ mile northward from Gallatin Rock, and is marked on its southeast side by a buoy (spar, red and black horizontal stripes).

Bearse Rock, with 5 feet over it, lies 700 yards eastward of Channel Rock, and is marked on its western side by a buoy (spar, red, No. 2).

Gannet Rocks, a detached ledge bare at low water, lie a little over ¾ mile westward from Hyannis Point, a little southward of the range of the point and the end of the railroad wharf at Hyannisport.

Gannet Ledge, a detached spot with 6 feet over it, lies 600 yards south-southwestward from Gannet Rocks, and is marked off its western side by a buoy (spar, red, No. 4).

Foul ground, with 3 to 6 feet over it, extends 1 mile east-southeastward from Osterville Point, on the westerly side of Centerville Harbor. **Dead Neck Rock**, at the easterly end of the foul ground, lies about ⅜ mile westward of Gannet Ledge buoy.

Spindle Rock, bare at low water, is near the upper part of the harbor, and 1 mile 155° true (**S** by **E** mag.) from the church spire in the village. It is marked on its southwest side by a buoy (spar, red, No. 6).

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[1] Shown on charts **112**, scale $\frac{1}{80,000}$, price $0.50; **247**, scale $\frac{1}{20,000}$, price $0.25.

EDGARTOWN HARBOR [1]

is on the northern side of Marthas Vineyard, just westward of Cape Poge; it is divided into the outer and inner harbors, the former being principally used as a harbor of refuge in southerly and easterly winds and as an anchorage for the night. On the western side of the outer harbor are numerous rocks and shoals, which are marked by buoys and a spindle. There is sufficient room eastward of these for a vessel to work to the anchorage. At the head of the outer harbor a narrow arm makes southward into Katama Bay, forming what is known as the inner harbor. This affords good anchorage in 3 to 5½ fathoms, but it is narrow and the tidal currents have considerable velocity. The bar south of Edgartown lighthouse, at the entrance to the inner harbor, has only 15 feet over it. Strangers in sailing vessels seldom enter the inner harbor, as a fair wind is necessary to keep in the channel.

On the western shore of the inner harbor is the town of **Edgartown**, which has a little commerce and a daily steamer to New Bedford. Some of the wharves have 15 feet at their ends.

Katama Bay is a large, shallow body of water, only used by local fishermen. It has a shallow channel through which the fishing boats put to sea at high water with a smooth sea.

The **channel** is free from dangers, and has a least width of ⅝ mile and depths of 4 to 6½ fathoms until nearly up to Edgartown lighthouse; here it narrows and takes a sharp bend westward, with a depth of 15 feet, leading to the wharves of the town. Abreast the town the channel is narrow and has a depth of 4 to 6 fathoms; it then curves southward, its eastern edge marked by two black buoys until about ½ mile above the upper wharf in the town, where it widens and has a depth of 3½ to 5 fathoms. This depth continues for nearly 1 mile to Katama Bay, where it shoals.

Anchorages.—In easterly gales good shelter is found westward of Cape Poge, on the eastern side of the outer harbor. In westerly and southerly gales vessels find shelter in the southern end of the outer harbor, about ⅜ mile eastward or east-southeastward from Edgartown lighthouse. Vessels should not anchor in the channel abreast the town, where the bottom is hard sand, the channel narrow, and tidal current strong. Above the town anchorage is found in the channel, south of Middle Ground Shoal, in 4 to 5 fathoms, sticky bottom.

Pilots will come out to a vessel making signal for one in the outer harbor.

Towboats are not used. A towboat is usually stationed at Vineyard Haven or Woods Hole in the winter and can be sent for by telephone from Edgartown.

Supplies.—Coal, in limited quantity, and water can be obtained alongside the wharf. Provisions and some ship-chandler's stores can be had in the town.

Marine hospital.—See page 10.

Currents.—The tidal currents in the narrow part of the channel, inside Edgartown lighthouse and off the town, have considerable velocity, but as a rule follow the direction of the channel. When the current turns from east to west in the sound off Edgartown, the southerly current is at its strength in the harbor.

Tidal data is given in the table on page 29.

Ice.—Drift ice from the sound, driven into the entrance by the wind, obstructs the entrance of sailing vessels during a part of the winter. The strong tidal currents keep the inner harbor open except for a few days at a time during severe winters.

SAILING DIRECTIONS, EDGARTOWN HARBOR.

The following directions are good for vessels of 18 feet draft to the anchorage eastward of Edgartown lighthouse, and for vessels of 14 feet draft to the town wharves.

FROM EASTWARD.—Passing 100 to 500 yards northward of Cross Rip light vessel steer 267° 30′ true (**W** by **N** mag.) for the high standpipe (water tower) on Marthas Vineyard southward of Cottage City, and pass northward of Cape Poge Flats buoy. When Cape Poge lighthouse bears about 155° true (*S* by *E* mag.), steer 209° true (**SW ¼ S** mag.) for Edgartown lighthouse. When Cape Poge lighthouse bears 88° true (*E* by *S* mag.) steer 195° true (**SSW ½ W** mag.), which should lead 400 yards eastward of buoy No. 8 and nearly ½ mile eastward of Edgartown lighthouse. Anchor eastward or east-southeastward of the lighthouse, distant not more than ½ nor less than ¼ mile, in 4 to 5 fathoms.

FROM WESTWARD.—To pass northward of Squash Meadow steer for Cape Poge lighthouse on any bearing southward of 136° true (**SSE ¾ E** mag.), and pass eastward of can buoy No. 19 on the southeast end of Squash Meadow. Then bring Hedge Fence light vessel astern on a 178° true (**S** by **W** mag.) course. When Edgartown lighthouse bears 209° true (*SW ¼ S* mag.) steer 195° true (**SSW ½ W** mag.), which should lead 400 yards eastward of buoy No. 8 as in the preceding paragraph.

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[1] Shown on charts **112**, scale $\frac{1}{80,000}$, price $0.50; **346**, scale $\frac{1}{20,000}$, price $0.25.

In the daytime to pass southward of Squash Meadow, pass about 200 yards northeastward of buoy No. 23, lying eastward of East Chop lighthouse. Then steer 124° true (**SE ¼ S** mag.) for Cape Poge lighthouse, pass about 200 yards southwestward of can buoy No. 21 at the northwest end of Squash Meadow, and pass northward and eastward of bell buoy No. 17, rounding it at a distance of about ¼ mile. Then steer 181° true (**S by W ¼ W** mag.) with Hedge Fence light vessel astern. When about 400 yards eastward of buoy No. 8, steer about 195° true (**SSW ½ W** mag.) and anchor as directed in the first paragraph.

To go the wharves.—Pass close southward of buoy of No. 10, lying southeastward of Edgartown lighthouse, steer 274° true (**WNW ½ W** mag.), pass 150 yards southward of the lighthouse, and as the wharves are approached follow them at a distance of about 50 yards.

Dangers.—**Cape Poge Flats** extend 1½ miles northeastward from Cape Poge and are marked near their end by a buoy (spar, black, No. 15). Vessels of over 14 feet draft should pass northward of the buoy; those of less draft can pass southward of it, but should give Cape Poge a berth of at least ¾ mile. The southerly edge of the white sector in West Chop light leads ¾ mile northward of the buoy.

A shoal, with 18 feet at its end, extends ⅜ mile northwestward of **Cape Poge**, and its edge is marked by a buoy (spar, black, No. 1) which lies nearly 1 mile west-northwestward from Cape Poge lighthouse.

Sturgeon Flats, with 3 to 15 feet over them, make off about 600 yards from the southeastern shore of the outer harbor southward of the narrow entrance to Cape Poge Bay. The edge of the flats is marked by a buoy (spar, black, No. 3), from which the edge of the flats extends in a general southwesterly direction to the head of the outer harbor. Edgartown lighthouse bearing anything southward of 245° true (**W by S** mag.) clears the flats.

On the western side of the harbor is a shoal which extends 2¾ miles in a north-northeasterly direction from Edgartown lighthouse. The northern extremity of this shoal is a spot with 11 feet over it, lying 2 miles 296° true (**NW ½ W** mag.) from Cape Poge lighthouse, and is marked by a black bell buoy (No. 17) which is left on the starboard hand by vessels entering the harbor. The depth on this shoal is very irregular, and there are a number of rocks with from 3 to 5 feet over them. **Allen Rock**, the farthest offshore, lies 274° true (**WNW ½ W** mag.) from Cape Poge lighthouse and 2 miles 11° true (**NNE ⅛ E** mag.) from Edgartown lighthouse, has 4 feet over it, and is marked by a buoy (spar, red, No. 2). **Hatsett Rock**, **Monohansett Rock**, and **Mill Rock**, lying 400 yards to ½ mile southward from Allen Rock, are other rocks on this shoal which are marked by buoys. The eastern edge of the shoal is marked by a buoy (spar, red, No. 8) lying nearly 1⅛ miles 29° true (**NE ¼ N** mag.) from Edgartown lighthouse. Light-draft steamers sometimes cross this shoal, but strangers should not do so.

Squash Meadow is described on page 70.

VINEYARD HAVEN [1]

is a funnel-shaped bight about 1⅜ miles long in a southwest direction and about 1¼ miles wide at the entrance; it is on the northern side of Marthas Vineyard between East Chop and West Chop, each marked by a lighthouse. The harbor is easy of access and is the most important and generally used harbor of refuge for coasters between Provincetown and Narragansett Bay; it is exposed to northeasterly winds, but vessels with good ground tackle can ride out any gale. The greatest danger encountered by vessels at anchor in a northeast gale is from vessels with poor ground tackle, which are likely to drift and foul other vessels and then go ashore. The depth is sufficient for the largest vessels passing through Vineyard Sound; it ranges from 35 feet or more at the entrance to 15 feet near the head of the harbor.

On the west shore, near the head of the harbor, is the town of **Vineyard Haven**, which has a little trade and daily communication by steamer with New Bedford. There is 13 feet at the end of the wharf at low water. On the east shore are numerous scattered houses and a wharf with 15 feet at its end at low water.

The **channel** is unobstructed and the lead will be the best guide in selecting an anchorage. When well inside the entrance the water shoals gradually toward the western shore; toward the eastern shore the water shoals abruptly to Canal Flats above buoy No. 1, and the shore should be given a berth of about 300 yards.

Anchorage.—Vessels anchor, according to draft, anywhere from the points at the entrance to the head of the harbor, the light-draft vessels favoring the western shore. On the flats on the western side near the head of the harbor there is a breakwater which shows 2 feet above high water; small craft can anchor between the breakwater and the steamboat wharf, in 6 to 9 feet.

Pilots.—Coasting vessels do not take a pilot to enter the harbor, as the anchorage can be made without difficulty. State pilotage is compulsory for foreign vessels entering to discharge cargo. Pilots for Vineyard and Nantucket Sounds can be obtained at Vineyard Haven.

Towboats.—A towboat will usually be found here in the winter.

Supplies.—Coal, in limited quantity, and fresh water can be obtained alongside the wharf for steamers of 15 feet draft or less. Provisions and some ship chandler's stores can be had at Vineyard Haven.

Repairs.—There is a marine railway at Vineyard Haven for small craft under 60 feet in length. New Bedford is the nearest place at which repairs to the machinery of steamers can be made.

[1] Shown on charts **112**, scale $\frac{1}{80,000}$, price $0.50; **347**, scale $\frac{1}{10,000}$, price $0.25.

Storm warning displays are made near East Chop lighthouse.

There is a United States **marine hospital** at Vineyard Haven to which seamen entitled to hospital treatment are sent.

Currents.—The tidal currents have little velocity in the harbor; care should, however, be taken on the ebb, which sets westward, not to approach too closely to West Chop, as the current there sets on the ledges which make eastward and northward from the point.

Tidal data is given in the table on page 29.

Ice.—Both local and drift ice obstruct the movements of vessels in severe winters and at times entirely close the harbor. Strong northerly winds drive drift ice from Vineyard Sound into the harbor and endanger vessels at anchor.

SAILING DIRECTIONS, VINEYARD HAVEN.

Note.—The currents turn about ½ hour earlier inshore across the entrance of the harbor than in the channel through the sound. Vessels entering the harbor, with a head wind or light breeze at the end of a favorable current through the sound, should stand on in the channel until the harbor is well opened before standing in for the anchorage, so as to clear the points at the entrance.

FROM EASTWARD.—Squash Meadow and East Chop Flats will be avoided by keeping in the white sector of West Chop light. From Hedge Fence light vessel steer for West Chop lighthouse on a 278° true (**WNW** ⅛ **W** mag.) course until East Chop lighthouse bears 155° true (*S* by *E* mag.). Then steer 220° true (**SW** ¾ **W** mag.) into the harbor, giving the eastern shore a berth of about ¼ mile; the course will lead about 150 yards northwestward of Canal Flats buoy, and the red spar buoy off the southeast end of the breakwater should be nearly ahead. There is good anchorage northeastward of the latter buoy in 20 to 23 feet, taking care, however, to keep clear of the edge of Canal Flats, which rise abruptly.

FROM WESTWARD.—Steer for East Chop lighthouse on a 133° true (**SE** by **S** mag.) course until West Chop lighthouse bears 262° true (*W* ½ *N* mag.). Then steer 189° true (**SSW** mag.) into the harbor to a position 150 yards northwestward of Canals Flats buoy; a 220° true (**SW** ¾ **W** mag.) course will then lead to the head of the harbor.

Dangers.—**East Chop Flats** have 8 to 18 feet over them, extend a little over ⅜ mile in a northeasterly direction from East Chop, and are marked off their northeastern end by a buoy (spar, black, No. 23).

Canal Flats, partly bare at low water, make off 300 yards from the eastern shore of the harbor, about 1 mile inside of East Chop lighthouse; their northwestern edge is marked by a buoy (spar, black, No. 1).

Shoals extend ¼ mile northward and eastward from **West Chop**, and their edges are marked by three buoys. **Alleghany Rock**, with 6 feet over it, lies 650 yards northward from West Chop lighthouse, and is marked on its northern side by a buoy (spar, black, No. 25), which is colored and numbered for the channel through Vineyard Sound. Low Point Flats buoy (nun, red, No. 2) is placed off the edge of the shoals 650 yards east-northeastward from West Chop lighthouse. Rocks awash at low water extend nearly ¼ mile off the eastern side of West Chop, and are marked by Great Rock buoy (spar, red, No. 2A), which lies ½ mile southeastward of the lighthouse.

WOODS HOLE [1]

is a narrow passage, with a depth of 10 feet, leading from Vineyard Sound to Buzzards Bay between the mainland and Nonamesset Island; on its northern side are Little and Great Harbors. Woods Hole is little used as an anchorage on account of the strong tidal currents and the difficulty of entering or leaving except with a fair wind.

The **channel** in Woods Hole from Great Harbor to Buzzards Bay has a narrow but straight reach (the northern) at its eastern end, and another (Broadway) which necessitates a sharp turn; the straight reach should be given the preference on account of the difficulty of making the turn in the strong currents. The channel is 300 feet wide and has a depth of 10 feet; by waiting for slack water, which occurs at about half tide in the passage, a draft of 10 feet can be taken through. The tidal currents are so strong that the passage is dangerous, even for steamers at times, without some local knowledge; the buoys in the narrowest part of the channel are frequently towed under by the currents. A stranger should not attempt to pass through except near slack water.

Little Harbor is the easternmost of the two coves in the north shore of the passage. A channel 150 feet wide and 12 feet deep has been dredged to the wharf of the lighthouse depot, which is on the western side of the cove, and a turning basin 400 feet wide and 12 feet deep in front of the wharf. Small craft can anchor off or above the wharf, favoring the western side, in 7 to 12 feet. The dredged channel is marked on its western side by two black spar buoys. The course into the harbor through the dredged channel is 351° true (**N** ⅜ **E** mag.).

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$, price of each $0.50; **348**, scale $\frac{1}{10,000}$, price $0.25.

Great Harbor is about ½ mile long and nearly ¼ mile wide; its depth is irregular, ranging from 3½ to 12 fathoms in the channel, and the holding ground is mostly poor. On the eastern side of the harbor is the wharf and depot of the New York, New Haven & Hartford Railroad, and above this is the wharf, basin, and large buildings of the **United States Fish Commission**, which are prominent when entering from southward. Shoals with 5 to 9 feet over them extend 400 yards from the northwesterly end of the harbor. There is good anchorage 200 yards northwestward of the Fish Commission wharf, in 5 to 8 fathoms.

Great Harbor range lights, on the Fish Commission wharf, lead into Great Harbor from Vineyard Sound in a depth of over 18 feet. The course on the range is 345° true (**N** ⅛ **W** mag.), and the range should be held until past Parker Flats buoy (spar, red, No. 6). Then steer north-northwestward and pass eastward of the black spar buoy, lying northeastward of Grassy Island, and pass about 75 yards westward of the Fish Commission wharf. When entering on the range attention should be paid to the currents through Woods Hole; the current from Buzzards Bay has a tendency to set vessels eastward. See also the directions for Woods Hole following.

Storm warning displays are made near Nobska Point lighthouse.

A **time ball** is dropped daily, Sunday excepted, on a staff on the tower at the Fish Commission buildings, at 12 h. 00 m. 00 sec. of seventy-fifth meridian time, 5 h. 00 m. 00 sec. Greenwich mean time. This time signal can be seen by vessels at anchor in Great Harbor.

Tides.—The mean rise and fall of tides in the passage is about 2 feet. High water occurs at about the strength of the east flowing current, and low water at about the strength of the west flowing current. Strong northwesterly winds may lower the water in the passage as much as 2 feet.

Currents.—In the passage through Woods Hole the current turns from east to west one hour before the time of Boston high water, and from west to east one hour before the time of Boston low water. In the narrowest part of the passage the velocity at strength is 5½ miles during spring tides and 4½ miles during neap tides. The east-going current is somewhat stronger than the west-going, owing to the greater depth of water then prevailing. Both the velocity of the current and time of slack water are affected by strong winds. At either entrance to Woods Hole the velocity of the current at strength is nearly 1 mile.

In the upper part of Great Harbor, near the Fish Commission wharf, the currents are barely perceptible and vessels at anchor lie head to the wind.

Ice.—The strong tidal currents usually keep Great Harbor open. Drift ice is brought through from Buzzards Bay, but seldom interferes with navigation, except in unusually severe winters, when it may close the entrance from that bay.

SAILING DIRECTIONS, WOODS HOLE.

The following directions are good for vessels of 10 feet draft with slack water in Woods Hole.

Approaching from eastward pass about ¼ mile southward of Nobska Point and Coffin Rock buoy on a west-southwesterly course; or, from Nobska gas and bell buoys steer 279° true (**WNW** mag.) until on the Great Harbor range. From westward give the south side of the Elizabeth Islands a berth of about ½ mile, and steer for Nobska Point lighthouse on any bearing northward of 51° true (**NE** by **E** ¾ **E** mag.) until about ¾ mile from it and on the Great Harbor range.

Steer 345° true (**N** ⅛ **W** mag.) on the Great Harbor range (two lights on the Fish Commission wharf), and pass about 150 yards eastward of Nonamesset Shoal bell buoy, about 50 yards westward of red spar buoy No. 2, and about 50 yards eastward of a black spar buoy.

When nearly up with Parker Flats buoy (spar, red, No. 6), a red spar buoy and a black spar buoy will be seen forward of the port beam, the red buoy lying just southward of Grassy Island Ledge light (a spindle with lantern). Turn sharply westward, pass midway between these buoys on a 257° true (**W** mag.) course, and pass about 200 feet northward of a black can buoy and about 100 feet northward of a black spar buoy (lying close northward of Middle Ledge light). When past the latter buoy bring Middle Ledge light astern on a 284° true (**NW** by **W** ⅝ **W** mag.) course heading for the north end of Uncatena Island, until red spar buoy No. 4 is about 100 yards distant on the starboard beam and in range with the western tangent of Long Neck, bearing 14° true (*NNE* ⅜ *E* mag.). Then steer 330° true (**N** by **W** ½ **W** mag.) which will lead into Buzzards Bay about 250 yards eastward of the black spar and bell buoys off Naushon Point Shoal.

Vessels of 7 feet or less draft can pass 300 yards southwestward of Nobska Point and steer 290° true (**NW** by **W** mag.) so as to pass about 200 yards southward of Parkers Neck, leaving Coffin Rock buoy well on the port hand and red spar buoy No. 4, off Parkers Neck, about 100

yards on the starboard hand. A 333° true (**N** by **W** ¼ **W** mag.) course for the end of the Fish Commission wharf will then lead about 50 yards westward of Parker Flats buoy (spar, red, No. 6). Then follow the directions in the preceding paragraph.

Dangers.—Ledges, partly bare at low water, extend 150 yards southwestward from **Nobska Point.**

Coffin Rock, with 5½ feet over it, lies ⅜ mile west-southwestward from Nobska Point lighthouse and is marked off its southeastern side by a buoy (spar, black, No. 1). A spot, with 11 feet over it, lies 175 yards southwestward from the buoy.

Great Ledge, with 1½ to 9 feet over it, is about 200 yards in diameter and lies over ½ mile westward from Nobska Point. It is marked off its southwest end by a buoy (spar, red, No. 2).

Nonamesset Shoal is partly bare at low water, has depths of 10 to 13 feet near its edge, and extends 400 to 500 yards eastward from the island on the western side of the entrance to Great Harbor. The shoal is marked at its southeasterly end by a black bell buoy, and on its easterly side by a black spar buoy.

Parker Flats make off 200 yards from the shore southward of the railroad wharf and are marked off their western edge by a buoy (spar, red, No. 6).

Red Ledge (awash at low water) and **Grassy Island** lie on the western side of the harbor opposite Parker Flats. The straight channel through Woods Hole leads between these dangers, and is marked by two buoys and on its northerly side by Grassy Island Ledge light. The northeasterly end of the ledges surrounding Grassy Island is marked by a black spar buoy. The channel to the anchorage in Great Harbor leads between this buoy and the end of the Fish Commission wharf.

Middle Ledge, on the south side of the channel in Woods Hole, is partly bare at low water, and is marked at its easterly end by a black can buoy and at its westerly end by Middle Ledge light; just north of the light is a black spar buoy.

Hadley Rock, with 5 feet over it, lies ¼ mile westward of Middle Ledge light, and is marked on its northerly side by a buoy (spar, red and black horizontal stripes).

Rocks, with little water over them in places, extend about 250 yards off the westerly side of **Long Neck**, and are marked at the southwest end by a buoy (spar, red, No. 4), which lies 600 yards northwestward from Middle Ledge light.

Naushon Point Shoal has 2 to 5 feet over it in places, and extends nearly ¼ mile north-northeastward from the northeast end of Uncatena Island, on the westerly side of the entrance to Woods Hole from Buzzards Bay. The northeasterly end of the shoal is marked by a black spar buoy, and a black bell buoy is moored about 200 yards north-northwestward from the spar buoy. A ledge with 11 to 15 feet over it lies southeastward from the spar buoy, and 400 to 500 yards east-northeastward from the northeast end of Uncatena Island.

Weepecket Rock, with 10 feet over it, lies in Buzzards Bay ⅞ mile northwestward of Uncatena Island, and is marked on its northeast side by a buoy (spar, red and black horizontal stripes).

QUICKS HOLE,[1]

leading between Pasque Island on the east and Nashawena Island on the west, is the only passage from Vineyard Sound into Buzzards Bay eastward of Cuttyhunk available for vessels of over 10 feet draft. It is much used by tows, especially with westerly or southerly winds, to avoid the very heavy sea in the entrance of Vineyard Sound, and also because a secure anchorage from these winds can be had if necessary on the north side of Nashawena Island. The passage is considered unsafe for a long tow at night, and otherwise it may be used by steamers either night or day.

Quicks Hole lies about 4 miles westward of Tarpaulin Cove and is about ⅝ mile wide, with a clearly defined entrance which bears 355° true (**N** ¾ **E** mag.) from Gay Head lighthouse. The channel is nearly straight, has a width of 700 yards, and is marked by buoys. The general depth is over 5 fathoms, but there are several spots with 18 feet over them, and a number with depths of 24 to 27 feet; on account of the broken nature of the bottom, the passage is not recommended for a greater draft than 21 feet in the absence of local knowledge.

The **tidal currents** have considerable velocity, and a sailing vessel should not attempt to pass through unless with a strong favorable wind or a favorable current. When the current is setting westward through Vineyard Sound it is setting northward through Quicks Hole, and vice versa. Strong winds affect the regularity of the currents.

SAILING DIRECTIONS, QUICKS HOLE.

FROM VINEYARD SOUND.—Enter Quicks Hole about midway between Pasque and Nashawena Islands, or pass ¼ mile eastward of the black buoys on the southwest side of the entrance, and steer 330° true (**N** by **W** ½ **W** mag.) with Quicks Hole Ledge gas buoy a very little on the starboard bow; at night Dumpling Rock lighthouse should be ahead on this course, showing just westward of the gas buoy. Continue the course to a position about 150 yards westward of the gas buoy. Then steer 355° true (**N** ¾ **E** mag.) with Gay Head lighthouse astern, which will lead into Buzzards Bay ¼ mile eastward of Lone Rock buoy.

Courses from Quicks Hole to the harbors in Buzzards Bay are given in the directions for them; or, passing ⅜ mile northeastward of Lone Rock buoy, a 279° true (**WNW** mag.) course made good for 4½ miles will lead to a position ½ mile south-southeastward of Mishaum Ledge

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$, price of each $0.50; **345**, scale $\frac{1}{10,000}$, price $0.25.

gas and bell buoy. A 240° true (**WSW ½ W** mag.) course for 3½ miles will then lead to Hen and Chickens light vessel.

FROM BUZZARDS BAY.—Passing eastward of Lone Rock buoy, steer 175° true (**S ¾ W** mag.) for Gay Head lighthouse, showing just westward of Quicks Hole Ledge gas buoy, to a position about 150 yards westward of the gas buoy. Then steer 150° true (**S** by **E ½ E** mag.) into Vineyard Sound.

Remarks and dangers.—The tidal currents have considerable velocity, and deep-draft vessels must be careful not to be set off the courses. There are a number of detached 18-foot spots in the passage, but these are avoided by closely following the directions which lead eastward of them.

Nashawena Flats, with 7 to 12 feet over them, make off ¼ mile southeastward from the southeast point of Nashawena Island, and are marked at their end by a buoy (spar, black, No. 1). A black bell buoy is moored ¼ mile south-southeastward from the spar buoy.

Quicks Hole Ledge is the extensive shoal, with bowlders, which makes off a greatest distance of ¼ mile from the western shore of Pasque Island. Near its western edge are a number of spots with 4 feet over them, and just westward of these the edge of the shoal is marked by gas buoy No. 2 (occulting white light).

Shoals make off 300 yards from the eastern shore of Nashawena Island. A small 18-foot spot lies nearly ¼ mile from the eastern shore of Nashawena Island, and a little over ¼ mile south-southwestward from the gas buoy. **Felix Ledge** is several spots with 18 feet over them, lying nearly ¼ mile from the eastern shore of Nashawena Island and ¼ mile northwestward from the gas buoy.

Lone Rock has 6 feet over it, and lies nearly ¾ mile 8° true (**N** by **E** ⅞ **E** mag.) from the northeast point of Nashawena Island. A buoy (nun, red and black horizontal stripes) is placed on the north side of this rock, and there is foul ground with depths of 15 to 23 feet for a distance of ¼ mile southward of the buoy.

BUZZARDS BAY [1]

indents the south shore of Massachusetts in a northeasterly direction north of the Elizabeth Islands, the latter separating the bay from Vineyard Sound. The shores are irregular, being broken by bays and rivers, which, with the exception of New Bedford Harbor and Wareham River, are of little importance. The general character of the shore is rocky; large bowlders are a prominent feature, and in some places extend out some distance into the bay, rendering close approach to the shore dangerous. The bay has deep water as far as Wings Neck lighthouse, above which it is full of shoals.

There are three entrances to the bay, two of which, the main entrance and Quicks Hole, are used by sailing vessels. Woods Hole and Quicks Hole, the entrances from Vineyard Sound, are described under separate headings preceding.

The western and main entrance is northward of Cuttyhunk Island, and has a clear width of 4¼ miles between Sow and Pigs and Hen and Chickens Reefs. The bottom in this entrance is irregular and rocky, and there are spots with 3 to 5¾ fathoms (on which the sea breaks in heavy southwest gales), surrounded by deeper water, so that extra caution is necessary for vessels of 22 feet or more draft when entering the bay. Cuttyhunk lighthouse, Vineyard Sound light vessel, and Hen and Chickens light vessel are the guides for entering, and Gay Head lighthouse is a guide for vessels approaching from southward.

New Bedford Harbor, Apponaganset Bay, Mattapoisett Harbor, Sippican Harbor, Wareham River, and Cuttyhunk Harbor are described under separate headings.

There is a good anchorage, sheltered from all southerly winds, on the northerly side of Nashawena Island eastward of Penikese and Gull Islands, in 7 to 8 fathoms. This anchorage is frequently used by tows, and is available for vessels of any draft.

The easterly shore of Buzzards Bay northward of Woods Hole has shoals making out a greatest distance of about 1 mile, the ends of which are marked by red buoys. The harbors are shoal and are frequented only by small local craft.

Quamquisset Harbor, a small harbor lying 1½ miles northeastward of the northern entrance of Woods Hole, has a narrow, buoyed entrance with a depth of about 9 feet. Small craft, closely following the buoys and passing southward of the inner buoy (red and black horizontal stripe), can anchor in the middle of the harbor southeastward of the inner buoy, in 16 to 18 feet, sticky bottom, width of anchorage 250 yards. The northeasterly point at the entrance is a small, prominent knoll.

Hamlin Point is marked by a prominent hotel. A shoal with 12 feet near its end extends ⅞ mile northwestward from Hamlin Point and Gunning Point, and is marked at its end by a buoy (spar, red, No. 4).

Gifford Ledge, with 10 feet near its end, extends ⅞ mile from the shore 1¼ miles northward from Hamlin Point; the ledge is marked at its end by a buoy (spar, red, No. 6). Westward and northward of this buoy are four white buoys marking a dumping ground for the material from the Cape Cod Canal.

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$; and the western entrance on chart **113**, scale $\frac{1}{80,000}$, price of each $0.50.

West Falmouth Harbor, 2¼ miles northward of Hamlin Point, has depths of 1 to 4 feet. A channel 100 feet wide and 6 feet deep has been dredged from the entrance along the south side of the harbor to the town landing at **West Falmouth**, and anchorage basins have been dredged to the same depth and 300 feet wide. Strangers should not attempt to enter. **Chappaquoit Point**, on the south side of the entrance, is built up with summer cottages.

Wild Harbor, a small cove on the south side of Nyes Neck, 1¾ miles northward of West Falmouth Harbor, affords anchorage during northerly or easterly winds just inside the entrance, in 12 to 18 feet. The shores of the harbor are foul, and its easterly part shoal. The entrance is clear in midchannel.

Cataumet Harbor, between Nyes Neck and Scraggy Neck, has its entrance 1¾ miles southward of Wings Neck lighthouse. The harbor has extensive shoals and ledges, but the channel is buoyed and a draft of 9 feet can be taken well inside to an anchorage in 18 to 22 feet between buoys Nos. 3 and 5. A narrow crooked channel with a depth of 8 feet leads to the village of Megansett.

Seal Rocks, partly bare at half tide, extend ⅜ mile southwestward from Scraggy Neck, on the north side at the entrance of Cataumet Harbor, and are marked at the southwest end by a buoy (spar, black, No. 1). The narrow channel between the ledge and Scraggy Neck has a depth of about 6 feet.

Southwest Ledge is two patches with little water in places, lying ¾ mile southwestward, and ⅜ to ⅝ mile westward, from the westerly end of Scraggy Neck; the two patches are marked at their westerly ends by spar buoys Nos. 8 and 10. There are depths of 12 to 16 feet, rocky bottom, between the patches and Seal Rocks.

Pocasset Harbor lies between Wenaumet Neck and Scraggy Neck, and its inner part is separated from Red Brook Harbor by Bassetts Island. Broken ground, with depths of 17 to 18 feet in places, extends across the entrance. Entering between Wings Neck lighthouse and Southwest Ledge north part buoy (spar, red, No. 10), and giving Scraggy Neck and Wenaumet Neck a berth of 400 yards, vessels of about 14 feet draft can anchor westward of Eustis Rock buoy (spar, red and black horizontal stripes), in about 5 fathoms; this anchorage is exposed to westerly winds. Eastward of Eustis Rock the entire eastern part of the harbor between Scraggy Neck and Bassetts Island is shoal.

The inner part of Pocasset Harbor is frequented only by small craft of about 6 feet or less draft. Its entrance is through a narrow, buoyed passage, with a depth of 14 feet, northward of the western end of Bassetts Island. Following a careful midchannel course, anchorage can be selected below buoy No. 1, in 14 to 18 feet. Above this point the navigation is not difficult in the daytime for vessels of 6 feet or less draft, with the aid of the chart and the buoys. The village of **North Pocasset** lies near the eastern end of Pocasset Harbor.

Red Brook Harbor lies eastward of Bassetts Island and is very shallow. A draft of about 6 feet can be taken into the harbor around the north end of Bassetts Island, which is the better entrance; the entrance south of Bassetts Island has a depth of about 4 feet. The village of **South Pocassett** lies near the southeasterly end of Red Brook Harbor.

Back River, **Onset Bay**, **Monument River**, **Cohasset Narrows**, and **Buttermilk Bay** lie at the northeast end of Buzzards Bay; the common entrance is between Wenaumet Neck, marked by Wings Neck lighthouse, on the south, and Great Neck, marked by **Tempes Knob** (a prominent hill), on the north. The indentation, of which these waters are a part, includes a large number of bights, coves, and shallow streams, whose channels are all more or less obstructed by shoals and rocks.

These waters are important as the western entrance of the **Cape Cod Canal**. The approach to the canal is a dredged channel, which, when completed, will be 250 feet wide and 26 feet deep. From deeper water in Buzzards Bay it extends 2¼ miles in a 54° true (**ENE** mag.) direction, passing close northward of Wenaumet Neck, then 1° true (**N** by **E** ¼ **E** mag.) for 1¾ miles to the projecting point southwestward of the entrance to Monument River, and then curves northeastward into the river. Above the mouth of the river the channel will have a bottom width of 100 feet. (See also p. 58.)

From the dredged channel a depth of about 9 feet can be taken to an anchorage in Onset Bay, passing either westward of Mashnee and Hog Islands or northward of Hog Island. Eastward of the dredged channel there is a buoyed channel with a least depth of about 12 feet to an anchorage in **Phinneys Harbor**, off the village of Monument Beach. Above Monument River there is a narrow and crooked, buoyed channel, with a depth of 6 feet, which leads through Cohasset Narrows to **Buttermilk Bay**. The latter has depths of 1 to 7 feet, and about 4 feet in the channel. These waters are frequented by small pleasure craft in summer, and otherwise there is little traffic.

Pilots for Buzzards Bay and for many of its harbors can be had at Cuttyhunk or off the entrance of the harbor to which the vessel is bound. State pilotage is compulsory for certain vessels. (See Appendix II.)

Tides.—Tidal data for points in the bay is given in the table on page 29.

Tidal currents at the entrance of the bay have considerable velocity at times when they are influenced by the winds. In the passages from the bay to Vineyard Sound the currents have great velocity, and require special attention.

Ice.—The head of the bay and the harbors in its vicinity are generally closed to navigation during the winter months; the approaches to the harbors on the eastern shore are rendered dangerous by drift ice, which in exceptionally severe winters extends across the bay and joins the local formations on the western shore, thus forming an impassable barrier for short periods. It forms more rapidly in the bay with the wind from north to west. Under ordinary circum-

stances a northeast wind, if continued for 48 hours, will clear the bay of ice. Southerly winds, especially southeasters, diminish the extent and weaken the strength of the pack. The ice does not usually affect the positions of the spar buoys in the bay, but the light vessels, and even the buoys, are sometimes carried away by unusually heavy floes.

In New Bedford Harbor steamers can generally make their way in and out during the winter, but sailing vessels require the assistance of a powerful towboat to break the ice. During very severe winters, however, the harbor is at times entirely closed to all navigation. Ice forms rapidly in calms or light winds from north to west, and strong winds from north to northeast break it up and carry it off.

SAILING DIRECTIONS, BUZZARDS BAY.

A draft of 20 feet at low water can be taken up to abreast Wings Neck lighthouse by the following directions. See the remarks on approaching Vineyard Sound, Buzzards Bay, or Narragansett Bay from sea, page 30. Courses from Woods Hole and Quicks Hole to the harbors in Buzzards Bay are given in the directions for those harbors.

FROM BRENTON REEF LIGHT VESSEL steer 89° true (**ESE** ⅞ **E** mag.) for 8 miles to a position 1¼ miles southward of Sakonnet lighthouse, and then steer 83° true (**E** ½ **S** mag.) for 8 miles to Hen and Chickens light vessel.

FROM POINT JUDITH GAS AND WHISTLING BUOY make good a 72° 30′ true (**E** ⅜ **N** mag.) course for 21½ miles to Hen and Chickens light vessel.

FROM BLOCK ISLAND.—From a position 2½ miles southeastward of Block Island southeast lighthouse a 49° true (**NE** by **E** ½ **E** mag.) course made good for 30 miles will lead to Hen and Chickens light vessel.

From Hen and Chickens light vessel steer 60° true (**ENE** ½ **E** mag.) for 3½ miles to a position ½ mile south-southeastward of Mishaum Ledge gas and bell buoy. Then steer 65° 30′ true (**E** by **N** mag.) for 6½ miles until Butler Flats lighthouse bears 324° true (*NNW* mag.). Then steer 32° true (**NE** mag.) for 9¾ miles, passing nearly 1¼ miles southeastward of the black buoys marking West Island Shoal, Nyes Ledge, and The Bow Bells, and to a position about 1 mile southeastward of Bird Island lighthouse. The last course leads in a least depth of about 20 feet between Cleveland Ledge and Bird Island lighthouse.

Vessels of more than 22 feet draft should avoid the broken ground in the entrance of Buzzards Bay. Approaching from westward keep Hen and Chickens light vessel a little on the starboard bow on an 80° true (**E** ¼ **S** mag.) course, and pass ⅜ mile northward of the light vessel. Approaching from southward steer for Hen and Chickens light vessel on any bearing between 341° true (**N** ½ **W** mag.) through north to 26° true (**NE** ½ **N** mag.). From a position ⅜ mile northward of the light vessel steer 65° 30′ true (**E** by **N** mag.), which will lead ½ mile southward of Mishaum Ledge gas and bell buoy as in the preceding paragraph.

Remarks and dangers.—Soundings of 5 and 5¼ fathoms are found from 1½ to ¾ mile southwestward of Hen and Chickens light vessel, and these are avoided by standing for the light vessel on the courses given above for vessels of more than 22 feet draft. There is a black whistling buoy ¾ mile 228° true (**SW** by **W** ⅜ **W** mag.) from the light vessel.

Sow and Pigs Reef is described on page 71.

Hen and Chickens is the ledge making off nearly 1½ miles southward from **Gooseberry Neck**, on the northern side at the entrance to Buzzards Bay. It has a number of spots with 4 to 9 feet over them, and near the southern end are several rocks bare at half tide. **Old Cock,** one of these rocks, is 3 feet out at low water and marked by a black spindle with cage. The south end of the ledge is marked by a buoy (spar, black, No. 1) which lies ¾ mile north-northwestward from Hen and Chickens light vessel.

Ribbon Reef is a small, detached ledge with 18 feet over it, lying 1½ miles northwestward from Cuttyhunk lighthouse. It is surrounded by deep water and marked off its northern side by a buoy (nun, red and black horizontal stripes). About 1¼ miles northward from Ribbon Reef is a ledge with 25 feet over it, on which the sea breaks in heavy southwest gales; it lies about 1⅝ miles 88° true (**E** by **S** mag.) from Hen and Chickens light vessel.

Mishaum Ledge is a number of shoal, rocky spots, one of which has a depth of 8 feet over it. The ledge extends 1¾ miles off the northern shore, about 3 miles eastward of Gooseberry Neck; it is marked off its southeastern end by a black gas and bell buoy (occulting white light). Strangers should pass southward of this buoy.

A rock with 23 feet over it lies nearly 1 mile north-northwestward from the northern end of Penikese Island, and another rocky spot with 18 feet over it lies ½ mile northward from the northern end of the island. The channel between the northernmost of these rocks and Mishaum Ledge is about 1½ miles wide.

Above Mishaum Ledge the principal dangers on the northwesterly side of the bay are **Wilkes Ledge**, the rock with 21 feet over it lying 1¼ miles south-southeastward from Hursell Rock, **West Island Shoal, Cormorant Rock, Nyes Ledge**, and **The Bow Bells**, and are described in the sailing directions for New Bedford, Mattapoisett, and Sippican Harbors.

Cleveland Ledge, a spot with 16 feet over it, lies near the middle of the bay, 2¼ miles 166° true (**S** mag.) from Bird Island lighthouse, and 3½ miles 214° true (**SW** ¼ **W** mag.) from Wings Neck lighthouse. Other spots with 16 to 20 feet over them lie between Cleveland Ledge and the eastern shore.

NEW BEDFORD HARBOR [1]

lies on the northwestern side of Buzzards Bay, and is the approach to the city of New Bedford and the towns of Fairhaven and Acushnet. The approach from Buzzards Bay and the entrance to the harbor are much obstructed by ledges and shoals. These, however, are well marked by buoys and other aids, so that in the daytime with clear weather no difficulty should be experienced in entering with the aid of the chart. Sailing vessels should not attempt to beat into the harbor unless well acquainted with the dangers. The approach between Sconticut Neck on the east and Dumpling Rock lighthouse on the west is nearly 4 miles wide. The entrance to the harbor is marked on its western side by Butler Flats and Palmer Island lighthouses.

At the head of the harbor, crossing the mouth of the Acushnet River, is **Fairhaven Bridge**, with a draw, east of Fish Island, 100 feet wide in the clear. The principal water-borne trade of **New Bedford** is coal, cotton, and whale oil. There is 16 to 22 feet alongside the wharves, according to location.

Clark Cove makes northward just west of the entrance to New Bedford Harbor; between **Clark Point**, marked by a granite fort, on the east and Moshers Point on the west the entrance is about ¾ mile wide. The cove has anchorage in 12 to 22 feet but is exposed to southerly winds and is seldom used; the channel is marked by several buoys. There are no dangers in the cove, until near its head, for vessels of 11 feet or less draft if the shores be given a berth of about 400 yards. The houses and spires of the city of New Bedford can be seen at the head of the cove.

Channels.—The channel from deeper water off Butler Flats lighthouse to the wharves at New Bedford has a depth of 18 feet and a least width of about 200 feet, and is marked by buoys and a range. The deepest draft of vessels entering the inner harbor is about 23 feet; a draft of 14 feet can be taken up to Wamsutta Mills at high water.

Improvements are in progress to deepen the entrance and harbor to 25 feet, the entrance channel to be 300 feet wide, its center line passing 475 feet eastward of Butler Flats lighthouse and 375 feet eastward of Palmer Island lighthouse. An anchorage about 1,400 feet wide is being dredged in the harbor between New Bedford and Fairhaven. From the anchorage a channel 300 feet wide and 25 feet deep will lead through the draw of Fairhaven Bridge to the wharves westward of Fish Island.

There are several channels leading up to Clark Point between the ledges in the approach. The eastern channel has the deeper water; with the aid of the chart and the ranges, a depth of about 26 feet can be taken through this channel to an anchorage eastward or southward of Clark Point. The middle and western channels are good for a depth of about 21 feet.

Ranges.—*Eastern channel.*—Egg Island beacon (white, granite cone, spindle and vane on top), bearing 339° true (**N** ⅝ **W** mag.), and in range with Rodgers House (a large white building with small black-topped cupola, in Fairhaven), will lead in a least depth of 30 feet from Hursell Rock until abreast Packet Rock. The range for entering at night is Palmer Island light showing just clear eastward of Butler Flats light, bearing 335° true (**N** by **W** mag.), which leads in a least depth of 24 feet from Hursell Rock up to the anchorage south of Butler Flats light. Both of the preceding ranges lead close to the 21-foot rock lying 1¼ miles south-southeastward from Hursell Rock. Egg Island beacon, bearing 347° true (**N** mag.), and in range with Rodgers School (large red building with pointed black cupola, in Fairhaven), will lead westward of the broken ground extending southwestward from Hursell Rock, and in a depth of 27 feet between Brooklyn Rock and the 18-foot spot east of North Ledge.

Middle channel ranges.—Egg Island beacon bearing 6° true (**N** by **E** ¾ **E** mag.), and in range with the large, high standpipe in Fairhaven, will carry a least depth of 21 feet until abreast of Butler Flats lighthouse. The stone fort on Clark Point, bearing 1° true (**N** by **E** ¼ **E** mag.), with Rodgers House (large white building with small black-topped cupola, in Fairhaven) showing just clear eastward of it, leads in a least depth of 23 feet until nearly up to Clark Point.

Inner Harbor range.—Palmer Island lighthouse in range with the square tower on Wamsutta Mills (over the middle of the draw in Fairhaven Bridge) leads from abreast Butler Flats in the 18-foot dredged channel until abreast of buoy No. 12; at night a white electric light is shown on the corner of the tower.

Anchorages.—The anchorage in what is known as the outer harbor, eastward and southward of Clark Point, has depths of 4 to 5 fathoms, but is exposed to southerly winds. The anchorage above Palmer Island has a limited area with a depth of about 23 feet, and is being widened to about 1,400 feet; the remainder has depths from 8 to 15 feet. This anchorage is well sheltered and has good holding ground. Light-draft vessels can anchor on the western side of the southern part of the harbor, giving the wharves a berth of about 150 yards.

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[1] Shown on charts 112, scale $\frac{1}{80,000}$; 249, scale $\frac{1}{40,000}$; 252, scale $\frac{1}{20,000}$, price of each $0.50.

Pilots are generally taken by large vessels, and may be had by signaling off Cuttyhunk lighthouse. For pilot laws and rates see Appendix II.

Towboats are generally taken by sailing vessels wishing to enter the inner harbor, and will come out to a vessel making the signal. A lookout for incoming vessels is kept by the towboat captains when they are not cruising.

Harbor regulations for the port are enforced by the harbor master, and are contained in the extracts from the laws of Massachusetts, under the heading "Harbor Control," in Appendix II.

Quarantine regulations.—See Appendix II.

Marine hospital.—See page 10.

Supplies.—Coal in unlimited quantities, water, and ship's stores may be obtained and will be put on board either at the wharves or anchorage.

Repairs.—At Fairhaven there is a marine railway by which vessels of 600 tons may be hauled out.

Storm warning displays of the United States Weather Bureau are made from a staff on one of the coal pockets of the Philadelphia & Reading Coal & Iron Co., and at the New Bedford Yacht Club. An explanation of the use and meaning of these signals is given in Appendix III.

Ice.—See page 82.

Tides.—The mean rise and fall of tides is 4.0 feet.

SAILING DIRECTIONS, NEW BEDFORD HARBOR.

With the exception of the course from Woods Hole, the following directions are good for vessels of 20 feet or less draft to the anchorage southward of Butler Flats lighthouse; clear weather is necessary for a stranger, who should be able to see the aids when entering. The ranges (see the description preceding), when they can be seen, will be of great assistance when entering by the Eastern or Middle Channels. The directions for the inner harbor are good for a draft of 15 feet; strangers of deeper draft should take a pilot, or, if in a sailing vessel they should employ a towboat.

1. Entering by the Eastern Channel.—*From northward.*—Coming down Buzzards Bay steer 212° true (**SW** mag.), and keep Bird Island lighthouse bearing northward of 32° true (*NE* mag.). When Dumpling Rock lighthouse bears 252° true (**W** ⅜ **S** mag.) steer for it, passing 400 yards southward of black can buoy No. 9 off West Island, and 600 yards southward of Mosher Ledge bell buoy. Round the bell buoy at about this distance, steer 335° true (**N** by **W** mag.) for Palmer Island lighthouse showing just eastward of Butler Flats lighthouse, and pass midway between the buoys marking Henrietta and Brooklyn Rocks. Anchor ½ mile southward of Butler Flats lighthouse, in 4 to 5 fathoms. To go to the inner harbor follow the directions in section 2.

From Woods Hole.—From a position ¼ mile northward of Naushon Point Shoal bell buoy a 283° true (**NW** by **W** ⅝ **W** mag.) course made good for 7⅜ miles will lead to Mosher Ledge bell buoy, passing ¼ mile northward of Weepecket Rock buoy; the course leads near a 16-foot spot lying 1½ miles east-southeastward from Mosher Ledge bell buoy. From Mosher Ledge bell buoy a 316° true (**NNW** ¾ **W** mag.) course for 1 mile will lead to a position about midway between the buoys marking Henrietta and Brooklyn Rocks. Then steer 335° true (**N** by **W** mag.) for Palmer Island lighthouse showing just eastward of Butler Flats lighthouse as in the preceding paragraph.

From Quicks Hole.—Steer 355° true (**N** ¾ **E** mag.) with Gay Head lighthouse showing just westward of Quicks Hole Ledge gas buoy astern; the course will lead about 300 yards eastward of Hursell Rock buoy, and the distance to it from Lone Rock buoy is 5¼ miles. Then steer 335° true (**N** by **W** mag.) for Palmer Island lighthouse showing just eastward of Butler Flats lighthouse as in the first paragraph.

From Vineyard Sound light vessel.—Steer 10° true (**NNE** mag.) for 3⅜ miles, passing ⅝ mile westward of Sow and Pigs buoy and to a position ½ mile northwestward of Ribbon Reef buoy, with Cuttyhunk lighthouse bearing 127° true (*SE* ½ *S* mag.) distant 2 miles. Then steer 42° true (**NE** ⅞ **E** mag.) for 8¾ miles, passing ½ mile southward of Wilkes Ledge buoy and Hursell Rock buoy. Then steer 335° true (**N** by **W** mag.) for Palmer Island lighthouse showing just eastward of Butler Flats lighthouse, pass about 300 yards eastward of Hursell Rock buoy, and proceed as directed in the first paragraph.

From Hen and Chickens light vessel.—Steer 60° true (**ENE** ½ **E** mag.) for 6 miles, passing about ½ mile southward of Mishaum Ledge gas and bell buoy and Wilkes Ledge buoy. When

Dumpling Rock lighthouse bears 342° true (*N* ⅜ *W* mag.) steer 42° true (**NE** ⅞ **E** mag.) for 3⅜ miles to a position ½ mile southward of Hursell Rock buoy. Then steer 335° true (**N** by **W** mag.) for Palmer Island lighthouse showing just eastward of Butler Flats lighthouse, pass about 300 yards eastward of Hursell Rock buoy, and proceed as directed in the first paragraph.

Dangers.—The dangers in the entrance of Buzzards Bay are described on page 83.

West Island Shoal extends nearly 1 mile southward from West Island, and for half this distance is mostly bare at extreme low water; for the remainder of the distance the depths range from 10 to 18 feet. A buoy (can, black, No. 9) is placed off the end of the shoal. A small ledge with 13 feet over it lies ⅜ mile westward, and another with 16 feet over it lies nearly 1 mile southwestward, from the buoy.

Hursell Rock, with 16 feet over it, lies 2⅝ miles 76° true (**E** mag.) from Dumpling Rock lighthouse, and is marked on its eastern side by a buoy (spar, red and black horizontal stripes). Broken ground with depths of 25 feet or less extends ⅜ mile southwestward from the rock. The range of Egg Island beacon and Rodgers School leads westward of the broken ground, and Palmer Island lighthouse open just eastward of Butler Flats lighthouse leads eastward of the rock.

A rock with 21 feet over it lies 1¼ miles south-southeastward from Hursell Rock, and on the range of Butler Flats and Palmer Island lighthouses.

Mosher Ledge is nearly ⅝ mile long, with depths of 7 to 18 feet. The shoalest water is near its southern end and lies 1 mile southward (true) from Sconticut Point. Depths of less than 25 feet extend nearly ⅜ mile southward from the ledge to the red bell buoy.

West Island Ledge is on the north side of the channel between West Island and Sconticut Point; it has a number of rocks showing bare at low water, and the depths over it range from 2 to 10 feet. A buoy (spar, red, No. 2) is placed on the southern end of the ledge.

Henrietta Rock, with 11 feet over it, lies nearly 1 mile southwestward from Sconticut Point, and is marked by a buoy (spar, red and black horizontal stripes).

Brooklyn Rock, with 18 feet over it, lies in the middle of the eastern channel between North Ledge and Henrietta Rock, and is marked by a buoy (spar, red and black horizontal stripes).

An 18-foot spot lies 450 yards northwestward from Brooklyn Rock, and 400 yards eastward of the edge of North Ledge.

Packet Rock Ledge, and **Packet Rock** with a depth of 5 feet, is the western part of the shoal making westward from the south end of Sconticut Neck; the western edge of the shoal is marked by a buoy (spar, red, No. 6). There is a black spar buoy 350 yards northeastward of the red buoy, and a red spindle nearly ⅜ mile eastward of the red buoy.

Phinney Rock, with 11 feet over it, lies ⅞ mile west-northwestward from Hursell Rock and is marked by a buoy (spar, black, No. 1A).

North Ledge is nearly ½ mile long and 450 yards wide; it lies between the Eastern and Middle Channels, and has depths of 9 to 18 feet over it. The eastern edge of the ledge is marked by two buoys, the southern (can, black, No. 3) and the northern (spar, black, No. 3A).

Old Bartlemy is a rock with ½ foot over it on the edge of the shoal which extends 400 yards eastward from Clark Point. A buoy (spar, black, No. 7) marks the edge of the shoal.

The range of Egg Island beacon and Rodgers House leads over the westerly edge of broken ground, with depths of 18 to 20 feet, which extends nearly 1 mile southward from buoy No. 10, opposite Butler Flats lighthouse.

1A. Entering by the Middle Channel.—Follow the directions in section 1 from Vineyard Sound or Hen and Chickens light vessels to a position ½ mile southward of Wilkes Ledge buoy, with Dumpling Rock lighthouse bearing 342° true (*N* ⅜ *W* mag.). Pass ¼ mile eastward of Wilkes Ledge buoy, and steer 6° true (**N** by **E** ¾ **E** mag.) for Egg Island beacon in range with the large high standpipe in Fairhaven, and pass westward of the buoy (spar, red, No. 6) off the southwesterly side of Great Ledge. The course leads to the entrance of the dredged channel eastward of Butler Flats lighthouse. Anchor ½ mile southward of Butler Flats lighthouse, in 4 to 5 fathoms. To go to the inner harbor follow the directions in section 2.

Dangers.—**Wilkes Ledge** is about ⅜ mile in diameter with depths less than 24 feet, and has a least depth of 9 feet near its northern side. The middle of the ledge lies nearly 1¾ miles 162° true (**S** ⅜ **E** mag.) from Dumpling Rock lighthouse, and the ledge is marked on its southern side by a buoy (can, red and black horizontal stripes); the buoy should be given a good berth.

The Sandspit is 600 yards long and has 10 to 18 feet over it. Its eastern end lies ⅝ mile southeastward from Dumpling Rock lighthouse, and is not marked; its western end is marked by a buoy (bell, red), which lies nearly ½ mile south-southeastward from the lighthouse.

Great Ledge is ¼ mile in diameter, and near its middle has 1 foot over it. The ledge is marked by two buoys—black spar buoy No. 7 on its eastern side, and red spar buoy No. 6 on its southwestern side. An 18-foot spot lies ¼ mile westward of buoy No. 6.

Middle Ledge, with 5 feet over it, and Inez Rock, with 11 feet over it, lie on the western side of Middle Channel, 1¼ and 1⅝ miles, respectively, 24° true (**NE** ⅝ **N** mag.) from Dumpling Rock lighthouse. Each is marked by a red and black horizontally striped spar buoy; an 18-foot spot lies nearly 250 yards northeastward from Middle Ledge buoy.

Phinney Rock is described under section 1.

Church Rock and **Decatur Rock** are a part of two ledges nearly 800 yards long, lying on the eastern side of Middle Channel southward of North Ledge. The former has a depth of 15 feet, and the latter 7 feet over it. The

southern end of the ledges (Church Rock) is marked by a buoy (spar, red, No. 6A), and the northwestern end (Decatur Rock) is marked by a buoy (spar, red, No. 8).

North Ledge is described under section 1; the buoys marking the eastern side of this ledge should be given a berth of ⅜ mile or more when in the Middle Channel. An 18-foot spot lies westward of North Ledge and 160 yards westward of the range of Egg Island beacon and the standpipe in Fairhaven.

Old Bartlemy is described under section 1.

1B. Entering by the West Channel.—*From Vineyard Sound light vessel.*—Steer 10° true (**NNE** mag.) for 3⅜ miles, passing ⅝ mile westward of Sow and Pigs buoy and to a position ½ mile northwestward of Ribbon Reef buoy, with Cuttyhunk lighthouse bearing 127° true (*SE* ½ *S* mag.) distant 2 miles. Then steer 26° 30′ true (**NE** ½ **N** mag.) and pass ¼ mile eastward of Mishaum Ledge gas and bell buoy and Dumpling Rock lighthouse, and 100 yards westward of the red and black horizontally striped spar buoy lying ⅝ mile southward of the lighthouse. Continue the course and pass about 600 yards eastward of Middle Ledge buoy and to a position 400 yards westward of Decatur Rock buoy (spar, red, No. 8). Then steer 6° true (**N** by **E** ¾ **E** mag.) for Egg Island beacon in range with the large, high standpipe in Fairhaven, and anchor ½ mile southward of Butler Flats lighthouse, in 4 to 5 fathoms. To go to the inner harbor follow the directions in section 2.

From Hen and Chickens light vessel.—Steer 60° true (**ENE** ½ **E** mag.) which will lead ½ mile southward of Mishaum Ledge gas and bell buoy. Pass ¼ mile eastward of this buoy and steer 26° 30′ true (**NE** ½ **N** mag.) as in the preceding paragraph.

Dangers.—The dangers until up to Wilkes Ledge are described on page 83.

Salters Point Ledge, with 2 feet over it, lies a little over 1 mile southwestward from Dumpling Rock lighthouse, and is marked on its eastern side by a buoy (spar, black, No. 5).

A rock with 17 feet over it lies nearly ¾ mile southward (true) from Dumpling Rock lighthouse, and is marked on its northerly side by a buoy (spar, red and black horizontal stripes).

Sandspit and **Great Ledge** are described under section 1A.

Rocks with 5 to 10 feet over them extend southward and southwestward from Dumpling Rock lighthouse. The eastern edge of these rocks is marked by a buoy (spar, black, No. 7), which lies 400 yards southward of the lighthouse.

Middle Ledge, Inez Rock, Church Rock, and **Decatur Rock** are described under section 1A and North Ledge and Old Bartlemy under section 1.

2. To Inner Harbor.—When southward of Butler Flats lighthouse, bring Palmer Island lighthouse in range with the middle of the draw in Fairhaven Bridge and stand in on the range, course 332° true (**N** by **W** ¼ **W** mag.), passing eastward of Butler Flats lighthouse and black spar buoy No. 9, which marks the edge of Butler Flats.

Continue close on the range after passing Butler Flats lighthouse; a number of buoys will be seen ahead. Leave these buoys on the side indicated by their color, giving them a berth of about 40 yards, until up with red spar buoy No. 12, and the point at Fort Phoenix is a little forward of the starboard beam. Then steer 347° true (**N** mag.) for the middle of Crow Island, and leave red spar buoy No. 14 about 50 yards on the starboard hand and black spar buoy No. 15 on the port hand. When 250 to 500 yards above the latter buoy anchor in 23 to 26 feet, soft bottom, with Egg Island beacon in range with or slightly open from the point at Fort Phoenix.

Dangers.—**Butler Flats** make off ⅜ mile from the western shore, and have 4 to 12 feet over them. The northeastern edge is marked by a buoy (spar, black, No. 9), and Butler Flats lighthouse is about 200 yards inside the eastern edge.

Egg Island Flat is the extensive shoal which lies on the eastern side of the channel and surrounds Egg Island beacon, extending ¾ mile southeastward from it. The shoalest part of the flat is northeastward and eastward from the beacon. A buoy (spar, red, No. 10) is placed in 18 feet, about 450 yards southward of the beacon, as a guide to keep vessels off the shoal part of the flat. **Egg Island beacon** is a white granite cone with spindle and vane on top.

Eleven-foot Bank makes off from the western shore about ½ mile southward of Palmer Island lighthouse; it has from 10 to 12 feet on its outer part, and is marked at its eastern edge by a buoy (spar, black, No. 11).

Palmer Island Shoal surrounds Palmer Island and extends nearly ¼ mile southward from it. The eastern edge is marked by two buoys (spars, black, Nos. 13 and 15).

Fort Flat extends southward and westward from **Fort Phoenix**, the eastern point at the entrance to the inner harbor. The western edge of the flat is marked by two buoys (spars, red, Nos. 12 and 14).

Dix Ledge has 5 feet over it and lies well over toward the eastern shore of the inner harbor, east-northeastward from Palmer Island lighthouse; it is marked on its western side by a buoy (spar, red, No. 16).

Crow Island lies in the northeastern part of the harbor, about 160 yards from the upper wharves in Fairhaven. The water is shallow eastward and northeastward of the island; there is 7 to 9 feet southward and westward of the island.

A flat with 7 to 9 feet over it fills the western side of the harbor for a distance of nearly ½ mile above Palmer Island. Its eastern edge is abrupt, and its direction is 315° true (**NNW** ⅞ **W** mag.).

APPONAGANSET BAY,[1]

sometimes called Padanaram Harbor, is the bight 2 miles northward of Dumpling Rock lighthouse, and is the approach by water to the village of **South Dartmouth** (**Padanaram**). On the south side of the entrance is the village of **Nonquitt**. The extension of the bay above the bridge at South Dartmouth is known as Apponaganset River, into which several small streams flow.

Apponaganset Bay is of little importance; small coasting vessels occasionally enter with cargoes of coal and building material for local use, and small yachts sometimes anchor here during the summer, but the anchorage is insecure in southeasterly gales. A breakwater extends 700 feet southward from the shoal at Ricketsons Point, and is marked at its southerly end by a red light during the summer. The approach to the bay is obstructed by numerous ledges and rocks, and a stranger should not attempt to enter except in the daytime with clear weather.

SAILING DIRECTIONS, APPONAGANSET BAY.

The following directions are good for a draft of 12 feet or less, in the daytime when the aids can be seen, and lead to an anchorage inside the breakwater.

FROM EASTWARD.—Coming down Buzzards Bay pass ¼ mile southward of West Island Shoal buoy (can, black, No. 9), steer 262° true (**W** ½ **N** mag.), and pass close to Mosher Ledge bell buoy and midway between Phinney Rock and Church Rock buoys. When about ¼ mile southwestward of Middle Ledge buoy, Dumpling Rock lighthouse bearing 206° true (*SW* ½ *S* mag.), steer 316° true (**NNW** ¾ **W** mag.), pass midway between Hussey Rock and Lone Rock buoys, and enter Apponaganset Bay southward of the breakwater. Anchorage can be selected when inside the breakwater as far up as 200 yards northwestward of Dartmouth Rock buoy, in 13 to 17 feet, sticky bottom.

FROM WESTWARD.—Follow the directions in section 1 B for New Bedford Harbor to a position ¼ mile eastward of Dumpling Rock lighthouse. Then steer 352° true (**N** ½ **E** mag.) and pass about 300 yards eastward of White Rock and Hussey Rock buoy. Pass midway between the latter buoy and Lone Rock buoy, and steer 316° true (**NNW** ¾ **W** mag.) into the harbor as in the preceding paragraph.

Dangers.—The principal dangers, **Hursell Rock, Phinney Rock, Church Rock,** and **Middle Ledge,** are described in the sailing directions for New Bedford Harbor.

White Rock and **Ragged Rocks** show above water, and lie about ½ mile offshore and about the same distance northward of Dumpling Rock lighthouse. **Fatal Rock**, with 3 feet over it, lies westward of Ragged Rocks, and is marked on its north side by a buoy (spar, red and black horizontal stripes).

Hussey Rock, with 4 feet over it, is nearly ⅝ mile offshore, and a little over 1 mile northward of Dumpling Rock lighthouse, and is marked by a buoy (spar, black, No. 1).

Lone Rock, with 2 feet over it, and marked by a buoy (spar, red and black horizontal stripes), lies 1⅜ miles north-northeastward from Dumpling Rock lighthouse.

MATTAPOISETT HARBOR[2]

lies about 5 miles northeastward of New Bedford Harbor, and is marked on its north side by **Ned Point lighthouse.** The entrance, between **Angelica** and **Strawberry Points** on the east, and **Mattapoisett Neck** on the west, is about 1½ miles wide, but is much obstructed by shoals and ledges, between which a buoyed channel leads to the anchorage off the village of **Mattapoisett,** which is situated on the north shore about ¾ mile above Ned Point. The harbor is exposed to southeasterly winds, but the ledges at the entrance somewhat break the sea from that direction. It is little frequented except by yachts. The carrying trade of Mattapoisett is comprised in a few cargoes of coal and building material for local use. The least depth in the channel as far as the anchorage off the village is 14 feet. A draft of 8 feet may be taken to the wharves and 14 feet to the anchorage off Ned Point. Strangers should not attempt to enter at night.

Tides.—The mean rise and fall of tides is 4.1 feet.

SAILING DIRECTIONS, MATTAPOISETT HARBOR.

FROM WOODS HOLE.—Passing 250 yards eastward of Naushon Point Shoal bell buoy steer 331° true (**N** by **W** ⅜ **W** mag.) for 6¼ miles to a position ¼ mile eastward of Nyes Ledge buoy, with Ned Point lighthouse bearing 324° true (**NNW** mag.). Then steer 313° true (**NW** by **N**

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$; **252**, scale $\frac{1}{20,000}$, price of each $0.50.

[2] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$; **251, 252**, scale $\frac{1}{20,000}$; price of each $0.50.

mag.), leaving black buoys Nos. 1, 3, and 5 on the port hand, and red buoy No. 4 over 100 yards on the starboard hand. When Barstow Rock buoy (spar, red and black horizontal stripes) is about 200 yards on the starboard beam, steer 320° true (**NNW** ⅜ **W** mag.) for the stone wharf with small coal pocket at Mattapoisett. Anchor about ¼ mile from the northeast shore of the harbor between Ned Point lighthouse and the wharves, in 13 to 17 feet.

FROM QUICKS HOLE.—When eastward of Lone Rock buoy steer 25° true (**NE** ⅝ **N** mag.) for 9¾ miles with Bird Island lighthouse ahead. When Ned Point lighthouse bears 324° true (*NNW* mag.) steer for it to a position ¼ mile eastward of Nyes Ledge buoy. Then steer 313° true (**NW** by **N** mag.) and proceed as directed in the preceding paragraph.

FROM NEW BEDFORD.—Pass about 250 yards southeastward of West Island Shoal buoy (can, black, No. 9), and steer 32° true (**NE** mag.) for 3¾ miles. Pass southeastward and ¼ mile eastward of Nyes Ledge buoy, steer 313° true (**NW** by **N** mag.), and enter as directed in the first paragraph.

Dangers.—A rock with 17 feet over it lies ⅞ mile east-northeastward from West Island Shoal buoy.

Cormorant Rock, which shows bare at half tide and is marked by a black spindle with cage, lies 1⅜ miles east-northeastward from the easterly point of West Island and ⅞ mile south-southeastward from **Ram Island**, the low, grassy island off Mattapoisett Neck. Ledges with little water over them surround the spindle to a distance of 150 yards, and depths of 18 to 21 feet extend ¼ mile southward from it; a rock with 14 feet over it lies ¼ mile east-northeastward from the spindle. There is a channel with a depth of about 15 feet between the rock and Ram Island.

Nyes Ledge is a large, detached ledge, with a least depth of 7 feet over it, lying nearly 1½ miles southeastward of Mattapoisett Neck, and is marked off its southeasterly end by a buoy (can, black). Bird Island lighthouse bearing 32° true (**NE** mag.) leads ¼ mile southeastward of the ledge, and Ned Point lighthouse bearing 324° true (**NNW** mag.) leads nearly ¼ mile northeastward of it.

Mattapoisett Ledge extends nearly 1 mile southeastward from Mattapoisett Neck, has a depth of 1 foot nearly ⅝ mile from the shore, and is marked at its easterly end by a buoy (spar, black, No. 1).

Gallatin Rock, with 10 feet over it, lies on the western side of the entrance, 1⅛ miles 161° true (**S** ½ **E** mag.) from Ned Point lighthouse, and is marked on its easterly side by a buoy (spar, black, No. 3).

Sunken Ledge has 3 feet over it, lies ¼ mile from the western shore, and is marked on its easterly side by a buoy (spar, black, No. 5).

Snow Rock, with 5 feet over it, lies on the eastern side of the channel, nearly ¾ mile 162° true (**S** ⅜ **E** mag.) from Ned Point lighthouse, and is marked by a buoy (spar, red, No. 4).

Barstow Rock, with 8 feet over it, lies a little over ½ mile 171° true (**S** ⅜ **W** mag.) from Ned Point lighthouse, and is marked on its northeast side by a buoy (spar, red and black horizontal stripes).

Ned Point Shoal makes off about 400 yards southeastward from the point and is marked by a buoy (spar, red, No. 6) off its end.

Landing Rock, with 3 feet over it, lies 125 yards east-southeastward from the stone wharf on the northern shore of the harbor, and is marked by a buoy (spar, red, No. 8).

SIPPICAN HARBOR [1]

makes into the north shore of Buzzards Bay about 2½ miles northeastward from Mattapoisett entrance. The entrance is marked on the easterly side by Bird Island lighthouse, and on the westerly side by a prominent large house on **Blake Point** (Charles Neck). The entrance is about 1⅛ miles wide, and has few dangers. Above the entrance the width of the harbor gradually lessens, and at Ram Island, 2¼ miles above Bird Island lighthouse, the width between the island and western shore is only 300 yards. The harbor is seldom used as an anchorage except by yachts; it is entered by a few vessels each year with cargoes of coal and lumber. The town of **Marion** is on the west shore, about 2½ miles above Bird Island lighthouse.

The depth of water in the **channel** to Nyes Wharf, abreast Ram Island, is 12 feet, and to the anchorage off the town 10 feet at low water. Some local knowledge is necessary to keep in the best water up to the town. The greatest draft entering the harbor is about 10 feet.

Pilots may be had by signaling at the entrance, westward of Bird Island, anchoring there if necessary.

Tides.—The mean rise and fall of tides is 4.2 feet.

Ice.—The harbor is usually closed to navigation for a month or more each winter.

SAILING DIRECTIONS, SIPPICAN HARBOR.

The following directions are good for vessels of 12 feet or less draft to an anchorage in 16 to 20 feet just eastward or northward of Seal Rocks buoy, and are good for vessels of less than 9 feet draft to the anchorage off Marion. Strangers should not attempt to enter at night.

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$; **251**, scale $\frac{1}{20,000}$; price of each $0.50.

FROM SOUTHWESTWARD.—Steer for Bird Island lighthouse on a 32° true (**NE** mag.) course, which will lead over ¼ mile southeastward of Nyes Ledge buoy and The Bow Bells buoy. When the large house on Blake Point (Charles Neck) bears 332° true (*N* by *W* ¼ *W* mag.) steer 346° true (**N** mag.), passing about midway between The Bow Bells buoy and Centerboard Shoal buoy, over 100 yards eastward of Mendells Rock buoy (spar, black, No. 1A), and close eastward of Seal Rocks buoy (spar, black, No. 1). Then steer 330° true (**N** by **W** ½ **W** mag.) for Little Island, and leave Black Rock buoy (spar, black, No. 3) about 30 yards on the port hand. Leave red spar buoy No. 4 about 25 yards on the starboard hand, steer 348° true (**N** by **E** mag.), and pass about 75 yards eastward of Little Island. Anchor about 200 yards eastward of black buoy No. 5, in 12 to 13 feet.

FROM WOODS HOLE.—Passing 250 yards eastward of Naushon Point Shoal bell buoy a 348° true (**N** ⅛ **E** mag.) course made good for 9½ miles will lead to Seal Rocks buoy (spar, black, No. 1), passing about midway between The Bow Bells buoy and Centerboard Shoal buoy, and over 100 yards eastward of Mendells Rock buoy (spar, black, No. 1A). Pass close eastward of Seal Rocks buoy (spar, black, No. 1) and steer 330° true (**N** by **W** ½ **W** mag.) as in the preceding paragraph.

Dangers.—The Bow Bells, a small ledge with 11 feet over it, lies ¾ mile from shore and nearly 1½ miles 226° true (**SW** by **W** ¼ **W** mag.) from Bird Island lighthouse; it is marked on its southeast side by a buoy (spar, black, No. 11).

Bird Island is joined to the point north-northeastward by a bar with little water over it. Shoals extend over ⅜ mile eastward from the island, and are marked by a black spar buoy. Spots with 18 feet over them lie over ½ mile southward of the island, and rocks with 7 to 9 feet over them lie nearly ¼ mile westward of it. **Centerboard Shoal,** with 12 feet over it, lies ½ mile southwestward of Bird Island lighthouse, and is marked off its southwesterly side by a buoy (spar, red, No. 2).

Mendells Rock, with 4 feet over it, is at the end of a shoal which extends ¼ mile eastward from Blake Point, and is marked on its easterly side by a buoy (spar, black, No. 1A).

Seal Rocks, mostly bare at low water, extend 400 yards off the northeasterly side of Blake Point, and are marked off the easterly side by a buoy (spar, black, No. 1).

Ram Island is low and partly wooded. The narrow channel westward of the island is marked on the westerly side by Black Rock buoy (spar, black, No. 3), and on its easterly side by red spar buoy No. 4. The currents sometimes have considerable velocity.

Little Island is partly wooded on its northeasterly end. There are two black buoys about 100 yards from the westerly shore northward of Little Island. The deeper water in the harbor (12 to 13 feet) favors Little Island and the first buoy (No. 5).

WAREHAM RIVER [1]

empties into the northern end of Buzzards Bay, the entrance lying 3½ miles northward of Bird Island lighthouse and 3½ miles northwestward of Wings Neck lighthouse. The river is the approach to the town of Wareham, situated on the west bank at the head of navigation, nearly 2 miles above its mouth. Off the entrance and in the river are extensive shoals and numerous ledges, through which a narrow, buoyed channel, with a depth of about 9 feet, leads from the deep water of the bay to the wharves of the town. There is no anchorage in the river except in the channel, but vessels waiting for a fair wind or tide usually anchor off the mouth of the river northeastward of **Great Hill.** The latter is high and wooded and is marked at its eastern end by a prominent, large stone building.

The town of **Wareham** has extensive iron manufactories. The deepest draft of the vessels trading here is about 12 feet. There is from 5 to 10 feet of water at the wharves.

Pilots are necessary for strangers, and may be obtained by making signal when off Bird Island lighthouse or at anchor off Great Hill. State pilotage is not compulsory for coasting vessels.

Towboats are usually employed by the larger vessels, especially in winter. They may be ordered from New Bedford by telegraph or telephone at Wareham.

Supplies.—Coal, water, and provisions can be had at Wareham.

Tides.—The mean rise and fall of tides is 4.1 feet.

Tidal currents.—The velocity of the currents is not great enough to materially interfere with a vessel having a good breeze. During the first half of the ebb the current below the wharves of the town sets across the flats westward of the channel; and during the whole of the ebb it sets across the flats eastward of the channel below **Long Beach,** at the mouth of the river.

Ice.—The river is closed part of each winter by ice.

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[1] Shown on charts **112,** scale $\frac{1}{80,000}$; **249,** scale $\frac{1}{40,000}$; **251,** scale $\frac{1}{20,000}$; price of each $0.50.

SAILING DIRECTIONS, WAREHAM RIVER.

The following directions lead to the anchorage off Great Hill, above which no stranger should go without a pilot.

Follow the directions for Buzzards Bay, and pass ¾ mile eastward of Bird Island lighthouse. Then steer 351° true (**N** ⅜ **E** mag.), pass about 350 yards eastward of the northeastern end of Great Hill, and anchor about 400 yards eastward of the wharf on its northeastern side, in 15 feet, soft bottom.

Dangers.—**Bird Island Reef** extends about ⅜ mile eastward from Bird Island, and is part of the shoal making southeastward and eastward from Great (Sippican) Neck. It has depths of 4 to 6 feet over it for a distance of over ¼ mile from the island, and is marked off its eastern side by a buoy (spar, black, No. 13).

Dry Ledge, bare at half tide, lies 1 mile from the western shore and east-southeastward of Great Hill. Off the southwestern end of the ledge is a buoy (spar, red, No. 12), which lies nearly 2 miles 307° true (**NW** ½ **N** mag.) from Wings Neck lighthouse. The depths north of the ledge, to Little Bird Island, range from 4 to 9 feet.

Wings Cove Flats extend southward from Great Hill Point, the southeastern point of Great Hill, and are marked off their end by a buoy (spar, black, No. 15).

Great Flats is an extensive shoal extending southward from the eastern side of the entrance to Wareham River. The southern end of this shoal is about 200 yards northeastward of the wharf on the northeastern end of Great Hill, and is marked by a buoy (spar, red, No. 14).

CUTTYHUNK HARBOR [1]

is on the south side near the western entrance of Buzzards Bay, and is formed by a bight between the eastern end of Cuttyhunk and western end of Nashawena Island. It is about ¾ mile wide, and affords anchorage in 12 to 24 feet, but is exposed to northeasterly winds. Northward of the harbor are **Penikese** and **Gull** Islands and a number of ledges, which shelter it from that direction. The shores on both sides of the harbor are foul, and the anchorage is in the middle; it is sometimes used by weather-bound coasting vessels and fishermen. The principal dangers are marked by buoys, and the approach from westward is marked by **Cuttyhunk lighthouse**, which is near the western end of the island. Canapitsit Channel, the dredged cut between Nashawena and Cuttyhunk Islands, has a depth of 6 feet, and is marked by several buoys.

On the southwest side of the harbor are two jetties at the entrance of **Cuttyhunk Pond**. Between the jetties a channel with a least width of 60 feet and depth 12 feet has been dredged to the town landing of **Gosnold** on the south side just inside the entrance of the pond. A turning basin of the same depth 300 feet long and 150 feet wide has been dredged at the wharf. The pond is partly dry at low water, and has depths up to 3 feet.

Storm warning displays are made at the life-saving station on the south side of the harbor.

SAILING DIRECTIONS, CUTTYHUNK HARBOR.

Strangers should not enter except in the daytime with clear weather and a fair wind. If entering from westward a greater draft than 15 feet should not be taken in.

FROM EASTWARD.—When westward of Quicks Hole and Lone Rock, steer 246° true (**W** by **S** mag.) for the northern end of Cuttyhunk Island, giving the northern shore of Nashawena Island a berth of about ½ mile. When the east end of Gull Island is on the starboard beam, steer 223° true (**SW** by **W** mag.), heading for red spar buoy No. 6 and passing 300 yards southward of black spar buoy No. 5. When red spar buoy No. 6 is ¼ mile distant, anchor in the middle of the harbor eastward of the buoy. Or, if of less than 9 feet draft, steer 184° true (**S** by **W** ½ **W** mag.) for the life-saving station on the south side of the harbor, and anchor a little over ¼ mile from the shore, in 16 to 18 feet.

FROM WESTWARD.—Steer for Cuttyhunk lighthouse on any bearing between 68° true (**E** ¾ **N** mag.) and 122° true (**SE** mag.), which leads between Sow and Pigs Reef and Ribbon Reef. Pass ½ mile northward of the lighthouse and steer 49° true (**NE** by **E** ½ **E** mag.) for black spar buoy No. 1. Pass about 30 yards southward of this buoy, steer 82° true (**E** ½ **S** mag.), and pass about 100 yards northward of the red and black horizontally striped buoy marking Middle Ledge. Pass about midway between Middle Ledge buoy and black spar buoy No. 3, and steer 122° true (**SE** mag.) for about ¼ mile. Then steer 184° true (**S** by **W** ½ **W** mag.) for the life-saving station on the south side of the harbor. Anchor near midharbor, eastward of the southermost red buoy (No. 6), in 3 to 4 fathoms.

Remarks and dangers.—When approaching from eastward, care should be taken to avoid Lone Rock, which lies about ¾ mile northward from the northeastern end of Nashawena Island. Black spar buoys Nos. 5 and 3 mark the southern side of a rocky ledge making southward and westward from Gull Island. Shoal water extends from Penikese

[1] Shown on charts **112**, scale $\frac{1}{80,000}$; **249**, scale $\frac{1}{40,000}$; price of each $0.50; **297**, scale $\frac{1}{10,000}$, price $0.25.

Island to Gull Island, and no attempt should be made to pass between them. The eastern point at the entrance and the eastern shore of the harbor should be given a berth of over 300 yards.

Shoals extend out about ½ mile northeastward from Cuttyhunk Island, **Whale Rock** and **Pease Ledge** being the names given to the parts which show at low water. A detailed description of the dangers would be of but little use; vessels must be guided mainly by the buoys and the chart.

WESTPORT HARBOR [1]

is the name given to the small anchorage just inside the mouth of **Westport River**, which empties into the northern part of the large bight between Gooseberry Neck and Sakonnet Point.

Westport River has a narrow and crooked channel, with a depth of 7 feet on the outer bar and 5 feet on the inner bar below the village of **Westport Point**, which is about 1½ miles above its mouth, on the point of land between the two branches. The channel is well marked by buoys, but is too narrow and crooked to be followed, except with local knowledge; 9 feet is the deepest draft that can be taken to the village at high water. There is a depth of 10 feet alongside some of the wharves. In southerly gales a heavy sea breaks on the bar at the entrance, making it unsafe to enter the harbor. About 1 mile above its mouth Westport River divides into two branches, East Branch and West Branch, which have narrow and shallow channels and are only navigated by small craft.

Vessels should not attempt to enter at night. On the western side of the entrance is a peculiar, rounded nubble, about 30 feet high, on which a flagstaff is erected, which serves as a guide to the entrance.

Tides.—The mean rise and fall of tides is 3.1 feet.

The **tidal currents** set in and out of the entrance with considerable velocity, and should be allowed for.

SAILING DIRECTIONS, WESTPORT HARBOR.

FROM EASTWARD.—From a position 1 mile westward of Hen and Chickens light vessel steer 336° true (**N** by **W** mag.), pass about ⅜ mile westward of Lumber Rocks buoy, and the same distance eastward of Two Mile Rock bell buoy and spindle. When the flagstaff on The Nubble, on the western side of the entrance, bears 302° true (**NW** mag.), steer for it and anchor on this line before reaching the entrance buoys, in 4 fathoms or more, until a pilot is obtained.

FROM VINEYARD SOUND LIGHT VESSEL.—A 336° true (**N** by **W** mag.) course will lead about 1 mile westward of Hen and Chickens light vessel.

FROM WESTWARD.—Pass about 1 mile southward of Sakonnet lighthouse and ¼ mile southward of Schuyler Ledge bell buoy and steer 63° true (**ENE** ¾ **E** mag.). Pass ⅜ mile northward of Elisha Ledge buoy, and pass southward of Two Mile Rock bell buoy. When past this buoy steer 347° true (**N** mag.) and pass about ¼ mile eastward of Two Mile Rock spindle. When the flagstaff on The Nubble, on the western side of the entrance, bears 302° true (**NW** mag.), steer for it and anchor on this line before reaching the entrance buoys, in 4 fathoms or more, until a pilot is obtained.

Remarks and dangers.—The bight eastward and northeastward of Two Mile Rock spindle is free from dangers, and the shore can be approached as close as 400 yards, but the western side of Gooseberry Neck is foul, and should be given a berth of over ½ mile. Close attention should be given the buoys, which are the best guides for a stranger.

There are numerous rocks and shoals around Gooseberry Neck and along the shore from Westport entrance to Sakonnet Point, and only the most important are described.

Hen and Chickens and **Old Cock** are described on page 83.

Lumber Rock, with 5 feet over it, lies nearly ⅝ mile southwestward from the southern end of Gooseberry Neck, and is marked by a buoy (spar, red, No. 2) on its southern side. Shoals extend from this rock to Gooseberry Neck, and ½ mile northward to Browing Ledge, which has 6 feet over it.

Two Mile Rock lies a little over 1 mile south-southeastward from The Nubble, and is marked by a black spindle with cage, and a buoy (spar, black, No. 1), 400 yards southward of the spindle. A black bell buoy is moored ⅜ mile southward of the spindle.

Joe Burris Ledge, with 13 feet over it, lies ⅜ mile northward from Two Mile Rock spindle.

Half Mile Rock is a bare rock lying close southward of the channel into Westport Harbor.

Two Mile Ledge extends 1 mile southward from the western side of Westport entrance. It has a depth of 3 feet near its southern end, and 6 to 10 feet farther northward. Several spots with 8 to 9 feet lie between the ledge and Two Mile Rock.

Palmer Ledge, **Briggs Ledge**, and **Church Ledge** lie from ¼ to 1¾ miles westward of Two Mile Ledge, and the shore should in this vicinity be given a berth of 1¼ miles. **Elisha Ledge** and **Schuyler Ledge** are described with the sailing directions for Sakonnet River.

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[1] Shown on chart **113**, scale $\frac{1}{80,000}$, price $0.50.

SAKONNET RIVER,[1]

on the easterly side of Narragansett Bay, lies between the mainland on the east and Rhode Island on the west, and is marked on the easterly side of its southerly entrance by **Sakonnet lighthouse**. It is about 12 miles long, and is good for a depth of 13 feet to Mount Hope Bay. The width of the river varies from ¾ mile to 2 miles, except its northern end where its least width is ¼ mile. Near its northern end the river is crossed by two drawbridges, each with an opening 100 feet wide in the clear. The river is little used except by fishing vessels and small local craft. In summer a small steamer runs from Providence to Sakonnet Harbor, stopping at intermediate landings.

Sakonnet Harbor is a boat harbor ⅞ mile north-northeastward from Sakonnet lighthouse. A short breakwater extends northward from its westerly point, and there are depths of 5 to 8 feet at the steamer landing just inside the breakwater. Two bare rocks with ledges close-to lie 75 to 125 yards eastward of the wharf. The depths in the cove inside the rocks are 4 to 7 feet until 100 yards from its head.

Tiverton Four Corners and **Tiverton** are two villages on the eastern shore, about 7 and 10½ miles, respectively, above Sakonnet lighthouse. Vessels trading to Tiverton usually enter the river from Mount Hope Bay. On the northeast end of Rhode Island, northward of the railroad bridge, there is a large fish-oil factory, and a marine railway for the use of the fishing steamers.

The **channel** of Sakonnet River is good for a depth of 20 feet to High Hill Point, 6 miles above the entrance. Above this point the channel contracts and leads between extensive shoals, the depths ranging from 3 to 9 fathoms except in the draw of the railroad bridge where it is 13 feet.

Anchorages.—There is good anchorage for vessels of 20 feet or less draft in mid-river about 5 miles above Sakonnet lighthouse and just below High Hill Point, in 3½ to 4½ fathoms. Though open southward a heavy sea seldom reaches as far as the anchorage, and in southeasterly gales the water is comparatively smooth inside the mouth of the river. Fishermen seeking shelter frequently anchor on the flats in the bight northward of Fogland Point, where the depths are 10 to 14 feet.

Tides.—The mean rise and fall of tides at Sakonnet Point is 3.3 feet.

Currents.—The two bridges act as dams to maintain the water at different levels on either side of them, and cause dangerous currents through the draws. Vessels usually pass through the draws near the time of slack water, which occurs about 1 hour before the time of high and low water at Fall River.

SAILING DIRECTIONS, SAKONNET RIVER.

The following directions lead in a least depth of 20 feet to High Hill Point, and are good for steamers of 12 feet draft to Mount Hope Bay.

From Hen and Chickens light vessel steer 263° true (**W** ½ **N** mag.), or from Vineyard Sound light vessel steer 290° true (**NW** by **W** mag.), and pass at least 1 mile southward of Sakonnet lighthouse.

From Brenton Reef light vessel steer 88° true (**E** by **S** mag.) for nearly 1½ miles to a position ¼ mile southward of Seal Ledge buoy, and then steer 78° true (**E** ⅛ **S** mag.) for Sakonnet lighthouse.

From Point Judith gas and whistling buoy steer 61° true (**ENE** ⅝ **E** mag.) for Sakonnet lighthouse.

Pass ¾ mile westward of Sakonnet lighthouse and steer 1° true (**N** by **E** ¼ **E** mag.) for 4½ miles heading for High Hill Point. The course leads near the middle of the river, passing ⅜ mile westward of bell buoy No. 4, and to a position ½ mile eastward of Black Point. Then steer 347° true (**N** mag.) to a position 100 yards westward of bell buoy No. 6. Then steer 7° true (**N** by **E** ¾ **E** mag.), pass 150 yards eastward of spar buoy No. 5, and continue the course heading to pass in midchannel eastward of Gould Island. When nearly up with the island steer 358° true (**N** by **E** mag.) for the draw in the first bridge and pass 250 yards eastward of Gould Island. Keep near the middle of the river until through the second draw, and then steer 9° true (**NNE** mag.), following the eastern bank at a distance of 250 yards until ½ mile northward of the second bridge to avoid a shoal with 11 feet near the middle of the river. Then give either bank of the river a berth of over 250 yards until in Mount Hope Bay.

Dangers.—**Elisha Ledge**, a rock with 13 feet over it, lies 2 miles 106° true (**SE** by **E** ⅜ **E** mag.) from Sakonnet lighthouse, and is marked by a buoy (can, red and black horizontal stripes).

Schuyler Ledge, the outermost of the ledges southward of Sakonnet Point, has 8 feet over it and lies ¾ mile 156° true (**S** by **E** mag.) from Sakonnet lighthouse, and is marked by a buoy (bell, red, No. 2).

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[1] Shown on charts 113, scale $\frac{1}{80,000}$, price $0.50; 353, scale $\frac{1}{40,000}$, price $0.75.

Cormorant Reef, with 2 feet over it, lies 2 miles 275° true (**WNW ⅜ W** mag.) from Sakonnet lighthouse and about ¼ mile southward of Cormorant Rock, and is marked on its south side by a buoy (spar, black, No. 1).

Cormorant Rock is a bare, dark rock off the western side of the entrance to Sakonnet River, lying about ¾ mile southward of Sachuest Point, the southern point of Sachuest Neck. Vessels should not pass between the rock and Cormorant Reef.

The western side of the river from the entrance nearly to Sandy Point should be given a berth of ⅜ mile to avoid spots with 18 feet which make out that distance in places. Rocks extend nearly ¼ mile off the northeast side of **Sachuest Neck**; a ledge with 10 feet over it, lying ½ mile northeastward from the northerly end of Sachuest Neck, is marked by a buoy (spar, black, No. 3). **Black Point** is a rocky bluff on the western side 4½ miles northward of Sakonnet lighthouse. **Sandy Point** and **McCurry Point** are low and backed by highland, and lie 1⅜ and 2¾ miles northward from Black Point.

The eastern side of the river is bolder than the western side. The principal dangers are a reef, with bare rocks near the end, which extends ½ mile southwestward from **Church Point**, and is marked at its end by a buoy (bell, red, No. 4); and **Almy Rock**, bare at low water, lying 350 yards southwestward from Fogland Point, and marked 350 yards off its southwest side by a buoy (bell, red, No. 6). A shoal with 15 feet over it lies 150 yards westward of buoy No. 6. **Church Point** is level and **High Hill Point** is a prominent small hill, and both have bluffs at the water. **Fogland Point** is projecting and prominent; its westerly and northerly sides should be given a berth of over 200 yards.

The western half of the river from McCurry Point to the stone bridge is shoal, with depths of 7 to 14 feet, and shoals fill the broad bights in the eastern shore northward of Fogland Point. The channel between the shoals is about ¼ mile wide, and leads from black spar buoy No. 5, off McCurry Point, toward **Gould Island**. The latter is high and wooded; a shoal with 15 feet at its end extends 600 yards southward from it.

NARRAGANSETT BAY.[1]

The entrance to this bay is between **Brenton Point**, the southwestern point of Rhode Island, on the east and Point Judith Neck on the west. The length of the bay, from the entrance to its northern extremity at the mouth of the Providence River, is 16 miles. It is the approach by water to the cities of Newport, Providence, Fall River, and Taunton, and to a number of towns and villages, the most important of which are Bristol, Wickford, and Greenwich. The bay is well marked by lights, making its navigation easy either day or night in clear weather. Conanicut and Prudence Islands and several smaller ones lie in the bay and divide it into two passages.

Eastern Passage, between Rhode Island on the east and Conanicut and Prudence Islands on the west, is good for a least depth of about 10 fathoms in the channel for a distance of 12 miles above the entrance, and a depth of about 4½ fathoms to Providence River entrance, but it requires some local knowledge to carry the latter depth above the entrance to Bristol Harbor. It is also the most direct passage to Newport, Bristol, Mount Hope Bay, and Taunton River.

Western Passage, between Conanicut and Prudence Islands on the east and the mainland on the west, is the approach to Dutch Island Harbor, Wickford, Greenwich, and Providence River. The dredged cut south of Warwick Neck and the cut east of Rocky Point form a passage through which a depth of 25 feet can be taken to Providence. Strangers of over 16 feet draft rarely go above Dutch Island Harbor without a pilot; but vessels of 16 feet draft should have no difficulty in going to the head of the bay and Providence by following the directions.

Anchorages.—The principal anchorages for vessels seeking shelter are Newport Harbor, in the Eastern Passage, and Dutch Island Harbor, in the Western Passage. These harbors afford anchorage with good holding ground for vessels of the deepest draft, and are used by coasting vessels on the passage between Vineyard Sound and Long Island Sound. Good anchorage will be found almost anywhere in the bay under the lee of the islands or the shore, and vessels becalmed or at night frequently anchor. Point Judith Harbor of Refuge is just west of the point.

Pilots for Narragansett Bay and the harbors in Rhode Island will sometimes be found cruising between Point Judith and Cuttyhunk and also off Block Island. A pilot can be obtained by making signal off Block Island, Beavertail lighthouse, and Brenton Point life-saving station. If a vessel passes into the bay without having been boarded by a pilot, one may be obtained at Newport or Dutch Island Harbor. State pilotage is compulsory for foreign vessels, or vessels from a foreign port (see pilot laws for the State of Rhode Island in Appendix II).

Towboats are frequently used by vessels in the bay, especially those bound to Providence by the Western Passage, and may sometimes be found off the entrance or in Newport Harbor. It is usual for vessels entering by the Western Passage to put into Dutch Island Harbor, and from there telephone to the towboat office at Providence. A towboat may be had by making signal off Point Judith, Beavertail lighthouse, or Brenton Point life-saving station.

Quarantine.—The quarantine laws for Rhode Island and Massachusetts govern the ports in the respective States. Local boards of health have the power to establish rules for the quarantine of their ports. (See Appendix II.)

Marine hospital.—There are relief stations of the United States Public Health and Marine-Hospital Service at Newport and Providence.

Supplies.—Coal, water, and ship-chandler's stores can be obtained at Newport, Providence, and Fall River, and provisions at most of the towns on the bay or its tributaries.

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[1] Shown on charts 113, scale $\frac{1}{80,000}$, price $0.50; 353, scale $\frac{1}{40,000}$, price $0.75; and in part on chart 353a, scale $\frac{1}{20,000}$, price $0.40.

Repairs to the hulls of vessels can be made at Newport, Fall River, and Providence, and to the machinery of steamers at Providence.

Storm warning displays of the United States Weather Bureau are made at Point Judith, Newport, Newport Torpedo Station (Goat Island), Saunderstown (opposite Dutch Island), Fall River, Providence, and Providence Yacht Club.

Fogs.—In the entrance to the bay and its approach fogs are more prevalent from April to October than during the rest of the year; they are brought in by winds from east through south to southwest, and are cleared off by northerly and westerly winds; their usual duration is 4 to 12 hours, but periods of 4 to 6 days have been known, with but short clear intervals. The head of the bay will sometimes be free from fog when the entrance is completely shut in.

Ice.—Navigation in the bay and its tributaries is sometimes impeded by floating ice, and in severe winters by pack or field ice. The ice breaking up in Providence River and Mount Hope Bay is set by north and northeast winds down the bay through the Eastern Passage, and if there is much ice a gorge is sometimes formed at Fort Adams, but it is of short duration. The passages are rarely closed for any length of time below Gould Island in the Eastern Passage and Dutch Island in the Western Passage. During January and February Mount Hope Bay, Bristol, Providence River, Greenwich, Warren, and Wickford are usually closed to sailing vessels unaided by steam. The inner harbor of Newport is also sometimes closed during the same months, with the exception of a channel kept open by the New York steamers.

SAILING DIRECTIONS, EASTERN PASSAGE OF NARRAGANSETT BAY.

The following directions are good for the deepest-draft vessels to the anchorage off Newport and up the bay to the entrance of Mount Hope Bay, and for a draft of 20 feet to the entrance of Providence River and to the city of Providence. Vessels of over 20 feet draft bound to Providence or Fall River should take a pilot.

Note.—Approaching the entrance in thick weather, Brenton Reef light vessel should be made and passed close-to. From the light vessel a stranger should be able to make the anchorage in Newport outer harbor by closely following the directions and paying attention to the fog signals. See also the remarks on page 30.

1. APPROACHING AND ENTERING.—*From Hen and Chickens light vessel* steer 263° true (**W** ½ **N** mag.) for 8 miles to a position 1¼ miles southward of Sakonnet lighthouse, and then steer 269° true (**WNW** ⅞ **W** mag.) for 8 miles to Brenton Reef light vessel.

From Vineyard Sound light vessel make good a 280° true (**WNW** mag.) course for 17 miles to Brenton Reef light vessel.

From Block Island.—Passing 2½ miles east-southeastward from Block Island southeast lighthouse make good an 18° true (**NNE** ¾ **E** mag.) course for 18 miles to Brenton Reef light vessel.

From Point Judith gas and whistling buoy steer 39° true (**NE** ⅝ **E** mag.) for 7 miles to Brenton Reef light vessel. Or, in clear weather, from Point Judith gas and whistling buoy a 33° true (**NE** mag.) course made good for 8¾ miles will lead nearly midway between Brenton Reef light vessel and Beavertail lighthouse and ¼ mile northwestward of Castle Hill lighthouse.

From Brenton Reef light vessel steer 9° true (**NNE** mag.) for 2 miles to a position 600 yards northwestward from Castle Hill lighthouse. Then steer 47° 30′ true (**NE** by **E** ⅜ **E** mag.) for Newport Harbor (Goat Island) lighthouse, which will lead to the anchorage in Newport Outer Harbor westward of Goat Island. Directions for proceeding up the bay are given in section 2 following.

Dangers.—The dangers off and eastward of Sakonnet Point are described in the directions for Sakonnet River.

Approaching Brenton Reef light vessel from eastward care should be taken to keep it bearing northward of 268° true (**W** by **N** mag.) to give Seal Ledge a good berth. In clear weather vessels may pass ½ mile eastward of Brenton Reef light vessel; Brenton Reef and other dangers on the easterly side of the entrance will be avoided by keeping Castle Hill lighthouse bearing eastward of 3° true (**N** by **E** ⅜ **E** mag.), and passing westward of the bell buoy off Butter Ball Rock.

Seal Ledge, with 17 feet over it, lies ⅞ mile southward from Brenton Point, and 1½ miles eastward from Brenton Reef light vessel; it is marked on its southern side by a buoy (nun, red, No. 2).

Seal Rock is a bare rock near the end of a reef which extends ½ mile from shore eastward of Brenton Point.

Brenton Reef, showing bare in places at low water, extends ½ mile south-southwestward from Brenton Point, and is marked at its southern end by a buoy (nun, red, No. 4).

Newton Rock has 3 feet over it, and is part of the ledge which extends 400 yards southward from Beavertail lighthouse, on the southern end of Conanicut Island. A red and black horizontally striped bell buoy is placed about ¼ mile southwestward of the rock and about 350 yards from the southern end of the ledge.

Butter Ball Rock, a small, bare rock about 200 yards from the southern end of Castle Hill, is marked off its western side by a red bell buoy which is 650 yards southwestward of Castle Hill lighthouse.

Kettle Bottom Rock is on the northern side of the channel about 300 yards southeastward of the eastern point of the entrance to Mackerel Cove. The rock is always bare, and there are spots with 8 to 15 feet over them northeastward of it. The shore in this vicinity should be given a berth of 500 yards.

2. From Castle Hill to Prudence Island lighthouse.—From a position 600 yards northwestward of Castle Hill lighthouse steer 47° 30′ true (**NE** by **E** ⅜ **E** mag.) for Newport Harbor (Goat Island) lighthouse. When the outer bare rocks of the Dumplings are on the port beam, and Rose Island lighthouse bears 10° true (*NNE* mag.), steer 358° true (**N** by **E** mag.), and pass ¼ mile eastward of the Dumplings and 400 yards westward of Rose Island lighthouse. When Gull Rocks lighthouse bears abeam, 88° true (*E* by *S* mag.), make good a 19° true (**NNE** ⅞ **E** mag.) course for 6½ miles, passing nearly ½ mile eastward of Gould Island lighthouse, in mid-channel westward of Dyer Island, or slightly favor Prudence Island, and to a position ¼ mile eastward of Prudence Island lighthouse. Then follow the directions of section 3 to Providence River.

From Prudence Island lighthouse directions to Mount Hope Bay and Bristol Harbor are given under those headings.

Dangers.—Dumplings are a cluster of bare and sunken rocks lying off **Bulls Point**, the southeastern point of Conanicut Island. They are easily avoided by passing over 200 yards eastward of the bare rocks.

Rose Island North Shoal extends about 300 yards northward and 550 yards northeastward from the north end of Rose Island and rises abruptly from deep water. The north end of the shoal is marked by a buoy (spar, red, No. 6) and the northeastern end by a buoy (spar, red, No. 8).

Bishop Rock Shoal, a small, detached shoal with 8½ feet over it, lies about 300 yards westward of **Bishop Rock**, the small, bare rock about ¼ mile northward from Coasters Harbor Island. The shoal is marked off its western side by a red bell buoy.

The Sisters, a small, rocky shoal, partly bare at low water, extends 200 yards from the shore and lies about ¼ mile north-northeastward from Bishop Rock. The northwest end of the shoal is marked by a buoy (spar, red, No. 10).

Coddington Cove is a good anchorage in southerly or easterly winds.

Halfway Rock, a small ledge showing bare at its southern end, lies ⅞ mile south-southwestward from the southern end of Prudence Island. A black spindle with cage is on the bare part of the ledge.

Fiske Rock, with 12 feet over it, lies ¼ mile northeastward from the spindle on Halfway Rock, and is marked by a buoy (spar, red and black horizontal stripes). Strangers should not pass between the buoy and spindle.

A shoal, partly bare at low water, extends ⅜ mile southward and southwestward from **Dyer Island**, and is marked on its western edge by a red spar buoy. A bar, with 8 to 17 feet over it, extends southward from the buoy to the shore. A shoal with 17 feet near its end extends 600 yards northward from Dyer Island, and is marked at its north end by a red spar buoy. There is a depth of 4½ fathoms 150 yards westward of the buoy.

Coggeshall Ledge has 7 feet at its end, extends nearly ⅜ mile northward from Coggeshall Point, the point northward of the coal piers at Bradford, and is marked at its northern end by a buoy (spar, red, No. 14).

3. From Prudence Island lighthouse to Providence River entrance.—From a position ¼ mile eastward of Prudence Island lighthouse steer 1° true (**N** by **E** ¼ **E** mag.) for 1 mile until Hog Island Shoal and Mussel Bed Shoals lighthouses are in range, bearing 67° true (*E* ⅞ *N* mag.). Then steer 341° true (**N** ½ **W** mag.) for 2¼ miles, passing nearly ⅜ mile westward of Popasquash Neck. When abreast the summit of Popasquash Neck and North Point of Prudence Island bears 286° true (*N W* by *W* ⅜ *W* mag.), steer 1° true (**N** by **E** ¼ **E** mag.) for 1¾ miles, or continue the course for ½ mile past the range of Conimicut and Bullock Point lighthouses, bearing 326° true (*N* by *W* ⅞ *W* mag.). Then steer 317° true (**NNW** ⅝ **W** mag.) for Conimicut lighthouse; the arched stone bridge at the entrance of Mill Gut should be a little on the starboard quarter, nearly astern. When ½ mile or less from Conimicut lighthouse, steer more northward so as to pass 200 yards northeastward of it, and then follow the directions for Providence River.

Vessels waiting for a towboat to go up to Providence generally anchor off the westerly side of Popasquash Neck.

Dangers.—Hog Island Shoal has 3 to 12 feet over it, and extends about ⅜ mile southward and southwestward from Hog Island. The southwestern end of the shoal is marked by a buoy (spar, red, No. 18). Spots with a least depth of 15 feet lie ½ mile westward from Southwest Point of Hog Island.

Shoals make off nearly ⅜ mile from the eastern shore of Prudence Island from 1⅛ miles above the lighthouse to its northern end. **Mount Tom Rock**, bare at lowest tides, is on this shoal about 350 yards from Prudence Island. A buoy (spar, black, No. 5) marks the eastern edge of the shoal, 400 yards eastward of Mount Tom Rock and 1¾ miles northward of the lighthouse.

Ohio Ledge, a small ledge with 8 feet over it, lies 1⅜ miles northeastward from North Point of Prudence Island, and nearly 1 mile westward from north point of Popasquash Neck. The ledge is near the southeastern end of an

extensive shoal, with 15 to 17 feet over it, which extends nearly 1 mile northward; it is marked on its southeast side by a gas buoy (occulting white light). At night a narrow red sector in Conimicut light covers this ledge.

Shoals, with depths of 9 to 18 feet over them, fill the bight between Warren River entrance and Nayat Point, the eastern point at entrance to Providence River. Depths less than 19 feet can be avoided by keeping Conimicut lighthouse bearing northward of 309° true (**NW** ⅝ **N** mag.) until within ½ mile of it.

Conimicut Middle Ground is the extensive shoal which makes off 1 mile from the shore south of Conimicut Point. The depths on this shoal range from 2 to 15 feet and the bottom has many rocky patches. On the eastern edge of the Middle Ground, ¾ mile southward from Conimicut lighthouse, is a black gas buoy (occulting white light).

SAILING DIRECTIONS, WESTERN PASSAGE OF NARRAGANSETT BAY.

The least depth on the sailing lines is 4 fathoms as far as Providence River entrance, but local knowledge is required for a greater draft than 16 feet.

1. Entering to Dutch Island lighthouse.—Pass close to Brenton Reef light vessel and steer 288° true (**NW** by **W** ¼ **W** mag.) for Whale Rock lighthouse until Beavertail lighthouse bears abaft the starboard beam. Then pass ⅜ to ½ mile westward of Beavertail lighthouse and steer 4° true (**N** by **E** ½ **E** mag.) for Dutch Island lighthouse, with Plum Beach lighthouse open westward of it. When ½ to ¾ mile from Dutch Island lighthouse steer more northward so as to pass ¼ mile westward of it, and follow the directions in section 2.

From Point Judith gas and whistling buoy steer 24° true (**NE** ¾ **N** mag.) for 7 miles, and pass midway between Whale Rock and Beavertail lighthouses. Then steer 4° true (**N** by **E** ½ **E** mag.) for Dutch Island lighthouse as in the preceding paragraph. At night a careful study of the characteristics of the lights is necessary, as a number of the lights marking the Eastern Passage will be seen on the starboard bow when approaching from Point Judith.

Dangers.—A reef extends ¼ mile off Point Judith, and several detached spots with 4¼ fathoms over them extend 1 mile southwestward from **Point Judith**. In heavy southerly gales the sea breaks on these spots.

The shore for a distance of 2¾ miles northeastward of Point Judith is foul and should be given a berth of ½ mile. Abreast the tall tower it is bold, but abreast Narranganset Pier there are shoals and rocks which extend about 300 yards from the shore. A rock with 14 feet over it, lying ¾ mile southwestward from Whale Rock lighthouse and ⅜ mile from shore, is marked by a black spar buoy.

Newton Rock, southward of Beavertail, is described in section 1 of the directions for the Eastern Passage.

Whale Rock, on the western side of the entrance to the Western Passage, is marked by Whale Rock lighthouse, which lies 1⅛ miles westward from Beavertail lighthouse. There is a 7-foot spot about 200 yards northward of Whale Rock lighthouse. A channel with a depth of about 8 fathoms leads between the lighthouse and the western shore, but strangers should not use it.

Jones Ledge, a rock with 9 feet over it, lies ⅜ mile from the western side of the passage and 1⅛ miles 11° true (**NNE** ⅛ **E** mag.) from Whale Rock lighthouse. The eastern side of the ledge is marked by a buoy (spar, red and black horizontal stripes).

Austin Hollow, the bight in the eastern shore 1 mile northward of Beavertail, is full of shoals, but the eastern shore above the bight to the entrance of Dutch Island Harbor can be approached as close as 200 yards. The western shore between Bonnet Point and South Ferry should be given a berth of 400 yards.

2. Dutch Island lighthouse to Warwick lighthouse.—Pass ¼ mile westward of Dutch Island lighthouse, steer 7° true (**N** by **E** ¾ **E** mag.) for Plum Beach lighthouse until abreast the north end of Dutch Island, and then steer northeastward. When Dutch Island lighthouse bears 186° 30′ true (*S* by *W* ¾ *W* mag.) bring it astern and steer 6° 30′ true (**N** by **E** ¾ **E** mag.), passing 600 yards eastward of Plum Beach lighthouse, and nearly 1 mile westward of Conanicut Island lighthouse.

Warwick lighthouse should be made ahead, and the course leads for the entrance of the dredged cut, which is 400 feet wide and 25 feet deep, and extends from ½ to 2¼ miles southward of Warwick lighthouse. A 5° 30′ true (**N** by **E** ⅝ **E** mag.) course for Warwick lighthouse leads through the cut. A day range, used by local pilots, for the cut is the outbuilding westward of Warwick lighthouse in range with the large residence standing to the right of the high stone tower on Warwick Neck.

When ½ mile from Warwick lighthouse and the gas and bell buoy off Patience Island is ¼ mile on the starboard beam, steer 54° true (**ENE** mag.), pass 350 yards northward of the gas and bell buoy, and follow the directions in section 3.

Dangers.—Shoals extend 200 yards in places off the western side and northern end of **Dutch Island.**

Plum Beach Shoal has 12 to 16 feet over it, and extends ½ mile from the western shore about 1 mile above Dutch Island. The northeastern end of the shoal is marked by Plum Beach lighthouse, and the south end by a black spar buoy which lies ½ mile southward of the lighthouse, in line between it and Dutch Island lighthouse. To insure a depth of more than 18 feet, vessels should keep over 350 yards eastward of a line joining the buoy and Plum Beach lighthouse.

Great Ledge stretches along the west shore of Conanicut Island for a distance of 1¾ miles, its southern end lying about ⅞ mile northward of Dutch Island. The distance to which this ledge extends from the shore varies from 175 yards at its southern to 500 yards at its northern end; it comprises a number of bare and sunken rocks and rises abruptly from deep water.

General Rock, **James Ledge**, and **Brig Ledge** are the easternmost of a number of dangerous ledges and rocks which lie in the northern side of the bight at the entrance to Wickford Harbor. These rocks are buoyed and lie about 189° true (**SSW** mag.) from Quonset Point, the point on the west shore 1¾ miles northwestward from Conanicut Island lighthouse. A shoal extends 400 yards southeastward from Quonset Point, and is marked at its eastern end by a buoy (spar, black, No. 3).

Shoals fill the bight between Quonset Point and **Calf Pasture Point**, the point about 2¼ miles northward. To avoid these a vessel should haul eastward when the water shoals to 18 feet. Abreast Calf Pasture Point and for some distance northward of it, a shoal extends ½ mile from shore

Shoals make eastward from the entrance to Greenwich Bay, and extend nearly to Patience Island. For a distance of nearly 1 mile from shore the shoal has depths of 2 to 12 feet, and has a number of rocks and ledges, one of which is marked by a black spindle with barrel. **Hunts Ledge**, with 12 feet over it, lies ¼ mile southeastward from the spindle, and is the easternmost of the rocks surrounding it. From this beacon a shoal with 14 to 17 feet over it extends ⅝ mile eastward and 1¾ miles south-southeastward; its southern point is marked by a buoy (spar, black, No. 5). Between this shoal and the shoal making westward and southward from Patience Island there is a channel with a least width of 300 yards and a depth of from 3¼ to 12 fathoms, leading up to Warwick Neck. The dredged channel, 400 feet wide and 25 feet deep, leads through this shoal on a 5° 30′ true (**N** by **E** ⅝ **E** mag.) bearing for Warwick lighthouse.

A **shoal** with 12 to 15 feet over it extends about 600 yards westward of Patience Island, and its edge is marked by a gas and bell buoy (occulting white light), lying ½ mile southward from Warwick lighthouse.

3. Warwick lighthouse to Providence River entrance.—Passing 350 yards northward of the gas and bell buoy westward of Patience Island, steer 54° true (**ENE** mag.), pass about midway between Warwick lighthouse and Patience Island, and pass about 100 yards northward of the red and black horizontally striped buoy, lying ½ mile northward of North Point of Prudence Island. When Conimicut lighthouse bears 1° true (*N* by *E* ¼ *E* mag.) steer 12° true (**NNE** ¼ **E** mag.) through the dredged cut, with the westerly end of North Point of Prudence Island astern, and leave Conimicut Middle Ground gas buoy about 150 yards on the port hand. Then steer about 335° true (**N** by **W** mag.) and pass 200 yards eastward of Conimicut lighthouse. Then follow the directions for Providence River.

Dangers.—A **shoal** with 11 feet near its end extends about 700 yards northeastward from the northern side of Patience Island.

Extensive shoals make off from the eastern side of Warwick Neck, and extend out about 2 miles to Ohio Ledge, with depths of 15 to 24 feet. The channel between these shoals and those making northward from Patience and Prudence Islands is about ¼ mile wide, with depths of 4 to 10 fathoms. A dredged cut, 400 feet wide and 25 feet deep, with depths of 17 to 21 feet on either side of it, leads through the shoals eastward of Rocky Point. A spot with 15 feet over it lies on the western edge of the dredged cut, southeastward from Rocky Point.

Ohio Ledge and **Conimicut Middle Ground** are described on page 97.

A **shoal** with about 10 feet over it makes northward a little over ½ mile from the north point of Prudence Island, and is marked near its northern end by Fork Rock buoy (spar, red and black horizontal stripes).

NEWPORT HARBOR [1]

is on the eastern side of the Eastern Passage of Narragansett Bay, about 3½ miles above the entrance. It is divided by Goat Island into an inner and outer harbor, and is an important harbor of refuge for coasters, tows, and yachts. The approach is well marked by lighthouses and fog signals, and the harbor is easy of access both day and night.

The **Outer Harbor** is on the western side of Goat Island, northward of Fort Adams and southeastward of Rose Island. Its entrance from southward is unobstructed; the entrance from northward, passing westward of Rose Island, is clear, but the passage eastward of Rose Island is obstructed by the rocks and ledges which lie between Coasters Harbor Island and Rose Island. The depths range from 7 to 10 fathoms, and the holding ground is good. The anchorage is anywhere westward of Goat Island and the breakwater, giving them a berth of over 250 yards, and taking care not to get too near the rocks and ledges eastward of Rose Island.

The **Inner Harbor** is on the eastern side of Goat Island, and extends along the western front of Newport. It has two entrances, the northern leading eastward of Newport Harbor (Goat Island) lighthouse, and the southern leading around the southern end of Goat Island, between it and Lime Rock lighthouse. A channel, with a depth of 18 feet at low water, leads through the harbor from the southern to the northern entrance; the anchorage, which is eastward of this channel, has a depth of 13 feet, and dredging is in progress to deepen it to 18 feet as far south as a line running 44° true (**NE** by **E** ⅛ **E** mag.) from Lime Rock lighthouse to the wharves. The depth at the principal wharves is 13 feet, and at the railroad wharves 16 to 18 feet.

[1] Shown on chart 353², scale $\frac{1}{20,000}$, price $0.40. See also footnote on page 94.

Brenton Cove is the bight in the southern part of Newport Harbor between Lime Rock lighthouse on the east and Fort Adams on the west. It has good anchorage in 15 to 17 feet, and is frequently used by yachts. There are no dangers if the westerly shore of the cove be given a berth of 200 yards. The passage southward of Lime Rock lighthouse is blocked by rocks.

The city of **Newport**, on the eastern shore of the inner harbor, is one of the principal summer resorts on the Atlantic coast. It has considerable trade in coal, lumber, and building material, carried in coasting vessels; few foreign vessels enter the port.

Prominent objects.—Many prominent objects will be seen, whether the harbor be approached from southward or northward, among which are the following: Fort Adams (stone), the tall buff stack and buildings of the Training Station and Naval War College on Coasters Harbor Island, the wireless tower and buildings of the Torpedo Station on Goat Island, and the large hotels and a tall red water tank at Jamestown on the eastern shore of Conanicut Island, opposite Rose Island. The lighthouses are the principal guides at all times.

Pilots.—See page 94. A **towboat** can be had at Newport.

Repairs.—At Newport there is a marine railway 140 feet long with a capacity of about 300 tons.

Harbor and quarantine regulations for the port and quarantine anchorage will be found in Appendix II.

Marine hospital.—See page 10.

Storm warning displays are made on the customhouse and on Goat Island.

A **time ball** is dropped on Goat Island at noon of the seventy-fifth meridian—that is, 5 h. 0 m. 0 s. Greenwich mean time. The ball is mastheaded five minutes before noon, and in case it fails to drop at the proper moment, is lowered by hand five minutes after noon.

Supplies.—Coal and water can be had in the stream or at the wharves where the depths are 12 to 13 feet at high water. Provisions and some ship-chandler's stores can be obtained in the city.

For **tides**, see page 29.

Ice sometimes obstructs navigation in the inner harbor.

SAILING DIRECTIONS, NEWPORT HARBOR.

The following directions are good either day or night for the deepest draft vessels to the Outer Harbor, and for vessels of less than 12 feet draft to the Inner Harbor. When the dredging is completed vessels of 16 feet draft can anchor in the Inner Harbor.

FROM SOUTHWESTWARD.—Enter Narragansett Bay by the Eastern Passage and steer 47° 30′ true (**NE** by **E** ⅜ **E** mag.) for Newport Harbor lighthouse, which will lead to the anchorage in the Outer Harbor westward of Goat Island. Or, steer this course until Lime Rock lighthouse is opened from the dock northward of Fort Adams, and then round the northern end of the dock, giving it a berth of 150 yards. Then steer 111° true (**SE** by **E** mag.) and round the south end of Goat Island at a distance of about 250 yards, passing 100 to 200 yards southward of the black buoy and Goat Island Shoal light. Then stand northeastward to the anchorage. Anchor in 13 to 16 feet, soft bottom, but not close enough to the wharves to interfere with the steamer and ferry traffic, and about 400 yards from Goat Island to avoid the track of the sound steamers.

FROM NORTHWARD.—Large vessels generally pass westward of Rose Island and enter the Inner Harbor around the south end of Goat Island. Passing 400 yards westward of Rose Island lighthouse steer 136° true (**SSE** ¾ **E** mag.) for Lime Rock lighthouse until Goat Island Shoal light bears 77° true (*E* mag.). Then haul eastward and round the south end of Goat Island at a distance of about 250 yards as in the preceding paragraph.

Or, passing eastward of Gould Island give it a berth of over 200 yards. Then bring Gould Island lighthouse astern on a 164° true (**S** ¼ **E** mag.) course heading for Newport Harbor lighthouse. On this course pass about 200 yards westward of Coasters Harbor Island, and 150 to 200 yards eastward of Gull Rocks lighthouse; then steer so as to pass about 200 yards eastward of Newport Harbor lighthouse. Then steer 175° true (**S** ¾ **W** mag.), pass about 100 yards off the railroad wharves and the same distance off the wharf at the Torpedo Station on Goat Island, and then stand over for the wharves of the city to the anchorage as described in the first paragraph.

Dangers.—**Goat Island** and the breakwater extending from its northern end to Newport Harbor lighthouse should be given a berth of 150 yards. The edge of the shoal at the south end of the island is marked at its southwest end by a black buoy and at its southeast end by Goat Island Shoal light.

Shoals with little water over them make out nearly 300 yards from the south shore of the harbor to **Lime Rock lighthouse** and the granite beacon with spindle and cage on **Little Lime Rock**. Northward of these shoals the depth in the harbor is 13 feet, except near the wharves; the southerly edge of the 18-foot dredged area in the harbor will pass 200 yards northward of the beacon.

Rose Island, marked at its southwest end by a lighthouse, is surrounded by a shoal, with little water in places, which extends about 400 yards northeastward and northward from the island, and rises abruptly from deep water. A black buoy is placed on the end of the shoal which extends 225 yards southward from the island. **Mitchell Rock** (14 feet) lies 200 yards southeastward, and **Tracey Ledge** (9 feet) lies nearly 300 yards eastward, from the edge of the shoal surrounding Rose Island, and are marked by black buoys. A red buoy marks a detached rock (9 feet) which lies 150 yards northeastward from the edge of the shoal. The north end of the shoal is marked by a red buoy.

Gull Rocks lie about midway between Rose Island and Coasters Harbor Island, and are small in extent. **Gull Rocks lighthouse** is on the middle of the rocks, and may be approached as close as 100 yards on its eastern and western sides, but the shoals and rocks extend over 100 yards northward of it and 300 yards southward. These rocks are surrounded by a depth of 4¼ to 5 fathoms, and north of the lighthouse are marked by a black buoy. A 17-foot spot lies 600 yards 336° true (N by W mag.) from Gull Rocks lighthouse.

There is a deep channel between Rose Island and Gull Rocks, and also between the latter and Coasters Harbor Island; the latter channel is the safer for strangers.

A shoal, with 3 to 18 feet over it, extends 350 yards southward from the southern end of **Coasters Harbor Island**, and eastward to the shore of Rhode Island.

St. Patricks Rock, with 6 feet over it, lies 150 yards from the eastern shore, and 800 yards northeastward from Newport Harbor lighthouse, and is marked by a red buoy.

MOUNT HOPE BAY AND TAUNTON RIVER.[1]

Mount Hope Bay, in the northeastern part of Narragansett Bay, is the approach to the city of Fall River and to Taunton River. The bay is about 6 miles long and 2½ miles wide at its widest part. The northwestern and northern parts of the bay have depths of 13 to 17 feet, the few dangers being described under the sailing directions; the deeper water of the bay is in its southern end and along the eastern shore. Several shallow rivers empty into the northern part of Mount Hope Bay, but they are of no commercial importance. There are two approaches by water to this bay—one through Sakonnet River and the other through the Eastern Passage of Narragansett Bay; the former is little used (see heading Sakonnet River); the entrance from the latter is marked by three lighthouses, and has a depth of over 6 fathoms in the channel until in the bay. The dredged channel in the bay to Fall River is 300 feet wide and 25 feet deep.

Taunton River has a narrow and crooked channel, with a depth of about 11 feet at mean high water, as far as Taunton. Several drawbridges cross the river between Fall River and the head of navigation. Vessels bound into the river take a towboat at Fall River.

The city of **Fall River**, on the eastern shore at the entrance to Taunton River, has a considerable coasting trade; large cargoes of coal are brought for its factories. At low water a draft of 23 feet can be taken up to the city; the depth at the wharves is 10 to 25 feet.

Somerset, about 5¼ miles, and **Dighton**, about 7½ miles above Fall River, on the west bank of Taunton River, are two villages to which vessels occasionally bring cargoes. A draft of 16 feet can be taken to Somerset at low water, and 12 feet to Dighton at high water.

Taunton is an important manufacturing city at the head of navigation, 12½ miles above Fall River. It has a large coasting trade in lumber and coal, carried principally in barges. Vessels of 9 feet draft can come to the city at high water.

Anchorage.—There is good anchorage in 3 to 5 fathoms abreast the city of Fall River. An anchorage 25 feet deep is being dredged in the eastern half of the harbor from abreast the Old Colony Railroad wharf to deeper water ½ mile farther up; in 1911 the least depth was 19 feet. Vessels can anchor anywhere in the bay where the depth and bottom are suitable.

Pilots for vessels bound to Fall River can be obtained at the entrance to Narragansett Bay; the rates of pilotage are the same as for ports in Rhode Island. (See Appendix II.)

Towboats are used by the larger vessels and those bound into Taunton River; they can be had from Fall River or may be taken at Newport.

Supplies.—Ship's supplies and coal for steamers can be had at Fall River. Water can be had through pipe at the coal wharves.

Repairs.—There is one marine railway capable of hauling out vessels of about 600 tons.

Storm warning displays are made at Fall River.

Harbor regulations for Fall River are contained in the extracts from the Laws of the Commonwealth of Massachusetts, under the heading "Harbor Control," in Appendix II.

Quarantine.—Extracts from the Regulations of the Board of Health of the city of Fall River are given in Appendix II.

For **tides** see table, page 29.

Ice generally closes Taunton River from December to March. Mount Hope Bay is occasionally closed to navigation.

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[1] Shown on chart 353, scale $\frac{1}{40,000}$, price $0.71

SAILING DIRECTIONS, MOUNT HOPE BAY.

These directions if closely followed will carry a least depth of 20 feet at low water to the city of Fall River; vessels of deeper draft should take a pilot.

Follow the directions for the eastern passage of Narragansett Bay to a position ¼ mile east-southeastward from Prudence Island lighthouse. Then steer 34° 30′ true (**NE** ¼ **E** mag.) for Hog Island Shoal lighthouse until ½ mile from it. Then steer 54° true (**ENE** mag.) for Mussel Bed Shoals lighthouse and pass 300 yards southward of Hog Island Shoal lighthouse. When the latter bears about 279° true (*WNW* mag.), distant nearly ¼ mile, steer 42° true (**NE** ⅞ **E** mag.), and pass about 200 yards northward of Mussel Bed Shoals lighthouse and 350 yards southward of Bristol Ferry lighthouse. Continue this course for 2½ miles to a position nearly ¼ mile southward from the black buoy off Mount Hope Point.

Then bring Hog Island Shoal lighthouse astern on a 45° true (**NE** by **E** ⅛ **E** mag.) course heading for Borden Flats lighthouse; Mechanics Mill stack should then show barely open to the left of Borden Flats lighthouse (see the remarks following). Steer this range, passing between the red and black buoys, until about ¾ mile from Borden Flats lighthouse and nearly up with the large coal piers on the southern shore. Then steer 58° 30′ true (**ENE** ⅜ **E** mag.) for the end of the Old Colony Railroad wharf, and pass about 250 yards off the coal piers and 300 yards southward of Borden Flats lighthouse. Pass the wharf of the Fall River Iron Works (large red-brick factory) at a distance not greater than 200 yards, and anchor above the Old Colony Railroad wharf, in the eastern half of the harbor, where dredging is in progress to obtain a depth of 25 feet. Anchorage can also be selected nearer Borden Flats lighthouse, where the least depth is 16 feet.

Remarks and dangers.—The lighthouses furnish excellent guides in Mount Hope Bay; all shoals with less than 16 feet over them can be avoided until nearing Borden Flats by keeping Prudence Island lighthouse bearing between Bristol Ferry and Mussel Bed Shoals lighthouses, and giving the eastern shore of the bay within these bearings a berth of about 200 yards. Vessels of over 16 feet draft must follow the directions closely to avoid the shoals on both sides of the channel.

The **range** for the lower section of the dredged channel is Borden Flats lighthouse and Mechanics Mill stack; the latter will be identified by a church with twin spires and a belfry which shows just to the right of it when on the range. This range leads in the dredged channel 40 feet from its southerly edge, so that care should be taken to go nothing southward of it to keep in the dredged channel.

The shore southward of Hog Island Shoal lighthouse should be given a berth of at least 500 yards.

Between Mussel Bed Shoals lighthouse and **Common Fence Point** (the western point at the northern entrance to Sakonnet River) shoals make out from the shore to a distance of 300 to 600 yards; northward of Common Fence Point the extremity of the shoal is marked by a gas buoy (occulting white light).

There are **shoals** and **rocks** in the bight between Bristol Ferry lighthouse and **Mount Hope Point** (the point 1⅝ miles northeastward of the lighthouse), but near the edge of the shoals are two black buoys.

Spar Island, the small, low, flat-topped island near the center of Mount Hope Bay, is surrounded for a distance of nearly 400 yards by shoals, with 3 to 10 feet over them.

The eastern edge of the shoals between Mount Hope Point and Borden Flats lighthouse, has 16 to 17 feet over it, and is marked by black spar buoys. **Spots** with 17 and 18 feet over them lie on the eastern side of the channel, and are marked by three red spar buoys.

Borden Flats, with about 9 feet on them, extend from Borden Flats lighthouse to **Brayton Point**, nearly 1 mile westward of the lighthouse.

The **Old Colony Railroad wharf** is ½ mile eastward (true) from Borden Flats lighthouse, and just above the large red brick factory of the Fall River Iron Works. The bight between the Old Colony Railroad wharf and the coal wharf ¼ mile above it has depths of 8 to 12 feet except near these wharves.

BRISTOL HARBOR [1]

is a cove lying between Bristol Neck on the east and Popasquash Neck on the west, and northward of Hog Island, which lies in the middle of the entrance with a good channel on either side of it. The cove is about 2 miles long, and 1¼ miles wide at its southern end, narrowing to ⅜ mile at its northern end. The harbor proper (northern part of the cove) is about 1 mile long and nearly ½ mile wide, has a depth of 15 to 17 feet, and excellent anchorage in soft bottom abreast the town. The northern part of the harbor above the railroad wharf is shallow, having a depth of 7 to 12 feet. The remains of an old pier that is covered at high water lies 50 yards westward of the railroad wharf.

[1] Shown on charts 353, scale $\frac{1}{40,000}$, price $0.75; 354a, scale $\frac{1}{20,000}$, price $0.20.

Bristol, a town on the eastern side of the harbor, has but little trade and is of no commercial importance. Near the southern end of the water front of the town is a shipyard where torpedo boats and yachts are built. Provisions and coal can be obtained; at low water 8 to 11 feet can be taken to some of the wharves.

Communication.—Bristol has communication by rail and steamer with Fall River and Providence. A ferry runs to the wharf on Rhode Island, eastward of Mussel Bed Shoals lighthouse, from which there is communication by electric road with Newport and Fall River.

Tides.—The mean rise and fall of tides is 4.1 feet.

SAILING DIRECTIONS, BRISTOL HARBOR.

The following directions are safe for vessels of 15 feet or less draft to an anchorage abreast the town.

EASTERN CHANNEL.—Enter about midway between Bristol Neck and the southeast point of Hog Island, steer 340° true (**N** ⅝ **W** mag.), and pass 150 to 200 yards eastward of Hog Island Rock buoy and the red and black horizontally striped buoy at the north end of the Middle Ground. Anchor in 16 to 17 feet abreast the wharves, giving the shores a berth of over 200 yards.

WESTERN CHANNEL.—Passing ¼ mile eastward of Prudence Island lighthouse steer 358° true (**N** by **E** mag.) for 2 miles heading for Popasquash Point until the southwest end of Hog Island bears 111° true (*SE* by *E* mag.). Then steer 29° true (**NE** ¼ **N** mag.), leaving Popasquash Point Shoal and Usher Rocks buoys about 200 yards on the port hand, and Castle Island beacon and Middle Ground buoy about 350 yards on the starboard hand. Then stand up the middle of the harbor, and anchor in 16 to 17 feet abreast the wharves.

Remarks and dangers.—Shoals make out over ⅜ mile southward of **Hog Island**, and vessels must pass at least 300 yards southeastward of Hog Island Shoal lighthouse.

The eastern shore of **Hog Island** should be given a berth of at least 350 yards. Hog Island Rock, with 3 feet over it, is on the eastern edge of the shoal about ½ mile northward of the southeastern end of the island, and is marked on its eastern side by a black buoy.

The southern and western shores of **Bristol Neck** should be given a berth of at least 250 yards to avoid the shoals making off that distance. A red buoy marks Pearce Rock, about ¼ mile westward of Bristol Ferry lighthouse.

Making northward from Hog Island is an extensive shoal with depths of 3 to 12 feet. For about ½ mile northward of the island this shoal has a width of ½ mile, thence it narrows to a point at the junction of the eastern and western channels 1 mile northward of the island. The northern end of the shoal, known as the **Middle Ground**, has a depth of only 5 feet, and is marked by a buoy (spar, red and black horizontal stripes). Near the western edge of the shoal, about ½ mile northward of the northwestern end of the island, is **Castle Island**, a rock bare at low water, marked by a beacon (stone tower, surmounted by a red ball).

The end of Hog Island Shoal, making off ⅜ mile southwestward from the island, is marked by a red buoy. A rock with 15 feet over it lies ½ mile west by north from the southwest point of Hog Island.

Popasquash Point Shoal makes off 400 yards in a south-southeast direction from Popasquash Point, and has little water over it for half this distance; it is marked at its southern edge by a black spar buoy.

Usher Rocks, bare at low water, lie on the western side of the channel ⅜ mile north-northwestward from Castle Island beacon. Eastward of the rocks on the edge of the channel is a black spar buoy. **Usher Cove,** lying westward of Usher Rocks, is shoal.

WARREN RIVER [1]

is a small river emptying into the head of Narragansett Bay, about 2 miles southeastward of Conimicut lighthouse, at the mouth of Providence River. The channel leading up to the town of **Warren** is narrow and crooked, but is well buoyed. A draft of about 14 feet can be taken up to the town at high water. Coal can be obtained at the wharves.

Anchorage.—There is excellent anchorage at the mouth of the river, about ¼ mile from the eastern shore, southward or just eastward of buoy No. 3, in 15 to 17 feet, soft bottom. There is not room for anchorage in the river except for small craft. Abreast the lower end of Warren, and 100 to 200 yards above buoy No. 12, the channel is about 450 feet wide with depths of 16 to 18 feet in the middle; a very small vessel can anchor temporarily at this point.

Tides.—The mean rise and fall of tides is 4.6 feet.

The **tidal currents** in some parts of the river run with considerable velocity, especially along the town front.

SAILING DIRECTIONS, WARREN RIVER.

The following directions lead in a least depth of 15 feet to the anchorage at the mouth of the river, and are good for vessels of 8 feet draft to Warren.

APPROACHING FROM SOUTHWARD be guided by the directions of section 3 for the Eastern Passage of Narragansett Bay. Give the western shore of Popasquash Neck a berth of 400

[1] Shown on chart 355, scale $\frac{1}{10,000}$, price $0.20.

yards, and when abreast North Point (where the shore of the neck turns abruptly eastward) steer 26° true (**NE** ½ **N** mag.) and pass 250 yards southeastward of Rumstick Shoal buoy, No. 1.

APPROACHING FROM NORTHWESTWARD bring Conimicut lighthouse astern on a 133° true (**SE** by **S** mag.) course. When Rumstick Shoal buoy, No. 1, is ½ mile distant forward of the beam, steer 77° true (**E** mag.) and pass 250 yards southward of it.

Pass about 350 yards eastward of Rumstick Shoal buoy, No. 1, and steer about 4° true (**N** by **E** ½ **E** mag.) with buoy No. 3 on the port bow. Pass 75 yards eastward of buoy No. 3, steer 354° true (**N** ⅝ **E** mag.) for the western side at the entrance of Smith Cove, and pass 100 yards westward of buoy No. 2. Pass 50 yards westward and northwestward of buoy No. 4, steer 47° true (**NE** by **E** ⅜ **E** mag.), and pass midway between buoy No. 6 and the old pier about 4 feet high on Allen Rock. When up with buoy No. 5, leave it about 100 feet on the port hand, and steer 354° true (**N** ⅝ **E** mag.), passing midway between buoy No. 8 and the black buoy opposite. When up with buoy No. 10, steer 13° true (**NNE** ⅜ **E** mag.) and pass 100 feet westward of it and buoy No. 12. Anchor in midriver, 100 to 200 yards above buoy No. 12.

Dangers.—Shoals and rocks extend over 200 yards in places from the eastern shore between North Point and **The Brothers**; the latter are two sunken rocks lying east by south from Rumstick Shoal buoy, No. 1.

Rumstick Shoal extends nearly ⅝ mile southward from Rumstick Neck, is about ⅜ mile wide, and has depths of 2 to 12 feet, the ruling depth southward of Rumstick Rock being about 7 feet. Near its southeastern extremity it is marked by black spar buoy No. 1, and on its eastern edge, nearly ¼ mile southeastward from the southern extremity of Rumstick Neck, is black spar buoy No. 3. **Rumstick Rock**, a bare rock, lies on the western point of the shoal, ¼ mile from Rumstick Neck, and **Rumstick Ledge**, bare at low water, lies 200 yards northwestward from the rock.

PROVIDENCE RIVER [1]

empties into the head of Narragansett Bay, and is the approach by water to the city of Providence. The entrance between Nayat Point on the east and Conimicut Point on the west is about ⅞ mile wide, but is obstructed by shoals on both sides, which leave an available channel about ¼ mile wide. On **Nayat Point** there is a disused light tower, and on the shoal making out from Conimicut Point is **Conimicut lighthouse.**

The city of **Providence**, about 7 miles above the entrance to the river and at its junction with Seekonk River, is an important commercial port. The deepest draft taken to the city is 27 feet at high water; the ordinary deepest draft is 24 feet. **East Providence**, a suburb of the city of Providence, is on the east bank of the river and is connected with the city proper by three drawbridges crossing the Seekonk River.

Pawtucket is a city at the head of navigation on the **Seekonk River** about 4½ miles from its mouth. For about 1 mile above its mouth to Red Bridge the river has a deep but crooked natural channel; the tidal currents have an estimated velocity of 3 miles at strength in the narrowest part of the river at India Point. A channel 16 feet deep has been dredged from Red Bridge to the wharves at Pawtucket, the width being 100 feet except in its upper part where it is 50 feet. The channel is buoyed, but strangers should have a pilot or towboat.

The village of **Pawtuxet**, on the west bank of Providence River westward of Sabine Point lighthouse, has no commerce and can only be reached at high water by vessels of 7 feet draft. It is frequented by oyster boats and small pleasure craft, for which there is a small marine railway.

Channel.—The channel of Providence River, leading between extensive shoals which make out from both shores, is well marked by lighthouses and other aids, and can be readily followed in the daytime in clear weather. For a width of 400 feet the channel has a least depth of 25 feet to the city of Providence, and improvements are in progress to widen it to 600 feet. From Conimicut lighthouse to abreast **Sabine Point lighthouse**, a distance of 3 miles, the 3½-fathom channel has a width varying from 250 to 300 yards. Above Sabine Point lighthouse the channel is dredged through flats having from 3 to 8 feet over them. Above Fuller Rock lighthouse dredging is in progress to deepen the river to 25 feet for its full width between harbor lines.

Anchorage.—Vessels anchor as directed by the harbor master on the edge of the channel between Fields Point and Fox Point. There is anchorage for a few vessels eastward of Fox Point, where Green Jacket Shoal has been removed.

Wharves and drawbridges.—There are depths of 10 to 25 feet at the wharves below the bridges. The least width of the drawbridges crossing Seekonk River at Providence is 75 feet. Point Street drawbridge, crossing Providence River 600 yards above **Fox Point** (the point at the junction of the two rivers), has a clearance on each side of the central pier of 98 feet, and a draft of 23 feet at high water can be taken to the coal wharves above the bridge.

Pilots.—Vessels desiring a pilot can get one at Newport, Dutch Island Harbor, or off the entrance to Narragansett Bay. See "Pilots," page 94, and the pilotage laws for the State of Rhode Island, in Appendix II.

[1] Shown on charts **113**, scale $\frac{1}{80,000}$, price $0.50; **353**, scale $\frac{1}{40,000}$, price $0.75; and in part on **352**, scale $\frac{1}{10,000}$, price $0.20.

Towboats are generally used by the larger sailing vessels, and will sometimes be found at the entrance of the river waiting for vessels expected to arrive; they may also be obtained at Newport or by telephone from Dutch Island Harbor.

Harbor and quarantine regulations for the port are given in Appendix II.

Marine hospital.—See page 10.

Supplies.—Coal, provisions, and ship-chandler's stores can be obtained. Water can be had at the wharves and from water boats.

Repairs.—There is a floating dock with a capacity for vessels of 1,000 tons at East Providence, and two marine railways for small craft on the Seekonk River. There are large machine shops in Providence, with excellent facilities for repairs to the machinery of steamers.

Storm-warning displays are made at Providence and at the Providence Yacht Club.

For **tides**, see table, page 29.

Tidal currents are not strong, and generally follow the direction of the channel.

Ice.—In severe winters the river is closed to navigation, but in ordinary winters the towboats and steamers keep the channel open.

SAILING DIRECTIONS, PROVIDENCE RIVER.

These directions are good for a least depth of 20 feet at low water to the city of Providence; vessels of deeper draft should take a pilot.

Having followed the directions in section 3 for the Eastern Passage or Western Passage of Narragansett Bay, pass 200 yards northeastward of Conimicut lighthouse and steer 307° true (**NW ½ N** mag.). When Sabine Point lighthouse opens westward of Bullock Point lighthouse make the turn with an easy port helm, steer 342° true (**N ⅜ W** mag.), and pass 200 yards westward of these lighthouses. Pass 200 yards northwestward of Sabine Point lighthouse and steer 22° true (**NE ⅞ N** mag.) for Pomham Rocks lighthouse until abreast the red buoy nearly ¼ mile below it.

Then steer 351° true (**N ⅜ E mag.**), pass 150 to 200 yards westward of Pomham Rocks lighthouse, and continue the course about ¼ mile above it. Then steer 335° 30′ true (**N** by **W** mag.) for Fuller Rock lighthouse, with Pomham Rocks lighthouse a little on the starboard quarter. When about ¼ mile from Fuller Rock lighthouse, steer 321° 30′ true (**NNW ¼ W** mag.), pass about 100 yards westward of it, and continue the course up the middle of the harbor. Anchor above Fuller Rock lighthouse and Fields Point, on the side of the channel as directed by the harbor master.

Remarks.—In addition to the lighthouses the channel is marked at comparatively short intervals by buoys. The channel is being improved to a least width of 600 feet, and the directions lead near the middle of the improved channel. Above Fuller Rock lighthouse, the harbor line on the easterly side extends from the end of Kettle Point to the end of the Wilkesbarre coal pier. On the westerly side the harbor line extends from Fields Point (as cut off) to the end of Harbor Junction wharf, and thence to the wharf opposite Fox Point. Where there are no wharves to mark the harbor lines, the edges of the channel are defined by buoys. Above Fields Point dredging is in progress to deepen the entire river between the harbor lines to a depth of 25 feet.

GREENWICH BAY [1]

is situated at the northwestern end of Narragansett Bay, its entrance being between Warwick Neck and Potowomut Neck. The bay is about 2½ miles long, has an average width of about 1 mile, and an average depth for the greater part of its area of about 10 feet. **Old Warwick Cove** and **Brush Neck Cove** are shallow coves in the northeastern part of Greenwich Bay; on **Oakland Beach**, between these coves, is a large hotel and flagstaff which show conspicuously in Greenwich Bay. **Apponaug River**, a shallow stream, empties into the northwestern part. Nearly 1 mile above the mouth of the river is the village of **Apponaug**. At the northwestern end of the bay southward of Apponaug River is a coal dock, to which 8 or 9 feet can be taken at high water.

Greenwich Cove, 1¼ miles long, 300 to 600 yards wide, and with a general depth of 8 to 10 feet, makes southward from the southwestern end of Greenwich Bay. On the western shore of the cove is the town of East Greenwich. The narrow channel into the cove has a depth of 10 feet, and there are depths up to 12 feet at high water to some of the wharves.

Tides.—The mean rise and fall of tides is 4.5 feet.

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[1] Shown on chart 351, scale $\frac{1}{20,000}$, price $0.20.

SAILING DIRECTIONS, GREENWICH BAY.

The following directions lead in a depth of about 10 feet to the entrance of Greenwich Cove, but 8 feet is about the deepest draft that can anchor with swinging room in the cove.

Pass ¼ mile southward of Warwick lighthouse, steer 302° true (**NW** mag.), and pass about 150 yards northward of buoy No. 1. Then steer 279° true (**WNW** mag.) to a position 75 yards northward of buoy No. 3. Then steer 244° true (**WSW** ⅞ **W** mag.) for buoy No. 2, pass close southward of it, and continue the course with buoy No. 5 on the port bow. Pass 75 yards northward and close westward of buoy No. 5, and steer about 156° true (**S** by **E** mag.) into the cove. Keep in the middle of the cove, and anchor not more than ½ mile above the entrance, in 10 to 13 feet.

Remarks and dangers.—The dangers eastward of Potowomut Neck are described on page 98.

A number of sunken rocks lie 200 yards or less off the south and southwest sides of Warwick Neck.

Sandy Point Shoal buoy (spar, black, No. 1), lying nearly 1 mile west-northwestward from Warwick lighthouse, marks the northern edge of the extensive shoal, with 7 feet over its outer part, which makes off from Sandy Point.

Sally Rock, with 5 feet over it, lies nearly ¼ mile northward of Potowomut Point (the north point of Potowomut Neck), with foul ground between; the rock is marked by a buoy (spar, black, No. 3).

Chippanogset Island is the small island, with yellow bluff facing eastward, in the extreme western part of the bay, and northward of the entrance to Greenwich Cove. From this island shoals, with little water over them, make off 500 yards northward and 250 yards eastward and southeastward; the southeastern extremity is marked by a buoy (spar, red, No. 2).

Shoals make out northward and northwestward for a distance of about 300 yards from Long Point, the northwestern point of Potowomut Neck. The western end of the shoals is marked by a buoy (spar, black, No. 5).

A shoal extends 110 yards off the mouth of a stream on the west side of Greenwich Cove 250 yards above buoy No. 5.

WICKFORD HARBOR,[1]

in the west shore of Narragansett Bay, westward of the northern end of Conanicut Island, comprises an outer and inner harbor. The **outer harbor** is a broad bight between Quonset Point on the north and Wild Goose Point on the south; between these points it is about 2 miles wide, but the northern part is full of rocks and shoals which extend nearly 1¼ miles in a south-southwesterly direction from Quonset Point; the middle and southern parts have good anchorage in 14 to 17 feet.

The entrance to the **inner harbor** is a little more than ¼ mile wide between Sauga Point on the north and Poplar Point on the south, but the shoals making out from these points leave only a narrow channel, marked by, and lying just northward of, **Wickford Harbor lighthouse**, which is on Old Gay Rock, about 300 yards northeastward from the disused light on Poplar Point. The entrance channel between the points leads to the common junction of three coves, **Fishing Cove** making northward, **Mill Cove** making northwestward, and **Wickford Cove** making southwestward. The first two of these coves are shallow and of no importance.

Wickford Cove has a depth of about 10 feet in a narrow dredged channel, which leads between flats that are mostly dry at extreme low water. Strangers should not go above the wharves at the entrance without a pilot, who may be had by making signal while eastward of the lighthouse. The town of **Wickford**, on the west side of Wickford Cove, is of little commercial importance; cargoes of coal are brought to it in vessels of 12 feet draft, and a steamer runs to Newport, connecting at Wickford with the railroad. The depth at low water at the steamer wharf, on the easterly side of the entrance, is 10 feet, and at those on the westerly side about 7 feet.

Tides.—The mean rise and fall of tides is 4.1 feet.

Ice.—In severe winters the inner harbor is closed by ice, but the outer harbor is usually open, although drift ice is occasionally encountered.

SAILING DIRECTIONS, WICKFORD HARBOR.

The following directions are safe for vessels of 12 feet draft to an anchorage ¼ mile or more southeastward or eastward of Wickford Harbor lighthouse.

From a position ¼ mile eastward of Plum Beach lighthouse steer 341° true (**N** ½ **W** mag.) and pass ¼ mile eastward of Fox Island; or from a position ¼ mile northward of Conanicut Island lighthouse steer 252° true (**W** ½ **S** mag.) and pass southward of General Rock bell buoy; or passing ¼ mile or more eastward of Quonset Point, and eastward of the black buoy off the point, steer 202° true (**SW** ⅞ **S** mag.) and pass eastward and southward of General Rock bell buoy.

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[1] Shown on chart 357, scale $\frac{1}{20,000}$, price $0.20.

Then steer for Wickford Harbor lighthouse on any bearing between 313° true (**NW** by **N** mag.) and 286° true (**NW** by **W** ⅜ **W** mag.), and anchor ¼ mile or more southeastward or eastward of the lighthouse, in 14 to 15 feet, soft bottom.

A depth of 10 feet can be taken to the steamboat wharf, on the easterly side of the entrance to the inner harbor, by passing 200 feet northward of Wickford Harbor lighthouse, and the same distance southward of Charles Rock buoy, on a 285° true (**NW** by **W** ½ **W** mag.) course. When the entrance to the inner harbor is open, steer 203° true (**SW** ¾ **S** mag.), heading to favor the wharf on the easterly side. Small craft or a few small vessels can anchor in the channel from Charles Rock buoy to abreast the entrance of the inner harbor.

Remarks and dangers.—All dangers off the southern shore of the harbor will be cleared by giving Fox Island a berth of over 300 yards when eastward of it, and keeping eastward of a line joining Fox Island and Wickford Harbor lighthouse.

A shoal, with numerous ledges and rocks, extends nearly 1¼ miles southwestward from Quonset Point. A number of these rocks and ledges are buoyed, and 7 feet may be taken across the shoal; but strangers should pass southward of **General Rock**, the southernmost, which has 10 feet over it, and is marked by a bell buoy. **James Ledge** has 2 feet over it, and is marked by a buoy (can, black, No. 1). **Brig Ledge**, with 12 feet over it, is marked by a buoy (spar, red and black horizontal stripes). These three are the easternmost of the dangers, and lie from ⅝ to nearly 1¼ miles south-southwestward from Quonset Point.

South White Rock, marked by a granite beacon, is the southwesternmost of the rocks southwestward of Quonset Point, and is ⅜ mile north-northwestward from General Rock.

Charles Rock, with 4 feet over it, is at the south end of the shoals making out from Sauga Point, and is marked by a red spar buoy which lies nearly 300 yards north-northwestward from Wickford Harbor lighthouse.

A shoal extends from Wickford Harbor lighthouse to the steamboat wharf, on the easterly side at the entrance of the inner harbor, and makes out 200 to 300 feet just eastward of the wharf. The westerly edge of the shoal is on or just eastward of the line of the westerly face of the wharf. The channel at the entrance of the inner harbor is about 150 feet wide westward of this shoal.

DUTCH ISLAND HARBOR

lies in the Western Passage of Narragansett Bay about 3 miles above Beavertail, and is a semicircular indentation ½ by 1 mile in extent making into the western side of Conanicut Island. **Dutch Island** is on the western side of the harbor, which may be entered by passing either northward or southward of the island. The harbor affords excellent anchorage in 2 to 8 fathoms, sticky bottom, is easy of access, and is frequently used as a harbor of refuge by coasters. The southern entrance is good for a depth of over 6 fathoms; but the northern entrance has a few spots with 3¼ fathoms over them, and should not be used by vessels of over 18 feet draft.

Dutch Island lighthouse is on the extreme southern end of Dutch Island, and is the guide for vessels coming up the Western Passage and entering Dutch Island Harbor by the southern entrance.

SAILING DIRECTIONS, DUTCH ISLAND HARBOR.

FROM SOUTHWARD.—Steer 4° true (**N** by **E** ½ **E** mag.) for Dutch Island lighthouse until ¼ mile or less from it. Then steer 43° true (**NE** by **E** mag.) into the harbor, leaving the black buoy southward of the lighthouse on the port hand, and red spar buoy No. 2 on the starboard hand. Select anchorage according to draft.

FROM NORTHWARD.—Steer 186° 30′ true (**S** by **W** ¾ **W** mag.) for Dutch Island lighthouse until about ½ mile past Plum Beach lighthouse, and then steer 157° true (**S** ⅞ **E** mag.) into the harbor with Plum Beach lighthouse astern. Give the northeastern end of Dutch Island a berth of over 100 yards, and select anchorage according to draft.

Remarks and dangers.—In seeking anchorage, if of over 18 feet draft, give the eastern shore of the harbor a berth of at least ⅜ mile; if of less than 14 feet draft, the eastern shore may be approached as close as 300 yards and closer in places, the general depth being 15 to 17 feet. The eastern shore of Dutch Island should be given a berth of 100 yards.

A narrow spit makes out about 150 yards south-southwestward from Dutch Island lighthouse, and has 6 feet near its end, where it is marked by a buoy (spar, black, No. 1).

On the south side of the entrance is a high point known as **Fox Hill**, which terminates in a bluff, rocky face northward, known as **Beaverhead**. From it a shoal makes out 200 yards westward and 350 yards northward. At its northern extremity the shoal rises abruptly from 8½ fathoms to 7 feet, and is marked by a buoy (spar, red, No. 2).

In the southeastern part of the harbor there is a shallow cove which makes southeastward about ½ mile, and is only separated from Mackerel Cove by a narrow neck of land which joins Beavertail peninsula to the main body of the island.

APPENDIX I.

EXPLANATION OF THE CURRENT DIAGRAM OF NANTUCKET AND VINEYARD SOUNDS.

The diagram represents average conditions of the surface currents along the middle of the channel (sailing line), from the whistling buoy in Pollock Rip Slue through Butlers Hole, passing Handkerchief and Cross Rip Light Vessels, between Squash Meadow and Hedge Fence, and through Vineyard Sound, favoring the Elizabeth Islands until abreast Gay Head. Strong winds may affect the currents so as to vary the times of their change as much as one hour in extreme cases.

The small scale of the diagram prevents the insertion of many details of minor importance.

By the expression "East Current" all currents setting eastward of N. and S. are designated, and by "West Current" those setting westward of N. and S. At Pollock Rip the current turns around the compass "with the hands of a watch" (that is, from N. to E., to S., etc), and there is but a short perceptible slack.

Distances along the sailing line are given at the top and bottom of the chart; the larger divisions represent 5 miles and smaller divisions 2½ miles. The small figures within the colored surface denote the velocity of the current in knots and tenths per hour at certain points along the sailing line, as shown by the distances at top or bottom of the chart.

The time of high water at Boston Navy Yard is taken as zero (0) hours, and on the sides of the chart are the hours before and after high water at that place; the small divisions represent 30 minutes.

The width between the high-water and low-water curves at any point (measured upward) represents the duration of fall, and the width from the low-water to the high-water curve (measured upward) represents the duration of rise. The duration of the current at any point along the sailing line is measured by the width of the current belt at that point.

EXAMPLE.—A vessel enters Pollock Rip Slue at 2 p. m., Nov. 27, 1911, and maintains a speed of 10 knots; what will be the state of the tide and how will she encounter the currents as she passes into and through the sounds?

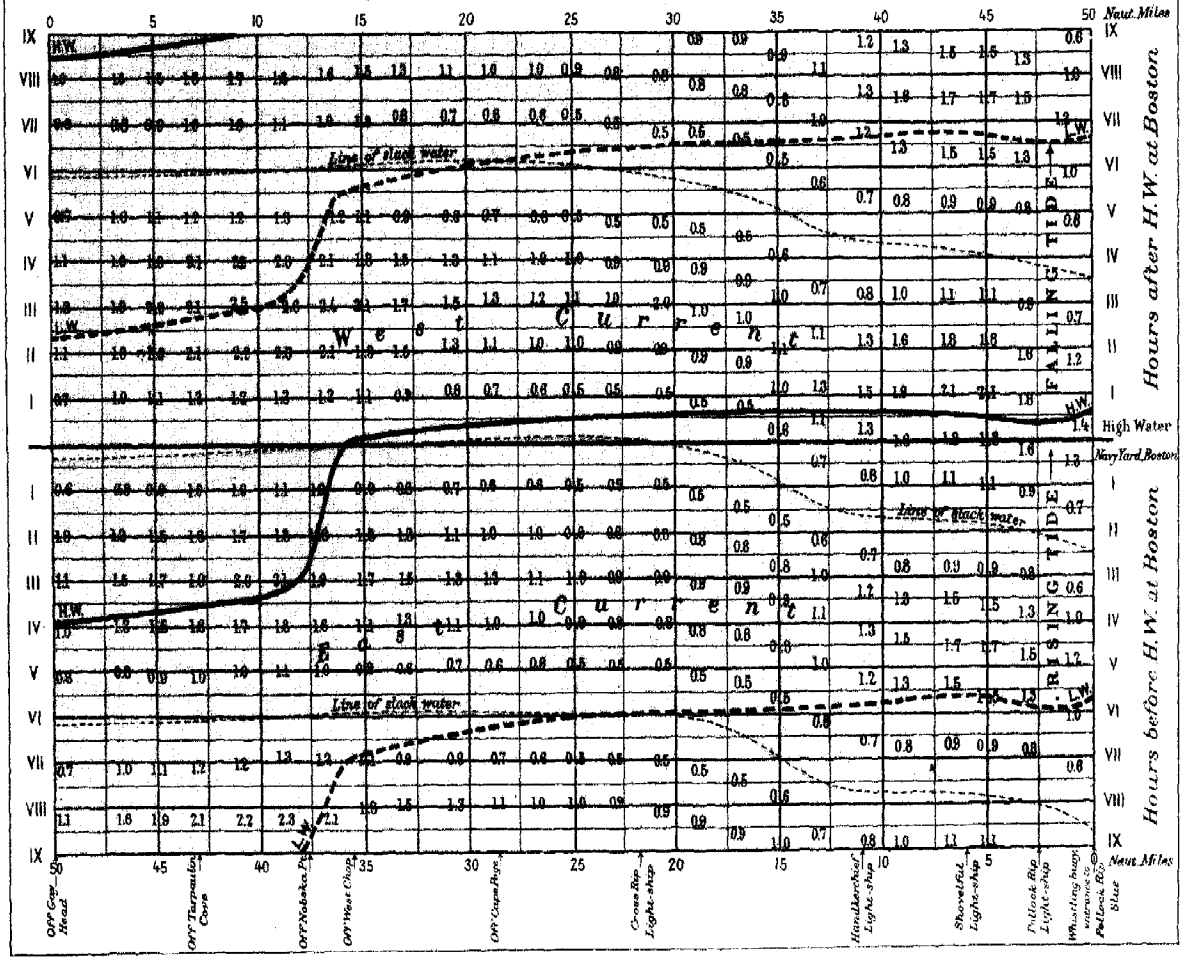
From the Coast and Geodetic Survey Tide Tables, 1911, the time of the nearest high water at Boston Navy Yard is 3 hours 48 minutes p. m., hence the vessel enters Pollock Rip Slue 1 hour 48 minutes before high water at Boston Navy Yard. From the 0 on the right-hand edge of the diagram, follow down to the time 1½ hours and interpolate for the 18 minutes, and from that point draw a line, *AB*, parallel to the speed line of 10 knots on the diagram for a vessel bound westward. The line *AB* will represent approximately the track of the vessel with regard to the tides and currents.

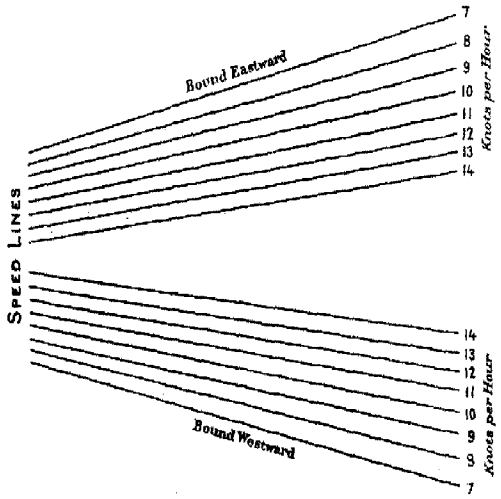
An inspection of this line will show that the vessel will carry a favorable (westerly) current the whole distance through the sounds, but that the velocity of this current is not uniform. For the first 15 miles from the whistling buoy, or until 4 miles westward of Handkerchief Light Vessel, the average velocity is 0.9 knot, and as this is favorable a new speed line for 11 knots (the approximate speed the vessel is making over the bottom) should be drawn from the point *A*, and this will represent the vessel's track with regard to the current and the tide for the first 15 miles. It will then be seen that the velocity of the current for the next 15 miles is very slight, and a 10-knot speed line can be drawn from the vertical 15-mile line about 25 minutes before high water at Boston to the vertical 30-mile line; from this latter point a speed line of nearly 12 knots will represent the current and tide conditions from off Cape Poge to abreast Gay Head. From these lines it will be seen that the vessel will have a rising tide for half the distance and then a falling tide until nearly abreast Gay Head.

If at any point along the track line the time of high water or low water is desired, measure the vertical distance to the high-water or low-water curve; this will give the time of high or low water, with reference to high water at Boston. When at any point along the track line, the time since the current turned is found by measuring downward to the current curve; or the time before it will turn by measuring upward to the curve.

Should a vessel not maintain a regular speed, or be delayed, the time (referred to high water at Boston) of arrival at any point along the sailing line may be noted and a new line drawn to indicate the continuation of her track. Similarly, a vessel beating may note the time of crossing the sailing line, and then read from the chart the state of the tide and current at any place along the sailing line.

CURRENT DIAGRAM OF SHIP CHANNEL, NANTUCKET AND VINEYARD SOUNDS





APPENDIX II.

PILOTAGE, HARBOR CONTROL, QUARANTINE, ETC.

MASSACHUSETTS.

PILOTS AND PILOTAGE.

Extracts from Chapter 67 of the Revised Laws of Massachusetts, 1902.

SEC. 17. A pilot shall have a lien for his pilotage fees upon the hull and appurtenances of every vessel liable to him therefor under the provisions of this chapter for sixty days after the completion of his services; but the lien of a pilot for the harbor of Boston shall not attach until it has been approved by the pilot commissioners.

SEC. 18. A pilot shall be liable for all damages which may accrue from his negligence, unskillfulness, or unfaithfulness.

SEC. 19. A pilot shall, if so required, exhibit his commission to the master of any vessel of which he may take charge.

SEC. 20. A pilot who takes charge of a vessel drawing more water than his commission authorizes shall be suspended or removed.

SEC. 21. Pilots shall first board such vessels, irrespective of size, as may have signals set for a pilot. If there are no such signals to be seen, pilots shall offer their services to the first vessel which they can board; and if a vessel liable to pilotage refuses to take a pilot, the pilot offering his services shall inform the officers of such vessel that she will be held to pay the regular fees for pilotage, whether such services are accepted or not.

SEC. 22. Every inward-bound vessel shall, except as provided in sections twenty-five and twenty-eight, receive the first pilot who holds a commission for her port of destination who offers his services, and such vessels shall, except as provided in sections twenty-six and twenty-seven, be held to pay to such pilot the regular fees for pilotage, whether his services are accepted or not.

SEC. 23. Every outward-bound vessel, except whaling vessels outward bound from the port of New Bedford, which is liable to pilotage if inward bound, shall, whether the services of a pilot are accepted or not, be held to pay the regular fees to the pilot who brought her into port or to some other pilot of the same boat, if he offers his services before she gets under way; or if such pilot does not so offer, or if such vessel was not piloted into port, then to the pilot who first offers his services.

SEC. 24. No vessel shall be liable to pay pilotage fees in or out of any port other than her ports of departure and destination, unless the aid of a pilot is requested, in which case the pilot shall be bound to act as such, and shall be entitled to the regular compensation therefor.

SEC. 25. Every pilot is authorized and directed to take charge, within the limits of his commission, of any vessels, not exempt from compulsory pilotage by section twenty-eight, and of vessels not bound from one port to another within the commonwealth, unless they are in the completion of a voyage from a port out of the commonwealth.

SEC. 26. Vessels of not more than two hundred tons burden, or vessels under three hundred and fifty tons register, bound into the port of Boston, which decline the services of a pilot, shall, if otherwise liable under the provisions of this chapter to the payment of pilotage fees, be liable to one-half of the regular fees; but if they request and receive such services, they shall pay the regular rates.

SEC. 27. If steam towage is taken by the desire of the master, the vessel shall pay full pilotage fees; but if taken by direction of the pilot in charge, such vessel shall pay the pilot but 75 per cent of the regular fees.

SEC. 28. Steam vessels regulated by the laws of the United States and carrying a pilot commissioned by United States commissioners, vessels regularly employed in the coasting trade, fishing vessels other than whalers, vessels of less than 7 feet draft of water, vessels bound into

the harbor of Boston and otherwise liable to pilotage, which arrive within a line drawn from Harding's Ledge to the Graves and thence to Nahant Head before the services of a pilot have been offered, and vessels under three hundred and fifty tons register bound out of the port of Boston, shall be exempt from the compulsory payment of pilotage, but if any such vessel requests the aid of a pilot, he shall serve the same in like manner as vessels which are not exempt, and shall be entitled to the regular compensation therefor.

SEC. 29. National vessels which employ a pilot shall pay the same rates as vessels in the merchant service.

SEC. 30. The period for winter rates of pilotage, if such rates are established, shall be from the first day of November to the thirtieth day of April, inclusive, and for summer rates, from the first day of May to the thirty-first day of October, inclusive. In the harbors of Boston, Cohasset, Salem, and Beverly, the rates shall be the same during the whole year; and in the harbors of Cohasset, Salem, and Beverly, the rates shall be the same as those in the harbor of Boston.

SEC. 31. If a vessel is anchored for twelve hours or more under any regulation relative to quarantine or to alien passengers, the pilot in charge, upon piloting such vessel to her port of destination, shall be entitled to an addition of twenty-five per cent to the regular fees.

SEC. 32. If a pilot, without fault or negligence of his own or of his associates, is unable to leave the vessel under his charge and is carried to sea, he shall be entitled to two dollars for each day on which he is necessarily detained from home.

SEC. 33. A pilot who fails to anchor a vessel carrying alien passengers or a vessel subject to quarantine, at the place assigned by the proper authorities, shall be suspended or removed.

SEC. 35. No person, unless he holds a commission as a pilot, shall, if a commissioned pilot offers his services, or can be obtained within a reasonable time, assume or continue to act as pilot in the charge or conduct of any vessel within the waters of this commonwealth, unless he is actually employed on such vessel for the voyage. * * *

PILOTAGE—SPECIAL REGULATIONS.

BOSTON HARBOR.[1]

Extracts from Laws, Rules and Regulations to 1908.

1. There shall be five pilot boats constantly employed by the Boston pilots; each boat shall have a number which shall be painted in black figures of not less than forty-eight inches in length in the mainsail and jib; the numbers of boats and crews of said boats to be regulated by the commissioners; but if and when pilot boats, propelled either in whole or in part by steam or other motive power, are substituted for any of the number aforesaid, they may, with the approval of the pilot commissioners, be reduced in number.

3. Each one of the pilot boats employed for the harbor of Boston, in alternate weeks, and in the order of their numbers, shall cruise on a station at the entrance of Boston Harbor, outside of Boston Light, and within the limits of a line drawn from Minot's Ledge to Nahant Head; and the boat on said station shall at all times show the established pilot-boat signal, and shall by day and by night, at all times, remain on said station whenever the weather does not render it impracticable, and be on the lookout for vessels approaching Boston Harbor; and shall at all times be furnished with pilots without leaving her station, and shall offer the services of a pilot to all vessels entering said harbor, * * * and she shall receive on board pilots from outward-bound vessels, * * *

11. Not less than three pilot boats shall at all times cruise in Boston Bay, outside of the limits prescribed for the station boat.

There shall be two stations for Boston pilots for inward-bound vessels. The outer station shall include a distance in sight of land in fair weather from the boat's deck, from where Race Point bears south to where the Highland Light bears west-northwest. * * *

The existing regulations of law for the inner station shall also apply to the Cape Cod station created by this act.

In addition to the stations now established, there shall be a third station for Boston pilots for inward-bound vessels which shall be established near the Boston light-ship; and the inner cruising line of this station shall be drawn from Minot's Light to Half Way Rock off Marblehead, and the outer limit of this station shall be with the light-ship in sight by day, and the lights of said light-ship in sight by night, in clear weather. * * *

The existing regulations of law for the two stations already established, known as the Cape Cod station and the inner station, shall also apply to the light-ship station created by this act.

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[1] Includes all places accessible to vessels from sea included within the limits of Nahant Rock on the north and Point Allerton on the south.

4. It shall be the duty of every pilot, after having brought a vessel to the inner harbor of Boston, to have such vessel properly moored in the stream, or secured to a wharf (below the bridges), at the option of the master, within twenty-four hours after arrival, weather and tide permitting, without extra charge.

5. If any vessel outward bound, having a pilot on board, should anchor in Nantasket Roads, it shall be the duty of the pilot to remain on board said vessel, if requested by the master, until the next high water, and if detained after that time, he shall be entitled to receive three dollars per day for each and every day so detained.

6. No pilot shall leave a vessel outward bound, until outside of Boston Light, without permission of the master of said vessel.

9. The fees for hauling a vessel from the stream to a wharf (below the bridges), after the expiration of twenty-four hours from arrival, shall be four dollars; and for hauling a vessel from the wharf to the stream, provided the vessel does not proceed to sea within twenty-four hours from the time of anchoring, four dollars.

12. Every commissioned pilot for Boston Bay shall be attached to a pilot boat * * *

13. No pilot shall take charge of any vessel of a larger draught of water than his commission authorizes, nor shall any other person, not having a commission, be put on board of any vessel from either of the pilot boats, in the capacity of pilot. But in the event of the master of any vessel taking on board an unauthorized person to assist him in going into port, the person so taken shall state the circumstances to the master of said vessel, and keep the usual signal flying for a pilot until within a line from the Harding Rocks to The Graves and Bass Point, and shall give the vessel up to any authorized pilot who may offer himself.

The established pilot signal by day is a white and blue flag, white next to the mast, and in the night a white light at the masthead.

The pilots of the port of Boston shall have an office, or keep a desk in some countingroom in some central situation, where all communications may be left for them, and it shall be the duty of the pilots, when in Boston, to call at said office or desk twice a day at least.

RATES OF PILOTAGE FOR BOSTON HARBOR.

Outward Rates.			Inward Rates.		
Draft of water.	Rate per foot.	Amount.	Draft of water.	Rate per foot.	Amount.
Feet.			*Feet.*		
7	$1.65	$11.55	7	$2.64	$18.48
8	1.66	13.28	8	2.69	21.52
9	1.67	15.03	9	2.73	24.57
10	1.70	17.00	10	2.77	27.70
11	1.74	19.14	11	2.80	30.80
12	1.78	21.36	12	2.85	34.20
13	2.00	26.00	13	2.95	38.35
14	2.00	28.00	14	3.45	48.30
15	2.10	31.50	15	3.50	52.50
16	2.25	36.00	16	3.55	56.80
17	2.50	42.50	17	3.75	63.75
18	2.75	49.50	18	3.80	68.40
19	3.00	57.00	19	4.00	76.00
20	3.25	65.00	20	4.25	85.00
21	3.50	73.50	21	4.50	94.50
22	3.75	82.50	22	4.50	99.00
23	4.00	92.00	23	5.00	115.00
24	4.25	102.00	24	5.00	120.00
25	5.00	125.00	25	5.00	125.00
26	.....	130.00	26	.....	130.00
27	.....	135.00	27	.....	135.00
28	.....	140.00	28	.....	140.00
29	.....	145.00	29	.....	145.00
30	.....	150.00	30	.....	150.00
31	.....	155.00	31	.....	155.00
32	.....	160.00	32	.....	160.00
33	.....	165.00	33	.....	165.00
34	.....	170.00	34	.....	170.00
35	.....	175.00	35	.....	175.00

Neponset River.—The pilotage for the several landing places in the towns of Dorchester and Neponset shall not be compulsory. When the services of a pilot are required, the rates of pilotage authorized by the commissioners shall be one dollar per foot on inward draft. Outward vessels without cargo, $5.00 per vessel; with cargo, same as inward.

Hingham, East Weymouth, Quincy, Quincy Point, Weymouth, East Braintree, and Nantasket.—The pilotage for the above places shall not be compulsory. When the services of a pilot are required, and are offered outside of a line drawn from Nantasket Point to the east point of Pettick's Island, from thence a line drawn to the northwest point of said

Pettick's Island, from thence in a line to Sunk Island, from Sunk Island in a direct line to Hangman's Island, the rates of pilotage authorized by the commissioners shall be, viz:

East Weymouth.			Quincy Point.			Hingham.		
Draft of water.	Rate per foot.	Amount.	Draft of water.	Rate per foot.	Amount.	Draft of water.	Rate per foot.	Amount.
Feet.			*Feet.*			*Feet.*		
7	$0.88	$6.16	7	$0.72	$5.04	7	$0.92	$6.44
8	.90	7.20	8	.72	5.76	8	.95	7.60
9	.92	8.28	9	.72	6.48	9	.97	8.70
10	.93	9.30	10	.80	8.00	10	1.00	10.00
11	.99	10.89	11	.92	10.12	11	1.00	11.00
12	1.10	13.20	12	1.00	12.00	12	1.10	13.20
13	1.25	16.25	13	1.25	16.25	13	1.25	16.25
14	1.40	19.60	14	Same as East Weymouth.				
15	1.50	22.50	15					
16	1.60	25.60	16					
17	1.70	28.90	17					
18	1.80	32.40	18					
19	1.90	36.10	19					
20	2.00	40.00	20					
21	2.10	44.10	21					
22	2.20	48.40	22					
23	2.30	52.80	23					
24	2.40	57.60	24					
25	2.50	62.50	25					

Nantasket, Quincy, Weymouth Landing, and Braintree, same rates as East Weymouth.
Inward and outward rates the same.

Lynn.—The pilotage for the harbor of Lynn shall not be compulsory: The rates of pilotage authorized by the commissioners, 1865, shall be, viz:

To Lynn on vessels drawing 12 feet of water, or less, $4.20 per vessel.

To West Lynn, $4.20 per vessel. Up the river through bridges, $5.60 per vessel.

The outward rates shall be one-half the inward rates.

Extracts from the acts of 1862 except where otherwise indicated

SOUTH SHORE.

The rates for piloting from west of a line drawn from Sakonnet Point to No Mans Land, to the ports herein named, shall be as follows, viz: Into Tarpaulin Cove, one dollar and fifty cents per foot; * * * Falmouth Port, and Holmes Hole, one dollar and seventy-five cents per foot. Into Edgartown and Hyannis, two dollars per foot; and to the bar of Nantucket Harbor, two dollars and twenty-five cents per foot. And into any other ports on the south coast of Barnstable County or on the Vineyard Sound, one dollar and seventy-five cents per foot.

The outward rates of pilotage from all of the above-named ports and from the bar of Nantucket Harbor, if taken westward past Gay Head, shall be three-fourths of the above; and the outward and inward rates shall be increased by twenty per cent for all piloting done between the first day of November and the thirtieth day of April, inclusive.

The rates for piloting vessels into any of the above-named ports, and to the bar of Nantucket Harbor, from any point east of a line drawn from Sakonnet Point to No Mans Land, and between said line and a line drawn due south from Tarpaulin Cove Lighthouse, shall be twenty-five per cent less than the above-named rates; and if said pilot is taken east of line drawn due south from Tarpaulin Cove Lighthouse, fifty per cent shall be deducted from said specified rates; and in case the master then declines taking a pilot, said pilot offering shall be entitled to one-quarter pilotage, agreeably to these regulations; and if no pilot shall have offered his services before passing a line drawn from the West Chop Lighthouse to the Nobska Lighthouse, there shall be no obligation on the part of the master or owner to pay pilotage if the master shall then decline receiving a pilot.

The rates of pilotage for vessels coming from the eastward, bound to the aforesaid ports, shall be from east of a line drawn due north from Nantucket Great Point Lighthouse to the bar of Nantucket, one dollar and fifty cents per foot of said vessel's draught. Into Edgartown and Hyannis, one dollar and seventy-five cents per foot. Into Holmes Hole and Falmouth Port, * * * two dollars per foot; and into all other ports on the south coast of Barnstable County or on the Vineyard Sound, one dollar and seventy-five cents per foot; and from west of said line drawn due north from Great Point Lighthouse, twenty-five per cent less than the foregoing. The outward rates, when passing to sea to eastward of Nantucket Shoals, shall be three-fourths

of the inward rates, and both outward and inward rates shall be increased by twenty-five per cent for all pilotage done between the first of November and the thirtieth of April, inclusive.

* * * * * * * * *

SEC. 1. The rates for pilotage for vessels in and out of Woods Holl Harbor shall be as follows: Whenever a pilot shall take charge of a vessel bound into said port from sea, east of a line drawn from Sakonnet Point to No Mans Land, the fees shall be two dollars and twenty-five cents a foot of the vessel's draught. If said vessel takes a pilot east of a line drawn due south from Tarpaulin Cove Lighthouse the fees for pilotage shall be one dollar and twenty-five cents a foot of the vessel's draught. For all pilotage done between the first day of November and the thirtieth day of April twenty-five cents a foot additional shall be charged as winter rates. The outward pilotage from Woods Holl for vessels bound west shall be one dollar and twenty-five cents a foot of the vessel's draught to a line drawn due north from Gay Head Lighthouse. When the pilot is taken east of a line drawn due north from Great Point Lighthouse the fee shall be two dollars and twenty-five cents of the vessel's draught. When the pilot takes charge of a vessel west of a line drawn due north from Nantucket Great Point Lighthouse, bound into Woods Holl, the fee shall be one dollar and twenty-five cents a foot of the vessel's draught; all outward bound vessels from Woods Holl, when bound east over Nantucket Shoals, when taken past and over said shoals, shall be subject to the full fees of two dollars and twenty-five cents a foot of the vessel's draught. (*Act of 1889.*)

NANTUCKET AND VINEYARD SOUNDS AND BUZZARDS BAY.

The rates for piloting vessels through the Vineyard Sound over Nantucket Shoal into Boston Bay, or to any port of destination eastward thereof, if the pilot be taken westward of a line drawn due south fron Tarpaulin Cove Lighthouse, or between said line and a line drawn from No Mans Land to Sakonnet Point, from the first day of November to the thirtieth day of April, inclusive, shall be for vessels not drawing more than eleven feet of water, three dollars and fifty cents per foot; if drawing more than eleven feet of water and not more than fourteen feet, four dollars per foot; if drawing more than fourteen feet, four dollars and fifty cents per foot. And from the first day of May to the thirty-first day of October, inclusive, for vessels drawing not more than eleven feet of water, two dollars and fifty cents per foot; if drawing more than eleven feet and not more than fourteen feet, three dollars per foot; if drawing more than fourteen feet, three dollars and fifty cents per foot. And if the pilot be taken west of said line drawn from Sakonnet Point to No Mans Land, ten per cent shall be added to the above specified rates; and if said pilot be taken at any point east of said line drawn due south from Tarpaulin Cove Lighthouse, ten per cent shall be deducted from said rates; and if, during the navigation aforesaid, the pilot is detained in any port at the request of the master, commander, or owner of said vessel, and not from stress of weather, he shall be allowed three dollars per day for all such detention; and in all cases five dollars shall be added to the rates aforesaid if the vessel shall be taken to a port of destination east of Cape Ann and not eastward of Portsmouth; and if the port of destination be Portsmouth or eastward thereof, ten dollars shall be added to said rates; *provided, however,* that any other rates may be agreed upon, by written contract between the master, commander, or owner of any vessel to be piloted, and the pilot taking charge of the vessel.

The rates of pilotage from one port to another on the Vineyard Sound, including the south coast of Barnstable County, and from the said ports to the bar of Nantucket Harbor, and *vice versa,* shall be uniformly one dollar and twenty-five cents per foot, and twenty-five per cent additional for all pilotage done between the first day of November and the thirtieth day of April, inclusive; and for pilotage inward or outward over the bar of Nantucket Harbor only, at all seasons of the year, one dollar per foot.

Any person holding a commission as pilot for Nantucket Shoals, is authorized to pilot vessels from any part of the Vineyard Sound, Nantucket Shoals, and ports bordering on the waters of the same, to the harbor pilot's limits of any port in Buzzards Bay, or ports west of said bay, at the following rates of pilotage: From any point east of a line drawn due north from Cape Poge, at two dollars per foot of such vessel's draught, and if taken westward of said line drawn due north from Cape Poge, one dollar and fifty cents per foot; and if no port pilot offers his services, with the consent of the master, they may proceed with said vessel to her destination and claim the whole amount of pilotage; *provided, however,* that no vessel passing through the waters of the Vineyard Sound, or over the Nantucket Shoals to ports beyond them, shall be holden to pay compulsory pilotage. But in no case shall an unauthorized pilot take charge of any vessel when a commissioned pilot can be obtained at a proper time. Pilots holding commissions for Vineyard Sound and Nantucket Shoals, who may have piloted a vessel over said shoals whose destination is a port in Barnstable or Boston Bay, or eastward thereof, on arrival at the port of her destination, and no harbor pilot offering his services, may, with the consent of the master (but not otherwise), pilot such vessel into her port of destination and receive the regular port pilot fees therefor.

NEW BEDFORD AND FAIRHAVEN.

Pilots especially commissioned for the purpose shall be authorized to pilot vessels from sea, which are bound into the ports of New Bedford and Fairhaven, to abreast of Clark Point Lighthouse, and to the port pilot limits of other ports in Buzzards Bay (or westward thereof), and if no port pilot offers his services, they may, with the consent of the master or owner, proceed with such vessel to her port of destination, and claim the full amount of pilotage.

The rates of pilotage from sea from vessels bound into the ports of New Bedford and Fairhaven to abreast of Clark Point Lighthouse shall be one dollar and ninety cents per foot, and from abreast of Clark Point Lighthouse to the inner harbors of New Bedford and Fairhaven, thirty-five cents per foot, and twenty per cent additional to the sea or bay pilotage, from the first day of November to the thirtieth day of April, when a pilot offers his services or is taken west of a line drawn from Sakonnet Point to the south point of No Mans Land.

The outward rates of pilotage from the ports of New Bedford and Fairhaven to abreast of Clark Point Lighthouse shall be thirty-five cents per foot; from abreast of Clark Point Lighthouse to sea, one dollar and fifty cents per foot.

Vessels bound into other ports (than New Bedford and Fairhaven) in Buzzards Bay, and ports west of said bay, are exempt from paying compulsory bay pilotage, when coming from sea, from westward to the port pilot limits of the several ports; but if a pilot is employed he shall be entitled to receive two dollars per foot, and if no port pilot offers his services, he may, with the consent of the master or owner, conduct said vessel to the port of her destination and claim the whole amount of pilotage.

The rates of port or harbor pilotage for all the different ports bordering on Buzzards Bay, and to the westward thereof, excepting New Bedford and Fairhaven, shall be for vessels inward bound, drawing less than twelve feet of water, one dollar per foot; for those drawing from twelve to fifteen feet of water, inclusive, one dollar and thirty cents per foot; for those drawing more than fifteen and not more than eighteen feet of water, two dollars per foot; and for those drawing over eighteen feet of water, two dollars and fifty cents per foot; and the rates of pilotage for vessels outward bound from said ports shall be three-quarters of said inward rates, and both outward and inward rates shall be increased by twenty per cent for all pilotage done between the first day of November and the thirtieth of April, inclusive.

OTHER PORTS IN MASSACHUSETTS.

NEWBURYPORT.—The rates of pilotage for vessels liable to pay pilotage bound into or out of the harbor of Newburyport shall be, for outward bound vessels, from seven to twelve feet draught of water, sixty-five cents per foot; from twelve to fifteen feet, inclusive, eighty-five cents per foot; upwards of fifteen feet, one dollar and five cents per foot. The summer rates of pilotage for inward bound vessels, drawing from seven to under twelve feet, ninety-five cents per foot; from twelve to fifteen feet, inclusive, one dollar and twenty-five cents per foot; over fifteen feet, one dollar and sixty cents per foot. The winter rates of pilotage for inward bound vessels, drawing from seven to twelve feet of water, one dollar and twenty-five cents per foot; from twelve to fifteen feet, inclusive, one dollar and sixty-five cents per foot; over fifteen feet, two dollars and ten cents per foot.

The district limits of the port of Newburyport shall be from Chebacco Bar, on the south, to the Isles of Shoals, on the north. Vessels not spoken until within the bar shall pay only half pilotage; if not spoken until within the Black Rocks shall pay no compulsory pilotage.

The pilots of Newburyport will be required to keep one or more * * * boats, and one boat shall be upon the cruising ground at all times, when the weather will permit.

MERRIMACK RIVER AND HARBORS.—The pilotage on the Merrimack River, between Newburyport and Haverhill, shall not be compulsory. When the services of a pilot are required, the rates of pilotage authorized by the commissioners shall be, between Newburyport and ship-yards at Bellville, thirty cents per foot; between Newburyport and Salisbury, fifty cents per foot; between Newburyport and Amesbury, sixty-two and one-half cents per foot; between Newburyport and Groveland, eighty-seven and one-half cents per foot; between Newburyport and Haverhill, one dollar per foot.

ROCKPORT, LANES COVE, AND ANNISQUAM.—The rates of pilotage shall be, for vessels under twelve feet draught of water, seventy-five cents per foot; of twelve to fifteen feet, inclusive, one dollar per foot; over fifteen feet, one dollar and fifty cents per foot. The inward and outward rates shall be the same.

GLOUCESTER.—SEC. 1. The rates of pilotage for vessels liable to pay pilotage bound into the harbor of Gloucester, shall be for vessels drawing seven feet and less than twelve feet, one dollar and fifty cents per foot; for those drawing twelve feet and upwards, the same as for the ports of Salem and Beverly. (*Act of 1873.*)

SALEM AND BEVERLY.—The pilots for the ports of Salem and Beverly shall keep one or more good decked boats, and shall cruise for the purpose of bringing vessels into said ports whenever the weather does not render it impracticable.

The harbor lines of the ports of Salem and Beverly shall be a line running north by east from Half-Way Rock to the northern shore, and a line running northwesterly from Half-Way

Rock to Marblehead Fort, within which lines there shall be no compulsory inward pilotage. The rules for pilotage, both for inward and outward bound vessels, shall be as follows, viz: * * *

SEC. 1. The rates of pilotage for the ports of Salem and Beverly shall hereafter be the same as those established for outward and inward bound vessels for the port of Boston.

* * * Any Salem and Beverly pilot, having brought a vessel in, shall have such vessel properly moored in the harbor or secured at the wharf, at the option of the master, within twelve hours after the arrival of said vessel, if the weather permits, without extra charge; but if called upon after the expiration of the twelve hours to haul any vessel into the wharf, the pilot shall be entitled to receive two dollars for his services, and the same sum for taking a vessel from the wharf into the harbor, if said vessel shall not proceed to sea within twelve hours from the time of her being anchored in the harbor. The signal for the pilot boats for the ports of Salem and Beverly shall be their accustomed signal by day, viz, a red flag with a white P, and a black ball painted on the upper part of mainsail and jib; and by night a green light. (*Chap. 204, Sup. to P. S.*)

MARBLEHEAD.—The rates of pilotage for vessels liable to pay pilotage bound into the harbor of Marblehead shall be, for vessels drawing from seven to eleven feet of water, sixty-seven cents per foot; from twelve to fourteen feet, ninety cents per foot; from fifteen to seventeen feet, one dollar and twenty cents per foot; eighteen feet and upwards, one dollar and sixty cents per foot.

The harbor limits of Marblehead shall be bounded by a line drawn from the south point of the Neck to Marblehead Rock, thence to Cat Island Rock, and thence westerly to Gerrys Island; within this line there shall be no compulsory inward pilotage. The outward rates shall be the same as the inward.

COHASSET HARBOR.—The rates of pilotage for said harbor shall be the same for outward and inward bound vessels as those established for the harbor of Boston. (*Chap. 298, Sup. to P. S.*)

PLYMOUTH.—The rates of pilotage for vessels liable to pay pilotage bound into the harbor of Plymouth shall be one dollar per foot. Vessels arriving inside of the Gurnet, and no pilot previously offering his services, are exempt from compulsory pilotage, if a pilot's services are then refused. Rate of pilotage outward, seventy-five cents per foot.

PROVINCETOWN.—There shall be commissioned from the port of Provincetown not more than six persons, who shall be competent as bay and harbor pilots, and who shall keep a * * * boat, * * * and shall cruise in all seasons, for the purpose of taking vessels into Provincetown or Cape Cod Harbor. Said pilots shall also be entitled to take vessels, when outside the limits of the line hereinafter defined, to or within said limits, or until spoken by a Boston pilot. Vessels bound into the port of Boston, and liable to pay pilotage, will take such pilots, when first spoken by them, and said pilots shall have authority to pilot any such vessels until spoken by a Boston pilot, when the vessel shall be given up to the first pilot commissioned for the port of Boston who may hail her; but the cape pilot shall continue on board until relieved by a Boston pilot, to whom the vessel shall be given up; and the pilotage of such vessel shall be divided between the two pilots, *pro rata*, in proportion to the distance each may have charge of her, after passing a line drawn from Plymouth Lights to Thacher Island, Cape Ann, in which event distance-money shall be wholly for the benefit of the cape pilots—otherwise for the Boston pilots; but the compensation of the first pilot shall in no case be less than five dollars, which amount shall be deducted from the regular pilotage, so that in no instance shall there be any addition to the usual rates of pilotage in consequence of taking such cape pilots.

The limits outside of which such Cape Cod or Provincetown pilots may take a vessel bound into Boston shall be a line drawn northeast from the Gurnet or Plymouth Lights; but all commissioned pilots for the port of Boston shall have the privilege of cruising outside of said line, as heretofore.

Vessels coming by Cape Cod and bound for the ports of Salem, Beverly, or Marblehead, who may desire the services of a cape pilot, may take such pilot as may be competent, to the several ports or pilots, under the same restrictions as are provided for vessels bound to Boston, as above.

The rates of pilotage for all vessels liable to pay pilotage bound into the harbor of Provincetown, if taken south of a line drawn due west from Race Point Lighthouse, or between that and a line drawn due south from Wood End Bar, shall be for vessels drawing less than twelve feet of water, one dollar per foot; for those drawing from twelve to fifteen feet of water, inclusive, one dollar and thirty cents per foot; for those drawing more than fifteen feet and not more than eighteen feet of water, two dollars per foot; for those drawing more than eighteen feet and not more than twenty-one feet of water, two dollars and fifty cents per foot; for those drawing more than twenty-one feet and not more than twenty-five feet of water, three dollars and fifty cents per foot, and no more. But no vessel shall be liable to pay compulsory pilotage if the services of a pilot are refused after passing a line drawn due south from Wood End Bar. And the outward rates of pilotage shall be three-fourths the amount of said inward rates.

TAUNTON RIVER.—The pilotage for Taunton River shall not be compulsory. When the services of a pilot are required, the rates of pilotage on all vessels piloted from Fall River to

Somerset, drawing not over twenty feet of water, is two dollars. From Fall River to Dighton, on vessels drawing twelve feet of water, seven dollars; eleven feet, six dollars and fifty cents; ten feet, six dollars; nine feet, five dollars and fifty cents; eight feet, five dollars; under eight feet, four dollars. From Somerset to Dighton and Berkley, fifty cents per foot for vessels drawing from eight to twelve feet of water; under eight feet, three dollars per vessel. The downward pilotage from the aforesaid places shall be one-half of the upward rates.

HARBOR CONTROL.

Extracts from Chapter 66 of the Revised Laws of Massachusetts, 1902.

SEC. 1. Whoever, not being a pilot or public officer, boards or attempts to board a vessel arriving in the harbor of Boston, Salem, Fall River, New Bedford, and Fairhaven, or Gloucester, before such vessel has been made fast to the wharf, without the previous permission of the master or person having charge thereof or the previous permission in writing of its owners or agents, or whoever, without such leave and without authority of law, boards a vessel in any of said harbors after having been forbidden so to do by a person having charge thereof at the time, or, having boarded such vessel, refuses or neglects to leave it when ordered so to do by the person having charge of it, shall forfeit not more than fifty dollars for each offense.

SEC. 6. For the purpose of the five preceding sections, the outer limits of Boston harbor shall be a line drawn from Harding's Rock to the Outer Graves and from thence to Nahant Head, and said harbor shall include the shores of Chelsea; the outer limits of Salem harbor shall be the chops of said harbor; the harbor of Fall River shall include the waters of Taunton Great River and Mount Hope Bay, from the south line of the town of Freetown to Rhode Island state line, including the shores of Somerset; the harbors of New Bedford and Fairhaven shall be considered one harbor, the outer limits of which shall be the outer limits of Buzzard's Bay; and the outer limits of Gloucester harbor shall be a line drawn from Eastern Point to Norman's Woe.

SEC. 17. Whoever wilfully and without lawful authority or license therefor, deposits in a harbor or other navigable tide waters stones, gravel, mud, ballast, cinders, ashes, dirt or any other substance tending to injure the navigation or to shoal the depth thereof shall be punished by a fine of not more than twenty dollars for each offense.

SEC. 18. No warp or line shall be passed across a channel or dock so as to obstruct vessels passing along the same.

SEC. 21. The master of a vessel within a harbor for which a harbor master is appointed shall anchor his vessel according to the regulations of the harbor master, and shall move to such place as the harbor master directs. The master of a towboat having a vessel in tow and a pilot having a vessel in charge shall allow such vessel to anchor only in such place as the regulations of the harbor master provide for anchorage.

SEC. 22. The master of a vessel, before unloading lumber in the stream or channel of a harbor having a harbor master, shall obtain from him a permit, designating where such lumber may be rafted.

SEC. 23. A vessel lying in a harbor or at a wharf or pier in a harbor shall, if so directed by the harbor master, cockbill the lower yards, brace the topsail yards fore and aft and rig in the jib-boom.

SEC. 24. A harbor master may, at the expense of the masters or owners thereof, cause the removal of any vessel which lies in his harbor and is not moved when directed by him, and upon the neglect or refusal of such master or owner on demand to pay such expense, he may recover the same from them in an action of contract, to the use of the city or town in which the harbor is situated.

SEC. 25. If the master or other person in charge of a vessel occupying a berth at a wharf or pier fails, after notice from the wharfinger thereof or his agent, to remove his vessel from such berth within such time as the harbor master adjudges reasonable, the harbor master shall cause such vessel to be moved to some other berth or anchored in the stream, and may recover the expense of such removal * * * from the master or owners. * * *

SEC. 26. A harbor master may, in the harbor for which he is appointed, regulate and station all vessels in the streams or channels thereof, and may remove such as he determines are not fairly and actually employed in receiving or discharging their cargoes, to make room for such others as require to be more immediately accommodated for such purposes.

SEC. 28. Whoever violates any of the provisions of the ten preceding sections or refuses or neglects to obey the lawful orders of a harbor master, or resists him in the execution of his duties, shall be punished by a fine of not more than fifty dollars, and shall be liable in an action of tort to any person suffering damage thereby.

GLOUCESTER HARBOR.

Extracts from chapter 315, acts of 1885.

SEC. 2. From Tenpound Island to Fivepound Island, a sufficient passageway of not less than two hundred feet in width on the northerly side of said harbor, leaving Babson Ledge buoy on the port hand going in and a passageway of not less than one hundred and fifty feet

in width from any wharf in Upper Cove, Smiths Cove, and Harbor Cove in said harbor, shall be at all times kept open for the passageway of vessels; and no vessel shall be anchored or allowed to lie at anchor in said passageways, or in the track of the ferryboats regularly running in said harbor.

SEC. 3. At least one man shall at all times be kept on board each vessel at anchor in said harbor, and a clear and distinct light shall be kept suspended not less than six feet above the deck of every such vessel during the night.

BOSTON HARBOR.

Extracts from chap. 16, acts of 1872.

SEC. 1. No vessel propelled by steam shall, either in Boston Harbor or Charlestown Harbor, pass within one hundred yards of any wharf at greater speed than at the rate of five miles an hour.

Rules and Regulations of the Harbor Master.

1. All vessels anchoring on the southwest side of the upper harbor shall anchor inside the following marks, viz.:

The round chimney on the cold storage building on Richmond Street, between Commercial Street and Atlantic Avenue, in range with the granite block on Long Wharf and southeast of pier 4, New York, New Haven & Hartford Railroad docks in South Boston.

2. All vessels anchoring on the northeast side of the upper harbor shall anchor inside the following marks, viz.:

The tall square chimney on the North End gas-house in range with the westerly end of the Quincy Market Cold Storage building on Eastern Avenue and southeast of a line of the large tower on the brewery on Marginal Street in range with the coal elevators on the pier of the Massachusetts Wharf Coal Company (adjoining the terminal of the Boston, Revere Beach & Lynn Railroad) in East Boston, and 600 feet from the wharves in East Boston.

3. All vessels of light draught shall anchor inside the above ranges.

4. No vessel shall anchor northwest of these ranges without permission of the Harbor Master.

5. No light vessel shall anchor on the northeast side of the harbor nor northwest of the Commonwealth pier in South Boston.

6. No vessel shall anchor in the dredged channel to the Metropolitan Coal Company's Wharf in South Boston nor in the dredged channel to L Street bridge in South Boston.

7. Before loading or discharging cargo or coal into or from a vessel at anchor, the master, consignee or stevedore must obtain a permit from the Harbor Master.

(Such vessel if not anchored in a proper place must be assigned to a berth before such permit is granted.)

8. Yachts anchoring on the yacht anchorage off Rowe's Wharf shall anchor within the following marks, viz.:

The round chimney on the cold storage building on Richmond Street, between Commercial Street and Atlantic Avenue, in range with the granite block on Long Wharf; to the westward of the dock between pier 1 and pier 2, New York, New Haven & Hartford Railroad; the flagstaff on freight house No. 2, on the Fort Point Channel side of the New York, New Haven & Hartford Railroad docks, in range with the northerly side of the Atlas Stores building in South Boston; and not less than 500 feet from pier 1, New York, New Haven & Hartford Railroad docks.

9. All vessels anchoring at Quarantine or in President Roads shall anchor inside a line drawn from Deer Island Point Light-house and Buoy No. 6, on the southeast end of the Lower Middle.

10. All vessels anchoring between Spectacle Island and Castle Island shall anchor southwest of a line drawn from the barn on the hill on Spectacle Island and southwest end of Castle Island.

Note.—The call for the harbor master and police steamers is three short and one long blasts of the steam whistle; the call for the fire boat is three long and two short blasts of the steam whistle.

QUARANTINE.

Extract from Chapter 75 of the Revised Laws of Massachusetts, 1902.

SEC. 131. A town may establish a quarantine ground in a suitable place. * * *

SEC. 132. The board of health in a seaport town may from time to time establish the quarantine to be performed by vessels arriving within its harbor, and may make quarantine regulations for the health and safety of the inhabitants, * * *

SEC. 133. Such board may at any time cause a vessel arriving in port, if such vessel or the cargo is, in its opinion, foul or infected so as to endanger the public health, to be removed to the quarantine ground and thoroughly purified at the expense of the owners, consignees, or persons in possession of the same; and may cause all persons arriving in or for any purpose visiting

such vessel, or handling the cargo, to be removed to any hospital under the care of the board, there to remain under its orders.

SEC. 134. Any person belonging to or arriving in a vessel on board of which any infection then is or has lately been, or is suspected to have been, or which has been at or has come from a port where an infectious distemper prevails which may endanger the public health, who refuses to make answer on oath, to be administered by any member of the board, to questions relating to such infection or distemper asked by the board of health of the town to which such vessel may come shall forfeit not more than two hundred dollars.

SEC. 135. All expenses incurred on account of any person, vessel, or goods which are under quarantine regulations shall be paid by the owner of such vessel.

GLOUCESTER HARBOR.

Extract from Regulations of the Board of Health, 1909.

REG. 32. Every vessel entering the harbor of Gloucester from any sickly port, or having any case of contagious or doubtful disease on board, or on board of which any person shall have died of any contagious or doubtful disease, shall be brought to anchor in that part of the harbor between Ten Pound Island and Eastern Point, and shall immediately display a yellow flag at the head of the foremast, which shall be kept flying so long as said vessel shall be at anchor in said place.

SALEM HARBOR.

Extracts from Regulations of the Board of Health, 1910.

REG. 48. From the first day of April in any year to the first day of January next following, all vessels arriving in this harbor from any foreign port or from any port south of Virginia, and also vessels arriving from any place in the United States where they may have touched on their way from any foreign port or place above named, shall come to and stop at the quarantine ground in said harbor.

REG. 49. The quarantine ground established for the port of Salem is that portion of Salem Harbor included within the following boundaries: Beginning at Eagle Island, so called, and running northwesterly to Coney Island; thence from said Coney Island in a more northerly direction to the Great Haste; thence from said Great Haste easterly to Bowditch's ledge, and from said ledge southwesterly to said Eagle Island.

REG. 51. No vessel arriving in said harbor from the ports aforesaid shall leave the quarantine ground until the examination provided by said regulation 50 shall have been fully completed, nor without a written permit from the board of health or its said agents.

REG. 53. While a vessel remains at the quarantine ground its cargo shall not be handled, nor shall anything whatsoever be removed from such vessel; nor shall any person or persons go on board or leave the same without the permission of the board of health or its said agent. Every vessel while at the quarantine ground shall constantly keep hoisted a yellow flag not less than three feet in length and two feet in width.

REG. 54. For any permit granted under regulations 51 or 52 the said clerk shall have the right to demand and receive from each vessel, her masters or owners, the fee established by the board of health.

BOSTON HARBOR.

Extracts from Quarantine Regulations, 1909.

ORDERED, That any vessel arriving at this port, which has on board at the time of her arrival, or has had during her passage to this port, any sickness of a contagious, infectious, or doubtful character which may be dangerous to the public health, or which has come from or has been in any port or place which has been epidemically infected with any contagious or infectious disease within the six months next preceding such arrival, or has on board any merchandise which has come by transshipment from any such infected port or place within the six months next preceding, or has on board any immigrants (except from British America) shall be anchored at Quarantine.

All old rags, paper stock, hair, feathers, hides, skins, wool and similar materials which are liable to convey disease germs must be accompanied by satisfactory certificates as to their place of collection and packing for shipment.

No article of clothing or bedding in use shall be thrown overboard from any vessel in Boston Harbor without the written consent of the Board of Health or the Quarantine Physician; nor shall any such article be removed from any vessel at her dock without such permission; all such articles which are to be destroyed, shall be burned in the harbor under the supervision of the Quarantine Physician, in the furnaces of the steamers.

No vessel shall leave Quarantine, nor shall her cargo, or any part thereof, be discharged, nor any person be allowed to go on board or to leave her while in Quarantine, without the written permit of the Port Physician, who is hereby authorized and instructed to take such

measures with regard to said vessel, cargo, and persons, as, in his judgment, the public health may require.

It is also hereby ordered, that during June, July, August, September, and October of each year, subject to such changes as circumstances may from time to time require, all vessels arriving in this harbor from the following ports shall be inspected at the Quarantine Station, viz: all vessels from any port in Europe, from the Western, Madeira, Canary, or Cape de Verde Islands; from the Mediterranean or Straits thereof; from the west coast of Africa, or around the Cape of Good Hope; from the West India, Bahama, or Bermuda Islands; from any American port south of Savannah, including Mexico, Central and South America; and vessels arriving from any place in the United States or British America, where they may have touched on their way from any foreign port or place above named.

No such vessel shall leave Quarantine or unload her cargo or any part thereof, nor shall any person go on board or leave the vessel while in Quarantine without the written permit of the Port Physician, who is hereby authorized and instructed to take any measures in regard to such vessels as in his judgment the public health may require.

The Port Physician is hereby authorized and instructed to demand and receive the Quarantine fees which are hereby made and established by this Board and which are as follows:

For examination of vessels, five dollars.

For disinfecting vessels, from ten to fifty dollars.

For baths and disinfecting personal clothing and baggage, one dollar for each person.

For vaccination, twenty-five cents for each person.

For board of patients in hospital, ten dollars a week.

PROVINCETOWN HARBOR.

Extracts from Quarantine Regulations adopted April 1, 1899.

1. Quarantine Ground of Provincetown. That portion of the harbor lying without a line drawn due northeast from the eastern extremity of Long Point and eastwardly three-fourths of a mile from Provincetown shore, shall be known as Quarantine grounds.

2. All vessels arriving from or having on board any persons or goods of any description from any foreign port where smallpox, cholera, typhus or ship fever or yellow fever, or any contagious disease is known to be prevailing or has lately been known to have prevailed, are hereby forbidden to cross quarantine line to come into harbor, or to land, within the harbor or limits of this town, any person whether of crew or passenger, or any goods, personal effects, or merchandise as aforenamed, until so permitted by the Board of Health after due inspection, or approval of the bill of health by said Board. Such vessel may however put to sea in preference to going into quarantine provided there be no infection aboard in which latter condition they will be subject to Regulation 3.

3. Any vessel having on board a case of any of the above named diseases shall immediately take a position upon Quarantine grounds, and shall there remain under the special supervision of the Board of Health until discharged by them, which will not be until after proper disinfection of the said vessel, crew and cargo. No persons, nor any goods, personal effects, or merchandise, shall be landed from any vessel in quarantine; nor shall any person visiting such vessel again land until the vessel's quarantine is finished, except by a permit from the Board of Health. Filthy or unclean vessels shall be subject to quarantine for purposes of purification. All vessels liable to quarantine shall discharge in quarantine and be detained thereafter for necessary purification.

8. A fee of five dollars shall be charged each vessel inspected by the Health officers and fifty cents additional for each passenger. All vessels arriving from foreign ports shall be subject to inspection during every month of the year, and all vessels from domestic ports south of Hatteras from April first to November first inclusive.

NEW BEDFORD HARBOR.

Extracts from Quarantine Regulations of the Board of Health, 1908.

All vessels arriving from foreign ports, excepting those from Canada and the provinces, are directed to go into quarantine until visited by the quarantine physician, and remain there until given permission to proceed. All pilots are required to observe this order.

The quarantine shall be had and performed at an anchorage ground near the Egg Islands, in said harbor (New Bedford), bounded as follows: Butler's Flat on the south, east shore of Clark's Point on the west, Eleven Foot Bank on the north, and the Egg Islands on the east, under the direction of the quarantine physician.

PORT OF FALL RIVER.

Extracts from Regulations of the Board of Health, 1899.

Reg. 55. All vessels arriving at this port from any port where Asiatic cholera, yellow fever, typhus fever, smallpox or any other contagious disease prevailed at the time of said vessel's sailing therefrom, or having on its arrival, or having had during its voyage any of

said diseases on board, shall anchor southerly from the "Lighthouse on Borden Flats," and not less than two thousand feet westerly from the easterly shore of Mount Hope Bay, at quarantine, and remain there until examined by the City Physician, and pending such examination no person shall be permitted to visit or go on board such vessel, except under the direction of the Board of Health. Such vessels shall only be allowed to come up to the city after such examination, and upon the certificate of said physician that in his opinion the health of the city would not be endangered thereby. The penalty for any violation of this regulation shall be a fine of one hundred dollars.

RHODE ISLAND.

Extracts from the General Laws of the State of Rhode Island and Providence Plantations, 1896.

PILOTS AND PILOTAGE.

CHAPTER 117.

SEC. 3. Every pilot shall take charge of all registered vessels entering the ports or waters of the state, or going out of the same, except fishing vessels not whaling vessels, coastwise vessels, vessels sailing from one port to another within the state and not in completion of a voyage from a place out of the state and passenger steam vessels regulated by United States laws and carrying a United States pilot.

SEC. 4. Every vessel inward bound, other than those included in the exception in the preceding section, shall pay to the first pilot offering his services, the regular pilotage fee; but coastwise vessels not taking a pilot shall be exempt therefrom; provided, however, that no vessel shall be obliged to take a pilot or to pay pilotage if she is bound into the harbors of Newport, Bristol or Warren, unless a commissioned pilot shall offer his services before such vessel passes the line from Point Judith to Brenton's Reef lightboat.

SEC. 5. Every pilot shall have a lien for his pilotage fees, for the space of sixty days, upon the hull and appurtenances of any vessel liable to him therefor.

SEC. 6. Coastwise vessels shall not be required to take a pilot, but if they elect to take a pilot, the pilotage shall be the same as for registered vessels.

SEC. 9. The commissioners may from time to time make rules and regulations concerning pilots and pilotage and fixing the rates of pilotage, * * *.

SEC. 11. Vessels taking steam towage into or out of a port or harbor of the state by direction of the owner or master shall pay full pilotage; but whenever steam towage is taken by request of the pilot the vessel shall be liable to pay only seventy-five per centum of the rates of pilotage to which such vessel would otherwise be liable.

SEC. 12. Whoever, not holding a commission as a pilot under the provisions of this chapter, except persons employed on board of the vessel for the voyage, exercises the duties of a pilot on board of any vessel within the waters of the state where a commissioned pilot offers his services or can be obtained at a reasonable time, shall be fined * * *, whether the vessel is liable to compulsory pilotage or not, * * *.

Extracts from Laws, By-laws and Rates of Pilotage, 1909

RATES FIXED BY THE PILOT COMMISSIONERS.

The rates to all ports in Rhode Island except Newport, Dutch Island, and Narragansett Pier are as given in the following table:

Draft.	Rate per foot.	Total.	Draft.	Rate per foot.	Total.	Draft.	Rate per foot.	Total.
7½ feet and under	$1.25	$9.37	11½ feet	$1.75	$20.12	15½ feet	$2.75	$42.62
8	1.50	12.00	12	2.00	24.00	16	3.00	48.00
8½	1.50	12.75	12½	2.00	25.00	16½	3.00	49.50
9	1.50	13.50	13	2.25	29.25	17	3.25	55.25
9½	1.50	14.25	13½	2.25	30.37	17½	3.25	56.87
10	1.75	17.50	14	2.50	35.00	18 feet and over	3.50	63.00
10½	1.75	18.37	14½	2.50	36.25			
11	1.75	19.25	15	2.75	41.25			

Men of war, $5.00 per foot.

The rates to Fall River, Mass., are the same as given above.

To Newport, Dutch Island, and Narragansett Pier the rates are as follows: 10 feet and under, $1 per foot; 10½ to 12 feet, $1.50 per foot; 12½ to 15 feet, $2 per foot; 15½ to 20 feet, $2.50 per foot; 20½ feet and over, $3 per foot.

The outward rates of pilotage for all ports in Rhode Island are the same as the inward rates.

HALF RATES.

If bound into Wickford and past the range of Fox Island and the Beacon, half the regular rates of pilotage.

If bound to East Greenwich or Apponaug (so called) and past the range of the Beacon and Warwick Neck Lighthouse, half of the regular rates of pilotage.

If bound to Providence and past the line of Warwick Neck Lighthouse and Poppasquash Point, half of the regular rates of pilotage.

If bound into Mount Hope Bay and past Sandy Point Lighthouse, half of the regular rates.

If bound into Warren or Bristol, and past Warwick Neck Lighthouse (West Passage), and Sandy Point Light (East Passage), half rate.

If bound into Narragansett Pier and past line drawn from buoy on head of reef to Brenton Reef Light Ship, from thence to Point Judith Light, half rate.

WINTER RATES.

From November 1 to May 1, 50 cents per foot extra in addition to foregoing rates.

No vessel bound to Providence shall be compelled to take a pilot unless spoken by a branch pilot below Nayatt Point; or if bound to East Greenwich or Apponaug, below Warwick Neck and the Spindle; or Mount Hope Bay, below the pyramid at Bristol Ferry.

Pilots shall not charge for less than 4 inches of water, but when a vessel draws 4 inches, then the pilot shall charge for the half foot.

Extracts from the General Laws of the State of Rhode Island and Providence Plantations, 1896.

PROTECTION TO NAVIGATION.

CHAPTER 118.

SEC. 4. No person shall throw * * * into the waters of Providence river or Seekonk river or Narragansett bay north of a line drawn from Nayatt Point to Rocky Point any cinders or ashes from any steamboat. * * *

SEC. 5. No person shall deposit any mud, earth, sand, gravel, ashes, cinders or other substances in the main channel of Providence river leading to the city of Providence, or in any part of the said river or of Warren river or of Narragansett bay lying east of the said main channel and north of a line drawn east and west across the said channel, and from the easterly line thereof to the eastern shore of the said bay, in the range of the lower buoy off Rumstick Point, or in the waters of Narragansett bay, within one mile of the shores of Bristol county or Hog Island; * * *

QUARANTINE.

CHAPTER 95.

SEC. 1. Each seaport town, or the town council thereof, may appoint a health officer.

SEC. 4. They shall designate the particular place in the harbor, bay or river, adjacent to such town, where all ships or vessels arriving, subject to examination or quarantine, shall come to anchor; and shall define the limits of such quarantine ground, and assign the time for which such ships or vessels shall be detained, and where and how unladen.

SEC. 6. Every commander of a ship or vessel who shall * * * refuse or neglect to bring his ship or vessel to anchor within the limits as above described, shall be fined not exceeding five hundred dollars nor less than twenty dollars, to the use of the town.

SEC. 8. Every person who shall leave any ship or vessel under order of quarantine, without permission from the health officer or the town council of such town, shall be fined not exceeding twenty dollars; * * *

SEC. 9. If any vessel shall arrive in the waters of the state, bound to the port of Providence, at any time while the quarantine regulations of the city of Providence are in force, no person on board such vessel shall leave the same until such vessel shall have been visited and examined by the health officer * * *

CHAPTER 94.

SEC. 1. Every commander of any vessel which shall come into any port or harbor of the state, and shall have any person on board sick of the smallpox or any other contagious or infectious distemper, or which has had any person sick of such distemper during the passage to such port or harbor, or shall come from any port or place usually infected with the smallpox, or where any other contagious or infectious distemper is prevalent, who shall bring such vessel to anchor in any of the ports or harbors of the state within the distance of one mile from any public ferry, pier or landing place, or permit or suffer any person on board such vessel to be landed, or any person to come on board such vessel, without a license first had and obtained from the town council of the town where such vessel shall arrive, shall be fined four hundred dollars.

SEC. 2. Such commander, on his arrival in any of the waters of the state, shall forthwith hoist and keep his colors in the shrouds of such vessel, as a signal that he has come from some such infected place or has infection or contagion on board.

SEC. 3. If any person shall come on shore from on board such vessel, without license first had and obtained as aforesaid, the town council may send back such offender immediately on board such vessel, or confine him on shore in such convenient place as to them shall appear most effectual to prevent the spreading of any infection; and the person so offending shall satisfy and pay all charges that shall arise thereon, and shall also be fined forty dollars.

SEC. 32. The health officer of the city of Newport shall * * * have authority * * * in all matters arising under this chapter in relation to any vessel coming within Dutch Island harbor or within the waters of the East (Sakonnet) river below the bridges between Portsmouth and Tiverton.

NEWPORT, R. I.

HARBOR REGULATIONS.

Extracts from City Ordinances, 1902.

CHAPTER 17.

SEC. 1. All vessels entering the harbor shall be anchored, by the master or commander thereof, according to the directions of the harbor master.

SEC. 2. All vessels lying in the harbor, not anchored according to the directions of the harbor master, and not having sufficient crew to move them, shall be moved by the harbor master, * * *

SEC. 3. The harbor master shall have authority to remove * * * such vessels as are not employed in receiving or discharging their cargoes, * * * he being sole judge as to the fact of their being fairly or properly employed in receiving or discharging their cargoes; and he also, for any purpose in his discretion, may move or order or cause to be moved any vessel lying anywhere in the harbor, whether at a wharf or elsewhere, * * *

CHAPTER 39.

SEC. 1. It shall be the duty of the captain or engineer of every ship or boat which is propelled by steam, to cause the speed of his said ship or boat while passing through the inner harbor of said city, between the lighthouse on Goat Island Breakwater and the south end of Goat Island, to be regulated to not exceeding the rate of five miles an hour.

QUARANTINE.

CHAPTER 18.

SEC. 1. A quarantine shall be had of all vessels, their officers, crews, passengers and cargoes that come within the harbor of Newport, which are from any port or place whatever, where any infectious, contagious or malignant disease prevails, or recently has prevailed, or which are foul or infected after their arrival; no vessel coming from any infected district, or on board which, during her voyage, any person may have died of any infectious disease, or whose cargoes or any part thereof has recently been brought from any such port or place, shall be unladen of any article which may be deemed by the health officer capable of generating or communicating disease, until written permission therefor can be obtained from the mayor, * * *

SEC. 2. The quarantine ground of the City of Newport shall comprise those portions of the harbor of Newport which lie to the northward of the lighthouse on the breakwater of Goat Island and to the southward of Coasters' Harbor Island, and west of a straight line drawn from said lighthouse to the western part of said Coasters' Harbor Island. * * *

All vessels that may be ordered into quarantine shall during the time they remain in quarantine, wear a color in their shrouds in such manner as to be seen at a safe distance.

SEC. 3. During the time any vessel is performing quarantine, no person shall go on board thereof. * * *

SEC. 4. It shall be the duty of the sentinel to board every vessel arriving at this port between the 30th day of June and the 1st day of November of any year, and examine their condition, and if such vessel is liable to quarantine, to order said vessel to the quarantine ground and deliver the captain or commanding officer a copy of these regulations, * * *

SEC. 9. All vessels arriving at this port, after having discharged their cargoes in any other port of the United States, agreeably to the quarantine regulations of such port, shall anchor on the quarantine ground, and be visited and examined by the said health officer, and be subject to the provisions of the first section of this chapter, the same as if said vessel came direct to this port.

SEC. 12. The said health officer shall have authority to put such interrogatories and inquiries to the captain or commanding officer, or any other person on board of any vessel arriving at this port and subject to quarantine, as he shall deem proper, * * *

PROVIDENCE, R. I.

HARBOR REGULATIONS.

Extracts from Revised City Ordinances, 1899.

SEC. 1. The harbor master shall have full power and authority to prescribe regulations and give directions regarding the anchorage station, management and control of all vessels within the harbor of Providence.

SEC. 2. Every vessel entering said harbor shall be anchored by the master or person in command thereof, according to the directions of the harbor master.

SEC. 3. All vessels not anchored according to the directions of the harbor master shall be forthwith moved by their crews under his direction; and if any such vessel have not sufficient crew to move the same, such vessel shall be moved by the harbor master. * * *

SEC. 4. No warp or line shall be passed across the channel so as to obstruct vessels passing along the same.

SEC. 5. Vessels shall not in any case be placed alongside of any wharf in said harbor more than three deep, without permission of the harbor master.

SEC. 6. The master, owners or persons in charge of any square-rigged vessel shall, as soon as may be after such vessel is made fast to any wharf or other vessel, cause the lower yards to be cockbilled, and the topsail yards to be braced fore and aft; and the jib-boom of any vessel shall be rigged in whenever so directed by the harbor master.

SEC. 7. The harbor master may remove * * * any vessel not employed in receiving or discharging cargo, * * * and shall be the sole judge of the fact of any vessel's being fairly and legitimately engaged in the receiving or discharging of cargo. He may also determine the extent, time and manner of accommodation respecting the stations of vessels, which should be extended by the owners or masters thereof to each other, and to require such accommodation to be extended.

SEC. 8. The master * * * of every vessel intending to unload lumber in the stream shall first obtain from the harbor master a permit designating the locality where such lumber may be rafted; but no vessel shall obstruct the channel in so doing.

SEC. 9. Every vessel drawing more than twenty feet of water, and approaching the harbor at any other than high tide, shall anchor below "The Crook" (so-called) until the tide shall warrant a free passage.

SEC. 10. No steamboat shall proceed at a greater speed than five miles an hour between Sassafras Point and Crawford Street bridge, in entering or leaving or moving within the harbor.

QUARANTINE.

Extracts from Rules of the Board of Aldermen.

RULE 28. The quarantine ground of the port of Providence shall be that portion of the harbor lying eastward of the main channel of Providence River, extending from Field's point to Sassafras point.

RULE 29. The health officer shall make examination of every vessel arriving in the harbor of Providence from any foreign port, and shall grant permit to land persons from said vessels and to unload the cargoes thereof, if in his opinion the public health is not endangered thereby; and no person shall be permitted to leave such vessel, nor shall its cargo be discharged, until such permit be first had and obtained from said health officer; provided that this rule shall not apply to vessels from British North America, not carrying persons or effects of persons non-resident in America for sixty days next preceding arrival; and provided also that the port of departure be free from quarantinable disease. The master of every vessel subject to examination as above provided, shall display a yellow flag as a signal.

RULE 30. The health officer may demand such information, and ask such questions as he shall deem necessary or proper, of the captain or commanding officer, or other person on board of any vessel arriving at this port and subject to examination or quarantine, respecting the condition of such vessel, and the health of the persons on board the same; * * *

RULE 31. If any vessel in the harbor of the city, whether subject to quarantine or not, shall have any sickness on board, or if such vessel or the cargo thereof is in a condition dangerous to the public health, in the opinion of the health officer, said health officer may subject such vessel to the regulations of quarantine, so far as in his opinion may be necessary to prevent all such danger.

RULE 32. No provisions, spirituous liquors or other articles shall be permitted to be brought on board any vessel at quarantine, without the written permission of the health officer.

RULE 33. No portion of the cargo, personal baggage, clothing or other goods shall be delivered from on board any vessel at quarantine, except in such manner and at such places as the health officer shall in writing direct.

RULE 34. No person in any boat or vessel shall go alongside of any vessel at quarantine, nor be at anchor or remain within one hundred yards of such vessel at quarantine, without written permission from the health officer.

RULE 35. Every vessel at quarantine shall be stationed at such place as the health officer shall direct.

RULE 40. The superintendent of health shall receive the sum of three dollars for each visit made by him to any vessel subject to examination or quarantine, together with his necessary expenses in making such visit, to be paid by the owners, agents or commanders of the vessels visited by him.

APPENDIX III.

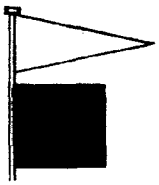
STORM WARNING DISPLAYS.

Storm warnings are displayed by the United States Weather Bureau on the coasts of the United States and the Great Lakes.

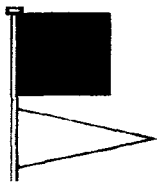
A red flag, with a black center, indicates that a storm of marked violence is expected.

The pennants displayed with the flags indicate the direction of the wind; red, easterly (from northeast to south); white, westerly (from southwest to north). The pennant above the flag indicates that the wind is expected to blow from the northerly quadrants; below, from southerly quadrants.

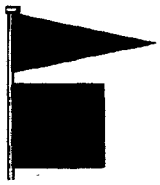
STORM WARNING FLAGS.



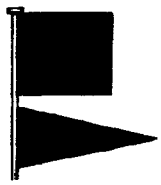
Northwesterly winds.



Southwesterly winds.

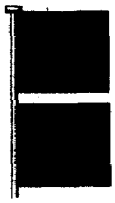


Northeasterly winds.



Southeasterly winds.

By night a red light indicates easterly winds, and a white light below a red light, westerly winds.



Hurricane.

Hurricane warning.—Two red flags, with black centers, indicate the expected approach of tropical hurricanes, and also of those extremely severe and dangerous storms which occasionally move across the Great Lakes and northern Atlantic coast. Hurricane warnings are not displayed at night.

Small craft warning.—A red pennant, displayed during the day only, indicates moderately strong winds that will interfere with the safe operation of small craft.

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APPENDIX IV.

REGULATIONS U. S. PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

(*Extracts.*)

DUTIES OF COMMISSIONED OFFICERS.

PROFESSIONAL DUTIES.

116. The professional duties of commissioned officers are to examine all applicants for relief, to prescribe for and furnish out-patient or hospital treatment as may be required, and to make physical examinations of the seamen of the several Government services and the merchant marine, under such regulations as shall hereinafter appear.

117. Commissioned officers will, upon the application of the United States shipping commissioner, or of the master or owner of any United States vessel engaged in the foreign, coastwise, or inland navigation trade, examine as to his physical condition any seaman brought to them for that purpose, and will give a certificate as to his fitness or unfitness for service. They will physically examine, in accordance with existing regulations governing physical examinations, any foreign seamen sent them for that purpose by the duly authorized agent of a foreign line or by the consul representing the nation to which the vessel belongs. A fee of one dollar will be charged for each examination of a foreign seaman, and fees so received will be deposited with the collector of customs in the same manner as donations to the marine-hospital fund. Officers will also, upon the application of the proper authority, examine cadets, enlisted men, and persons desiring to enlist in the Revenue-Cutter, Life-Saving, Coast Survey, and Lighthouse Services, or to instruct them in the mode of resuscitating persons apparently drowned. No fee will be charged for this service. They will also examine alien immigrants when detailed for that purpose. They will also, when officially requested, furnish to commanding officers of revenue cutters certificates as to the physical condition of enlisted men of the Revenue-Cutter Service who may be under treatment in hospital or as out-patients. * * *

119. Whenever officially requested by the local inspectors of steam vessels or other proper officers, commissioned officers will examine applicants for pilot's license as to sense of hearing, color perception, and general visual capacity, and will give a certificate accordingly.

120. No fee will be charged by any officer of the Public Health and Marine-Hospital Service for the medical examination or professional treatment of seamen of the United States merchant marine or for making a certificate as to their physical condition, and no officer shall accept a fee for professional service relating to the public service.

SANITARY DUTIES.

123. It shall be the duty of commissioned officers to enforce the national health and quarantine laws and regulations; but no additional compensation shall be allowed said officers by reason of such service as they may be required to perform except actual and necessary traveling expenses.

127. Upon the outbreak of smallpox at or near a relief station, commissioned officers will vaccinate such seamen as may come to the marine-hospital office for the purpose; and officers are authorized at all times to visit vessels to examine and vaccinate crews.

RELIEF STATIONS.

404. A relief station of the Public Health and Marine-Hospital Service is a port or place where an officer of the service is on duty to extend relief to seamen, or where an officer of the customs service is specifically authorized to extend said relief.

405. Relief stations shall be divided into the following classes:

Class I. United States marine hospitals.

Class II. All other stations under command of a commissioned officer.

Class III. All stations under charge of an acting assistant surgeon where there is a contract for the care of sick and disabled seamen.

Class IV. All other relief stations not included in the above classes.

406. At all relief stations where the number of patients warrants, an officer of the service will be assigned to the command of the station, and whenever practicable the patients of the service will be treated in hospitals maintained exclusively for their benefit. * * *

408. At each relief station of the first and second class, and whenever practicable at each relief station of the third class where an acting assistant surgeon of the service is on duty, there shall be a marine-hospital office, where applicants for relief shall be received and examined, and the necessary action taken according to the regulations.

409. The marine-hospital office shall be located at the customhouse whenever practicable, and suitable office room for that purpose shall be set apart by the custodian of the customhouse building, subject to the approval of the Secretary of the Treasury.

BENEFICIARIES.

411. The persons entitled to the benefits of the Public Health and Marine-Hospital Service are those employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service on board of those engaged in such care, preservation, or navigation. Officers and crews of the Lighthouse Establishment, officers and crews of the Revenue-Cutter Service, seamen employed on the vessels of the Mississippi River Commission, seamen employed on the vessels of the Engineer Corps of the Army, and keepers and crews of the United States Life-Saving Service are entitled to the facilities of the hospitals and relief stations under special rules hereinafter prescribed.

412. Officers on vessels of the Coast and Geodetic Survey, and seamen thereon who are not enlisted men from the Navy, are entitled to the benefits of the service.

413. Seamen employed on yachts are entitled to treatment, provided the said yachts are enrolled, licensed, or registered as vessels of the United States.

414. Seamen employed on United States Army transports or other vessels belonging to the Quartermaster's Department, United States Army, when not enlisted men of the Army, are entitled to the benefits of the service.

415. No person employed in or connected with the navigation, management, or use of canal boats engaged in the coasting trade shall, by reason thereof, be entitled to any benefit or relief from the service.

417. Seamen taken from wrecked vessels of the United States are entitled to the benefits of the service if sick or disabled, and will be furnished care and treatment without reference to the length of time they have been employed.

418. Seamen employed on merchant vessels of the United States returned to the United States from foreign ports by United States consular officers, if sick or disabled at the time of their arrival in a port of the United States, shall be entitled to the benefits of the service without reference to length of service.

419. A sick or disabled seaman, in order to obtain the benefits of the service, must apply in person, or by proxy if too sick or disabled so to do, at the office of the Public Health and Marine-Hospital Service, to an officer of that service, or to the proper customs officer acting as the agent of the said service at stations where no medical officer is on duty, and must furnish satisfactory evidence that he is entitled to relief under the regulations.

420. Master's certificates and discharges from United States shipping commissioners, made out and signed in proper form, showing that the applicant for relief has been employed for sixty days of continuous service "in a registered, enrolled, or licensed vessel of the United States," a part of which must have been during the sixty days immediately preceding his application for relief, shall entitle him to treatment. The phrase "sixty days continuous service" shall not be held to exclude seamen whose papers show brief intermission between short services that aggregate the required sixty days.

421. The certificate of the owner or accredited commercial agent of a vessel as to the facts of the employment of any seamen on said vessel may be accepted as evidence in lieu of the master's certificate in cases where the latter is not procurable.

422. Masters of documented vessels of the United States shall, on demand, furnish any seaman who has been employed on such vessel a certificate, Form 1915, of the length of time said seaman has been so employed, giving the dates of such employment. This certificate will be filed in the marine-hospital office or office of the customs officer when application is made for relief, if relief is furnished.

423. Any master of a vessel or other person who shall furnish a false certificate of service, with intent to procure the admission of a seaman into any marine hospital, shall be immediately reported to the nearest United States attorney for prosecution.

424. When an interval has occurred in the applicant's seafaring service by reason of the closure of navigation on account of ice or low water, such interval shall not be considered as excluding him from relief unless the sickness or injury for which he applies for relief be the direct result of employment on shore.

425. During the season when navigation is closed at any port, by reason of ice or low water, seamen applying for relief at such ports shall be entitled to same, provided they present the documentary evidence required in paragraph 420, which must show that the applicants

were employed within sixty days immediately preceding the said closure of navigation, and provided it does not appear that the disease or injury is the result of employment on shore or the result of vicious habits.

426. The time during which a seaman has been under treatment in hospital as a patient of the service shall not be reckoned as absence from vessel in respect to debarring him from further relief.

427. Whenever an applicant for relief presents himself at the marine-hospital office or the customhouse without a master's certificate or shipping commissioner's discharge and it is impracticable to obtain such certificate, the affidavit of the applicant as to the facts of his last employment, stating names of vessels and dates of service, may be accepted as evidence in support of his claim for the benefits of the service.

428. When the period of the seaman's service as shown by his certificate on last vessel is less than sixty days, his affidavit as to previous service may be accepted.

431. When a seaman applies for relief after an absence of sixty days or more from his last vessel, and it satisfactorily appears that such absence was due to sickness or injury acquired in the line of duty, and that it was impracticable for him to apply to the proper officer for treatment, a statement of the facts, together with a copy of the application and other papers in support of same, shall be forwarded, with the recommendation of the medical officer, to the Surgeon General for decision.

432. Any seaman who is able to write will be expected to sign his name upon the face of the master's certificate issued to him before said certificate is signed by the master of the vessel. * * *

434. When a seaman who has received continuous treatment at the out-patient office for a period of two months applies for further treatment he must, to entitle him to treatment, furnish a new certificate of service, showing that he is still following his vocation as seaman, or give satisfactory evidence that such service has been prevented by closure of navigation or by sickness, the latest dates of service and, in case of lack of recent service, its explanation, to appear in each new relief certificate.

435. The expenses of caring for sick and disabled seamen incurred during a voyage will not be paid by the service.

436. The expenses for the care and treatment of seamen suffering from contagious diseases, who are entitled to the benefits of the service, and who, in accordance with the State or municipal health laws and regulations are taken to quarantine or other hospitals under charge of the local health authorities, will not be paid unless such seamen were admitted at the time by the request of an officer of the service.

437. In no case shall money be paid to a seaman or to his family or friends by the service as reimbursement for expenses incurred during his sickness or disability.

439. Seamen who may be injured in street brawls or while committing a breach of the peace, and are therefore confined in jail or taken to civil hospitals by the local authorities for such acts, shall not receive treatment at the expense of the Service.

440. Seamen taken sick or injured while actually employed on a documented vessel shall be entitled to treatment at relief stations without reference to the length of their service.

441. A certificate of discharge may, at the discretion of the officer in charge of the case, be given to a hospital patient, but such certificate when presented at another relief station shall not be taken as sufficient evidence of the applicant's title to marine-hospital relief, but may be considered as collateral to other satisfactory data submitted by the seaman.

442. Temporary relief only is contemplated, and admission to hospital is not intended to permit an indefinite residence therein for cause other than actual disease or injury.

THE REVENUE-CUTTER SERVICE.

444. The officers and crews of the Revenue-Cutter Service will receive hospital or out-patient treatment, as hereinafter provided, on certificate signed by the commanding officer or executive officer of a revenue cutter, without regard to length of service. The certificate shall contain a description of the applicant for relief. Officers on leave or waiting orders may sign their own certificate.

THE ENGINEER CORPS, UNITED STATES ARMY.

453. Seamen employed on vessels under the charge of the Engineer Corps of the United States Army shall be admitted to the benefits of the Marine-Hospital Service without charge at stations of the first, second, and third class upon the written request of the commanding officers of said vessels.

THE LIGHTHOUSE SERVICE.

460. Officers and crews of the several vessels belonging to the Lighthouse Establishment, including lightships, may be admitted to the benefits of the Public Health and Marine-Hospital Service upon the application of their respective commanding officers. No charge will be made for care and treatment.

THE COAST AND GEODETIC SURVEY.

460*a*. Officers and seamen on vessels of the Coast and Geodetic Survey shall be entitled to relief under the same regulations governing the treatment of seamen on documented vessels (see par. 412), except as hereinafter provided.

460*b*. When immediate medical aid is considered absolutely essential for any number of the crew of a vessel of the Coast and Geodetic Survey, and the services of the Public Health and Marine-Hospital Service can not be procured, the commanding officer of the vessel may, for the time being, until the services of the Public Health and Marine-Hospital Service can be obtained, avail himself of the most suitable local facilities, provided the charges are reasonable, and shall immediately report his action to the Superintendent of the Coast and Geodetic Survey, forwarding, as a part of the report, the statement of the attending physician, certifying the necessity for immediate treatment and the probable duration of same, said report and certificate to be forwarded to the Surgeon General. Vouchers covering the expenses of such services and the necessary medicines, properly certified and accompanied by a full statement of the circumstances, shall be forwarded to the Superintendent of the Coast and Geodetic Survey, who will forward the vouchers, with all papers relating thereto, to the Surgeon General for approval and settlement. This paragraph shall not be construed to authorize relief at the expense of the Public Health and Marine-Hospital Service in foreign ports or in ports of the Philippine Islands.

UNITED STATES ARMY AND NAVY.

461. Officers and enlisted men of the United States Army and Navy and civilian officers and crews of naval auxiliary vessels, may be admitted for care and treatment as patients of the service only upon the written request of their respective commanding officers. Every such admission shall be immediately reported to the Surgeon General by the officer in charge of the station, on a daily report (Form 1957) or relief certificate (Form 1916), accompanied by a copy of the request upon which such officer or man was admitted. They will be furnished treatment at stations of the first, second, and third class only. The rate of charge to be made for the care and treatment of the said officers and men will be fixed by the department at the beginning of each fiscal year, and will be announced to officers and others in the annual circular entitled "Contracts for care of seamen." Patients of the above-named class are not subject to the provisions requiring transportation to marine hospitals.

FOREIGN SEAMEN.

462. The accommodations provided for the care and treatment of the patients of the Public Health and Marine-Hospital Service are also available to foreign seamen at relief stations of the first, second, and third class upon the application of the consular officer of the nation under whose flag they are sailing; or upon the application of the masters of the vessels upon which said seamen serve, provided satisfactory written security is given for the payment of the expenses of such care and treatment, at rates fixed annually by the department.

463. A bill (Form 1928) in duplicate must be rendered by the officer of the service * * *. One copy of this bill shall be delivered to the collector of customs, who shall at once collect the amount * * *.

464. Customs officers acting as agents of the Public Health and Marine-Hospital Service shall collect all bills for the care and treatment of seamen of the classes enumerated in paragraphs 461 and 462 * * *.

465. Collectors of customs will notify the commanding officer of the vessel of the class enumerated in paragraphs 461 and 462, upon whose request the seaman was admitted, of the amount of the bill, and when paid will give a receipt therefor. * * *

466. The rate of charge to be made for the care and treatment of foreign seamen will be fixed by the department at the beginning of each fiscal year, and will be announced to officers and others in the annual circular entitled "Contracts for care of seamen." Foreign seamen are not subject to the provision of paragraphs 493 and 501 requiring transportation to marine hospitals.

RELIEF.

OUT-PATIENT RELIEF.

467. Sick and disabled seamen entitled under these regulations to the benefits of the service whose diseases or injuries are of such a nature that they can properly be relieved by medicines, dressings, or advice, without admission to hospital, shall be treated as out-patients, and furnished medicines, dressings, surgical appliances, or advice, as the case may require.

468. Seamen will not be furnished relief at their own homes, except by special authority from the Surgeon General, and then only an allowance for medical attendance and medicines will be made at rates fixed by the Treasury Department.

HOSPITAL RELIEF.

480. A sick or disabled seaman entitled to the benefits of the service shall be admitted to hospital only in cases where the gravity of the disease or injury from which he suffers is such as to require hospital treatment in the opinion of an officer of the service or of a reputable physician designated by the department to act at a place where no officer is stationed.

STATIONS OF THE FIRST CLASS.

483. A bed ticket (Form 1919) shall be prepared and delivered to the applicant for relief in a sealed envelope addressed to the officer or other person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the ticket will be invalid.

STATIONS OF THE SECOND CLASS.

491. A bed ticket (Form 1919) shall be prepared and delivered to the applicant for relief in a sealed envelope addressed to the officer or other person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the ticket will be invalid.

STATIONS OF THE THIRD CLASS.

499. Customs officers, or acting assistant surgeons, when in charge of the station by special authority of the bureau, shall issue hospital permits for the care and treatment of such applicants as may be found to be entitled to the benefits of the service and to require hospital treatment. The period for which treatment is authorized by the permit * * * should in no case exceed twenty days.

STATIONS OF THE FOURTH CLASS.

512. Customs officers, or acting assistant surgeons, when in charge of the station by special authority of the bureau, shall issue hospital permits for the care and treatment of such applicants as may be found to be entitled to the benefits of the service and to require hospital treatment. The period for which treatment is authorized by the permit * * * should in no case exceed twenty days.

515. The hospital permit, before being delivered to the applicant for relief, must be inclosed in an envelope, sealed, and addressed to the person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the permit will be invalid.

479. Foreign seamen or employees of the various Government services, not beneficiaries, shall not be treated.

INSANE SEAMEN.

531. Insane seamen entitled to the benefits of the service may be admitted to the Government Hospital for the Insane, Washington, D. C., upon the order of the Secretary of the Treasury.

DECEASED SEAMEN.

538. On the death of a patient while under the charge of the service, notice to receive his effects shall be given by letter or otherwise to his nearest known relative. * * *

539. The necessary expenses of a plain burial for deceased patients of the service will be paid, but no part of the expenses of the burial of any deceased seaman will be paid for at the expense of the Marine-Hospital Service unless said seaman was at the time of his death a patient of the service. When friends or relatives of a deceased seaman claim the body and assume charge of the funeral arrangements, no part of the expenses of the same will be paid by the Marine-Hospital Service.

NATIONAL QUARANTINES.

QUARANTINE LAWS.

AN ACT Granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service.

(*Extracts.*)

[Approved February 15, 1893, and amended August 18, 1894, and March 2, 1901.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any merchant ship or other vessel from any foreign port or place of [to] enter any port of the United States except in accordance with the

provisions of this act and with such rules and regulations of State and municipal health authorities as may be made in pursuance of, or consistent with, this act; and any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding five thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 2. That any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consul, vice consul, or other consular officer of the United States at the port of departure, or from the medical officer where such officer has been detailed by the President for that purpose, a bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury, setting forth the sanitary history and condition of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the said vessel, its cargo, passengers, and crew; and said consular or medical officer is required, before granting such duplicate bill of health, to be satisfied that the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases.

The President, in his discretion, is authorized to detail any medical officer of the Government to serve in the office of the consul at any foreign port for the purpose of furnishing information and making the inspection and giving the bills of health hereinbefore mentioned. Any vessel clearing and sailing from any such port without such bill of health, and entering any port of the United States, shall forfeit to the United States not more than five thousand dollars the amount to be determined by the court, which shall be a lien on the same, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

The provisions of this section shall not apply to vessels plying between foreign ports on or near the frontiers of the United States and ports of the United States adjacent thereto; but the Secretary of the Treasury is hereby authorized, when, in his discretion, it is expedient for the preservation of the public health, to establish regulations governing such vessels.

SEC. 5. That the Secretary of the Treasury shall from time to time issue to the consular officers of the United States and to the medical officer serving at any foreign port, and otherwise make publicly known, the rules and regulations made by him, to be used and complied with by vessels in foreign ports, for securing the best sanitary condition of such vessels, their cargoes, passengers, and crew, before their departure for any port in the United States, and in the course of the voyage; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases; and it shall not be lawful for any vessel to enter said port to discharge its cargo, or land its passengers, except upon a certificate of the health officer at such quarantine station certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers, and crew; and the master of every such vessel thall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said bills of health required to be obtained at the port of departure and the certificate herein required to be obtained from the health officer at the port of entry; and that the bills of health herein prescribed shall be considered as part of the ship's papers, and when duly certified to by the proper consular officer or other officer of the United States, over his official signature and seal, shall be accepted as evidence of the statements therein contained in any court of the United States.

SEC. 6. That on the arrival of an infected vessel at any port not provided with proper facilities for treatment of the same, the Secretary of the Treasury may remand said vessel, at its own expense, to the nearest national or other quarantine station, where accommodations and appliances are provided for the necessary disinfection and treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo, and passengers are each and all free from infectious disease, or danger of conveying the same, said vessel shall be admitted to entry to any port of the United States named within the certificate. But at any ports where sufficient quarantine provision has been made by State or local authorities the Secretary of the Treasury may direct vessels bound for said ports to undergo quarantine at said State or local station.

SEC. 7. That whenever it shall be shown to the satisfaction of the President that by reason of the existence of cholera or other infectious or contagious diseases in a foreign country there is serious danger of the introduction of the same into the United States, and that notwithstanding

the quarantine defense this danger is so increased by the introduction of persons or property from such country that a suspension of the right to introduce the same is demanded in the interest of the public health, the President shall have power to prohibit, in whole or in part, the introduction of persons and property from such countries or places as he shall designate, and for such period of time as he may deem necessary.

SEC. 10. That the Supervising Surgeon General, with the approval of the Secretary of the Treasury, is authorized to designate and mark the boundaries of the quarantine grounds and quarantine anchorages for vessels which are reserved for use at each United States quarantine station; and any vessel or officer of any vessel, or other person, other than State or municipal health or quarantine officers, trespassing or otherwise entering upon such grounds or anchorages in disregard of the quarantine rules and regulations, or without permission of the officer in charge of such station, shall be deemed guilty of a misdemeanor and subject to arrest, and upon conviction thereof be punished by a fine of not more than three hundred dollars or imprisonment for not more than one year, or both, in the discretion of the court. Any master or owner of any vessel, or any person violating any provision of this act or any rule or regulation made in accordance with this act, relating to inspection of vessels or relating to the prevention of the introduction of contagious or infectious diseases, or any master, owner, or agent of any vessel making a false statement relative to the sanitary condition of said vessel or its contents or as to the health of any passenger or person thereon, shall be deemed guilty of a misdemeanor and subject to arrest, and upon conviction thereof be punished by a fine of not more than five hundred dollars or imprisonment for not more than one year, or both, in the discretion of the court.

SEC. 11. That any vessel sailing from any foreign port without the bill of health required by section two of this act, and arriving within the limits of any collection district of the United States, and not entering or attempting to enter any port of the United States shall be subject to such quarantine measures as shall be prescribed by regulations of the Secretary of the Treasury, and the cost of such measures shall be a lien on said vessel, to be recovered by proceedings in the proper district court of the United States and in the manner set forth above as regards vessels from foreign ports without bills of health and entering any port of the United States.

QUARANTINE REGULATIONS.[1]

(*Extracts.*)

4. Under the act of Congress approved August 18, 1894, vessels plying between Canadian ports on the St. Croix River * * * and ports in the United States; also vessels plying between Mexican ports on the Rio Grande River and adjacent ports in the United States are exempt from the provisions of section 2 of the act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service, approved February 15, 1893, which requires vessels clearing from a foreign port for a port in the United States to obtain from the consular or medical officer a bill of health. During the prevalence of any of the quarantinable diseases at the foreign port of departure vessels above referred to are hereby required to obtain from the consular officer of the United States, or from the medical officer of the United States, when such officer has been detailed by the President for this purpose, a bill of health, or a supplemental bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury.

INSPECTION OF VESSELS LEAVING FOREIGN PORTS AND PORTS IN THE POSSESSIONS OR OTHER DEPENDENCIES OF THE UNITED STATES FOR PORTS IN THE UNITED STATES OR ITS POSSESSIONS OR OTHER DEPENDENCIES.

5. The officer issuing the bill of health shall satisfy himself, by inspection if necessary, that the conditions certified to therein are true, and is authorized, in accordance with the law, to withhold the bill of health or the supplemental bill of health until he is satisfied that the vessel, the passengers, the crew, and the cargo have complied with all the quarantine laws and regulations of the United States.

6. Inspection is required of—

(*a*) All vessels from ports at which cholera, yellow fever, or plague in men or rodents prevails, or at which smallpox or typhus fever prevails in epidemic form, and at which a medical officer is detailed.

(*b*) All vessels carrying steerage passengers; but need only include the inspection of such passengers and their living apartments, if sailing from a healthful port.

7. Inspection of the vessel is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including examination of manifests and other papers, food and water supply, the ascertainment of its relations with the shore, the manner of loading and possibilities of invasion by rats and insects as will enable the inspecting officer to determine if these regulations have been complied with.

[1] These regulations are subject to change.

8. When an inspection is required, it should be made by daylight, as late as practicable before sailing. The vessel should be inspected before the passengers go aboard, the passengers just before embarkation, and the crew on deck; and no communication should be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

INSPECTION.

60. Every vessel subject to quarantine inspection entering a port of the United States, its possessions or dependencies, shall be considered in quarantine until given free pratique. Such vessel shall fly a yellow flag at the foremast head from sunrise to sunset, and shall observe all the other requirements of vessels actually quarantined.

61. Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

(*a*) All vessels from foreign ports except those covered by paragraph 4, provided the latter are not inspected.

(*b*) Any vessel with sickness on board.

(*c*) Vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox or typhus fever prevails in epidemic form.

(*d*) Vessels from ports suspected of infection with yellow fever, having entered a port north of the southern boundary of Maryland without disinfection, shall be subjected to a second inspection before entering any ports south of said latitude during the quarantine season of such port.

62. The inspections of vessels required by these regulations shall be made between sunrise and sunset, except in case of vessels in distress. * * *

63. In making the inspection of a vessel, the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests and any discrepancies investigated. * * *

65. No person except the quarantine officer, his employees, United States customs officers, or pilots shall be permitted to board any vessel subject to quarantine inspection until after the vessel has been inspected by the quarantine officer and granted free pratique, and all such persons so boarding such vessel shall, in the discretion of the quarantine officer, be subject to the same restrictions as the personnel of the vessel.

66. Towboats or any other vessels having had communication with vessels subject to inspection shall themselves be subject to inspection.

QUARANTINE.

69. Vessels arriving under the following conditions shall be placed in quarantine:

(*a*) With quarantinable disease on board or having had such disease on board during the voyage.

(*b*) Any vessel which the quarantine officer considers infected with quarantinable disease.

(*c*) A vessel arriving at a port south of the southern boundary of Virginia in the season of close quarantine, April 1 to November 1, from a tropical American port, unless said port is known to be free from yellow fever.

(*d*) Vessels arriving at ports north of this line, and south of the southern boundary of Maryland, between May 15 and October 1, if from a tropical American port, unless said port is known to be free from yellow fever.

(*e*) Vessels arriving at a southern port, referred to in paragraphs (*c*) and (*d*) during the season of close quarantine for such ports, via a northern port, when from a port known to be infected with yellow fever, unless six days have elapsed since the fumigation of the vessel in such northern port and certificate be presented from the quarantine officer at such northern port, or an accredited medical officer of the United States.

(*f*) In the case of vessels arriving at a northern port without sickness on board from ports where yellow fever prevails, the personnel shall be detained under observation at quarantine to complete six days from the port of departure.

(*g*) Towboats and other vessels having had communication with vessels subjected to quarantine shall themselves be quarantined if they have been exposed to infection.

70. Vessels engaged in the fruit trade may be admitted to entry without detention, provided that they have complied in all respects with the special rules and regulations made by the Secretary of the Treasury with regard to vessels engaged in said trade.

GENERAL REQUIREMENTS AT QUARANTINE.

72. No direct communication shall be allowed between any vessel in quarantine and any person or place outside, and no communication whatever between quarantine or any vessel in quarantine and any person or place outside except under the supervision of the quarantine officer.

76. Vessels detained at any national quarantine will be subject to such additional rules and regulations as may be promulgated from time to time by the Surgeon General.

SPECIAL REGULATIONS RELATING TO NAVAL VESSELS.

146. Vessels of the United States Navy may be granted the hereinafter-stated exemptions from quarantine regulations, but are subject to quarantine inspection upon arrival at a port of the United States.

147. The certificates of the medical officers of the United States Navy as to the sanitary history and condition of the vessel and its personnel may be accepted for naval vessels by the quarantine officer boarding the vessel in lieu of an actual inspection.

148. Vessels of the United States Navy having entered the harbors of infected ports, but having held no communication which is liable to convey infection, may be exempted from the disinfection and detention imposed on merchant vessels from such ports.

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APPENDIX V.

RULES TO PREVENT COLLISIONS OF VESSELS.

[Compiled for insertion in volumes of the U. S. Coast Pilot.]

AN ACT In regard to collisions at sea.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in every case of collision between two vessels it shall be the duty of the master or person in charge of each vessel, if and so far as he can do so without serious danger to his own vessel, crew, and passengers (if any), to stay by the other vessel until he has ascertained that she has no need of further assistance, and to render to the other vessel, her master, crew, and passengers (if any), such assistance as may be practicable and as may be necessary in order to save them from any danger caused by the collision, and also to give to the master or person in charge of the other vessel the name of his own vessel and her port of registry, or the port or place to which she belongs, and also the name of the ports and places from which and to which she is bound.

If he fails so to do, and no reasonable cause for such failure is shown, the collision shall, in the absence of proof to the contrary, be deemed to have been caused by his wrongful act, neglect, or default.

SEC. 2. That every master or person in charge of a United States vessel who fails, without reasonable cause, to render such assistance or give such information as aforesaid shall be deemed guilty of a misdemeanor, and shall be liable to a penalty of one thousand dollars, or imprisonment for a term not exceeding two years; and for the above sum the vessel shall be liable and may be seized and proceeded against by process in any district court of the United States by any person; one-half such sum to be payable to the informer and the other half to the United States.

SEC. 3. That this act shall take effect at a time to be fixed by the President by proclamation issued for that purpose.

Approved September 4, 1890. Proclamation dated November 18, 1890, to take effect December 15, 1890.

INTERNATIONAL RULES.

I.—ENACTING CLAUSE, SCOPE, AND PENALTY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following regulations for preventing collisions at sea shall be followed by all public and private vessels of the United States upon the high seas and in all waters connected therewith navigable by sea-going vessels.

ART. 30. Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland waters.

PRELIMINARY DEFINITIONS.

In the following rules every steam vessel which is under sail and not under steam is to be considered a sailing vessel, and every vessel under steam, whether under sail or not, is to be considered a steam vessel.

The words "steam vessel" shall include any vessel propelled by machinery.

A vessel is "under way" within the meaning of these rules when she is not at anchor, or made fast to the shore, or aground.

II.—LIGHTS AND SO FORTH.

The word "visible" in these rules when applied to lights shall mean visible on a dark night with a clear atmosphere.

ART. 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

STEAM VESSELS—MASTHEAD LIGHT.

ART. 2. A steam vessel when under way shall carry—(*a*) On or in front of the foremast or if a vessel without a foremast, then in the fore part of the vessel, at a height above the hull of not less than twenty feet, and if the breadth of the vessel exceeds twenty feet, then at a height above the hull not less than such breadth, so, however, that the light need not be carried at a greater height above the hull than forty feet, a bright white light, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side and of such a character as to be visible at a distance of at least five miles.

STEAM VESSELS—SIDE LIGHTS.

(*b*) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(*c*) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(*d*) The said green and red side lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

STEAM VESSELS—RANGE LIGHTS.

(*e*) A steam vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (*a*). These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

STEAM VESSELS WHEN TOWING.

ART. 3. A steam vessel when towing another vessel shall, in addition to her side lights, carry two bright white lights in a vertical line one over the other, not less than six feet apart, and when towing more than one vessel shall carry an additional bright white light six feet above or below such light, if the length of the tow measuring from the stern of the towing vessel to the stern of the last vessel towed exceeds six hundred feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article two (*a*), excepting the additional light, which may be carried at a height of not less than fourteen feet above the hull.

Such steam vessel may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

SPECIAL LIGHTS.

ART. 4. (*a*) A vessel which from any accident is not under command shall carry at the same height as a white light mentioned in article two (*a*), where they can best be seen, and if a steam vessel in lieu of that light, two red lights, in a vertical line one over the other, not less than six feet apart, and of such a character as to be visible all around the horizon at a distance of at least two miles; and shall by day carry in a vertical line one over the other, not less than six feet apart, where they can best be seen, two black balls or shapes, each two feet in diameter.

(*b*) A vessel employed in laying or in picking up a telegraph cable shall carry in the same position as the white light mentioned in article two (*a*), and if a steam vessel in lieu of that light three lights in a vertical line one over the other not less than six feet apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all around the horizon, at a distance of at least two miles. By day she shall carry in a vertical line one over the other, not less than six feet apart, where they can best be seen, three shapes not less than two feet in diameter, of which the highest and lowest shall be globular in shape and red in color, and the middle one diamond in shape and white.

(*c*) The vessels referred to in this article, when not making way through the water, shall not carry the side lights, but when making way shall carry them.

(*d*) The lights and shapes required to be shown by this article are to be taken by other vessels as signals that the vessel showing them is not under command and can not therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in article thirty-one.

LIGHTS FOR SAILING VESSELS AND VESSELS IN TOW.

ART. 5. A sailing vessel under way and any vessel being towed shall carry the same lights as are prescribed by article two for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

LIGHTS FOR SMALL VESSELS.

ART. 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side lights can not be fixed, these lights shall be kept at hand, lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

LIGHTS FOR SMALL STEAM AND SAIL VESSELS AND OPEN BOATS.

ART. 7. Steam vessels of less than forty, and vessels under oars or sails of less than twenty tons gross tonnage, respectively, and rowing boats, when under way, shall not be required to carry the lights mentioned in article two (*a*), (*b*), and (*c*), but if they do not carry them they shall be provided with the following lights:

First. Steam vessels of less than forty tons shall carry—

(*a*) In the fore part of the vessel or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than nine feet, a bright white light constructed and fixed as prescribed in article two (*a*), and of such a character as to be visible at a distance of at least two miles.

(*b*) Green and red side lights constructed and fixed as prescribed in article two (*b*) and (*c*), and of such a character as to be visible at a distance of at least one mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lanterns shall be carried not less than three feet below the white light.

Second. Small steamboats, such as are carried by seagoing vessels, may carry the white light at a less height than nine feet above the gunwale, but it shall be carried above the combined lantern mentioned in subdivision one (*b*).

Third. Vessels under oars or sails of less than twenty tons shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

Fourth. Rowing boats, whether under oars or sails, shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision.

The vessels referred to in this article shall not be obliged to carry the lights prescribed by article four (*a*) and article eleven, last paragraph.

LIGHTS FOR PILOT VESSELS.

ART. 8. Pilot vessels when engaged on their station on pilotage duty shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand, ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

Pilot vessels when not engaged on their station on pilotage duty shall carry lights similar to those of other vessels of their tonnage.

A steam pilot vessel, when engaged on her station on pilotage duty and in waters of the United States and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of eight feet below her white masthead light a red light, visible all around the horizon and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least two miles, and also the colored side lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in waters of the United States, and at anchor, she shall carry in addition to the lights required for all pilot boats the red light above mentioned, but not the colored side lights. When not engaged on her station on pilotage duty, she shall carry the same lights as other steam vessels.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. Fishing vessels and fishing boats, when under way and when not required by this article to carry or show the lights hereinafter specified, shall carry or show the lights prescribed for vessels of their tonnage under way.

(*a*) Open boats, by which is to be understood boats not protected from the entry of sea water by means of a continuous deck, when engaged in any fishing at night, with outlying tackle extending not more than one hundred and fifty feet horizontally from the boat into the seaway, shall carry one all-around white light.

Open boats, when fishing at night, with outlying tackle extending more than one hundred and fifty feet horizontally from the boat into the seaway, shall carry one all-round white light, and in addition, on approaching or being approached by other vessels, shall show a second white light at least three feet below the first light and at a horizontal distance of at least five feet away from it in the direction in which the outlying tackle is attached.

(*b*) Vessels and boats, except open boats as defined in subdivision (*a*), when fishing with drift nets, shall, so long as the nets are wholly or partly in the water, carry two white lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall be not less than six feet and not more than fifteen feet, and so that the horizontal distance between them, measured in a line with the keel, shall be not less than five feet and not more than ten feet. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all around the horizon, and to be visible at a distance of not less than three miles.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea sailing fishing vessels of less than twenty tons gross tonnage shall not be obliged to carry the lower of these two lights. Should they, however, not carry it, they shall show in the same position (in the direction of the net or gear) a white light, visible at a distance of not less than one sea mile, on the approach of or to other vessels.

(*c*) Vessels and boats, except open boats as defined in subdivision (*a*), when line fishing with their lines out and attached to or hauling their lines, and when not at anchor or stationary within the meaning of subdivision (*b*), shall carry the same lights as vessels fishing with drift nets. When shooting lines, or fishing with towing lines, they shall carry the lights prescribed for a steam or sailing vessel under way, respectively.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea sailing fishing vessels of less than twenty tons gross tonnage shall not be obliged to carry the lower of these two lights. Should they, however, not carry it, they shall show in the same position (in the direction of the lines) a white light, visible at a distance of not less than one sea mile on the approach of or to other vessels.

(*d*) Vessels when engaged in trawling, by which is meant the dragging of an apparatus along the bottom of the sea—

First. If steam vessels, shall carry in the same position as the white light mentioned in article two (*a*) a tri-colored lantern so constructed and fixed as to show a white light from right ahead to two points on each bow, and a green light and a red light over an arc of the horizon from two points on each bow to two points abaft the beam on the starboard and port sides, respectively; and not less than six nor more than twelve feet below the tri-colored lantern a white light in a lantern, so constructed as to show a clear, uniform, and unbroken light all around the horizon.

Second. If sailing vessels, shall carry a white light in a lantern, so constructed as to show a clear, uniform, and unbroken light all around the horizon, and shall also, on the approach of or to other vessels, show where it can best be seen a white flare-up light or torch in sufficient time to prevent collision.

All lights mentioned in subdivision (*d*) first and second shall be visible at a distance of at least two miles.

(*e*) Oyster dredgers and other vessels fishing with dredge nets shall carry and show the same lights as trawlers.

(*f*) Fishing vessels and fishing boats may at any time use a flare-up light in addition to the lights which they are by this article required to carry and show, and they may also use working lights.

(*g*) Every fishing vessel and every fishing boat under one hundred and fifty feet in length, when at anchor, shall exhibit a white light visible all around the horizon at a distance of at least one mile.

Every fishing vessel of one hundred and fifty feet in length or upward, when at anchor, shall exhibit a white light visible all around the horizon at a distance of at least one mile, and shall exhibit a second light as provided for vessels of such length by article eleven.

Should any such vessel, whether under one hundred and fifty feet in length or of one hundred and fifty feet in length or upward, be attached to a net or other fishing gear, she shall on the approach of other vessels show an additional white light at least three feet below the anchor light, and at a horizontal distance of at least five feet away from it in the direction of the net or gear.

(*h*) If a vessel or boat when fishing becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall in daytime haul down the day signal required by subdivision (*k*); at night show the light or lights prescribed for a vessel at anchor; and during fog, mist, falling snow, or heavy rain storms make the signal prescribed for a vessel at anchor. (See subdivision (*d*) and the last paragraph of article fifteen.)

(*i*) In fog, mist, falling snow, or heavy rain storms drift-net vessels attached to their nets, and vessels when trawling, dredging, or fishing with any kind of drag net, and vessels line fishing with their lines out, shall, if of twenty tons gross tonnage or upward, respectively, at intervals of not more than one minute make a blast; if steam vessels, with the whistle or siren, and if sailing vessels, with the fog horn, each blast to be followed by ringing the bell. Fishing vessels and boats of less than twenty tons gross tonnage shall not be obliged to give the above-mentioned signals; but if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

(*k*) All vessels or boats fishing with nets or lines or trawls, when under way, shall in daytime indicate their occupation to an approaching vessel by displaying a basket or other efficient signal where it can best be seen. If vessels or boats at anchor have their gear out, they shall, on the approach of other vessels, show the same signal on the side on which those vessels can pass.

The vessels required by this article to carry or show the lights hereinbefore specified shall not be obliged to carry the lights prescribed by article four (*a*) and the last paragraph of article eleven.

LIGHTS FOR AN OVERTAKEN VESSEL.

ART. 10. A vessel which is being overtaken by another shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so constructed, fitted, and screened that it shall throw an unbroken light over an arc of the horizon of twelve points of the compass, namely, for six points from right aft on each side of the vessel, so as to be visible at a distance of at least one mile. Such lights shall be carried as nearly as practicable on the same level as the side lights.

ANCHOR LIGHTS.

ART. 11. A vessel under one hundred and fifty feet in length when at anchor shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light in a lantern so constructed as to show a clear, uniform, and unbroken light visible all around the horizon at a distance of at least one mile.

A vessel of one hundred and fifty feet or upward in length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than twenty and not exceeding forty feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

A vessel aground in or near a fair-way shall carry the above light or lights and the two red lights prescribed by article four (*a*).

SPECIAL SIGNALS.

ART. 12. Every vessel may, if necessary in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that can not be mistaken for a distress signal.

NAVAL LIGHTS AND RECOGNITION SIGNALS.

ART. 13. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal-lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of recognition signals adopted by shipowners, which have been authorized by their respective Governments and duly registered and published.

STEAM VESSEL UNDER SAIL BY DAY.

ART. 14. A steam vessel proceeding under sail only, but having her funnel up, shall carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III.—SOUND SIGNALS FOR FOG, AND SO FORTH.

PRELIMINARY.

ART. 15. All signals prescribed by this article for vessels under way shall be given:

First. By "steam vessels" on the whistle or siren.

Second. By "sailing vessels" and "vessels towed" on the fog horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds' duration.

A steam vessel shall be provided with an efficient whistle or siren, sounded by steam or by some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn, to be sounded by mechanical means, and also with an efficient bell. (In all cases where the rules require a bell to be used a drum may be substituted on board Turkish vessels, or a gong where such articles are used on board small seagoing vessels.) A sailing vessel of twenty tons gross tonnage or upward shall be provided with a similar fog horn and bell. In fog, mist, falling snow, or heavy rain storms, whether by day or night, the signals described in this article shall be used as follows, namely:

STEAM VESSEL UNDER WAY.

(*a*) A steam vessel having way upon her shall sound, at intervals of not more than two minutes, a prolonged blast.

(*b*) A steam vessel under way, but stopped, and having no way upon her, shall sound, at intervals of not more than two minutes, two prolonged blasts, with an interval of about one second between.

SAIL VESSEL UNDER WAY.

(*c*) A sailing vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession.

VESSELS AT ANCHOR OR NOT UNDER WAY.

(*d*) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

VESSELS TOWING OR TOWED.

(*e*) A vessel when towing, a vessel employed in laying or picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to maneuver as required by the rules, shall, instead of the signals prescribed in subdivisions (*a*) and (*c*) of this article, at intervals of not more than two minutes, sound three blasts in succession, namely: One prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other.

SMALL SAILING VESSELS AND BOATS.

Sailing vessels and boats of less than twenty tons gross tonnage shall not be obliged to give the above-mentioned signals, but, if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

SPEED IN FOG.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam vessel hearing, apparently forward of her beam, the fog signal of a vessel the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

IV.—STEERING AND SAILING RULES.

PRELIMINARY.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SAILING VESSELS.

ART. 17. When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, namely:

(*a*) A vessel which is running free shall keep out of the way of a vessel which is close-hauled.

(*b*) A vessel which is closehauled on the port tack shall keep out of the way of a vessel which is closehauled on the starboard tack.

(*c*) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(*d*) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to the leeward.

(*e*) A vessel which has the wind aft shall keep out of the way of the other vessel.

STEAM VESSELS.

ART. 18. When two steam vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

This article only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two vessels is end on, or nearly end on, to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each vessel is in such a position as to see both the side lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course; or by night, to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

TWO STEAM VESSELS CROSSING.

ART. 19. When two steam vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

STEAM VESSEL SHALL KEEP OUT OF THE WAY OF SAILING VESSEL.

ART. 20. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

COURSE AND SPEED.

ART. 21. Where, by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision can not be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision. (See articles twenty-seven and twenty-nine.)

CROSSING AHEAD.

ART. 22. Every vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

STEAM VESSEL SHALL SLACKEN SPEED OR STOP.

ART. 23. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

OVERTAKING VESSELS.

ART. 24. Notwithstanding anything contained in these rules, every vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam, that is, in such a position, with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally passed and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel, she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

NARROW CHANNELS.

ART. 25. In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

RIGHT OF WAY OF FISHING VESSELS.

ART. 26. Sailing vessels under way shall keep out of the way of sailing vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels or boats.

GENERAL PRUDENTIAL RULE.

ART. 27. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR PASSING STEAMERS.

ART. 28. The words "short blasts," used in this article, shall mean a blast of about one second's duration.

When vessels are in sight of one another, a steam vessel under way, in taking any course authorized or required by these rules, shall indicate that course by the following signals on her whistle or siren, namely:

One short blast to mean, "I am directing my course to starboard."

Two short blasts to mean, "I am directing my course to port."

Three short blasts to mean, "My engines are going at full speed astern."

PRECAUTION.

ART. 29. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

ART. 30. [Follows enacting clause.]

DISTRESS SIGNALS.

ART. 31. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, namely:

In the daytime—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. The international code signal of distress indicated by N. C.

Third. The distance signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball.

Fourth. A continuous sounding with any fog-signal apparatus.

At night—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. Flames on the vessel (as from a burning tar barrel, oil barrel, and so forth).

Third. Rockets or shells throwing stars of any color or description, fired one at a time, at short intervals.

Fourth. A continuous sounding with any fog-signal apparatus.

INLAND RULES.

NOTE.—*The paragraphs indicated by a vertical line are identically the same as corresponding paragraphs in the International Rules.*

I.—ENACTING CLAUSE, SCOPE, AND PENALTY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following regulations for preventing collision shall be followed by all vessels navigating all harbors, rivers, and inland waters of the United States, except the Great Lakes and their connecting and tributary waters as far east as Montreal and the Red River of the North and rivers emptying into the Gulf of Mexico and their tributaries, and are hereby declared special rules duly made by local authority.

SEC. 2. That the supervising inspectors of steam vessels and the Supervising Inspector General shall establish such rules to be observed by steam vessels in passing each other and as to the lights to be carried by ferryboats and by barges and canal boats when in tow of steam vessels, not inconsistent with the provisions of this act, as they from time to time may deem necessary for safety, which rules when approved by the Secretary of Commerce and Labor, are hereby declared special rules duly made by local authority, as provided for in article thirty of chapter eight hundred and two of the laws of eighteen hundred and ninety. Two printed copies of such rules shall be furnished to such ferryboats and steam vessels, which rules shall be kept posted up in conspicuous places in such vessels.

SEC. 3. That every pilot, engineer, mate, or master of any steam vessel, and every master or mate of any barge or canal boat, who neglects or refuses to observe the provisions of this act, or the regulations established in pursuance of the preceding section, shall be liable to a penalty of fifty dollars, and for all damages sustained by any passenger in his person or baggage by such neglect or refusal: *Provided*, That nothing herein shall relieve any vessel, owner, or corporation from any liability incurred by reason of such neglect or refusal.

SEC. 4. That every vessel that shall be navigated without complying with the provisions of this act shall be liable to a penalty of two hundred dollars, one-half to go to the informer, for which sum the vessel so navigated shall be liable and may be seized and proceeded against by action in any district court of the United States having jurisdiction of the offense.

PRELIMINARY DEFINITIONS.

In the following rules every steam vessel which is under sail and not under steam is to be considered a sailing vessel, and every vessel under steam, whether under sail or not, is to be considered a steam vessel.

The words "steam vessel" shall include any vessel propelled by machinery.

A vessel is "under way," within the meaning of these rules, when she is not at anchor, or made fast to the shore, or aground.

II.—LIGHTS AND SO FORTH.

The word "visible" in these rules, when applied to lights, shall mean visible on a dark night with a clear atmosphere.

ART. 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

STEAM VESSELS—MASTHEAD LIGHT.

ART. 2. A steam vessel when under way shall carry (*a*) on or in front of the foremast, or, if a vessel without a foremast, then in the forepart of the vessel, a bright white light so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side, and of such a character as to be visible at a distance of at least five miles.

STEAM VESSELS—SIDE LIGHTS.

(*b*) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(*c*) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(*d*) The said green and red side lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

STEAM VESSELS—RANGE LIGHTS.

(*e*) A seagoing steam vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (*a*). These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

(*f*) All steam vessels (except seagoing vessels and ferryboats) shall carry in addition to green and red lights required by article two (*b*), (*c*), and screens as required by article two (*d*), a central range of two white lights; the after light being carried at an elevation at least fifteen feet above the light at the head of the vessel. The headlight shall be so constructed as to show an unbroken light through twenty points of the compass, namely, from right ahead to two points abaft the beam on either side of the vessel, and the after light so as to show all around the horizon.

STEAM VESSELS WHEN TOWING.

ART. 3. A steam vessel when towing another vessel shall, in addition to her side lights, carry two bright white lights in a vertical line one over the other, not less than three feet apart, and when towing more than one vessel shall carry an additional bright white light three feet above or below such lights, if the length of the tow, measuring from the stern of the towing

vessel to the stern of the last vessel towed exceeds six hundred feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article two (*a*) or the after range light mentioned in article two (*f*).

Such steam vessels may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

LIGHTS FOR SAILING VESSELS AND VESSELS IN TOW.

ART. 5. A sailing vessel under way or being towed shall carry the same lights as are prescribed by article two for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

LIGHTS FOR FERRYBOATS, BARGES, AND CANAL BOATS IN TOW.

See section 2, enacting clause, scope and penalty, preceding; also Pilot Rules, which are issued by the Steamboat-Inspection Service.

LIGHTS FOR SMALL VESSELS.

ART. 6. Whenever, as in the case of vessels of less than ten gross tons under way during bad weather, the green and red side lights can not be fixed, these lights shall be kept at hand, lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

ART. 7. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision.

LIGHTS FOR PILOT VESSELS.

ART. 8. Pilot vessels when engaged on their station on pilotage duty shall not show the lights required for other vessels, but shall carry a white light at the masthead visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side nor the red light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand, ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

Pilot vessels, when not engaged on their station on pilotage duty, shall carry lights similar to those of other vessels of their tonnage.

A steam pilot vessel, when engaged on her station on pilotage duty and in waters of the United States, and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of eight feet below her white masthead light a red light, visible all around the horizon and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least two miles, and also the colored side lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in waters of the United States, and at anchor, she shall carry in addition to the lights required for all pilot boats the red light above mentioned, but not the colored side lights.

When not engaged on her station on pilotage duty, she shall carry the same lights as other steam vessels.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. (*a*) Fishing vessels of less than ten gross tons, when under way and when not having their nets, trawls, dredges, or lines in the water, shall not be obliged to carry the colored side lights; but every such vessel shall, in lieu thereof, have ready at hand a lantern with a green glass on one side and a red glass on the other side, and on approaching to or being approached by another vessel such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

(*b*) All fishing vessels and fishing boats of ten gross tons or upward, when under way and when not having their nets, trawls, dredges, or lines in the water, shall carry and show the same lights as other vessels under way.

(*c*) All vessels, when trawling, dredging, or fishing with any kind of dragnets or lines, shall exhibit, from some part of the vessel where they can be best seen, two lights. One of these lights shall be red and the other shall be white. The red light shall be above the white light, and shall be at a vertical distance from it of not less than six feet and not more than twelve feet; and the horizontal distance between them, if any, shall not be more than ten feet. These two lights shall be of such a character and contained in lanterns of such construction as to be visible all around the horizon, the white light a distance of not less than three miles and the red light of not less than two miles.

LIGHTS FOR RAFTS OR OTHER WATER CRAFT.

(*d*) Rafts, or other water craft not herein provided for, navigating by hand power, horse power, or by the current of the river, shall carry one or more good white lights, which shall be placed in such manner as shall be prescribed by the Board of Supervising Inspectors of Steam Vessels.[1]

LIGHTS FOR AN OVERTAKEN VESSEL.

ART. 10. A vessel which is being overtaken by another, except a steam vessel with an after range light showing all around the horizon, shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

ANCHOR LIGHTS.

ART. 11. A vessel under one hundred and fifty feet in length when at anchor shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a lantern so constructed as to show a clear, uniform, and unbroken light visible all around the horizon at a distance of at least one mile.

A vessel of one hundred and fifty feet or upwards in length when at anchor shall carry in the forward part of the vessel, at a height not less than twenty and not exceeding forty feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

SPECIAL SIGNALS.

ART. 12. Every vessel may, if necessary, in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that can not be mistaken for a distress signal.

NAVAL LIGHTS AND RECOGNITION SIGNALS.

ART. 13. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of recognition signals adopted by shipowners, which have been authorized by their respective Governments, and duly registered and published.

STEAM VESSELS UNDER SAIL BY DAY.

ART. 14. A steam vessel proceeding under sail only, but having her funnel up, may carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III.—SOUND SIGNALS FOR FOG, AND SO FORTH.

PRELIMINARY.

ART. 15. All signals prescribed by this article for vessels under way shall be given:

1. By "steam vessels" on the whistle or siren.
2. By "sailing vessels" and "vessels towed" on the fog horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds duration.

A steam vessel shall be provided with an efficient whistle or siren, sounded by steam or by some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn; also with an efficient bell. A sailing vessel of twenty tons gross tonnage or upward shall be provided with a similar fog horn and bell.

In fog, mist, falling snow, or heavy rainstorms, whether by day or night, the signals described in this article shall be used as follows, namely:

[1] See Pilot Rules issued by the Steamboat Inspection Service.

STEAM VESSEL UNDER WAY.

(*a*) A steam vessel under way shall sound, at intervals of not more than one minute, a prolonged blast.

SAIL VESSEL UNDER WAY.

(*c*) A sailing vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession..

VESSELS AT ANCHOR OR NOT UNDER WAY.

(*d*) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

VESSELS TOWING OR TOWED.

(*e*) A steam vessel when towing, shall, instead of the signals prescribed in subdivision (*a*) of this article, at intervals of not more than one minute, sound three blasts in succession, namely, one prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other.

RAFTS OR OTHER WATER CRAFT.

(*f*) All rafts or other water craft, not herein provided for, navigating by hand power, horse power, or by the current of the river, shall sound a blast of the fog horn, or equivalent signal, at intervals of not more than one minute.

SPEED IN FOG.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rainstorms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam vessel hearing, apparently forward of her beam, the fog signal of a vessel the position of which is not ascertained shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

IV.—STEERING AND SAILING RULES.

PRELIMINARY.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SAILING VESSELS.

ART. 17. When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows, namely:

(*a*) A vessel which is running free shall keep out of the way of a vessel which is close-hauled.

(*b*) A vessel which is close-hauled on the port tack shall keep out of the way of a vessel which is close-hauled on the starboard tack.

(*c*) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(*d*) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to the leeward.

(*e*) A vessel which has the wind aft shall keep out of the way of the other vessel.

STEAM VESSELS.

ART. 18. RULE I. When steam vessels are approaching each other head and head, that is, end on, or nearly so, it shall be the duty of each to pass on the port side of the other; and either vessel shall give, as a signal of her intention, one short and distinct blast of her whistle, which the other vessel shall answer promptly by a similar blast of her whistle, and thereupon such vessels shall pass on the port side of each other. But if the courses of such vessels are so far on the starboard of each other as not to be considered as meeting head and head, either vessel shall immediately give two short and distinct blasts of her whistle, which the other vessel shall answer promptly by two similar blasts of her whistle, and they shall pass on the starboard side of each other.

The foregoing only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision; in other words, to cases in which, by day, each vessel

sees the masts of the other in a line, or nearly in a line, with her own, and by night to cases in which each vessel is in such a position as to see both the side lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course or by night to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light or a green light without a red light is seen ahead, or where both green and red lights are seen anywhere but ahead.

RULE III. If, when steam vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle.

RULE V. Whenever a steam vessel is nearing a short bend or curve in the channel, where, from the height of the banks or other cause, a steam vessel approaching from the opposite direction can not be seen for a distance of half a mile, such steam vessel when she shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam whistle, which signal shall be answered by a similar blast, given by any approaching steam vessel that may be within hearing. Should such signal be so answered by a steam vessel upon the farther side of such bend, then the usual signals for meeting and passing shall immediately be given and answered; but, if the first alarm signal of such vessel be not answered, she is to consider the channel clear and govern herself accordingly.

When steam vessels are moved from their docks or berths, and other boats are liable to pass from any direction toward them, they shall give the same signal as in the case of vessels meeting at a bend, but immediately after clearing the berths so as to be fully in sight they shall be governed by the steering and sailing rules.

RULE VIII. When steam vessels are running in the same direction, and the vessel which is astern shall desire to pass on the right or starboard hand of the vessel ahead, she shall give one short blast of the steam whistle, as a signal of such desire, and if the vessel ahead answers with one blast, she shall put her helm to port; or if she shall desire to pass on the left or port side of the vessel ahead, she shall give two short blasts of the steam whistle as a signal of such desire, and if the vessel ahead answers with two blasts, shall put her helm to starboard; or if the vessel ahead does not think it safe for the vessel astern to attempt to pass at that point, she shall immediately signify the same by giving several short and rapid blasts of the steam whistle, not less than four, and under no circumstances shall the vessel astern attempt to pass the vessel ahead until such time as they have reached a point where it can be safely done, when said vessel ahead shall signify her willingness by blowing the proper signals. The vessel ahead shall in no case attempt to cross the bow or crowd upon the course of the passing vessel.

RULE IX. The whistle signals provided in the rules under this article, for steam vessels meeting, passing, or overtaking, are never to be used except when steamers are in sight of each other, and the course and position of each can be determined in the daytime by a sight of the vessel itself, or by night by seeing its signal lights. In fog, mist, falling snow or heavy rainstorms, when vessels can not so see each other, fog-signals only must be given.

SUPPLEMENTARY REGULATIONS.

See section 2, enacting clause, scope and penalty, preceding.

TWO STEAM VESSELS CROSSING.

ART. 19. When two steam vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

STEAM VESSEL SHALL KEEP OUT OF THE WAY OF SAILING VESSELS.

ART. 20. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

COURSE AND SPEED.

ART. 21. Where, by any of these rules, one of the two vessels is to keep out of the way, the other shall keep her course and speed. [See articles twenty-seven and twenty-nine.]

CROSSING AHEAD.

ART. 22. Every vessel which is directed by the rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

STEAM VESSEL SHALL SLACKEN SPEED OR STOP.

ART. 23. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

OVERTAKING VESSELS.

ART. 24. Notwithstanding anything contained in these rules, every vessel overtaking any other shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam; that is, in such a position, with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

NARROW CHANNELS.

ART. 25. In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

RIGHT OF WAY OF FISHING VESSELS.

ART. 26. Sailing vessels under way shall keep out of the way of sailing vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels or boats.

GENERAL PRUDENTIAL RULE.

ART. 27. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR PASSING STEAMERS.

See article 18.

ART. 28. When vessels are in sight of one another a steam vessel under way whose engines are going at full speed astern shall indicate that fact by three short blasts on the whistle.

PRECAUTION.

ART. 29. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

LIGHTS ON UNITED STATES NAVAL VESSELS AND REVENUE CUTTERS.

ART. 30. The exhibition of any light on board of a vessel of war of the United States or a revenue cutter may be suspended whenever, in the opinion of the Secretary of the Navy, the commander in chief of a squadron, or the commander of a vessel acting singly, the special character of the service may require it.

DISTRESS SIGNALS.

ART. 31. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, namely:

In the daytime—

A continuous sounding with any fog-signal apparatus, or firing a gun.

At night—

First. Flames on the vessel, as from a burning tar barrel, oil barrel, and so forth.

Second. A continuous sounding with any fog-signal apparatus, or firing a gun.

REGULATION OF MOTOR BOATS.

AN ACT To amend laws for preventing collisions of vessels and to regulate equipment of certain motor boats on the navigable waters of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the words "motor boat" where used in this act shall include every vessel propelled by machinery and not more than sixty-five feet in length except tugboats and towboats propelled by steam. The length shall be measured from end to end over the deck, excluding sheer: *Provided*, That the engine, boiler, or other operating machinery shall

be subject to inspection by the local inspectors of steam vessels, and to their approval of the design thereof, on all said motor boats, which are more than forty feet in length, and which are propelled by machinery driven by steam.

SEC. 2. That motor boats subject to the provisions of this act shall be divided into classes as follows:

Class one. Less than twenty-six feet in length.

Class two. Twenty-six feet or over and less than forty feet in length.

Class three. Forty feet or over and not more than sixty-five feet in length.

SEC. 3. That every motor boat in all weathers from sunset to sunrise shall carry the following lights, and during such time no other lights which may be mistaken for those prescribed shall be exhibited.

(*a*) Every motor boat of class one shall carry the following lights:

First. A white light aft to show all around the horizon.

Second. A combined lantern in the fore part of the vessel and lower than the white light aft showing green to starboard and red to port, so fixed as to throw the light from right ahead to two points abaft the beam on their respective sides.

(*b*) Every motor boat of classes two and three shall carry the following lights:

First. A bright white light in the fore part of the vessel as near the stem as practicable, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side. The glass or lens shall be of not less than the following dimensions:

Class two. Nineteen square inches.

Class three. Thirty-one square inches.

Second. A white light aft to show all around the horizon.

Third. On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side. The glasses or lenses in the said side lights shall be of not less than the following dimensions on motor boats of—

Class two. Sixteen square inches.

Class three. Twenty-five square inches.

On and after July first, nineteen hundred and eleven, all glasses or lenses prescribed by paragraph (*b*) of section three shall be fresnel or fluted. The said lights shall be fitted with inboard screens of sufficient height and so set as to prevent these lights from being seen across the bow and shall be of not less than the following dimensions on motor boats of—

Class two. Eighteen inches long.

Class three. Twenty-four inches long:

Provided, That motor boats as defined in this act, when propelled by sail and machinery or under sail alone, shall carry the colored lights suitably screened but not the white lights prescribed by this section.

SEC. 4. (*a*) Every motor boat under the provisions of this act shall be provided with a whistle or other sound-producing mechanical appliance capable of producing a blast of two seconds or more in duration, and in the case of such boats so provided a blast of at least two seconds shall be deemed a prolonged blast within the meaning of the law.

(*b*) Every motor boat of class two or three shall carry an efficient foghorn.

(*c*) Every motor boat of class two or three shall be provided with an efficient bell, which shall be not less than eight inches across the mouth, on board of vessels of class three.

SEC. 5. That every motor boat subject to any of the provisions of this act, and also all vessels propelled by machinery other than by steam more than sixty-five feet in length, shall carry either life-preservers, or life belts, or buoyant cushions, or ring buoys or other device, to be prescribed by the Secretary of Commerce and Labor, sufficient to sustain afloat every person on board and so placed as to be readily accessible. All motor boats carrying passengers for hire shall carry one life-preserver of the sort prescribed by the regulations of the board of supervising inspectors for every passenger carried, and no such boat while so carrying passengers for hire shall be operated or navigated except in charge of a person duly licensed for such service by the local board of inspectors. No examination shall be required as the condition of obtaining such a license, and any such license shall be revoked or suspended by the local board of inspectors for misconduct, gross negligence, recklessness in navigation, intemperance, or violation of law on the part of the holder, and if revoked, the person holding such license shall be incapable of obtaining another such license for one year from the date of revocation: *Provided*, That motor boats shall not be required to carry licensed officers except as required in this act.

SEC. 6. That every motor boat and also every vessel propelled by machinery other than by steam, more than sixty-five feet in length, shall carry ready for immediate use the means of promptly and effectually extinguishing burning gasoline.

SEC. 7. That a fine not exceeding one hundred dollars may be imposed for any violation of this act. The motor boat shall be liable for the said penalty and may be seized and proceeded against, by way of libel, in the district court of the United States for any district within which such vessel may be found.

SEC. 8. That the Secretary of Commerce and Labor shall make such regulations as may be necessary to secure the proper execution of this act by collectors of customs and other officers of the Government. And the Secretary of the Department of Commerce and Labor, may upon application therefor, remit or mitigate any fine, penalty, or forfeiture relating to motor boats except for failure to observe the provisions of section six of this act.

SEC. 9. That all laws and parts of laws only in so far as they are in conflict herewith are hereby repealed: *Provided*, That nothing in this act shall be deemed to alter or amend acts of Congress embodying or revising international rules for preventing collisions at sea.

APPENDIX VI.

NAVIGATIONAL AIDS AND THE USE OF CHARTS.

The Coast and Geodetic Survey is charged with the survey of the coasts, harbors, and tidal estuaries of the United States and its insular possessions, and issues the following publications relating to these waters as guides to navigation: Charts, Coast Pilots, Tide Tables, a Catalogue of these publications, and Notice to Mariners, the last named published weekly by the Bureau of Lighthouses and Coast and Geodetic Survey.

CHARTS are corrected from information received to the date of issue, which is stamped in the lower left-hand corner. Subsequent changes relating to changes in aids, recently discovered dangers, wrecks, etc., must be procured from the Notice to Mariners. When the amount and importance of new material warrant it, a new edition of the chart is issued and the old edition called in from the agents and canceled; the date of the edition is given in the title or at the middle of the bottom of the chart.

The charts are various in character, according to the objects which they are designed to subserve. The most important distinctions are the following:

1. Sailing charts, mostly on a scale of approximately $\frac{1}{1,200,000}$, which exhibit the approaches to a large extent of coast, give the offshore soundings, and enable the navigator to identify his position as he approaches from the open sea.

2. General charts of the coast, on scales of $\frac{1}{400,000}$ and $\frac{1}{200,000}$, intended especially for coastwise navigation.

3. Coast charts, on a scale of $\frac{1}{80,000}$, by means of which the navigator is enabled to avail himself of the channels for entering the larger bays and harbors.

4. Harbor charts, on larger scales, intended to meet the needs of local navigation.

COAST PILOTS, relating to the surveyed waters of the United States, Porto Rico, and a part of Alaska, and Sailing Directions of the Philippine Islands, contain full nautical descriptions of the coast, harbors, dangers, and directions for coasting and entering harbors. Similar information relating to parts of Alaska and Hawaii is published in Coast Pilot Notes, for which no charge is made.

Coast Pilots are corrected for important information received to the date of issue, which is stamped on the correction sheets accompanying the volume. From time to time, as the material accumulates, supplements are issued, containing the more important corrections since the publication of the volume. The supplements are printed on one side of the paper only, so that they may be cut and pasted in the appropriate places in the volume. Supplements and other corrections for any volume can be furnished on application, provided the volume itself has not been superseded by a subsequent edition.

TIDE TABLES.—The Coast and Geodetic Survey Tide Tables are issued annually in advance of the year for which they are made, and contain the predicted time and height of the tides for each day in the year at the principal ports of the world, including the United States and its possessions. A table of tidal differences is given by means of which the tides at more than 3,000 intermediate ports may be obtained. Separate reprints from the general Tide Tables are issued for the Atlantic and Pacific coasts of the United States and its dependencies.

AGENCIES for the sale of the Charts, Coast Pilots, and Tide Tables of the Coast and Geodetic Survey are established in many ports of the United States and in some foreign ports. They can also be purchased in the Office of the Coast and Geodetic Survey, Washington, D. C. If ordered by mail, prepayment is obligatory. Remittances should be made by postal money order or express order, payable to the "Assistant in Charge of the Office." Postage stamps, checks, and drafts can not be accepted. The sending of money in an unregistered letter is unsafe. Only catalogue numbers of charts need be mentioned. The catalogue of charts and other publications of the Survey can be obtained free of charge on application at any of the sale agencies or to the Coast and Geodetic Survey Office, Washington, D. C.

OTHER PUBLICATIONS.—Lists of Lights, Buoys, and other Daymarks of the United States, its insular possessions, and the Great Lakes, are published by the Bureau of Lighthouses. Notice to Mariners, relating to the same waters, are published weekly by the Bureau of Lighthouses and Coast and Geodetic Survey. These publications can be obtained free of charge on application to the Division of Publications, Department of Commerce and Labor, Washington, D. C.

USE OF CHARTS.

ACCURACY OF CHART.—The value of a chart depends upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become. In these respects the source from which the information has been compiled is a good guide.

This applies particularly to the charts of the Alaska Peninsula, Aleutian Islands, Arctic Ocean, and parts of Bering Sea and the Philippine Islands. The early Russian and Spanish surveys were not made with great accuracy, and until they are replaced by later surveys these charts must be used with caution.

With respect to these regions the fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed it may be taken for granted that the survey was not in great detail.

A wide berth should therefore be given to every rocky shore or patch, and this rule should be invariably followed, viz, that instead of considering a coast to be clear unless it is shown to be foul, the contrary should be assumed.

With respect to a well-surveyed coast only a fractional part of the soundings obtained are shown on the chart, a sufficient number being selected to clearly indicate the contour of the bottom. When the bottom is uneven the soundings will be found grouped closely together, and when the slopes are gradual fewer soundings are given. Each sounding represents an actual measure of depth and location at the time the survey was made.

Shores and shoals where sand and mud prevail, and especially bar harbors and the entrances of bays and rivers exposed to strong tidal currents and a heavy sea, are subject to continual change of a greater or less extent, and important ones may have taken place since the date of the last survey. In localities which are noted for frequent and radical changes, such as the entrance to a number of estuaries on the Atlantic, Gulf, and Pacific coasts, notes are printed on the charts calling attention to the fact.

It should also be remembered that in coral regions and where rocks abound it is always possible that a survey with lead and line, however detailed, may have failed to find every small obstruction. For these reasons when navigating such waters the customary sailing lines and channels should be followed, and those areas avoided where the irregular and sudden changes in depth indicate conditions which are associated with pinnacle rocks or coral heads.

DREDGED CHANNELS.—These are generally shown on the chart by two broken lines to represent the side limits of the improvement. Before completion of the project the depth given is that shown by the latest survey received from the engineer in charge. After completion the depth given is the one proposed to be maintained by redredging when necessary.

The actual depth of a completed channel may be greater than the charted depth shortly after dredging, and less when shoaling occurs as a result of storms or other causes. These changes are of too frequent occurrence and uncertain duration to chart. Therefore when a vessel's draft approximates the charted depth of a dredged channel, the latest information should be obtained before entering.

DANGER CURVES.—The curves of depth will be found useful in giving greater prominence to outlying dangers. It is a good plan to trace out with a colored pencil the curve next greater than the draft of the vessel using the chart, and regard this as a "danger curve," which is not to be crossed without precaution.

Isolated soundings shoaler than surrounding depths should be avoided, as there is always the possibility that the shoalest spot may not have been found.

CAUTION IN USING SMALL-SCALE CHARTS.—It is obvious that dangers to navigation can not be shown with the same amount of detail on small-scale charts as on those of larger scale, therefore in approaching the land or dangerous banks regard should be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason, bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

DISTORTION OF PRINTED CHARTS.—The paper on which charts are printed has to be dampened. On drying, distortion takes place from the inequalities in the paper, which varies with the paper and the amount of the original dampening; but it is not sufficient to affect ordinary navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

BUOYS.—Too much reliance should not be placed on buoys always maintaining their exact position, especially when in exposed positions; it is safer, when possible, to navigate by bearings or angles to fixed objects on shore and by the use of soundings.

Gas buoys and other unwatched lights can not be implicitly relied on; the light may be altogether extinguished, or, if intermittent, the apparatus may get out of order.

LIGHTS.—The distances given in the light lists and on the charts for the visibility of lights are computed for a height of 15 feet for the observer's eye. The table of distances of visibility

due to height, published in the light list, affords a means of ascertaining the effect of a greater or less height of the eye. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking for a light, the fact may be forgotten that from aloft the range of vision is increased. By noting a star immediately over the light a bearing may be afterwards obtained from the standard compass.

The actual power of a light should be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by its candlepower, as given in the light lists, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

Fog Signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from the wind, large areas of silence have been found in different directions and at different distances from the origin of the sound signal, even in clear weather. Therefore too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal may require some time before it is in readiness to act. A fog often creeps imperceptibly toward the land, and is not observed by those at a lighthouse until it is upon them; whereas a vessel may have been in it for many hours while approaching the land. In such a case no signal may be sounded. When sound travels against the wind, it may be thrown upward; in such a case a man aloft might hear it when it is inaudible on deck. The conditions for hearing a signal will vary at the same station within short intervals of time; mariners must not, therefore, judge their distance from a fog signal by the force of the sound, and must not assume that a signal is not sounding because they do not hear it.

Taken together, these facts should induce the utmost caution when nearing the land or danger in fog. The lead is generally the only safe guide and should be faithfully used.

Submarine bells have an effective range of audibility greater than signals sounded in air, and a vessel equipped with receiving apparatus can determine the approximate bearing of the signal. These signals can be heard also on vessels not equipped with receiving apparatus, by observers below the water line, but the bearing of the signal can not then be readily determined.

Tides.—A knowledge of the tide, or vertical rise and fall of the water, is of great and direct importance whenever the depth at low water approximates to or is less than the draft of the vessel, and wherever docks are constructed so as to be entered and left near the time of high water. But, under all conditions such knowledge may be of indirect use, as it often enables the mariner to estimate in advance whether at a given time and place the current will be running flood or ebb. In using the tables slack water should not be confounded with high or low tide nor a flood or ebb current with flood or ebb tide. In some localities the rise or fall may be at a stand while the current is at its maximum velocity.

The Tide Tables published by the Coast and Geodetic Survey give the predicted times and heights of high and low waters for most of the principal ports of the world, and tidal differences and constants for obtaining the tides at all important ports. If the height at any intermediate time is required it may be obtained by the aid of Tables 2, 2A, and 2B of the Tide Tables. The height at any time may be also approximately obtained by plotting the predicted times and heights and connecting them with a curve.

Plane of Reference for Soundings on Charts.—For the Atlantic coast of the United States and Porto Rico the plane of reference for soundings is the mean of all low waters; for the Pacific coast of the United States and Alaska, with the two exceptions noted below, and for the Hawaiian and Philippine Islands, it is the mean of the lower low waters. For Puget Sound, Wash., the plane of reference is 2 feet below mean lower low water, and for Wrangell Strait, Alaska, it is 3 feet below mean lower low water.

For the Atlantic coast of the Canal Zone, Panama, the plane of reference for soundings is mean low water, and for the Pacific coast of the same it is low water springs.

For foreign charts many different planes of reference are in use, but that most frequently adopted is low water springs.

It should be remembered that whatever plane of reference is used for a chart, there may be times when the tide falls below it. When the plane is mean low water or mean lower low water, there will generally be as many low waters or lower low waters below those planes as above them. Also the wind may at times cause the water to fall below the plane of reference.

Tidal Currents.—In navigating coasts where the tidal range is considerable, special caution is necessary. It should be remembered that there are indrafts into all bays and bights, although the general set of the current is parallel to the shore.

The turn of the tidal current offshore is seldom coincident with the time of high and low water on the shore.

At the entrance to most harbors without important tributaries or branches the current turns at or soon after the times of high and low water within. The diurnal inequality in the

velocity of current will be proportionately but half as great as in the height of the tides. Hence, though the heights of the tide may be such as to cause the surface of the water to vary but little in level for ten or twelve hours, the ebb and flow will be much more regular in occurrence.

A swift current often occurs in narrow openings between two bodies of water, because the water at a given instant may be at different levels.

Along most shores not seriously affected by bays, tidal rivers, etc., the current usually turns soon after high and low waters.

Where there is a large tidal basin with a narrow entrance, the strength of the current in the entrance may occur near the time of high and low water, and slack water at about half tide, outside.

The swiftest current in straight portions of tidal rivers is usually in the mid-channel, but in curved portions the strongest current is toward the outer edge of the curve.

Counter currents and eddies may occur near the shores of straits, especially in bights and near points.

Tide Rips and Swirls occur in places where strong currents occur, caused by a change in the direction of the current, and especially over shoals or in places where the bottom is uneven. Such places should be avoided if exposed also to a heavy sea, especially with the wind opposing the current; when these conditions are at their worst the water is broken into heavy choppy seas from all directions, which board the vessel, and also make it difficult to keep control, owing to the baring of the propeller and rudder.

Current Arrows on charts show only the usual or mean direction of a tidal stream or current. It must not be assumed that the direction of the current will not vary from that indicated by the arrow. In the same manner, the velocity of the current constantly varies with circumstances, and the rate given on the chart is a mean value, corresponding to an average range of tide. At some stations but few observations have been made.

Fixing Position.—The most accurate method available to the navigator of fixing a position relative to the shore is by plotting with a protractor sextant angles between well-defined objects on the chart; this method, based on the "three-point problem" of geometry, should be in general use.

In many narrow waters, also, where the objects may yet be at some distance, as in coral harbors or narrow passages among mud banks, navigation by sextant and protractor is invaluable, as a true position can in general be obtained only by its means. Positions by bearings are too rough to depend upon, and a small error in either taking or plotting a bearing might under such circumstances put the ship ashore.

For its successful employment it is necessary: First, that the objects be well chosen; and, second, that the observer be skillful and rapid in his use of the sextant. The latter is only a matter of practice.

Near objects should be used either for bearings or angles for position in preference to distant ones, although the latter may be more prominent, as a small error in the bearing or angle or in laying it on the chart has a greater effect in misplacing the position the longer the line to be drawn.

On the other hand, distant objects should be used for direction because less affected by a small error or change of position.

The three-arm protractor consists of a graduated circle with one fixed and two movable radial arms. The zero of the graduation is at the fixed arm and by turning the movable arms each one can be set at any desired angle with reference to the fixed arm.

To plot a position, the two angles observed between the three selected objects are set on the instrument, which is then moved over the chart until the three beveled edges in case of a metal instrument, or the radial lines in the case of a transparent or celluloid instrument, pass respectively and simultaneously through the three objects. The center of the instrument will then mark the ship's position, which may be pricked on the chart or marked with a pencil point through the center hole.

The tracing-paper protractor, consisting of a graduated circle printed on tracing paper, can be used as a substitute for the brass or celluloid instrument. The paper protractor also permits the laying down for simultaneous trial of a number of angles in cases of fixing important positions. Plain tracing paper may also be used if there are any suitable means of laying off the angles.

The value of a determination depends greatly on the relative positions of the objects observed. If the position sought lies on the circle passing through the three objects it will be indeterminate, as it will plot all around the circle. An approach to this condition, which is called a revolver, must be avoided. In case of doubt select from the chart three objects nearly in a straight line, or with the middle object nearest the observer. Near objects are better than distant ones, and, in general, up to 90° the larger the angles the better, remembering always that large as well as small angles may plot on or near the circle and hence be worthless. If the objects are well situated, even very small angles will give for navigating purposes a fair position, when that obtained by bearings of the same objects would be of little value.

Accuracy requires that the two angles be simultaneous. If under way and there is but one observer, the angle that changes less rapidly may be observed both before and after the other angle and the proper value obtained by interpolation.

A single angle and a range give in general an excellent fix, easily obtained and plotted.

THE COMPASS.—It is not intended that the use of the compass to fix the position should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. Where accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart, as fresh soundings or new buildings. In such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained prevent any errors.

When only two objects are visible, a sextant angle can be used to advantage with the compass bearings and a better fix obtained than by two bearings alone.

DOUBLING THE ANGLE ON THE BOW.—The method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "bow and beam bearing," the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives the maximum of accuracy, and is an excellent fix for a departure, but does not insure safety, as the object observed and any dangers off it are abeam before the position is obtained.

By taking the bearings at two points and four points on the bow, a fair position is obtained before the object is passed, the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current. Taking afterwards the beam bearing gives, with slight additional trouble, the distance of the object when abeam; such beam bearings and distances, with the times, should be continuously recorded as fresh departures, the importance of which will be appreciated in cases of being suddenly shut in by fog.

A graphic solution of the problem for any two bearings of the same object is frequently used. The two bearings are drawn on the chart, and the course is then drawn by means of the parallel rulers so that the distance measured from the chart between the lines is equal to the distance made good by the vessel between the times of taking the bearings.

DANGER ANGLE.—The utility of the danger angle in passing outlying rocks or dangers should not be forgotten. In employing the horizontal danger angle, however, charts compiled from early Russian and Spanish sources, referred to in a preceding paragraph, should not be used.

SOUNDINGS.—In thick weather, when near, or approaching the land or danger, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By marking the soundings on tracing paper, according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined.

SUMNER'S METHOD.—Among astronomical methods of fixing a ship's position the great utility of Sumner's method should be well understood, and this method should be in constant use. The Sumner line—that is, the line drawn through the two positions obtained by working the chronometer observation for longitude with two assumed latitudes, or by drawing through the position obtained with one latitude a line at right angles to the bearing of the body as obtained from the azimuth tables—gives at times invaluable information, as the ship must be somewhere on that line provided the chronometer is correct. If directed toward the coast, it marks the bearing of a definite point; if parallel with the coast the distance of the latter is shown. Thus the direction of the line may often be usefully taken as a course. A sounding at the same time with the observation may often give an approximate position on the line. A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The Sumner lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing. In these cases one of the lines must be moved for the run of the ship. The moon is often visible during the day and in combination with the sun gives an excellent fix.

CHANGE OF VARIATION OF THE COMPASS.—The gradual change in the variation must not be forgotten in laying down positions by bearings on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are reengraved for every new edition if the error is appreciable. Means for determining the amount of this error are provided by printing the date of constructing the compass and the annual change in variation near its edge.

The change in the magnetic variation in passing along some parts of the coast of the United States is so rapid as to materially affect the course of a vessel unless given constant attention. This is particularly the case in New England and parts of Alaska where the lines of equal magnetic variation are close together and show rapid changes in magnetic variation from place to place, as indicated by the large differences in variation given on neighboring compass roses.

LOCAL MAGNETIC DISTURBANCE.—The term "local magnetic disturbance" or "local attraction" has reference only to the effects on the compass of magnetic masses external to the ship.

Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places.

Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local center of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centers near together.

The law which has hitherto been found to hold good as regards local magnetic disturbances, is, that north of the magnetic equator the north end of the compass needle is attraced toward any center of disturbance; south of the magnetic equator it is repelled.

It is very desirable that whenever an area of local magnetic disturbance is noted, the position should be fixed, and the facts reported as far as they can be ascertained.

USE OF OIL FOR MODIFYING THE EFFECT OF BREAKING WAVES.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil skillfully applied may prevent much damage both to ships (especially of the smaller classes) and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves, i. e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances, but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, either when running, or lying-to, or in wearing.

6. No experiences are related of its use when hoisting a boat at sea or in a seaway, but it is highly probable that much time would be saved and injury to the boat avoided by its use on such occasions.

7. In cold water the oil, being thickened by the lower temperature and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to facilitate leakage of the oil. The oil is also frequently distributed from canvas bags or oakum inserted in the closet bowls.

The positions of these bags should vary with the circumstances. Running before the wind, they should be hung on either bow—e. g., from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying-to, the weather bow, and another position farther aft, seem the best places from which to hang the bags, using sufficient line to permit them to draw to windward while the ship drifts.

9. Crossing a bar with a flood tide, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect can not be so much trusted.

On a bar, with the ebb tide running, it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat and the bag readily hauled on board for refilling, if necessary.

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