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UNITED STATES COAST AND GEODETIC SURVEY

HENRY S. PRITCHETT

SUPERINTENDENT

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UNITED STATES COAST PILOT

ATLANTIC COAST

PART IV

FROM POINT JUDITH TO NEW YORK

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THIRD EDITION

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TREASURY DEPARTMENT,
OFFICE OF THE COAST AND GEODETIC SURVEY,
WASHINGTON, D. C., *November 28, 1899.*

This volume covers the coast from Point Judith to New York, including Block Island Sound, Gardiners Bay, Fishers Island Sound, Long Island Sound, East River, the south coast of Long Island and New York Bay and Harbor.

This publication is based mainly upon the work of the Coast and Geodetic Survey, including the results of special examinations and investigations carried on 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, Weather Bureau wind signal display stations, and seacoast telegraph 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. For this purpose, and to afford a ready means of reference from one part to another, the sailing directions, where long, are divided into numbered or lettered sections, printed in large type, each followed by its own subordinate remarks in smaller type.

IV. Appendices.

The first edition of this volume was prepared by Lieut. George H. Peters, U. S. N., assisted by Ensign Edwin H. Tillman, U. S. N., and Mr. John Ross. In the present (third) edition the text has been revised and brought up to date by Mr. John Ross, assisted by Mr. Herbert C. Graves and Mr. Harry L. Ford, under the general direction of Herbert G. Ogden, Assistant, Coast and Geodetic Survey, Inspector of Hydrography and Topography.

The aids to navigation are correct to November 28, 1899.

As absolute accuracy in a work of this class is scarcely possible, 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 information of mariners.

Henry S. Pritchett,
Superintendent.

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NOTE.

All bearings and courses are *magnetic*.

All distances are in *nautical miles*.

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.

SYSTEM OF BUOYAGE ADOPTED IN UNITED STATES WATERS.

The following order is observed in coloring and numbering the 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 of the channel, and must be left on the STARBOARD hand in passing in.

2. In approaching the channel, etc., from seaward, BLACK BUOYS, with ODD NUMBERS, will be found on the PORT side of the channel, and must be left on the PORT hand in passing in.

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, *a description of which is given in the printed list of buoys.*

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, stakes, and spindles (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.

Wherever practicable, the towers, beacons, buoys, spindles, and all other aids to navigation, are arranged in the buoy list in regular order *as they are passed by vessels entering from sea.*

The positions of the buoys enumerated in the list below are shown on the charts of the United States Coast and Geodetic Survey, which are kept corrected from information furnished by the Inspectors of the Lighthouse Districts, for the changes in the aids to navigation rendered necessary from time to time to indicate the best channels.

The following symbols and abbreviations are used on the charts of the Coast and Geodetic Survey:

◊ Red buoys, with even numbers, to be left on starboard hand in entering.

● Black buoys, with odd numbers, to be left on the port hand in entering.

◊ Black and white perpendicular stripes, without numbers, mid-channel or fairway buoys.

◊ or H. S., red and black horizontal stripes, without numbers, marking dangers or obstructions, to be left on either hand.

◊ Lighted buoys, different colors as above; R., red light; W., white light.

◊ ***WHISTLE***, whistling buoys, different colors as above.

◊ ***BELL***, bell buoys, different colors as above.

C.; N., or S. signifies can, nun, or spar buoy.

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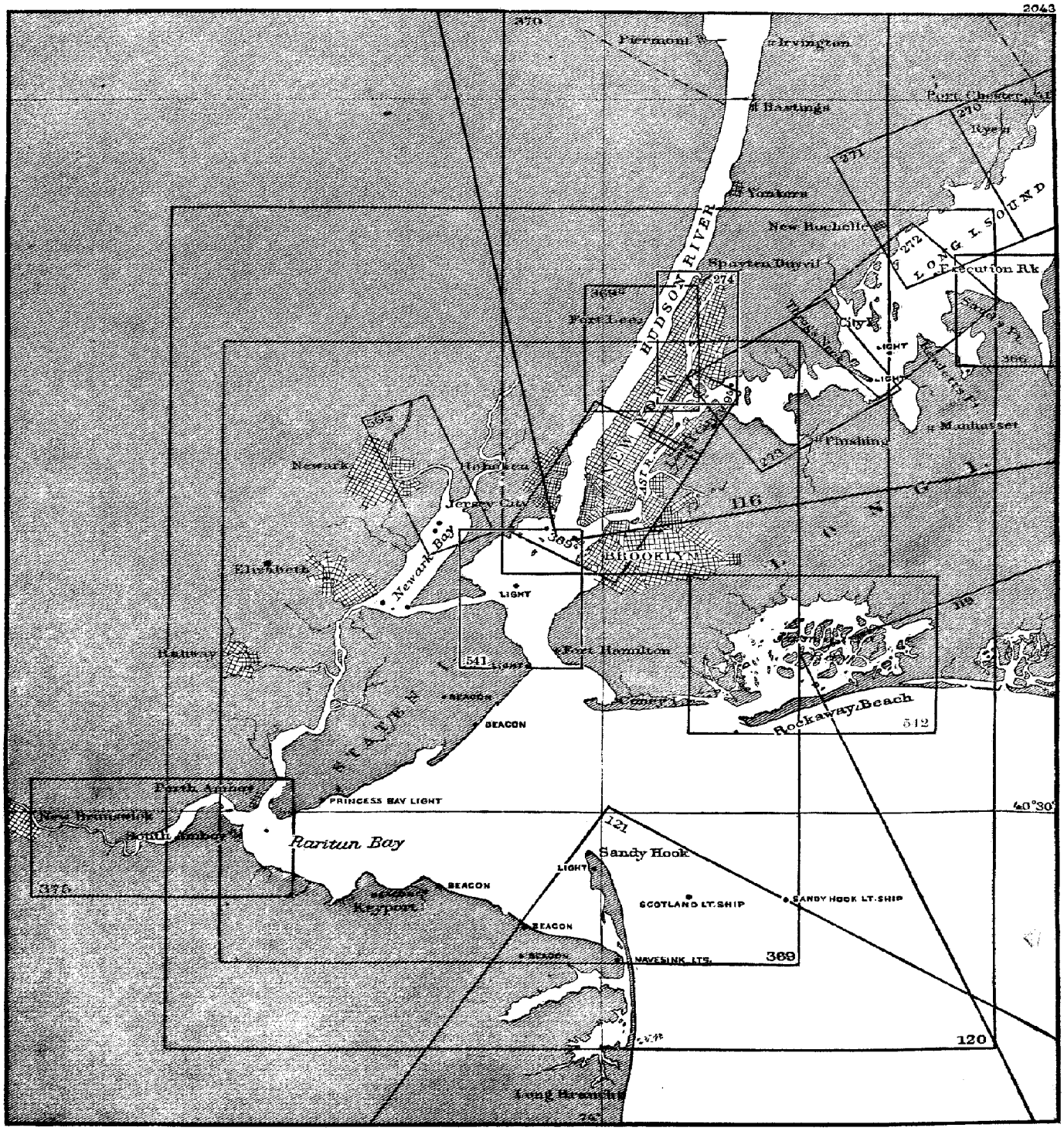
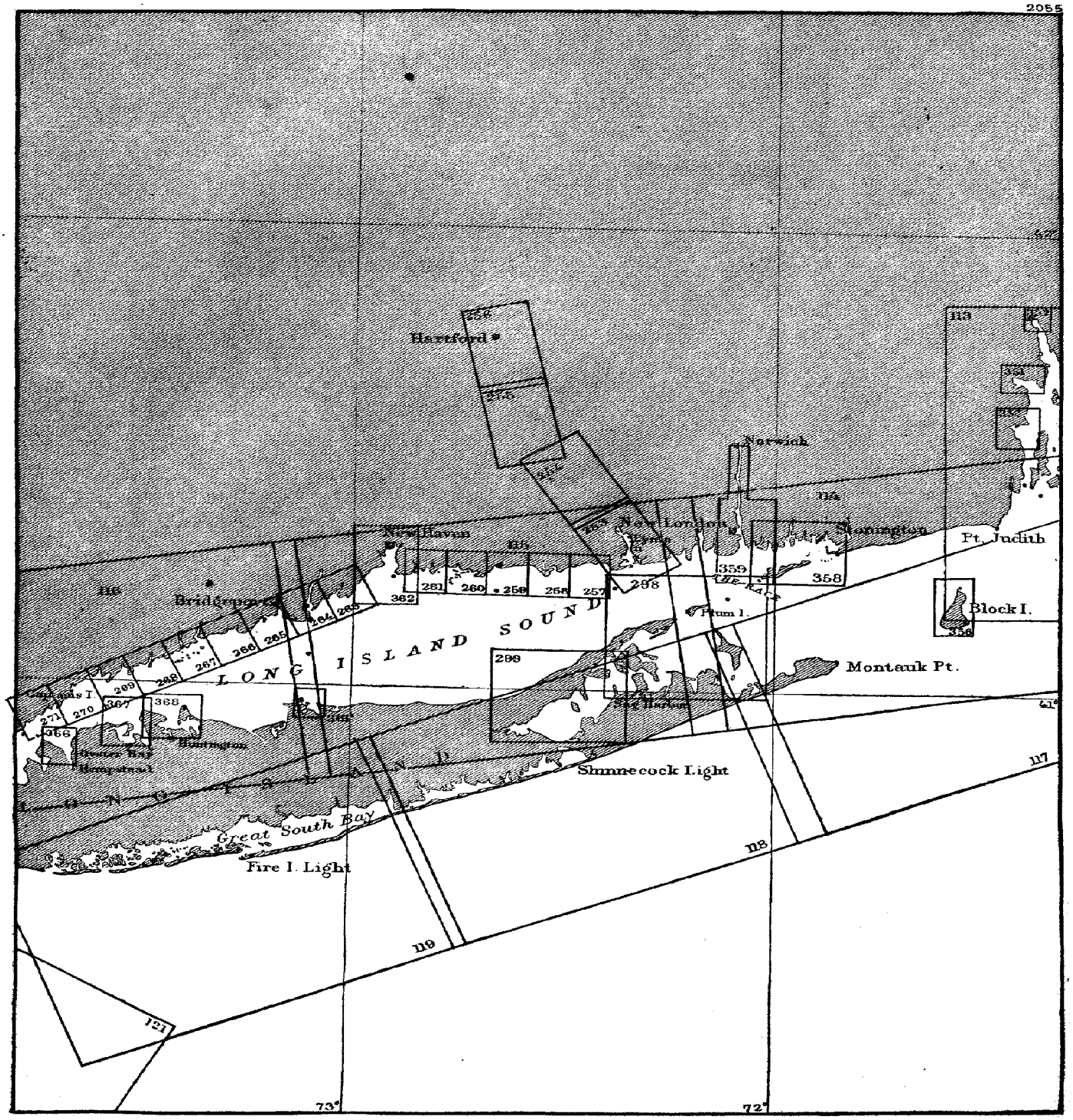

Piermont
Irvington
Hastings
Port Chester
Rye
Yonkers
New Rochelle
Spuyten Duyvil
Execution Rk
Fort Lee
City Pt
Manhasset
Flushing
Newark
Hoboken
Jersey City
Newark Bay
Elizabeth
Railway
BROOKLYN
Fort Hamilton
Coney I.
Rockaway Beach
Perth Amboy
New Brunswick
South Amboy
Raritan Bay
Keyport
Sandy Hook
SCOTLAND LT. SHIP
SANDY HOOK LT. SHIP
NAVESINK LTS.
Long Branch
HUDSON RIVER
LONG I. SOUND
STATEN I.
LIGHT
BEACON
PRINCESS BAY LIGHT
40°30'
116
119
120
121
270
271
272
274
369
541
542
365
376


2055
Hartford
Norwich
New Haven
New London
Stonington
Pt. Judith
Bridgeport
Plum I.
Block I.
Montauk Pt.
LONG ISLAND SOUND
Huntington
Hempstead
Shinnecock Light
Great South Bay
Fire I. Light
73°
72°
41°

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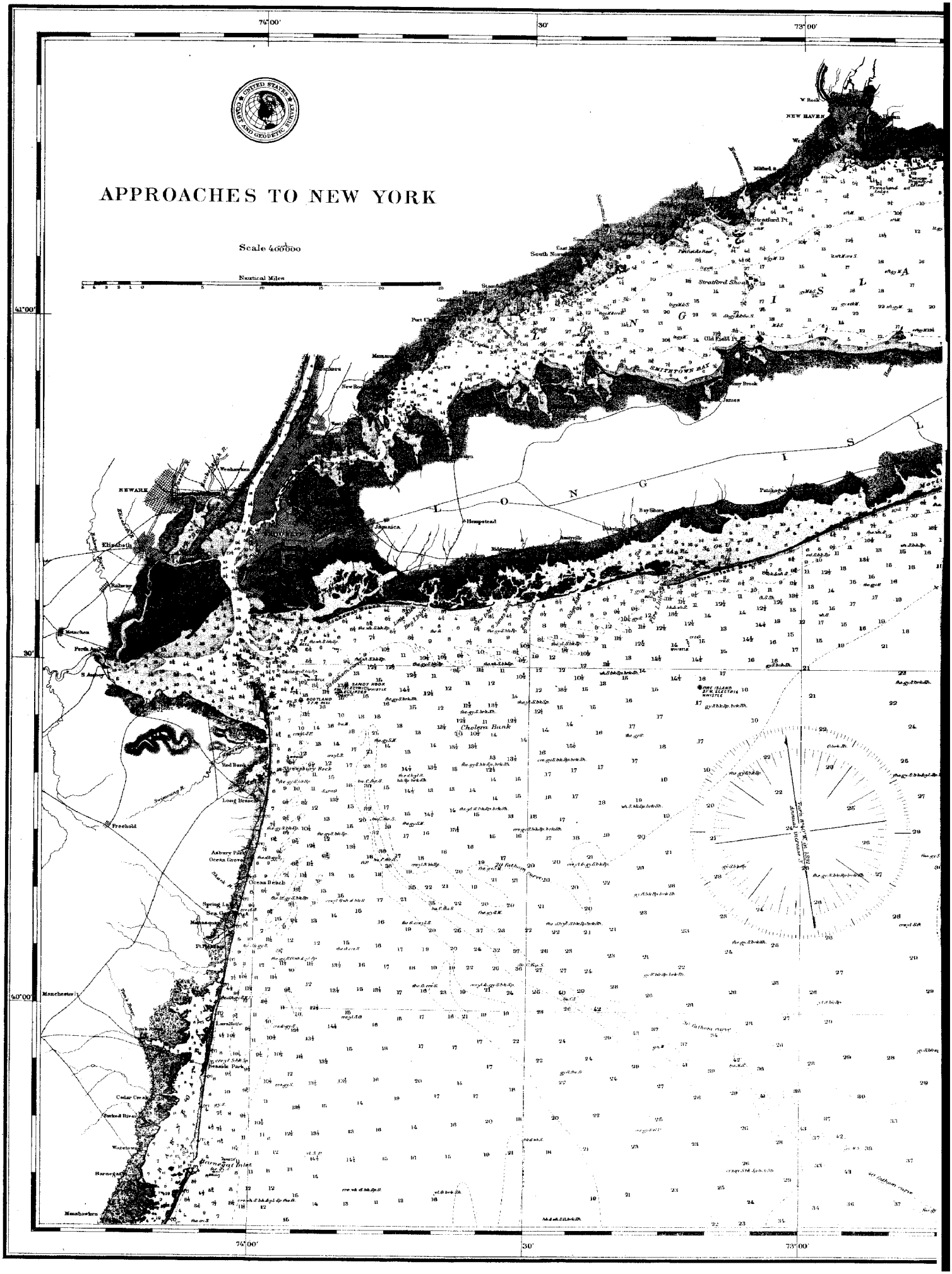
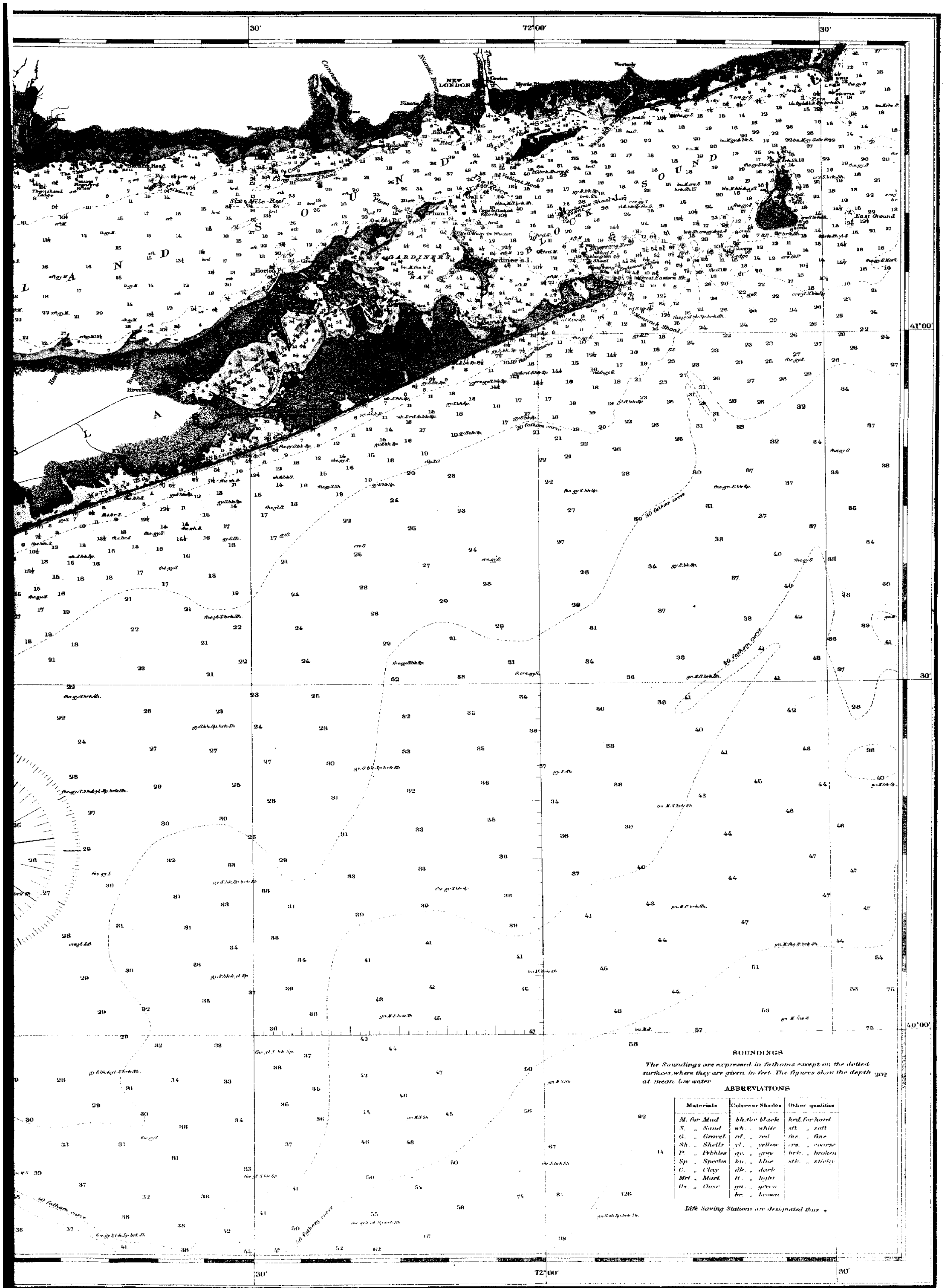

APPROACHES TO NEW YORK
Scale 1/400000
Nautical Miles
74°00'
30'
73°00'
41°00'
40°00'
NEW HAVEN
Stratford Pt
Stratford Shoal
Old Field Pt
SMITHTOWN BAY
Jamaica
Hempstead
Bay Shore
NEWARK
Elizabeth
Rahway
Metuchen
Perth Amboy
Freehold
Red Bank
Long Branch
Asbury Park
Ocean Grove
Ocean Beach
Manchester
Cedar Creek
Forked River
Barnegat
Manahawken
Cholera Bank
Sandy Hook
Sandy Hook Electric Whistle
Fire Island
Fire Island Sw. Electric Whistle
Barnegat Inlet
Lavallette
Seaside Park
Spring Lake
Sea Gate
Manasquan
Pt Pleasant
Shrewsbury Rock
Scotland
Tarn 8°40' W. in 1891
Annual Increase 3'
20 fathom curve
30 fathom curve
40 fathom curve
L O N G I S L A N D



(Approaches to New York)

The following addenda have become necessary while this volume was in print:

PAGE 10.—The fog signal at Little Gull Lighthouse now sounds blasts of 3 seconds duration separated by silent intervals of 17 seconds.

PAGE 12.—An additional fixed white lantern light is placed 8 feet below the original light on the east end of New Haven Middle Breakwater.

PAGE 12.—New Haven Outer Breakwater light is a fourth-order light showing a red flash every 5 seconds; it illuminates the entire horizon and can be seen about 13¼ miles.

PAGE 92.—A black spar buoy (No. 1) has been placed inside the entrance to Port Jefferson, on the east side of the channel and $\frac{6}{10}$ mile S. by E. from the beacon on the end of the East Jetty. This buoy marks a 9-foot spot.

UNITED STATES COAST PILOT.

ATLANTIC COAST—PART IV.

FROM POINT JUDITH TO NEW YORK.*

LONG ISLAND SOUND, WITH APPROACHES AND ADJACENT WATERS.†

GENERAL REMARKS.

The waters included between Point Judith and the East River have comparatively few dangers which menace vessels standing through Block Island Sound and Long Island Sound, though the approaches to some of the harbors are much obstructed. The chief obstacles to navigation on this coast are the fogs and the tidal currents, the former being particularly prevalent in the vicinity of Point Judith—a locality known to coasters as the "fog hole." The tidal currents have considerable strength in Block Island Sound, Fishers Island Sound, and Long Island Sound, though not forming any great hindrance to navigation; but in The Race, in Plum Gut, and through Hell Gate in the East River, the tidal currents have great velocity, and in the latter place are dangerous on account of the narrow channel and the number of vessels encountered. Sailing vessels approaching The Race with the current against them are frequently unable to get through until the tide turns; sailing vessels are generally towed through the East River.

Block Island Sound has but few dangers; its shores are bold to as a rule. Gardiners Bay is one of the best natural harbors in the world. Fishers Island Sound has a number of dangers, and the currents have considerable velocity; strangers should not pass through it when the buoys can not be seen readily. The Race, except for its strong current, is practically free from dangers for most of the vessels using it—Valiant Rock, in the middle of The Race, having 19 feet over it at mean low water. Long Island Sound has some shoals lying alongshore, but in mid-sound there are very few dangers, and these are well marked or are easily avoided. In the East River strangers in sailing vessels should have a pilot or a towboat.

The prevailing winds are northwesterly and northerly in winter, and southwesterly and southerly in summer, subject to many variations at all seasons.

Fogs are liable to occur at any season, but are more prevalent from April to October than during the rest of the year. They come most frequently with easterly and southeasterly winds, often with southerly winds, and occasionally with the wind to the westward of south. Off Montauk Point and Point Judith winds between south and southwest are nearly as apt to bring fog as those from the southeastward. Westerly and northerly winds clear away fog, this holding good for all parts of the Atlantic coast.

In Block Island Sound and in the eastern part of Long Island Sound fogs are generally heaviest with southeast winds. In these waters the usual duration of a fog is from 4 to 12 hours, but periods of from 4 to 6 days have been known, with very short clear intervals. As already stated, the vicinity of Point Judith is known to coasters as the "fog hole." In the autumn "land fogs," as they are termed locally, sometimes occur with northerly breezes, but they are generally "burnt off" before midday.

In Long Island Sound the north and south shores are equally subject to fog, except that on spring and summer mornings, when there is little or no wind, fog will often hang along the Connecticut shore when it is clear off shore and to the southward.

In the western end of Long Island Sound, although fogs are liable to occur at any season, they are not encountered so often, nor do they generally last so long as is the case to the eastward.

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* In this volume Long Island Sound with approaches and adjacent waters is first treated, then the south coast of Long Island, New York Bay and Harbor, and the approaches thereto.

† These waters fall within the limits of the following Coast and Geodetic Survey charts: **A**, Sailing chart, Atlantic coast, scale $\frac{1}{1,200,000}$, price $0.50; **8**, Approaches to New York, Gay Head to Cape Henlopen, scale $\frac{1}{400,000}$, price $0.50; and are also shown in part on the following charts:—**52**, Montauk Point to New York and Long Island Sound, Mercator projection, price $0.50; and Long Island Sound in three sheets, charts **114, 115, 116**, scale of each $\frac{1}{80,000}$, price of each $0.50; south shore of Long Island in three sheets, charts **117, 118, 119**, scale of each $\frac{1}{80,000}$, price of each $0.50. Portions of the coast are shown more in detail on harbor charts, as noted under the several headings.

Coast and Geodetic Survey charts can be obtained from the agents named in the list given on pages 7–8. Between pages 5 and 7 are index maps, showing the location and limits of charts covering that part of the coast included in this volume. The catalogue of charts and other publications of the Survey also contain similar index maps; copies of this catalogue can be obtained, free of charge, on personal application at any of the sale agencies or by letter addressed to the Coast and Geodetic Survey Office, Washington, D. C.

TABLE OF LIGHTS.

Lighthouse District, Etc.—The coast and the waters covered by this volume lie within the **Third Lighthouse District** of the United States. This district extends from Gooseberry Point, Massachusetts, to the westward and southward as far as Squan Inlet, New Jersey. The Light list for the seacoasts of the United States and the Buoy list for the Third District give full descriptions of the aids to navigation at the date of publication.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
		° ′ ″				
1	POINT JUDITH	41 21 40 71 28 55	Flashing white every 15 seconds	4	65	13½
2	BLOCK ISLAND (N.)	41 13 40 71 34 35	Fixed white	4	58	13
3	Range. Block Island Breakwater (front)		Fixed red	Lantern	9	
4	Range. Block Island Breakwater (rear)		Fixed red	Lantern	57	
5	BLOCK ISLAND (SE.)	41 09 10 71 33 08	Fixed white	1	201	20½
6	Great Salt Pond Breakwater (Outer End) Beacon	41 11 (54) 71 35 (35)	Fixed red	Lens lantern.	22	
7	Great Salt Pond Breakwater (Inner End) Beacon	41 11 (44) 71 35 (26)	Fixed white	Lantern	28	
8	WATCH HILL	41 18 14 71 51 32	Fixed white	4	60¾	13¼
9	MONTAUK POINT	41 04 16 71 51 27	Fixed white, varied by a white flash every 2 minutes.	1	168¼	19
	LONG ISLAND SOUND AND TRIBUTARIES:					
10	Stonington Breakwater	41 19 (31) 71 54 (49)	Fixed red	4	33¾	11
11	Latimer Reef	41 18 16 71 56 02	Flashing white every 10 seconds	4	55	12¾
12	*Ram Island Reef Light-Vessel, No. 23*	41 18 (10) 71 58 (31)	Fixed white	Refl'r	43	11¾
13	Morgan Point	41 18 59 71 59 24	Fixed white	6	60	11
14	North Dumpling	41 17 16 72 01 11	Fixed white, with a fixed red sector between W. ¼ S. through southward to NNE. ⅞ E.	5	69¼	11¾
15	New London Harbor	41 19 00 72 05 25	Fixed white, with a fixed red sector between N. ⅞ E. and NE. ⅝ E.	4	88¾	15
16	*Bartlett Reef Light-Vessel, No. 13*	41 16 (17) 72 07 (50)	Two fixed white	Refl'r	{28 28}	10½
17	Race Rock	41 14 37 72 02 51	Flashing alternately red and white, intervals between flashes 10 seconds.	4	67	13¾
18	LITTLE GULL ISLAND	41 12 23 72 06 26	Fixed white	2	90¾	15¼
	GARDINERS BAY—					
19	Plum Island	41 10 25 72 12 43	Flashing white every 30 seconds	4	74¾	14¼
20	Orient Point	41 09 (48.5) 72 13 (26)	Fixed red	5	84	8½
21	Long Beach Bar	41 06 33 72 18 23	Fixed red	5	53	8½
22	Cedar Island	41 02 27 72 15 41	Fixed white	6	44	11¼
23	Greenport Harbor Beacon	41 06 (12) 72 20 (52)	Fixed red	Lantern.	27	
	CONNECTICUT RIVER—					
24	Saybrook Breakwater	41 15 48 72 20 35	Fixed white, with a fixed red sector between E. ⅝ N. and ESE. ⅜ E.	4	58¼	13
25	Saybrook (Lynde Point)	41 16 17 72 20 37	Fixed white	5	71	13
26	*Cornfield Point Light-Vessel, No. 48*	41 12 (56) 72 22 (33)	Flashing white every 30 seconds (foremast). Fixed red (mainmast)	Refl'r Refl'r	37 37	11¼

POINT JUDITH TO NEW YORK.

These pamphlets, which are corrected and reprinted annually, are sent free of charge to any shipmaster on application to the Office of the Lighthouse Board, Washington, D. C., or to the inspector of the district, Tompkinsville, New York. They can also be had on application at the U. S. Branch Hydrographic Office, Maritime Exchange, Produce Exchange Building, New York City.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
1	Octagonal, pyramidal tower, lower half white, upper half brown, connected with dwelling. Fog-signal building southerly of tower.	46	1st-class steam siren; blasts 6 seconds, silent intervals 40 seconds.
2	Light-brown tower, on a gray granite dwelling	46	
3	Lantern hung on a white stake standing at end of pier	12	
4	Lantern on a white mast near small white house, back of the bulkhead of the basin.	48	
5	Octagonal red brick tower, attached to red brick dwelling with granite trimmings; lantern, black. Fog-signal building 100 feet SE.	52	1st-class steam siren; blasts 4 seconds, silent intervals 30 seconds.
6	Square, white, pyramidal, wooden tower, on a square concrete block on the breakwater.	19	Blower siren, continuous blast.
7	Lantern suspended from a bracket on a wooden post, on a square wooden base; all red.	25	
8	Gray granite tower, attached to SE. corner of white building	40	
9	White tower, with a brown band about midway of its height; white dwelling on hill near by. Fog-signal building about 100 feet easterly of tower.	97	1st-class siren (compressed air); blasts 3 seconds, alternate silent intervals 3 and 21 seconds.
10	White, conical tower, with octagonal base on masonry foundation forming end of breakwater; lantern, black.	25	Bell struck by machinery, a double blow every 30 seconds.
11	Conical tower, white, with brown band about midway of its height; on brown cylindrical foundation; lantern, black.	44	Bell struck by machinery every 15 seconds.
12	Two masts, schooner-rigged; black circular cagework day-mark at each masthead. Hull, red, with "RAM ISLAND REEF" in black on each side and "23" in black on each quarter.		Bell.
13	Light on granite dwelling	44	
14	White tower on dwelling	39½	Bell struck by machinery every 15 seconds.
15	White stone tower attached to white dwelling. Fog-signal building about 120 feet WSW. from tower.	85	1st-class Daboll trumpet; blasts 6 seconds, silent intervals 30 seconds.
16	Two masts, schooner-rigged; circular straw-colored day-mark at each masthead. Hull, black, with white streak; "BARTLETT REEF" in black on each quarter and "13" in black on the white streak on the bend of each bow.		Bell or horn.
17	Tower, square at base and octagonal above, attached to granite dwelling, with gable roof; on conical granite pier, with a landing pier attached; lantern, black.	40	2d-class siren (compressed air); blasts 3 seconds, two silent intervals 3 seconds, one silent interval 45 seconds. If the siren be disabled, a bell will be struck by machinery a double blow every 20 seconds.
18	Gray granite tower, connected with red sandstone dwelling, with Mansard roof and granite trimmings. Fog-signal building to the eastward of tower. The buildings stand on a pier of granite.	74	2d-class steam siren; blasts 5 seconds, silent intervals 40 seconds.
19	White tower, on granite dwelling; lantern, black	46	Bell struck by machinery every 15 seconds.
20	Black, cylindrical, iron foundation pier, surmounted by a brown, conical iron tower, with a lantern on top and a covered gallery surrounding its base.		*To be established.*
21	Screw-pile structure; piles, red; dwelling and tower, white; lantern, black		Bell struck by machinery every 15 seconds.
22	Light on granite dwelling	35	Bell struck by machinery every 20 seconds.
23	Red stake, with shelf for lantern, on rectangular, pyramidal stone pier	20	
24	White conical tower, on brown cylindrical foundation; lantern, black	44	Bell struck by machinery every 20 seconds.
25	White stone tower, with white dwelling attached	64	Bell struck by machinery every 12 seconds.
26	Two masts, schooner rigged, no bowsprit, black mastheads with black circular cagework day-mark at each. Hull, red, with "CORNFIELD POINT" in white on each side and "No. 48" in white on each bow. A black smokestack and the fog-signal between the masts.		12-inch steam whistle; blasts 3 seconds, alternate silent intervals 1 and 30 seconds. If whistle be disabled, a bell will be rung by hand.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	LONG ISLAND SOUND AND TRIBUTARIES—Cont'd.	° ′ ″				
27	HORTON POINT	41 05 07 72 26 46	Fixed white	3	102½	16
28	Duck Island Breakwater Beacon	41 15 (26.5) 72 29 (05)	Fixed red	Lantern.	29½	
29	Falkner Island	41 12 43 72 39 15	Fixed white, varied by a white flash every 90 seconds.	4	93½	15¼
30	SOUTHWEST LEDGE	41 14 04 72 54 45	Fixed white, with a fixed red sector between W. ¾ N. and WNW. ⅛ W.	4	54¼	12¾
31	New Haven Middle Breakwater (E. end) Beacon		Fixed white	Lantern.	30	
32	New Haven Middle Breakwater (W. end) Beacon		Fixed red	Lantern.	30	
33	New Haven Outer Breakwater. (*Being built*)					
34	New Haven Long Wharf	41 17 34 72 54 56	Fixed red	Lantern.	39	
35	Milford Harbor Beacon	41 12 (36) 73 02 (56)	Fixed red	Lantern.	24	
36	Housatonic River Breakwater Beacon	41 09 (53) 73 05 (54)	Fixed red	Lantern.	20	
37	Stratford Point	41 09 07 73 06 13	Flashing white every 45 seconds	3	52	12½
38	STRATFORD SHOAL (Middle Ground)	41 03 36 73 06 06	Flashing white every 10 seconds	4	60	13¼
39	PORT JEFFERSON. East Breakwater Beacon	40 58 (21) 73 05 (31)	Fixed red	Lantern.	37	
40	PORT JEFFERSON. West Beacon	40 58 (00) 73 05 (29)	Fixed white	Lantern.	30	
41	Old Field Point	40 58 37 73 07 09	Fixed white	4	76	14¼
42	Bridgeport Harbor	41 09 24 73 10 49	Fixed red	4	52½	11¼
43	Bridgeport Breakwater	41 09 (58) 73 10 (35)	Fixed white	Lens lantern.	29	
44	Black Rock	41 08 33 73 13 04	Fixed white	5	39½	11½
45	PENFIELD REEF	41 07 02 73 13 21	Flashing red every 5 seconds	4	50½	12½
	NORWALK HARBOR—					
46	Grassy Hammock (*To be established*)					
47	Round Beach (*To be established*)					
48	Fitchs Point (*To be established*)					
49	White Rock Reef (*To be established*)					
50	Norwalk Islands	41 02 56 73 25 11	Fixed white, varied by a red flash every minute.	4	48½	12¼
51	Greens Ledge. (*Light and fog signal to be established*)					
52	EATONS NECK	40 57 14 73 23 45	Fixed white	3	143¾	18
53	Lloyd Harbor	40 54 54 73 26 06	Fixed red	5	37	8½
54	Cold Spring Harbor	40 54 51 73 29 42	Fixed white, with a fixed red sector, between NE. ¼ E. and SE. ¾ E.	4	40½	11¼
55	Stamford Harbor	41 00 49 73 32 35	Fixed red	4	56½	11¼
56	Pine Island Beacon	41 01 (55) 73 32 (17)	Fixed red	Lantern.	29	

POINT JUDITH TO NEW YORK—Continued.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
27	Square white brick tower, with dwelling attached	35	
28	Red post, with shelf 3 feet below the top, supporting lantern; post painted white above the shelf. Small red house at base of post.		
29	White octagonal tower, with dwelling attached. Fog-signal building 150 feet to the northward.	46	10-inch steam whistle; blasts 6 seconds, silent intervals 52 seconds. If whistle be disabled, a bell will be struck by machinery every 15 seconds.
30	White octagonal house, one-story, with high Mansard roof; lantern, black, on brown cylindrical foundation.	32	Daboll trumpet; blasts 3 seconds, alternate silent intervals, 3 and 11 seconds. If trumpet be disabled, a bell will be struck by machinery every 15 seconds.
31	Lantern on a black pole with a white top		
32	Lantern on a red pole with a white top		
33			
34	Lantern on a mast on a square drab tower with brown trimmings	37	
35	Red stake, with shelf supporting lantern	16	
36	Red post with small shelf on top, and red ladder		
37	Conical tower, white, with brown band about midway of its height; lantern, black. White dwelling detached. Fog-signal building, white.	35	Bell struck by machinery every 15 seconds.
38	Gray octagonal tower, projecting from south side of square house standing on pier	40	2d-class Daboll trumpet; blasts 6 seconds, silent intervals 21 seconds. If trumpet be disabled, a bell will be struck by machinery a triple blow every 15 seconds.
39	White, wedge-shaped, wooden skeleton, with bracket at top from which lantern is suspended, on rough stone foundation. Elevated walk to shore.		Bell struck by machinery a double blow every 30 seconds.
40	Pyramidal concrete pier supporting a white post with bracket at top, from which lantern is suspended.		
41	Lantern on gray two-story dwelling	46	
42	Screw-pile structure; piles, red; tower and dwelling, white; Mansard roof, slate-color; lantern, black.	34	Bell struck by machinery every 15 seconds.
43	Cylindrical pier, surmounted by a conical iron tower with lantern; entire structure black.		Bell struck by machinery every 8 seconds.
44	White stone tower; lantern, black	33	
45	White tower, on granite dwelling with Mansard roof, standing on dark pier; lantern, white; dome, black.	37	Daboll trumpet; blasts 3 seconds, silent intervals 17 seconds. If trumpet be disabled, a bell will be struck by machinery a double blow every 20 seconds.
46			
47			
48			
49			
50	Gray octagonal tower, on gable end of two-story granite dwelling; lantern, black.	46	
51			
52	White tower, and dwelling attached; lantern, black. Fog-signal building about 280 feet NNW. from tower.	63	2d-class steam siren; blasts 9 seconds., silent intervals 35 seconds.
53	Square white brick tower, and dwelling attached	34	
54	Square, white, pyramidal wooden tower, on black cylindrical foundation pier; lantern, black.		Bell struck by machinery every 30 seconds.
55	White conical tower, on red cylindrical foundation; lantern, black	60	Bell struck by machinery every 20 seconds.
56	Triangular wooden platform, surmounted by a red iron column, from which lantern is suspended.	25	

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	LONG ISLAND SOUND AND TRIBUTARIES—Cont'd.	° ′ ″				
57	Great Captain Island	40 58 57 73 37 26	Fixed white	4	72½	14
58	Jones Rocks Beacon	40 59 (18) 73 38 (07)	Fixed white	Lantern.	27	
59	Port Chester Beacon	40 59 (04) 73 39 (24)	Fixed red	Lantern.	27	
60	Execution Rocks	40 52 41 73 44 17	Flashing white, with a flashing red sector, between NE. ¼ N. and E. by N. Interval between flashes, 10 seconds.	4	54½	12¾
61	Sands Point	40 51 57 73 43 48	Fixed white	4	64½	13½
62	Hart Island Fog-Signal Station. (*To be established*)					
63	Stepping Stones	40 49 28 73 46 31	Fixed red	5	45½	8½
64	Throgs Neck	40 48 (21) 73 47 (28)	Fixed white	5	60	12¾
	EAST RIVER—					
65	Whitestone Point Post Light	40 48 (02) 73 49 (12)	Fixed white	Lens lantern.	36½	
66	Flushing Bay Post Light	40 46 (13) 73 51 (12)	Fixed red	Lantern.	10	
67	Rikers Island Post Light	40 47 (50) 73 53 (21)	Fixed red	Lantern.	32½	
68	Oak Bluff Post Light		Fixed red Fixed white	Lantern.	33 25	
69	North Brother Island	40 47 57 73 54 00	Fixed white, 5 seconds; eclipse 5 seconds	6	46½	11¼
70	South Brother Island Ledge Post Light	40 47 (34) 73 53 (57)	Fixed red	Lantern.	17½	
71	Lawrence Point Ledge Post Light	40 47 (35) 73 54 (16)	Fixed white	Lantern.	17½	
72	Sunken Meadow Post Light	40 47 (48) 73 54 (57)	Fixed red	Lantern.	23	
73	Hell Gate Post Light	40 46 41 73 56 06	Alternately red and white, each 3 seconds	Lens lantern.	22	
74	Man-o'-War Rock Post Light	40 44 (40) 73 58 (03)	Fixed red	Lantern.	29¾	
75	MONTAUK POINT	41 04 16 71 51 27	Fixed white, varied by a white flash every 2 minutes.	1	168¼	19
76	SHINNECOCK BAY	40 51 03 72 30 16	Fixed white	1	160	18¼
77	*Fire Island Light-Vessel, No. 68*	40 28 (15) 73 11 (15)	Two fixed white; three lanterns encircling each masthead; electric. If the electric-light apparatus should become inoperative, the lights will show fixed white, from lens lanterns suspended *under* the galleries, and will be *less brilliant* than the electric lights.	Lens lantern.	57 57	13
78	FIRE ISLAND	40 37 57 73 13 08	Flashing white every minute	1	167	19
79	Canarsie Dike Beacon	40 37 (24) 73 52 (24)	Fixed red	Lantern.	19.5	
	ENTRANCE TO NEW YORK BAY:					
80	*Sandy Hook Light-Vessel, No. 51*	40 28 (15) 73 50 (09)	Fixed white 12 seconds, eclipse 3 seconds; four lanterns encircling mainmast head; electric. If, from any cause, the light can not be shown from the mainmast, it will be shown with the same characteristics from the foremast head. Should the electric-light machinery become entirely inoperative, all lights will be placed in one set of lens lanterns, and the characteristic of the light will be *fixed* white.	Lens lantern.	54	12¾
81	*Scotland Light-Vessel, No. 7*	40 26 (48) 73 55 (17)	Two fixed red	Reff'r	45 45	12

POINT JUDITH TO NEW YORK—Continued.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
57	White tower, on S. gable of granite dwelling. Brick fog-signal building about 125 feet easterly from tower.	46	10-inch steam whistle; blasts 3 seconds; silent intervals 27 seconds.
58	Iron column, with square day mark, and bracket from which lantern is suspended, on iron skeleton structure; all black.	23	
59	Red wooden post, with iron bracket from which lantern is suspended	18	
60	White tower, with brown band about midway of its height; granite dwelling attached on W. side. Red fog-signal building on northeasterly side of tower.	47	1st-class automatic steam siren; blasts 3 seconds; silent intervals 17 seconds.
61	White tower, with light-brown dwelling attached; lantern, black	46	
62			
63	Lantern on red brick dwelling with stone trimmings and Mansard roof, on granite pier.	36	Bell struck by machinery a double blow every 20 seconds.
64	White, square, pyramidal skeleton iron tower; lantern, black	61¼	Bell struck by machinery every 15 seconds.
65	Square, pyramidal frame tower, on piers; lower part, white; upper, wood color	20	Bell struck by machinery a double blow every 30 seconds.
66	Red stake bolted to pile on end of dike		
67	Lantern on roof of boathouse		
68	Red stake		
69	White dwelling with Mansard roof, surmounted by black lantern. White wedge-shaped fog-bell tower southeasterly of lighthouse.	38	Bell struck by machinery every 15 seconds.
70	Red, square foundation, surmounted by a red house with post; top of post white		
71	Square, black structure, with a black house and post on top. The post, above the shelf to support the lantern, is white.		
72	Red, square foundation crib, surmounted by a red post with lantern on shelf; a small oil house on corner of crib.		
73	Small white pyramidal wooden tower		Bell struck by machinery every 5 seconds.
74	Spindle with bracket, from which lantern is suspended, painted in alternate black and white stripes, each 6 feet wide.		
75	White tower, with a brown band about midway of its height; white dwelling on hill near by. Fog-signal building about 100 feet easterly of tower.	97	1st-class siren (compressed air); blasts 3 seconds, alternate silent intervals 3 and 31 seconds.
76	Red brick tower, with drab dwelling attached	150	
77	Flush-deck steam vessel, two masts, schooner-rigged, no bowsprit. Mastheads, black; black, circular gallery under lens lanterns at each masthead; hull, red, with "Fire Island" in white on each side and "68" in white on each bow and each quarter. A black smokestack and the fog signal are between the masts.		12-inch steam chime whistle; blasts 3 seconds, alternate silent intervals 4 and 20 seconds. If whistle be disabled, a bell will be struck by hand 7 blows every minute.
78	Tower, colored with alternate black and white horizontal bands, two of each color, black at the top; dark-red granite dwelling attached, standing upon white pier.	152	
79	Red post, with small red house at base, and shelf at top for lantern		
80	Steam light-vessel, two masts, schooner-rigged, no bowsprit. Mastheads black, black circular iron gallery under lanterns at each masthead. Black smokestack and fog signal between the masts. Hull, red, with "Sandy Hook" in white on each quarter and "No. 51" in white on each bow.		12-inch steam whistle; blasts 3 seconds, silent intervals 12 seconds. If whistle be disabled, a bell will be rung by hand.
81	Two masts, schooner-rigged, no bowsprit; black circular cagework daymark at each masthead. Hull, lead color, with "Scotland" in black on each side and "7" in black on each quarter.		Bell struck by hand.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	ENTRANCE TO NEW YORK BAY—Continued.	° ′ ″				
82	NAVESINK (northerly light)	40 23 48 73 59 10	Fixed white. *Discontinued.—Will be shown only if* SOUTHERLY LIGHT *is accidentally extinguished.*	1	246	22¼
83	NAVESINK (southerly light)	40 23 46 73 59 09	Flashing white every 5 seconds; duration of flash about $\frac{1}{10}$ second.	Electric.	246	22¼
84	SW. Spit Range. SANDY HOOK (rear)	40 27 42 74 00 09	Fixed white	3	88	15
85	SW. Spit Range. South Hook Beacon (front)	40 27 (47) 74 00 (23)	Fixed white	6	37	11¼
86	North Hook Beacon	40 28 (19) 74 00 (26)	Fixed white with a fixed red sector between SW. by W. ¾ W. and W. ⅞ S.	4	44	12
87	Sandy Hook Fog Bell					
	NEW YORK LOWER BAY:					
88	Main Channel Range. Point Comfort Beacon (front)	40 26 53 74 07 18	Fixed white	Range lens.	42½	11¾
89	Main Channel Range. Waackaack (rear)	40 26 (38) 74 08 (11)	Two fixed white	Range lens.	{101½ 95½}	{16 15½}
90	Conover and Chapel Hill Range. Conover Beacon (front)	40 25 17 74 03 22	Fixed white	Range lens.	57½	13
91	Conover and Chapel Hill Range. Chapel Hill Beacon (rear)	40 23 54 74 03 33	Fixed white	Range lens.	221½	21½
	NEW YORK BAY:					
92	Old Orchard Shoal	40 30 (44) 74 05 (57)	Fixed white 12 seconds, eclipse 3 seconds from S. 30° 57′ W. (SSW. ¾ W.) through eastward and southward to S. 84° 42′ E. (E. ½ S.); fixed red 12 seconds, eclipse 3 seconds throughout remaining sector. Between S. 71° 52′ E. (ESE. ⅝ E.) and S. 18° 07′ W. (S. by W. ⅝ W.) the red light shows dimly.	4	50½	12½
93	Romer Shoal	40 30 47 74 00 50	Flashing white every 4 sec	4	54	12.8
94	West Bank. (*To be established*)					
95	Swash Channel Range. Elm Tree Beacon (front)	40 33 (51) 74 05 (45)	Fixed white	Range lens.	59½	13¼
96	Swash Channel Range. New Dorp Beacon (rear)	40 34 51 74 07 14	Fixed white	Range lens.	189½	20
97	Coney Island	40 34 (35) 74 00 (46)	Flashing red every 5 seconds	4	75	14¼
98	Fort Tompkins	40 36 07 74 03 17	Flashing alternately red and white; interval between flashes, 10 seconds.	4	87½	15
99	Fort Wadsworth Fog-Signal Station	40 36 (21) 74 03 (15)				
100	Fort Lafayette Fog-Signal Station	40 36 (28) 74 02 (19)				
101	Robbins Reef	40 39 (27) 74 03 (57)	Flashing white every 6 seconds	4	56	13
102	Liberty Enlightening the World	40 41 21 74 02 42	Fixed white, electric		303	24¼
108	Governors Island Post Light	40 41 (35) 74 01 (13)	Two fixed red	Lantern.	{60 76}	

In the foregoing table the names of the lights are printed as follows, viz:

1st. PRIMARY SEACOAST LIGHTS.
2d. SECONDARY SEACOAST LIGHTS.
3d. *Light-vessels.*
4th. Sound, bay, river, and harbor lights.

POINT JUDITH TO NEW YORK—Continued.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
82	Two brown stone towers, connected by brown stone dwelling; northerly tower, octagonal; southerly tower, square.	53	
83		53	
84	White tower, with white frame dwelling detached; lantern, black	77	
85	White wooden tower; lantern, black	24	
86	Brown conical tower; lantern, black. White dwelling 50 feet to southward of tower. Fog-signal building about 700 feet easterly from tower.	42	1st-class automatic steam siren; blasts 3 seconds, silent intervals 27 seconds.
87	White, wedge-shaped skeleton structure		Bell struck by machinery a triple blow every 10 seconds.
88	Square, white wooden tower, rising from the roof of a white wooden dwelling; top of lantern, dark red.	40	
89	White, square, pyramidal, iron skeleton tower, inclosing stair cylinder; lantern, black. The old white wooden tower, with black lantern, stands on the Main Channel Range line, 52 feet in front of the new iron tower.	96½ / 91½	
90	Tower, colored in horizontal belts of white, red, and white. For the purpose of distinguishing this beacon more easily during the day, at times when the ground is covered with snow, black screens, each 20 by 25 feet, are built on each side of the tower; consequently the surface of the entire front is 25 by 60 feet, and shows the tower in belts of white, red, and white, between two black surfaces.	55	
91	White tower on dwelling. The front of the dwelling shows from the direction of the main channel of the bay a white surface of 25 by 40 feet. At each end are black screens of the same dimensions. The surface of the entire front is 25 by 120 feet, and the dwelling shows white between two black surfaces.	40	
92	Black cylindrical pier, expanding in trumpet shape at its upper end to form a gallery, above which rises a conical tower, lower half brown, upper half white, surmounted by a black lantern. A conical roof surrounds the lower part of tower and covers the gallery.		Blower siren; blasts 7½ seconds, silent intervals 7½ seconds.
93	Black cylindrical iron pier, surmounted by a conical iron tower, lower part white, upper part brown.	45	Bell struck by machinery every 30 seconds.
94			
95	Wooden tower, painted in bands, two white and one red; roof of lantern, red	55	
96	White wooden tower on white dwelling	40	
97	White, square, pyramidal skeleton iron tower; lantern, black; keeper's dwelling about 15 feet to southward and eastward; fog-bell tower near edge of bluff, to southward and westward of light tower.	61¼	Bell struck by machinery every 15 seconds.
98	Tower on white dwelling with Mansard roof; lantern, black	40	
99	Lead-colored, wedge-shaped skeleton structure, with small house at base		Bell struck by machinery every 15 seconds.
100	Square white structure with shingled roof, natural color. Bell hung from gallows frame on top.		Bell struck by machinery alternately a single and a double blow, intervals 20 seconds.
101	Conical tower; stone base, white; lower half of tower brown, upper half white; lantern, black.	46	Blower siren; blasts 3 seconds, silent intervals 3 seconds. If siren be disabled, a bell will be struck by machinery every 15 seconds.
102	Bronze statue on granite pedestal		
103	White post, with shelf and ladder; one lantern on shelf and other on top of post. Fog-bell house painted white.		Bell struck by machinery a double blow every 20 seconds.

The geographical positions of lighthouses which are uncertain by some seconds, not having yet been accurately determined, and those of light-vessels, which vary somewhat in position, have the seconds inclosed thus: 30° 45′ (57″).

In the column "Characteristic of light" the time interval of flashing lights is given from the beginning of one flash to the beginning of the next following flash; bearings relating to the visibility of lights are given from *seaward*.

In the column "Distance visible, in nautical miles" will be found the distances within which the lights can be seen under ordinary conditions of the atmosphere, the height of the light being measured from mean high water and the eye of the observer taken at an elevation of fifteen feet above sea level.

Vessels approaching or passing light-vessels and stations having fog signals of the United States, *in thick or foggy weather*, will be warned of their proximity by the sounding of a characteristic fog signal. Provision is made for special warning signals in the event of the characteristic signal being disabled, and the column "Fog signal" will show whether it is by a gong, fog horn, or bell.

The fact should be noted that sound signals are not always reliable. The sound may be lost while really approaching it, after being heard; or even when approached until close-to, it may not be heard at all, though properly made. These conditions are the exception, not the rule. They are, however, always possible and render great care necessary.

BEARINGS AND DISTANCES.

NOTE.—The following bearings and distances of over 20 miles are computed. The bearings are given to the nearest ¼ point and the distances to the nearest ¼ mile. The meaning of the letters in parentheses, placed after the bearings, is as follows:

(*l*) indicates that the bearing in this case leads across land.

(*d*) indicates that the bearing in this case leads across some danger distant more than two miles from either object.

(*n*) indicates that the bearing leads near to but clears dangers which are distant more than two miles from either object.

(*o*) indicates open water between the two objects; no dangers unless the objects are approached closer than two miles on the bearing.

Thus under bearings and distances from Point Judith Lighthouse is given the bearing: Montauk Point Lighthouse, **SW.** by **W.**, (*o*) 24¼ miles. This indicates that from a position two miles **SW.** by **W.** from Point Judith Lighthouse a **SW.** by **W.** course will lead clear of all dangers to within two miles of Montauk Point Lighthouse.

In this and in some other cases one or both of the lighthouses may be approached closer than two miles on the given bearing, but the two-mile limit is given as being a general rule safe in all cases. Where a closer approach is desirable or necessary, the Sailing Directions and Descriptions (given elsewhere in this volume) give the desired information.

Point Judith Lighthouse.—The following are bearings and distances from Point Judith Lighthouse:

		Miles.
Nantucket Shoals Light-vessel, **SE. ¼ E. Southerly**	(*o*)	95¾
Gay Head Lighthouse, **ESE. ⅞ E**	(*o*)	29
Vineyard Sound Light-vessel, **E. ¾ S**	(*o*)	21¾
Cuttyhunk Lighthouse, **E. ⅝ S**	(*o*)	24¼
Hen and Chickens Light-vessel, **E. ¼ N**	(*o*)	21½
Sakonnet Lighthouse, **E. by N**	(*o*)	13¾
Brenton Reef Light-vessel, **NE. by E. ⅜ E**	(*o*)	6¼
Watch Hill Lighthouse, **W**	(*n*)	17¼
Race Rock Lighthouse, **W. ⅜ S**	(*n*)	26½
Little Gull Island Lighthouse, **W. ⅝ S**	(*o*)	29¾
Montauk Point Lighthouse, **SW. by W**	(*o*)	24¼
Block Island (N.) Lighthouse, **SW. ¼ S**	(*o*)	9
Block Island (SE.) Lighthouse, **SSW. ¼ W**	(*o*)	13

Block Island (N.) Lighthouse.—The following are bearings and distances from Block Island (N.) Lighthouse:

		Miles.
Nantucket Shoals Light-vessel, **SE. by E. Southerly**	(*o*)	96¼
Gay Head Lighthouse, **E**	(*o*)	34¼
Vineyard Sound Light-vessel, **E. ⅝ N**	(*o*)	27½
Cuttyhunk Lighthouse, **E. ⅞ N**	(*o*)	30½
Hen and Chickens Light-vessel, **ENE. ½ E**	(*o*)	28½
Sakonnet Lighthouse, **NE. by E. ⅝ E**	(*o*)	21½
Brenton Reef Light-vessel, **NE. ¼ E**	(*o*)	15
Watch Hill Lighthouse, **NW. by W. ¼ W**	(*o*)	18½
Race Rock Lighthouse, **WNW. ¾ W**	(*o*)	21¼
Little Gull Island Lighthouse, **W. ¾ N**	(*o*)	24
Orient Point Lighthouse, **W. ⅜ N**	(*d*)	20½
Montauk Point Lighthouse, **SW. by W. ¾ W**	(*o*)	15¾

Montauk Point Lighthouse.—The following are bearings and distances from Montauk Point Lighthouse:

		Miles.
Nantucket Shoals Light-vessel, SE. by E. $\frac{5}{8}$ E	(o)	105½
Block Island (SE.) Lighthouse, E. $\frac{3}{4}$ N	(d)	14½
Watch Hill Lighthouse, N. by E	(o)	14
Race Rock Lighthouse, NNW. ½ W	(n)	13½
Little Gull Island Lighthouse, NW. ⅛ N	(d)	14
Orient Point Lighthouse, NW. by W. $\frac{5}{8}$ W	(d)	17½
Five-Fathom Bank Light-vessel, SW. $\frac{5}{8}$ W	(o)	185¾
Cape Charles Light-vessel, SW	(o)	299¼
Diamond Shoal Light-vessel (Cape Hatteras), SSW. $\frac{7}{8}$ W	(o)	393

Little Gull Island Lighthouse.—The following are bearings and distances from Little Gull Island Lighthouse:

		Miles.
Race Rock Lighthouse, NE. by E. ½ E	(n)	3½
North Dumpling Lighthouse, NE. ½ E	(o)	6½
New London Lighthouse, N. by E. $\frac{5}{8}$ E	(o)	6¾
Bartlett Reef Light-vessel, N. ¼ W	(o)	4
Saybrook Breakwater Lighthouse, NW. by W. ½ W	(o)	11¼
Cornfield Point Light-vessel, WNW. $\frac{7}{8}$ W	(o)	12
Southwest Ledge Lighthouse, WNW. $\frac{7}{8}$ W	(n)	36½
Falkner Island Lighthouse, W. by N	(o)	24¾
Stratford Point Lighthouse, W. ½ N. Northerly	(n)	45
Norwalk Island Lighthouse, W. ⅛ N	(n)	60
Stratford Shoal (Middle Ground) Lighthouse, W. Southerly	(o)	45¾
Eatons Neck Lighthouse, W. $\frac{3}{8}$ S	(d)	60¼
Great Captain Island Lighthouse, W. Southerly	(d)	70
Cedar Island Lighthouse, SW. ⅛ W	(n)	12

Falkner Island Lighthouse.—The following are bearings and distances from Falkner Island Lighthouse:

		Miles.
Horton Point Lighthouse, SE. $\frac{5}{8}$ S	(o)	12
Orient Point Lighthouse, ESE. ¼ E	(o)	19¾
Plum Island Lighthouse, ESE. ½ E	(n)	20¼
Cornfield Point Light-vessel, E. $\frac{7}{8}$ S	(d)	12½
Race Rock Lighthouse, E. $\frac{5}{8}$ S	(d)	27½
Southwest Ledge Lighthouse, WNW. ½ W	(d)	11¾
Branford Reef Beacon, WNW. ¾ W	(o)	6¾
Stratford Point Lighthouse, W	(o)	20¾
Stratford Shoal (Middle Ground) Lighthouse, WSW. ¾ W	(o)	22¼
Old Field Point Lighthouse, SW. by W. $\frac{7}{8}$ W	(o)	25¼

Stratford Shoal (Middle Ground) Lighthouse.—The following are bearings and distances from Stratford Shoal Lighthouse:

		Miles.
Horton Point Lighthouse, E. $\frac{5}{8}$ S	(o)	29¾
Plum Island Lighthouse, E. Southerly	(o)	40¾
Race Rock Lighthouse, E. ¼ N	(o)	49
Bartlett Reef Light-vessel, E. ½ N	(n)	45¾
Cornfield Point Light-vessel, E. ¼ N	(n)	34
Southwest Ledge Lighthouse, NE. $\frac{5}{8}$ E	(o)	13½
Stratford Point Lighthouse, N. ¾ E	(o)	5½
Bridgeport Lighthouse, NNW	(o)	6¾
Black Rock Lighthouse, NW. ¾ N	(o)	7¼
Penfield Reef Lighthouse, NW. ¼ W	(o)	6½
Norwalk Island Lighthouse, W. $\frac{5}{8}$ N	(o)	14½
Stamford Lighthouse, W. ⅛ N	(n)	20¼
Great Captain Island Lighthouse, W. ⅛ S	(n)	24
Execution Rocks Lighthouse, W. by S	(d)	30¼
Eatons Neck Lighthouse, WSW. $\frac{5}{8}$ W	(o)	14¾
Old Field Point Lighthouse, S. by W. $\frac{5}{8}$ W	(o)	5

Great Captain Island Lighthouse.—The following are bearings and distances from Great Captain Island Lighthouse:

		Miles.
Eatons Neck Lighthouse, ESE. $\frac{5}{8}$ E	(n)	10¼
Old Field Point Lighthouse, E. by S	(d)	22¾
Execution Rocks Lighthouse, SW. $\frac{5}{8}$ W	(o)	8
Sands Point Lighthouse, SW	(o)	8¼

Execution Rocks Lighthouse.—The following are bearings and distances from Execution Rocks Lighthouse:

		Miles.
Stamford Lighthouse, **NE.** by **E.** $\frac{1}{8}$ **E**	(*o*)	12
Norwalk Island Lighthouse, **NE.** by **E.** $\frac{3}{4}$ **E**	(*o*)	$17\frac{3}{4}$
Penfield Reef Lighthouse, **ENE. Easterly**	(*n*)	$27\frac{1}{2}$
Stratford Point Lighthouse, **ENE.** $\frac{1}{4}$ **E**	(*d*)	33
Stepping Stones Lighthouse, **SW.** $\frac{3}{4}$ **S**	(*o*)	$3\frac{3}{4}$
Throgs Neck Lighthouse, **SW.** $\frac{5}{8}$ **S**		5

Fire Island Light-vessel.—The following are bearings and distances from Fire Island Light-vessel:

		Miles.
Nantucket Shoals Light-vessel, **E.** $\frac{3}{4}$ **S**	(*o*)	163
Gay Head Lighthouse, **ENE.** $\frac{5}{8}$ **E**	(*o*)	119
Block Island (SE.) Lighthouse, **ENE.** $\frac{3}{8}$ **E**	(*o*)	$84\frac{3}{4}$
Montauk Point Lighthouse, **ENE.** $\frac{1}{4}$ **E. Northerly**	(*l*)	$70\frac{1}{4}$
Shinnecock Lighthouse, **NE.** by **E.** $\frac{5}{8}$ **E**	(*l*)	$38\frac{1}{3}$
Fire Island Lighthouse, **N**	(*o*)	$9\frac{5}{8}$
Sandy Hook Light-vessel, **W.** $\frac{3}{4}$ **N**	(*o*)	$29\frac{1}{2}$
Scotland Light-vessel, **W.** $\frac{1}{2}$ **N. Northerly**	(*o*)	$33\frac{1}{2}$
Navesink Lighthouses, **W.** $\frac{1}{2}$ **N**	(*o*)	$36\frac{3}{4}$
Sea Girt Lighthouse, **WSW.** $\frac{5}{8}$ **W**	(*o*)	$43\frac{1}{4}$
Barnegat Lighthouse, **SW.** $\frac{3}{4}$ **W**	(*o*)	$59\frac{3}{4}$

Sandy Hook Light-vessel.—The following are bearings and distances from Sandy Hook Light-vessel:

		Miles.
Nantucket Shoals Light-vessel, **E.** $\frac{3}{4}$ **S**	(*o*)	$192\frac{1}{2}$
Fire Island Lighthouse, **E.** $\frac{7}{8}$ **N**	(*o*)	$29\frac{3}{4}$
Barnegat Lighthouse, **SSW.** $\frac{1}{4}$ **W. Southerly**	(*o*)*	$44\frac{1}{4}$
Navesink Lighthouses, **SW.** by **W.** $\frac{3}{4}$ **W**	(*o*)	$8\frac{1}{4}$
Scotland Light-vessel, **W.** by **S**	(*o*)	$4\frac{1}{4}$
Sandy Hook Lighthouse, **W.** $\frac{3}{8}$ **N**	(*o*)	$7\frac{3}{4}$
Gedney Channel Whistling buoy (black and white perpendicular stripes), **WNW.** $\frac{1}{4}$ **W**	(*o*)	$3\frac{1}{4}$

Navesink Lighthouses.—The following are bearings and distances from Navesink Lighthouses:

		Miles.
Nantucket Shoals Light-vessel, **E.** $\frac{3}{8}$ **S**	(*o*)	$199\frac{3}{4}$
Fire Island Lighthouse, **ENE.** $\frac{7}{8}$ **E**	(*n*)	$37\frac{3}{4}$
Shinnecock Lighthouse, **ENE.** $\frac{7}{8}$ **E**	(*l*)	$72\frac{3}{4}$

WIND SIGNAL STATIONS.

The wind signals of the United States Weather Bureau are shown for the benefit of mariners at the following points. The list of stations is correct to October 1, 1899. The signals are described and their meaning is explained in Appendix II.

Point Judith, R. I.
Block Island, R. I.
Block Island (Southeast Light), R. I.
Stonington, Conn.
New London (Custom-House), Conn.
New Haven, Conn.
New Haven Light, Conn.
Bridgeport, Conn.
Greenwich, Conn.
New Rochelle, N. Y.
City Island, N. Y.
Montauk Point, N. Y.
Bay Shore, N. Y.
Manhattan Beach, N. Y.
New York City (Borough of Manhattan), N. Y.
Sandy Hook, N. J.
Galilee, N. J.

SEACOAST TELEGRAPH STATIONS.

The Western Union Telegraph Company maintains telegraph stations at the following places, from which passing vessels are reported to the Maritime Exchange in New York for the information of members, and from this exchange the reports are distributed to the newspapers.

Block Island (Southeast Light), R. I.
City Island, N. Y.
Fire Island Light, N. Y.
Highlands of Navesink, N. J.
Sandy Hook, N. J.
Quarantine, Staten Island.

* Open water until within 6 miles of the lighthouse.

UNITED STATES LIFE-SAVING STATIONS.

The following is a list of life-saving stations on the coast covered in this volume. 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.*

Name of Station.	State.	Locality.	Approximate Position. Latitude North.			Longitude West.		
			°	′	″	°	′	″
Point Judith	R. I	Near light	41	21	40	71	29	00
Quonocontaug	R. I	7½ miles E. of Watch Hill light	41	19	50	71	43	10
Watch Hill	R. I	Near light	41	18	20	71	51	30
Sandy Point	R. I	Block Island, north side, near light	41	13	40	71	34	40
New Shoreham	R. I	Block Island, east side, near landing	41	10	20	71	33	30
Block Island	R. I	Block Island, west side, near Dickens Point	41	09	40	71	36	40
Montauk Point	N. Y	At the light	41	04	00	71	51	30
Ditch Plain	N. Y	3½ miles SW. of Montauk light	41	02	10	71	54	30
Hither Plain	N. Y	½ mile SW. of Fort Pond	41	01	30	71	57	50
Napeague	N. Y	Abreast of Napeague Harbor	40	59	45	72	02	40
Amagansett	N. Y	Abreast of the village	40	58	00	72	08	20
Georgica	N. Y	1 mile S. of the village of East Hampton	40	56	40	72	11	40
Mecox	N. Y	2 miles S. of the village of Bridgehampton	40	54	10	72	18	00
Southampton	N. Y	¾ mile S. of the village	40	52	10	72	23	40
Shinnecock	N. Y	2 miles ESE. of Shinnecock light	40	50	40	72	27	50
Tiana	N. Y	2 miles SW. of Shinnecock light	40	49	40	72	31	30
Quogue	N. Y	½ mile S. of the village	40	48	20	72	36	00
Petunk	N. Y	1½ miles SW. of Petunk village	40	47	30	72	39	00
Moriches	N. Y	2½ miles SW. of Speonk village	40	46	30	72	43	10
Forge River	N. Y	3½ miles S. of Moriches	40	44	30	72	49	00
Smiths Point	N. Y	Abreast of the point	40	44	00	72	52	20
Bellport	N. Y	4 miles S. of the village	40	42	40	72	55	50
Blue Point	N. Y	4½ miles S. of Patchogue	40	40	40	73	01	20
Lone Hill	N. Y	8 miles E. of Fire Island light	40	39	40	73	04	20
Point of Woods	N. Y	4 miles E. of Fire Island light	40	38	50	73	08	10
Fire Island	N. Y	½ mile W. of Fire Island light	40	37	40	73	13	20
Oak Island	N. Y	East end of Oak Island	40	38	10	73	17	40
Gilgo	N. Y	West end of Oak Island	40	37	20	73	22	20
Jones Beach	N. Y	East end of Jones Beach	40	36	40	73	26	20
Zachs Inlet	N. Y	West end of Jones Beach	40	36	10	73	28	50
Short Beach	N. Y	½ mile E. of Jones Inlet	40	35	30	73	31	20
Point Lookout	N. Y	2 miles W. of New Inlet	40	35	10	73	35	40
Long Beach	N. Y	Near west end Long Beach	40	35	10	73	40	45
Far Rockaway	N. Y	(*Not yet rebuilt*)						
Rockaway	N. Y	Near the village of Rockaway	40	35	30	73	47	30
Rockaway Point	N. Y	West end of Rockaway Beach	40	34	10	73	51	50
Coney Island	N. Y	Manhattan Beach	40	34	20	73	55	30
Sandy Hook	N. J	On Bayside, ½ mile S. of Point of Hook	40	27	51	74	00	27
Spermaceti Cove	N. J	2½ miles S. of Sandy Hook light	40	25	40	73	59	00
Eatons Neck	N. Y	East side of entrance to Huntington Bay, Long Island Sound.	40	57	10	73	24	00
Rocky Point	N. Y	Near Rocky Point, Long Island Sound, about 4 miles northerly from Greenport.	41	08	20	72	21	10

* 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.

TIDES.*

GENERAL TABLE.

Locality.	High water lunitidal interval.†	Mean Rise and Fall.			Mean Duration of—			Rise of highest tide observed.
		Mean tides.	Spring tides.	Neap tides.	Rise.	Fall.	Stand.	
	h. m.	Feet.	Feet.	Feet.	h. m.	h. m.	h. m.	Feet.
Point Judith	7 32	3.1	3.8	2.3	6 15	6 10	0 50	5.0
Montauk Point	8 20	1.9	2.3	1.5	6 17	6 08	0 31	3.6
Fishers Island Sound (Eastern Entrance)	8 49	2.7	3.1	2.3	6 11	6 14	0 14	4.6
Stonington	9 09	2.7	3.2	2.1	6 06	6 19	0 25	4.6
Little Gull Island light	9 21	2.5	3.0	2.0	6 10	6 15	0 37	3.6
Plum Gut	9 52	2.6	3.1	2.1	6 11	6 14	0 35	3.2
Gardiners Bay, SE. part (Acabonack Harbor)	9 25	2.7	3.2	2.1	6 04	6 21	0 36	3.5
New London	9 26	2.4	2.9	1.9	5 54	6 31	0 22	4.5
Connecticut River Entrance	10 29	3.6	4.3	2.8	6 18	6 07	0 36	5.4
Falkner Island	10 54	5.4	6.3	4.4	6 17	6 08	0 40	6.4
Thimble Islands	10 58	5.6	6.6	4.6	6 18	6 07	0 30	6.8
New Haven Entrance	11 04	6.2	7.2	5.1	6 10	6 15	0 32	8.1
Port Jefferson	11 41	6.6	7.7	5.4	5 55	6 30	0 28	8.1
Stratford Shoal (Middle Ground) light	11 01	6.6	7.7	5.4	6 08	6 17	0 25	8.6
Bridgeport	11 09	7.2	8.4	5.9	6 05	6 20	0 29	8.9
Sheffield Island Harbor	11 03	7.0	8.2	5.7	6 07	6 18	0 19	8.8
Huntington Bay	11 06	7.6	8.9	6.2	6 07	6 18	0 15	9.6
Northport Harbor	11 07	7.3	8.5	6.0	6 07	6 18	0 15	9.6
Lloyd Harbor	11 07	7.6	8.8	6.4	6 07	6 18	0 15	9.0
Oyster Bay	11 07	7.3	8.5	6.0	6 01	6 24	0 25	10.4
Cold Spring Harbor	11 08	7.6	8.9	6.2	6 01	6 24	0 22	9.2
Captain Harbor	11 04	7.3	8.5	6.0	6 07	6 18	0 20	9.1
Hempstead Harbor	11 03	7.2	8.4	5.9	6 01	6 24	0 18	8.7
New Rochelle	11 13	7.6	8.9	6.2	6 03	6 22	0 13	9.0
Manhasset Bay	11 13	7.7	8.9	6.5	5 55	6 30	0 14	10.1
Willets Point	11 07	7.3	8.7	5.8	5 54	6 31	0 40	10.8
Throgs Neck	11 09	7.3	8.5	6.0	5 55	6 30	0 43	11.7
Pot Cove	11 10	5.9	6.9	4.8	5 51	6 34	0 16	8.2
Hell Gate Ferry	10 00	5.1	6.2	4.0	6 19	6 06	0 15	7.4
Governors Island	8 04	4.4	5.3	3.4	5 58	6 27	0 28	7.1
The Narrows	7 41	4.5	5.5	3.7	6 03	6 22	0 26	7.1
Sandy Hook	7 30	4.6	5.6	3.6	6 07	6 18	0 24	8.6
Rockaway Inlet	7 42	4.0	4.8	3.1	6 05	6 20	0 19	5.6
Fire Island Inlet (inside)	7 19	1.8	2.2	1.4	5 59	6 26	0 17	3.0

It will be noticed that there is in Long Island Sound a gradual increase of rise and fall from east to west until the contracted part of the Sound is reached at Eatons Neck; to the westward of this there is but a slight increase in the range. Between Stratford Shoal (Middle Ground) and Throgs Neck the differences in the times of high and of low water are but small between the various stations.

*Tide Tables, published annually by the U. S. 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 named in the list given on pages 7–8, price $0.50.

†The mean interval of time from the meridian transit of the moon to the next following high water; it is also called the corrected establishment.

TIDAL CURRENTS IN BLOCK ISLAND SOUND AND LONG ISLAND SOUND.

Stations.		*Strength* of Flood Current.		*Strength* of Ebb Current.		Current turns from Flood to Ebb *before* or *after* Moon's Transit.
No.	Locality.	Set.	Drift.	Set.	Drift.	h. m.
1	2⅛ miles NE. ¼ N. from the northern end of Block Island North Reef.	N. ⅝ W	1.6	E. by N	2.8	0 18 before.
2	Between Montauk Point and Block Island	NW. ⅛ N	1.3	SE. by S	2.4	0 44 "
3	2 miles SE. of Watch Hill Point	W. ⅛ N	1.2	SE. ⅝ E	1.1	0 44 "
4	2 miles ESE. from Montauk Point	N. ⅛ W	2.1	S. by E. ⅛ E.	2.1	0 22 "
5	2 miles N. from Montauk Point	NW. ¼ N	2.0	SE. ⅜ S	1.9	2 1 "
6	1½ miles NNE. ⅝ E. from Cerberus Shoal	WNW. ⅜ W	1.4	E. ½ S	1.9	0 46 "
7	Off Fort Pond Bay	W. ⅛ N	0.8	ENE. ⅛ E	1.0	2 7 "
8	In The Race	WNW. ⅛ W	4.7	SE. ⅛ E	4.5	0 20 after.
9	Off New London Entrance	W. ¼ S	1.0	ENE	1.3	1 43 before.
10	2½ miles to the eastward of Gardiners Point	NW	1.6	ESE	1.9	0 58 "
11	Between Plum Island and Great Gull Island	NW. ⅛ N	2.1	SE. by E. ⅛ E.	2.8	0 15 "
12	¼ mile to the eastward of Bartlett Reef Light-vessel.	WNW. ⅜ W	2.0	E. ¼ S	2.0	2 0 "
13	Between Plum Island Point and Black Point	W. ⅝ S	2.6	E. by N	2.7	0 45 "
14	In Plum Gut	W. ⅞ N	1.8	SE. by E. ½ E.	2.5	1 56 "
15	Off the mouth of Connecticut River	SW. ½ W	1.8	NE. by E. ½ E	2.4	1 00 "
16	1 mile to the southward of Cornfield Point Light-vessel.	SW. by W. ½ W	1.4	NE. by E. ½ E	2.0	0 0
17	In the North Channel, between Cornfield Point and Long Sand Shoal.	WNW. ⅛ W	1.5	ESE. ⅜ E	1.5	1 49 before.
18	1⅝ miles to the westward of the western end of Long Sand Shoal.	NW. by W. ⅞ W	1.4	ESE. ½ E	1.6	0 9 after.
19	3½ miles ESE. from Falkner Island Lighthouse	W. ⅞ N	1.2	ENE	1.5	0 55 before.
20	5 miles N. of Friar Head	WNW. ¾ W	1.9	ESE	2.0	0 38 "
21	2 miles S. of Branford Reef	W. ⅞ S	0.6	E. by N	0.8	0 8 "
22	2¾ miles SSW. ¾ W. from Southwest Ledge Lighthouse.	NW. ⅞ W	1.5	E. ⅛ N	1.5	1 2 "
23	1½ miles SE. ½ E. from Middle Ground Light-house.	W	1.9	E. ⅜ N	2.2	0 20 after.
24	1¾ miles NNE. from Middle Ground Light-house.	WSW. ¼ W	1.2	E. ¾ N	1.3	0 47 "
25	Between Old Field Point and The Middle Ground.	SW. ¼ S	1.4	NE. by E. ⅞ E	1.5	0 55 "
26	2 miles WNW. ¼ W. from Middle Ground Lighthouse.	WSW. ½ W	1.0	ENE. ¼ E	0.8	0 49 "
27	3½ miles NNE. from Eatons Neck Light-house.	W. ⅛ S	1.2	ENE. ¾ E	1.2	0 6 before.
28	Off Huntington Bay	SW. ⅞ W	1.3	E. ⅜ N	1.1	0 0
29	Off Oyster Bay	SW. ½ W	0.6	NE. by E. ⅛ E	0.6	0 12 "
30	1½ miles SSE. from Great Captain Island Lighthouse.	SW. by W. ⅞ W	0.6	NE. ⅛ N	0.7	1 48 after.
31	1⅞ miles S. by E. ¼ E. from Rye Point	SW. by S	0.6	NE. ¼ N	0.9	0 44 "
32	1 mile ENE. from Execution Rocks	SW. by S	0 5	NE. ⅝ E	1.0	0 42 "
33	Main Channel, between Execution Rocks and Sands Point.	SSW	0.5	NE. ¾ E	0.9	0 46 "
34	Northern Passage, between Execution Rocks and Whortleberry Island.	SW. by S	0.7	NE. ⅜ N	1.0	4 0 before.

Remarks.—The tidal currents in Long Island Sound turn and commence setting in the opposite direction along the northern and southern shores of the eastern part of the Sound at various intervals from one to two hours before they turn in the middle of the Sound. The currents along the shore, between New Haven and New London, are earlier by one hour than between Fishers Island and Point Judith, making, in all, a difference of two and a quarter hours between the first-named places, and of one and a quarter hours between the last-named and the beginning of the motion in the channel. The currents through the entrances formed by Block Island begin to run simultaneously, and about one hour earlier than in The Race. The ebb through Plum Gut lasts about two hours longer, and the flood so much shorter, than at other places in the vicinity.

The duration of the ebb stream at the entrance, middle, or head of the Sound appears to be the same, and this holds good for the duration of the slack water. The means for the eastern entrance, the middle, and head of the Sound give the duration as follows: 6 h. 34 min., 6 h. 38 min., 6 h. 3 min. for the ebb, and 6 h. 8 min., 6 h. 8 min., 5 h. 48 min. for the flood, and 5, 3, and 16 minutes for the slack water.

VARIATION OF THE COMPASS.

The magnetic variations for 1900 and annual increase at points mentioned are as follows:

Locality.	Compass variation.	Annual increase.
	° ′	′
Off Point Judith	11 45 W.	2½
Between Watch Hill and Montauk Point	11 15 W.	2½
Between Block Island and Montauk Point	11 15 W.	2½
Gardiners Bay	11 00 W.	3
Stonington Harbor	11 00 W.	3
New London Harbor	11 00 W.	3
Connecticut River Entrance	10 30 W.	3
North of Horton Point Lighthouse	10 45 W.	3
New Haven Harbor Entrance	10 00 W.	3
Bridgeport Harbor Entrance	10 00 W.	3
Off Norwalk Island Lighthouse	10 00 W.	3
Huntington Bay	9 30 W.	3
Oyster Bay	9 30 W.	3
Off Great Captain Island Lighthouse	9 30 W.	3
Throgs Neck	9 15 W.	3
Southward of Montauk Point	10 45 W.	2½
Off Shinnecock Lighthouse	10 00 W.	3
Off Fire Island Lighthouse	9 30 W.	3
Entrance to New York Bay	8 30 W.	3
New York Upper Bay	9 00 W.	3

BLOCK ISLAND SOUND*

is the approach to Long Island Sound, Fishers Island Sound, and Gardiners Bay, and is otherwise of no special importance. Its eastern and its southern limits are defined by Point Judith, Block Island, and the eastern end of Long Island. It is free of dangers in the northern part, and easily navigated in clear weather; the aids are numerous and the important dangers are marked by buoys.

Point Judith, the eastern limit of the northern part of Block Island Sound, is marked by a lighthouse (see page 10); about 1¼ miles to the southward of this lighthouse a whistling buoy is moored. To the northward of Point Judith, near Narragansett Pier, is a massive square granite tower over 100 feet high, which can be seen 20 miles on a clear day.

Point Judith Harbor of Refuge.—About 1½ miles **W.** from Point Judith Lighthouse is the southern point of **Squid Ledge**; the ledge extends from here in a **N.** ¼ **W.** direction for a distance of 1⅛ miles to within nearly ⅜ mile of the shore. The western arm of a breakwater extends in a northerly direction over Squid Ledge, and the eastern arm in a **NE.** by **E.** ¼ **E.** direction from the south end of Squid Ledge; the better entrance to this harbor is between the end of the eastern breakwater and Point Judith. There is a red beacon light on the elbow of the breakwater and a red bell buoy is placed about 100 yards to the southward of the beacon light. The holding ground in the harbor is generally poor and not to be trusted in heavy gales.

Block Island, 9 miles **SW.** by **S.** from Point Judith, is a prominent feature in approaching from the eastward; it is 5 miles long in a **N.** and **S.** direction, is high at both ends, and is marked by a lighthouse on its northern end and another on its southeastern end, the latter showing a primary seacoast light.

Block Island Harbor and **Great Salt Pond** are treated separately.

Montauk Point, the eastern point of Long Island, presents high sand bluffs covered with grass when seen from the eastward; Montauk Point Lighthouse on the top of one of the bluffs shows a primary seacoast light.

Fort Pond Bay is a semicircular bay about 1 mile wide making into the northern shore of Long Island about 5½ miles to the westward of Montauk Point. The bay is entirely free from dangers; flats make out from its eastern shore for ¼ mile. In approaching, the dangers lying off shore must be avoided when to the westward of Montauk Point. Fort Pond Bay affords good anchorage in 7 to 8 fathoms of water, soft bottom, but is exposed to northerly winds, being entirely open to the northward, and is little used except by the menhaden fishermen who frequent the waters about Gardiners Island. There is good fishing, and in summer provisions can be obtained from the adjacent farms.

Napeague Bay, a part of Block Island Sound, lies to the southward and southeastward of Gardiners Island, between it and the Long Island shore. **Promised Land** is a small village on the eastern shore of the bay. Vessels anchor here occasionally, but the bottom is sand and not good holding ground. There is considerable tidal current in the bay.

*Shown on Coast and Geodetic Survey charts 114 and 8; is also within the limits of chart A. See the footnote on page 9.

These bays are not sheltered against northerly winds; strong, northerly squalls occur frequently in summer. Of the two, Fort Pond Bay is the better anchorage.

Napeague Harbor, in the southern part of Napeagne Bay, has about 8 feet over the bar at low water; the channel is crooked and unfit for a stranger. It is used by the menhaden fishermen and by small craft well acquainted.

Wind signal and seacoast telegraph stations.—Storm signals are displayed at Point Judith, Montauk Point, Block Island Harbor, and Block Island (SE.) Lighthouse. There is a seacoast telegraph station at Block Island (SE.) Lighthouse from which passing vessels are reported. The international code signals are employed to communicate with the telegraph station.

For **variation of the compass**, see page 24.

For **tides**, see page 22.

Tidal currents in Block Island Sound.—The results of current observations are given on page 23.

Lists of lighthouses, life-saving stations, and wind signal display stations, with other general matters, will be found on preceding pages.

BLOCK ISLAND HARBOR.*

This artificial harbor, constructed under Government appropriation, is on the eastern side of Block Island, about 1⅝ miles to the northward of Block Island (SE.) Lighthouse. It consists of a crib-work basin 250 by 300 feet; and an inner harbor sheltered by a riprap breakwater extending in a **NNE.** direction 1,900 feet, and another breakwater, beginning at a point about 1,150 feet **NW.** from the inner beacon, and extending from shore in a northeasterly direction for a distance of about 600 feet, and from there in an **ESE.** direction to connect with the outer breakwater at a point about 1,000 feet from the inner beacon, leaving an entrance 100 feet wide about 200 feet to the westward of its intersection with the outer breakwater. A timber jetty filled with stone forms the shore end of this breakwater. The basin has a best depth of 9 feet at mean low water; the entrance is 80 feet wide; vessels entering run lines and haul in, and generally moor with lines to the shore and crib work.

The inner harbor affords fair shelter, and vessels of 9 feet draft can enter, but the anchorage space is very limited, owing to shoals in its western part, and only small vessels can find room to swing at anchor. The anchorage is most used during the spring and summer months by small craft; the bottom in the inner harbor is sand and clay, and small vessels can ride out any but the heaviest northeasterly gales.

Two lighted beacons (see Table of Lights, page 10) form a range to clear the end of the breakwater and are guides to the inner harbor and basin; the outer beacon is a lantern hung on a stake on the western side of the entrance to the basin, and the inner one bears about **S. ¾ W.** from it. The range of these two stakes just touches the end of the western breakwater at the entrance to the inner harbor.

A bell buoy is placed ½ mile **NE.** from the northern end of the outer breakwater in about 9 fathoms of water, and a black spar buoy is placed in 21 feet of water 75 feet north from its northern end.

The island has some trade in fish and produce, carried in local vessels and by strangers. In the summer it has steamboat communication with Long Island and points in Connecticut and Rhode Island; in the winter a steamer runs to the island from Newport. In easterly gales, when no landing can be made on the east side of the island, a good harbor can be made in Great Salt Pond, on the west side of the island.

Pilots.—Strangers entering sometimes take a pilot, standing off and on, or anchoring outside the breakwater, until one comes on board.

Supplies.—Limited quantities of anthracite coal for steamers, and water through pipe and hose, can be obtained at the wharf in the basin. Provisions and ship-chandler's stores can be had at Block Island, the settlement at the harbor.

Wind signals are displayed near the landing, and are visible to the shipping in the harbor (see Appendix II).

Ice usually forms the whole length of the breakwater during January.

Tides.—The mean rise and fall of tides is 3 feet; high water occurs 1 h. 53 m. before high water at New London, and low water 2 h. 07 m. before low water at New London.

GREAT SALT POND.*

This is a large pond in the middle of Block Island, having deep water and good holding ground. It is the best harbor in Block Island Sound for vessels of 10 feet or less draft. In easterly gales, when the sea is too heavy to make a landing at Block Island Harbor, a landing can always be made at Great Salt Pond. The

*Shown on Coast and Geodetic Survey chart 356, Block Island, scale $\frac{1}{10,000}$, price $0.50. See also the footnote on page 24.

entrance to the harbor is 2 miles **SW.** by **S.** from Block Island (North) Lighthouse; it is a dredged cut through the narrow strip of beach which separates the pond from Block Island Sound, and is protected on its southern side by a riprap jetty which extends 330 yards in a **NNW.** ¼ **W.** direction from the beach into a depth of 18 feet in the sound. On the outer end of the jetty is a white pyramidal light tower and fog signal (see page 10), and where the jetty joins the beach is a red wooden post light. These two lights form the range for entering the harbor at night; a red bell buoy is moored about 600 yards **N.** by **W.** ½ **W.** from the outer end of the jetty.

The dredged entrance has a general depth of 12 feet for a width of about 200 feet, but there are several spots with as little as 9 feet over them lying in the middle of the channel, and unless familiar with the channel it is not advisable to enter with a greater draft than 9 feet. The town and post office of Block Island is distant about 1 mile, by a good road, from the head of Great Salt Pond.

For **wind signal** and **seacoast telegraph stations** see page 20.

Tides.—The mean rise and fall of tides in the western part of the pond is .5 foot.

GENERAL DIRECTIONS, GREAT SALT POND.

The following directions, in 1899, are good for a draft of 9 feet; if a greater depth is obtained in the dredged cut these directions will be good for an increased draft.

Approaching and Entering.—Give the western shore of Block Island a berth of at least 600 yards until the bell buoy or the light tower and fog signal on the end of the jetty are sighted; then steer so as to be about 200 yards outside of the end of the jetty when it is brought on a line. When the two lights on the jetty are in range, stand in for the entrance, course **SSE.** ¼ **E.**, leave the jetty 120 feet on the starboard hand, and follow it in at this distance until the vessel is well inside. Then steer **SSE.** ½ **E.** for the end of the large wharf (the easternmost of the two wharves at the head of the pond). Anchor when the wharf is about 350 yards distant, and in 4 fathoms water, soft bottom.

Or, when well inside the entrance, haul to the eastward and anchor in 4 to 5 fathoms water, soft bottom.

Remarks and Dangers.—There is very little tidal current and a small rise and fall of tides. The best water leads about 120 feet from the south jetty; this leaves two 9-foot spots on the port hand, the inner one of these spots was (in August, 1899) marked by a small red and black horizontally striped spar buoy, placed there by local pilots; this buoy is left on the port hand.

On the **SSE.** ½ **E.** course care should be taken not to approach closer than 220 yards to the point, lying on the starboard hand, about midway between the entrance and the large wharf at the head of the pond; a shoal makes out for a distance of 200 yards from this point.

The eastern shore near the head of the pond is very shoal and should be approached with caution; the western shore should be given a berth of at least 200 yards.

COURSES THROUGH BLOCK ISLAND SOUND.

For convenience in comparison and reference, courses are given from several positions and under two sections: 1. Entering by the passage between Point Judith and Block Island. 1 A. Entering by the passage between Block Island and Montauk Point. Under each of these, courses are given if bound to Gardiners Bay, Long Island Sound, or Fishers Island Sound. Although the position of a vessel entering Block Island Sound may not agree exactly with any of the positions here given, yet a comparison of the paragraphs which most nearly meet each case may facilitate shaping the proper course.

1. ***From the Eastward, Entering by the Passage between Point Judith and Block Island.***—The entrance by this passage is clear and unobstructed except that a dangerous reef (Block Island North Reef, see dangers below) makes out for ¾ mile from the northern end of Block Island, but is marked by a black bell buoy at its northern end.

A red whistling buoy, moored about 1¼ miles to the southward of Point Judith Lighthouse, is a useful thick-weather aid. Note the information concerning tidal currents on page 23.

If bound to Gardiners Bay.—Proceed as directed below, according to position, and then follow the directions under the heading "Gardiners Bay."

If the courses and distances given in the first three paragraphs below, I, II, III, be made good, the rectangular concrete structure near the northern end of the sand spit,

making to the northward from Gardiners Island, will bear **S.** by **E.** and be distant $\frac{3}{4}$ mile. The lighted buoy (in summer) or bell buoy (in winter) should be $\frac{1}{3}$ mile distant on the port beam, and Orient Point Lighthouse should bear **NW.** by **W.** $\frac{3}{4}$ **W.**

I. ***From a position 1 mile S. of Point Judith Lighthouse.***—Make good the course **W.** $\frac{1}{8}$ **S.** for $32\frac{1}{4}$ miles.

II. ***From a position $2\frac{3}{4}$ miles S. of Point Judith Lighthouse.***—Make good the course **W.** $\frac{5}{8}$ **S.** for $32\frac{1}{4}$ miles.

III. ***From a position $4\frac{1}{4}$ miles S. of Point Judith Lighthouse.***—Make good the course **W.** $\frac{3}{8}$ **S.** for 32 miles, passing $1\frac{1}{4}$ miles to the northward of Block Island North Reef bell buoy.

IV. ***If farther to the southward than the position of paragraph III, foregoing.***—Exercise caution in rounding the north end of Block Island, giving the northern shore a berth of at least 1 mile and going well to the northward of Block Island North Reef bell buoy; then shape course **W.** $\frac{1}{8}$ **S.** for Gardiners Bay entrance. In rounding the north end of Block Island, the following rule will insure safety: While Block Island North Lighthouse bears to the westward of **SW.** by **S.**, keep well outside of 12 fathoms; with this lighthouse bearing from **SW.** by **S.** to **S.**, keep outside of 8 fathoms; haul sharply to the northward if you get shoaler water than this.

V. ***At night.***—Follow any of the foregoing directions, and when Orient Point Light is sighted steer for it on any bearing between **WNW.** and **W.** $\frac{1}{2}$ **N.** Pass to the northward of the lighted buoy off the north point of Gardiners Island, and when Little Gull Island Light bears **NE.**, a **SW.** course will lead into the middle of Gardiners Bay.

Remarks.—*To the northward,* about $17\frac{1}{4}$ miles to the westward of Point Judith Lighthouse, Watch Hill Lighthouse is passed; extending to the westward from the latter are Fishers Island Sound entrance, Fishers Island (hilly, bare of trees), The Race with its two lighthouses, and then the islands defining the northern side of Gardiners Bay entrance; these will be made after getting well to the westward. For description of the lighthouses, see pages 10–11.

To the southward is passed Block Island, about 12 miles to the westward of which is Montauk Point; Fort Pond and Napeague bays are passed, and when well to the westward Gardiners Island will be made on the port bow stretching away to the southward.

A rectangular concrete structure has been erected near the north end of the spit which makes to the northward of Gardiners Island. The structure is about 20 feet high and gray in color; it should be given a berth of about $\frac{3}{4}$ mile when passing to the northward of it.

The eastern shore of Gardiners Island should not be approached nearer than $\frac{3}{4}$ mile on account of the shoals which make off from the shore for that distance.

The courses given lead to the northward of Cerberus Shoal and to the southward of Constellation Rock. The ebb sets to the southward and the flood to the northward, and allowance must be made accordingly, and a lookout kept for the buoys marking these dangers.

Dangers.—On any of these courses, when to the westward of Squid Ledge and Block Island North Reef, and until nearly up with Gardiners Bay entrance, there are only two dangers requiring special notice, Cerberus Shoal and Constellation Rock.

Block Island North Reef extends $\frac{1}{3}$ mile to the northward from the northern point of Block Island, has from 5 to 13 feet of water, and is marked off its northern end by a bell buoy (black); deep-draft vessels should pass well to the northward of this buoy. This rocky shoal is dangerous to approach, the tidal currents setting across it with great velocity.

Cerberus Shoal, 7 miles **SE.** by **E.** $\frac{1}{8}$ **E.** from Little Gull Island Lighthouse, has 14 feet of water and is marked by a whistling buoy and a spar buoy (both have red and black horizontal stripes). The whistling buoy is $\frac{1}{4}$ mile to the eastward of the shoal; the spar buoy is on the shoal, in rocky bottom. The shoal is small; ordinarily there are strong tide rips near it.

Constellation Rock is $1\frac{7}{8}$ miles **S.** by **W.** $\frac{1}{4}$ **W.** from Little Gull Island Lighthouse, and nearly on the range of Little Gull Island Lighthouse and New London Lighthouse. It has 17 feet of water, and is marked by a buoy (spar, red and black horizontal stripes). About $\frac{3}{4}$ mile **W.** $\frac{1}{4}$ **N.** from Constellation Rock is a 16-foot rock, and to the northwestward of this, between Plum Island and Great Gull Island, are foul rocky patches.

If bound to Long Island Sound.—Proceed as directed below, according to position, until nearing The Race. Race Rock Lighthouse and Little Gull Island Lighthouse then become the guides. In approaching and passing through The Race, follow the directions under the heading "Long Island Sound."

In paragraphs I, II, III, and IV, following, the courses made good for the distances stated, will lead to a point about $\frac{3}{4}$ mile to the northeastward of Little Gull Island Lighthouse.

I. *From a position 1 mile S. of Point Judith Lighthouse.*—Make good a course **W.** $\frac{5}{8}$ **S.** for 29 miles.

II. *From a position 2¾ miles S. of Point Judith Lighthouse.*—Make good a course **W.** for 29 miles.

III. *From a position 4¼ miles S. of Point Judith Lighthouse.*—Make good a course **W.** ¼ **N.** for 29 miles.

IV. *If farther to the southward than the position of III, foregoing.*—Steer so as to pass 1½ miles north of the lighthouse on the northern end of Block Island, and pass to the northward of the bell buoy marking Block Island North Reef. When the bell buoy bears **S.**, distant about ¼ mile, make good the course **W.** ½ **N.** This course, if made good for 23½ miles, leads about ¾ mile to the northeastward of Little Gull Island Lighthouse.

In rounding the northern end of Block Island, note the rule of paragraph IV, page 27, with regard to depth.

Remarks.—The courses given above lead well clear of all dangers, until up with The Race, and pass 3¼ to 4⅝ miles to the northward of Cerberus Shoal, and 1¾ to 3½ miles to the southward of the dangers in Fishers Island Sound entrance.

On the flood a vessel will probably be set to the northward and on the ebb to the southward.

Prominent features.—About 17¼ miles to the westward of Point Judith is Watch Hill Lighthouse; extending to the westward from the latter are Fishers Island Sound extrance, Fishers Island, and The Race, through which the course will lead. About ½ mile to the southwestward of Race Point (the southwestern end of Fishers Island) is Race Rock Lighthouse (see page 10), marking the northern side of The Race. About 3½ miles **SW.** by **W.** ⅝ **W.** from Race Rock Lighthouse is Little Gull Island Lighthouse (see page 10), marking the southern side of The Race; beyond the latter are the islands, all to be left on the port hand, separating Long Island Sound from Gardiners Bay entrance.

Dangers.—Block Island North Reef and Cerberus Shoal are described on page 27. The dangers of Fishers Island Sound entrance are described under the heading "Fishers Island Sound," and those of The Race are described in connection with the sailing directions for that passage (see heading "Long Island Sound").

If bound to Fishers Island Sound.—Proceed as directed below, according to position, and then follow the directions under the heading "Fishers Island Sound" in approaching and entering.

Strangers should not attempt to enter Fishers Island Sound at night.

I. *From a position 1 mile S. of Point Judith Lighthouse.*—Make good a course **W.** ¼ **N.** for 17¼ miles, to Gangway Rock buoy (spar, red, No. 2).

Remarks.—The course leads clear of all dangers, and does not approach the north shore closer than ⅞ mile until nearly up to Watch Hill Lighthouse, which will be made a little on the starboard bow. Fishers Island (hilly and bare of trees) will be made ahead or on the port bow. Drawing near Watch Hill Lighthouse, several buoys and spindles will be seen, which mark some of the many rocks and ledges which obstruct the eastern entrance to Fishers Island Sound.

Dangers.—Block Island North Reef is described on page 27.

Gangway Rock, ⅓ mile **S.** of Watch Hill Lighthouse, is marked by a buoy (spar, red, No. 2) placed ⅓ mile **S.** of the rock on the end of a shoal making to the southward from Watch Hill Point.

The dangers at the entrance to Fishers Island Sound are described under the heading "Fishers Island Sound."

II. *From a position 2¾ miles S. of Point Judith Lighthouse.*—Make good a course **W.** ¾ **N.** for 17½ miles, up to Gangway Rock buoy (spar, red, No. 2).

The remarks, etc., under paragraph I, foregoing, also apply to this course.

III. *From a position 4¼ miles S. of Point Judith Lighthouse.*—Make good a course **WNW.** $\frac{7}{8}$ **W.** for 17¾ miles, up to Gangway Rock buoy.

Note the remarks, etc., under paragraph I, foregoing. The course passes about 2¾ miles to the northward of the bell buoy marking Block Island North Reef.

IV. *If farther to the southward than the position of par. III, foregoing.*—Follow the directions of paragraph IV, page 27, in rounding the north end of Block Island, until ¼ mile to the northward of the bell buoy marking Block Island North Reef, then shape the

course **NW.** by **W.** ⅛ **W.** This course, made good for 13 miles, leads up to Gangway Rock buoy at Fishers Island Sound entrance.

Note the remarks, etc., under paragraph I, foregoing.

COURSES THROUGH BLOCK ISLAND SOUND.

1 A. ***From the Southward, Entering between Block Island and Montauk Point.***—The flood sets northerly and the ebb southerly, both with considerable velocity. (See tidal currents, page 23.)

The tidal currents off Montauk Point form tide rips which are most marked on the ledges and shoals.

Many of the dangers (see paragraph V, following) lying in this passage are marked by buoys, and a good lookout should be kept for them.

If bound to Gardiners Bay.—Proceed as directed below, according to position, and then follow the directions under heading "Gardiners Bay."

I. ***From a position 1¼ miles SSW. of Block Island SE. Lighthouse.***—Make good a course **WNW.** ¾ **W.** for 26¾ miles until Gardiners Island lighted buoy bears **S.** by **E.**, distant about ⅓ mile; or, having passed to the northward of this buoy, continue the course until Little Gull Lighthouse bears **NE.**

Remarks.—The course leads north of Southwest Ledge and Shagwong Reef and south of Cerberus Shoal and Constellation Rock.

The south shore of Block Island can be approached as close as ⅓ mile.

Dangers are described under paragraph V, following.

II. ***From a position 4 miles SSW. of Block Island SE. Lighthouse.***—Make good a course **WNW.** ¼ **W.** for 26½ miles until Gardiners Island lighted buoy bears **S.** by **E.** distant about ⅓ mile.

Remarks.—The course leads nearly ¾ mile north of Shagwong Reef, and south of Southwest Ledge, Cerberus Shoal, and Constellation Rock; it leads close to and over spots having a depth of 5¼ to 6 fathoms over them, and in a heavy sea deep-draft vessels should follow the directions in the next paragraph, III. (See dangers under paragraph V, following.)

III. ***From a position to the southwestward of that of paragraph II, foregoing.***—If coming from the southward, give Montauk Point a berth of 5 miles and steer **N.**, passing about 5 miles to the eastward of Montauk Point Lighthouse, or a little more than 6 miles to the westward of Block Island. When the south end of Block Island bears **E.** ¾ **S.**, steer **WNW.** ¾ **W.** about 17¼ miles, passing ⅓ mile to the northward of Gardiners Island lighted buoy. When Little Gull Island Lighthouse bears **NE.** a **SW.** course will lead into the middle of Gardiners Bay.

Remarks.—These directions avoid the detached shoals lying to the southeastward, eastward, and northeastward of Montauk Point. In a heavy sea deep-draft vessels should follow these directions; or, if coming from the eastward, they may follow the directions in paragraph I, preceding. The **WNW.** ¾ **W.** course leads about midway between Shagwong Reef and Cerberus Shoal, giving them a berth of over 1½ miles. Allowance should be made for the currents, which have considerable velocity. (See dangers under paragraph V, following.)

IV. ***To round Montauk Point close inshore.***—Give the south shore of Long Island a berth of at least ½ mile; steer so as to be from ¾ to 1¼ miles from Montauk Point Lighthouse when it bears **W.** ½ **N.**; then steer **N.** until the lighthouse bears **SW.** and is distant about 1½ miles. From this position make good a **NW.** course for 4½ miles, passing about ¾ mile to the northward of the bell buoy on Shagwong Reef, and when this buoy is off the port quarter steer **WNW.** ½ **W.** for Gardiners Bay entrance. Leave Gardiners Island lighted buoy ⅓ mile on the port hand, and when Little Gull Lighthouse bears **NE.** a **SW.** course will lead into the middle of Gardiners Bay.

Remarks.—The above directions are good in smooth weather for vessels of less than 17 feet draft. The **N.** course leads between Montauk Point and Great Eastern Rock, and passes over and near spots having as

little as 3¾ fathoms of water over them. Strong tide rips cover the shoal spots to the eastward of the point, and in a heavy sea they are marked by breakers.

Dangers are described under paragraph V, following.

V. *At night.*—If coming from the eastward, follow the directions in paragraph I.

If coming from the southward or westward, follow the directions in paragraph III until Block Island (North) Lighthouse bears **ENE. ¼ E.**, then haul up on the **WNW. ¾ W.** course and continue as directed in paragraph III.

If coming from the westward in smooth weather and with light-draft vessel, follow the directions in paragraph IV.

When to the westward of Cerberus Shoal keep Orient Point Light bearing between **W. ½ N.** and **WNW.**, to clear Constellation Rock and the north end of Gardiners Island.

See Table of Lights, pages 10–11.

Dangers.—The dangers entering by the passage between Block Island and Montauk Point would not, in smooth weather, interfere with light-draft vessels.

Southwest Ledge lies 2½ to 3¾ miles **WSW.** from the southwestern point of Block Island. It has as little as 25 feet of water over it, and is marked by a spar buoy on the ledge and a whistling buoy moored to the southward of the ledge; both are painted red and black in horizontal stripes. The sea breaks on this ledge in heavy weather.

Phelps Ledge and **Great Eastern Rock** lie about 1¾ miles to the eastward of Montauk Point, between a **NE.** and **E.** bearing from the lighthouse. The least depth on Phelps Ledge is 28 feet, and on Great Eastern Rock 21 feet; the latter rock is 1⅝ miles **E.** from Montauk Point Lighthouse and is marked by black can buoy No. 1.

The depths from Montauk Point to Phelps Ledge range from 3¾ to 5 fathoms. The 18-foot curve lies about ¼ mile from the beach.

Endeavor Shoals consist of a number of spots lying to the northward and eastward of Phelps Ledge. The general depth over these spots is from 5 to 6 fathoms, but to the northward of Phelps Ledge, and lying 2¼ miles between **NE.** by **N.** and **NE.** from Montauk Point Lighthouse, the depths range from 19 to 24 feet. The eastern end of Endeavor Shoals, with less than 6 fathoms over it, lies 4½ miles between **NE.** by **E.** and **E.** by **N.** from Montauk Point Lighthouse.

Montauk Shoal lies 2 to 3 miles between the bearings **SE.** by **S.** to **S.** from Montauk Point Lighthouse. It has from 5 to 6 fathoms of water and the sea breaks on it in heavy southerly gales; inside of the shoal a depth of 12 fathoms is found. The shoal is generally plainly shown by tide rips.

Shagwong Reef, 3¾ miles **NW. ⅞ N.** from Montauk Point Lighthouse, has 7 feet of water and is marked by a black bell buoy placed at the eastern end of the reef. There are several spots, with from 7½ to 18 feet over them, lying between Shagwong Reef and Shagwong Point (the nearest land on Long Island).

Washington Shoal, about midway between Shagwong Reef and Shagwong Point, has 15½ feet of water. A spot with 18 feet of water over it lies 500 yards **N.** of Washington Shoal.

Shagwong Rock, about 700 yards **N.** by **E. ¼ E.** from Shagwong Point, has 7½ feet of water. It is marked by a buoy (spar, red and black horizontal stripes). A spot with 17½ feet of water over it lies about 500 yards **N.** of Shagwong Rock.

Cerberus Shoal and *Constellation Rock* are described on page 27.

If bound to Long Island Sound.—Proceed as directed below, according to position, until nearing The Race. Race Rock Lighthouse and Little Gull Island Lighthouse then become the guides. In approaching and passing through The Race follow the directions under the heading "Long Island Sound." For description of lighthouses see pages 10–11.

The tidal currents have considerable velocity and proper allowance should be made.

Dangers are described above, and a good lookout should be kept for the buoys marking them.

I. ***From a position 1¾ miles SSW. of Block Island SE. Lighthouse.***—A course **NW.** by **W. ⅛ W.** made good for about 25 miles will lead about ¾ mile to the northeastward of Little Gull Island Lighthouse.

Remark.—The course leads north of Southwest Ledge and Cerberus Shoal (see description above, and page 27).

II. ***From a position 4¾ miles SSW. of Block Island SE. Lighthouse.***—A course **NW.** by **W. ¼ W.** made good for about 25 miles will lead about ¾ mile to the northeastward of Little Gull Island Lighthouse.

Remark.—The course leads ¼ mile south of the whistling buoy on Southwest Ledge (see above) and only about ¼ mile north of Cerberus Shoal buoys (see page 27).

III. *From a position to the southwestward of that of paragraph II, foregoing.*—Steer so as to pass about midway between Montauk Point and Block Island, and when fair between them steer **NW.** until Montauk Point is abaft the beam. Then shape a course **NW.** by **W.**, and when nearing The Race head a little more to the westward, if necessary, and follow the directions for that passage.

IV. *To round Montauk Point close inshore.*—Follow the directions of paragraph IV, page 29, until Montauk Point Lighthouse bears **SW.** distant 1½ miles. Then a course **NW.** ⅛ **W.** made good 13¾ miles will lead about ¾ mile to the northeastward of Little Gull Island Lighthouse.

Remarks.—Strong tide rips are apt to be met in rounding Montauk Point close inshore. The course leads clear of dangers (see page 30).

V. *General remarks on entering and passing through Block Island Sound at night.*—Block Island SE. Light and Montauk Point Light are the guides entering by this passage; after passing to the northward of a line drawn between these two lights, Watch Hill Light, Race Rock Light, and Little Gull Island Light will be made to the northward and westward, and Block Island N. Light to the northeastward. On approaching The Race, New London Light and Bartlett Reef Light-vessel will be made to the northwestward of The Race, and Orient Point Light may be made to the southwestward.

For description of lights, see table, page 10.

Little Gull Island Light and Race Rock Light, the two lights leading through The Race, will be made nearly at the same time.

Little Gull Island Light can be steered for on any course between **NW.** by **W.** ¼ **W.** and **NW.** ⅝ **W.**, leaving the light 1 mile on the port hand when passing, or it can be steered for on any course between **W.** by **S.**, through **W.**, to **WNW.**, leaving it 1 mile on the port hand when passing.

Race Rock Light can be steered for on any course between **W.** ¼ **N.** and **NW.**, leaving the light about ¼ to ½ mile on the starboard hand.

See directions under the heading "Long Island Sound."

If bound to Fishers Island Sound.—Proceed as directed below, according to position, and then follow the directions under the heading "Fishers Island Sound."

Strangers should not attempt to enter Fishers Island Sound at night.

For description of dangers between Block Island and Montauk Point see page 30; for other dangers see heading "Fishers Island Sound."

See remarks on tides and tidal currents under section 1 A, page 29.

I. *From a position 1 mile S. of the southwestern point of Block Island.*—A course **NW.** ⅜ **N.** made good for 15½ miles will lead up to Gangway Rock buoy (spar, red, No. 2) at Fishers Island Sound entrance.

Remarks.—Watch Hill Lighthouse should be made right ahead. The course leads clear of all dangers until up to Fishers Island Sound entrance.

II. *From a position 6 miles E. of Montauk Point.*—A course **N.** by **W.** ¼ **W.** made good for nearly 14 miles will lead clear of all dangers, up to Gangway Rock buoy (spar, red, No. 2).

The remarks under paragraph I, preceding, apply to this paragraph also.

III. *From close around Montauk Point.*—Keep ¾ mile off the south shore of Long Island and round Montauk Point, keeping the same distance from the shore. When Montauk Point Lighthouse bears **W.**, distant ¾ mile, steer **N.** ¾ **E.** This course made good for 13½ miles leads up to Gangway Rock buoy (spar, red, No. 2).

Remarks.—These directions are good only in smooth water and for vessels of less than 17 feet draft. (See the remarks under paragraph IV, page 29.)

GARDINERS BAY.*

Gardiners Bay is at the western end of Block Island Sound, from which it is separated by Gardiners Island, and makes into the northern shore of the eastern part of Long Island; the entrance is about 14 miles **NW.** by **W.** from Montauk Point and 32½ miles **W.** ¼ **S.** from Point Judith.

The bay is irregular in form, has an average diameter of about 6 miles, and is comparatively free from dangers. It forms the approach to Shelter Island Sound and the Peconic bays, a favorite cruising ground for yachts, and is sometimes used by naval ships.

Gardiners Bay is important as an anchorage for vessels bound into Long Island Sound and overtaken by unfavorable weather. It is one of the best natural harbors of refuge on the Atlantic seaboard. The depths at the anchorage for large vessels range from 5 to 6 fathoms, with good holding ground.

Entrances.—The approach to Gardiners Bay from the eastward is through Block Island Sound and between Gardiners and Plum islands; this entrance, leading in past the northern end of Gardiners Island, has an unobstructed width of 1¾ miles, with a depth of 5½ to 21 fathoms.

There is a narrow, crooked, and obstructed channel, partly buoyed, leading in to the southward of Gardiners and Ram islands, but it is not used by strangers.

Plum Gut, the entrance to Gardiners Bay from Long Island Sound, is nearly ¾ mile wide and has sufficient water for vessels of the deepest draft; there are several rocks in the passage, with depths of 17 to 19 feet over them, and the tidal currents set through with great velocity, but steamers, or sailing vessels with a strong favorable wind, should have no difficulty in passing through. Plum Island Lighthouse is on the eastern side of the passage, and Orient Point Lighthouse is near the end of Oyster Pond Reef, on the western side of the passage.

Adjacent waters.—Shelter Island Sound, divided by Shelter Island into a northern and a southern part, is on the western side of Gardiners Bay, and connects it with Little and Great Peconic bays. Orient Harbor, Greenport Harbor, Sag Harbor, and other waters having special names, are mentioned elsewhere.

Lighthouses and other aids.—At night, in clear weather, a sufficient number of lights will be in sight to guide to an anchorage. It is not advisable for a stranger to attempt to enter Shelter Island Sound at night, although the entrances to the sound are marked by buoys and lighthouses. (See table, page 10.)

Repairs.—Greenport has facilities for making ordinary repairs to the machinery of steamers, with well equipped shipyards for repairs to hulls of vessels, and 5 marine railways, the largest capable of hauling out vessels of 1,000 tons. (See also "Fishers Island Sound" and "Long Island Sound.")

For **variation of the compass** in Gardiners Bay see page 24; for **tides** see page 22.

Consult also pages 9–21.

SAILING DIRECTIONS, GARDINERS BAY.

Orient Point Lighthouse is the leading mark for entering Gardiners Bay by day or night.

If bound into Shelter Island Sound, or Little or Great Peconic Bay, see also heading "Shelter Island Sound," etc.

Directions for approaching through Block Island Sound are given on pages 27 and 29.

1. ***From the Eastward.***—I. Having left Gardiners Island lighted buoy on the port hand and with Orient Point Lighthouse bearing between **W.** ½ **N.** and **WNW.**, bring Little Gull Island Lighthouse to bear **NE.** and steer **SW.** Having stood on the latter course until well into the bay, stand over to an anchorage which affords the best lee in the prevailing wind. Take care to keep clear of Crow Shoal, which makes off from the southwest point of Gardiners Island.

II. ***Or, deep-draft vessels desiring to anchor in 6 fathoms of water.***—Passing north of Gardiners Island lighted buoy, keep Orient Point Lighthouse bearing between **W.** ½ **N.** and **WNW.** until Little Gull Lighthouse bears **NE.**, then steer **WSW.** until Orient Point Lighthouse bears **N.**; now steer **S.**, keeping Orient Point Lighthouse on the bearing astern, and anchor on this bearing anywhere to within 1½ miles from the southern end of the bay.

Remarks.—The northern end of Gardiners Island is washing away; the only mark left in 1899 was a rectangular, unfinished, concrete structure about 20 feet high, which was partly protected by riprap. This

*Shown on Coast and Geodetic Survey chart 298, scale $\frac{1}{40,000}$, price $0.25, and in part on charts 114 and 115, scale $\frac{1}{80,000}$, price of each $0.50.

structure can not be seen on a dark night. Too much dependence can not be placed on sighting the lighted buoy at night, as the strong tidal currents heel the buoy over so as to obscure the light until it is close-to.

The above directions lead clear of all dangers, and those in paragraph II lead in the best water in the bay.

The western shore for a distance of 3 miles to the southward of Orient Point should not be approached nearer than ¾ mile by vessels of 18 feet draft or over.

The shore in Bostwick Bay, on the western side of the spit which makes off to the northward from Gardiners Island, can be approached to within 500 yards in 3¾ fathoms water; but keep clear of Crow Shoal.

Crow Shoal makes out to the southwestward from the point south of Bostwick Bay for a distance of 1¼ miles; it has from 6 to 18 feet over it, and is marked at its southwestern extremity by a buoy (spar, red and black horizontal stripes); there is 16 feet across the shoal midway between this buoy and the point.

For sailing directions through Gardiners Bay to Greenport and beyond see heading "Shelter Island Sound," etc.

For sailing directions through Gardiners Bay to Sag Harbor see heading "Sag Harbor."

1 A. ***From the Westward through Plum Gut.***—Owing to the velocity of the tidal currents, this passage is often extremely difficult and at times is impracticable for sailing vessels. Strangers under sail should not use it unless the wind and tide are favorable. The following directions are available for vessels drawing 15 feet or less.

Steer for Plum Island Lighthouse on any course from **E. ½ S.**, through **S.**, to **S.** by **W.** Give the lighthouse a berth of at least ¼ mile and pass about midway between Plum Island and Orient Point lighthouses. Then steer **SE. ¾ E.**; leave the shore of Pine Point, the southernmost point of Plum Island, about 300 yards on the port hand, and the buoy marking Midway Shoal about 300 yards on the starboard hand.

When Little Gull Island Lighthouse shows clear of the southern end of Plum Island, bearing about **ENE.**, *if bound to Orient, Greenport, Southold, or into Little Peconic Bay*, turn to the southward, giving Midway Shoal buoy a berth of 200 yards, and follow the directions in "Sailing Directions for Shelter Island Sound," etc. (see pages 35–37).

If bound to Sag Harbor, follow the directions just given until past Orient Point Lighthouse; then haul to the southward and bring Plum Island Lighthouse to bear **N.** by **E. ½ E.** and make good the course **S.** by **W. ½ W.** for about 6 miles, until Cedar Island Lighthouse bears **SW.** by **W. ¾ W.**, when head for it and follow the directions under the heading "Sag Harbor."

The ***tidal currents*** in Plum Gut have great velocity; the velocity here at strength is as great as in The Race; but while the current there has very great velocity nearly all the time, the period of such marked velocity is perhaps somewhat shorter in Plum Gut.

On the flood the current sets to the westward in Plum Gut directly on Oyster Pond Reef.

Remarks.—Approaching Plum Island, Orient Point Lighthouse, near the end of Oyster Pond Reef, will be made to the southwestward of Plum Island Lighthouse, and a rectangular concrete structure about 20 feet high on the end of the spit making to the northward from Gardiners Island, will be made showing between Plum Island and Orient Point as Plum Island Lighthouse is approached. *Orient (Oyster Pond) Point* will be distinguished from the westward as a low bare point with straggling trees at a distance from its end, and several houses and a large hotel backed by trees some distance to the right of the point. *Crow Head*, the high bluff on the western side of Gardiners Island, will be seen showing between Plum Island and Orient Point.

Ram Head.—To a vessel which has entered Gardiners Bay through Plum Gut, several prominent bluffs will show on the shore to the southwestward. Of these Ram Head is the nearest, and the smoothest in appearance and outline. When well within the bay another bare patch will be seen to the northward of it, somewhat similar in appearance but farther away.

Dangers.—**A reef** with 6 to 10 feet of water over it makes off to the southwestward for about 150 yards from the shore at Plum Island Lighthouse, and causes a dangerous rip or overfall, and the shore should here be given a berth of not less than ¼ mile.

Middle Ground is the name given to a shoal with 3¼ fathoms lying about 500 yards **SSW. ¼ W.** from Plum Island Lighthouse.

Oyster Pond Reef makes off to the eastward from Orient Point for about 1,000 yards, and has less than 4 feet at a distance of 800 yards from shore. About 750 yards from the shore, near the eastern edge of the reef, is Orient Point Lighthouse. Vessels drawing 10 feet should pass at least 125 yards to the eastward of Orient Point Lighthouse; vessels drawing 15 feet should give it a berth of not less than 250 yards.

Midway Shoal lies about ¼ mile **ESE. ½ E.** from Orient Point Lighthouse, and has a least depth of 17 feet. It is marked by a buoy (spar, red and black horizontal stripes). There are a number of spots with 3¼ to 3¾ fathoms of water over them lying between Orient Point Lighthouse and Midway Shoal.

SHELTER ISLAND SOUND, LITTLE AND GREAT PECONIC BAYS, AND PECONIC RIVER.*

These waters lie in the order mentioned, extending to the westward of Gardiners Bay in a general **WSW.** direction about 22 miles to Riverhead, which is the head of navigation on the Peconic River. At low water 20 feet can be carried through Shelter Island Sound and Little Peconic Bay, and as far as Robbins Island at the entrance to Great Peconic Bay. Across the bar between Little and Great Peconic bays 13 feet can be carried at low water. When across this bar, a greater depth is found in Great Peconic Bay. Up to Jamesport, at the mouth of the Peconic River, 5 feet can be carried at low water; above this only small craft and lighters go as far as Riverhead. Above Greenport and Sag Harbor these waters are mostly navigated by small vessels carrying coal, lumber, building material, firewood, and produce, and by yachts—Shelter Island being a prominent summer resort. In the summer several lines of steamers ply between the different towns and villages on these waters and the ports in Long Island Sound and Block Island.

Principal waters, settlements, etc.—Shelter Island Sound is divided into a northern and a southern part by Shelter Island. On the arm to the northward are Orient Harbor, Greenport Harbor, Pipes Cove, Derring Harbor, and Southold Bay; on the southern arm are Sag Harbor and Noyack Bay.

The more important places are Orient Harbor with Orient and East Marion (Rocky Point), Greenport Harbor and Greenport, Southold Bay and Southold, and Sag Harbor; these are mentioned more fully under separate headings.

Little Peconic Bay is about 5 miles long and 3¾ miles wide at its widest part; on its northern side is Hog Neck Bay. To the westward of Hog Neck Bay, and separated from it by a long peninsula (Little Hog Neck) is Cutchogue Harbor, on the western side of which is New Suffolk.

Great Peconic Bay, nearly circular in form and about 5 miles in diameter, is separated from Little Peconic Bay by Robbins Island, which lies about midway between the north and the south shores, leaving a channel on its northern and southern sides; the passage to the northward is not practicable for strangers.

Peconic River, at the western end of Great Peconic Bay, is navigable for very small craft as far as Riverhead, 4¼ miles above its mouth.

New Suffolk, on the western side of Cutchogue Harbor, in the western part of Little Peconic Bay, has a little trade in produce carried by small vessels. The entrance to this harbor is obstructed by flats, and strangers should not enter without a pilot.

Jamesport Harbor and the village of Jamesport are at the western part of Great Peconic Bay on the north shore, opposite Southport. Vessels of 8 to 9 feet draft go up as far as Jamesport. The least depth in the channel at mean low water is 5 feet, which depth is said to be increasing. The depth alongside the wharves at low water is 5 feet.

Southport is a small settlement on the south side of the entrance to the Peconic River. It is 1¼ miles south of Jamesport, and the same draft can be carried there as to Jamesport.

Flanders is 2½ miles to the westward of Southport and at the head of Reeves Bay (a shallow bight).

Riverhead, on the Peconic River, is 4½ miles above Jamesport, and is at the head of navigation, but the deepest draft of vessels going there is 4½ feet at high tides. Vessels having cargoes for Riverhead unload at Jamesport, and the cargoes are sent up in lighters.

Channels.—Shelter Island Sound forms two channels leading from Gardiners Bay into Little Peconic Bay. *The channel north of Shelter Island* has the better water and is the easier to navigate, there being no shoals and flats except at the entrance and in the bights and coves. *The channel south of Shelter Island* has numerous shoals, but up to Sag Harbor, along the most dangerous part, it is well buoyed and easily followed.

To the southwestward of Shelter Island these two channels unite and lead into Little Peconic Bay, through a passage about ½ mile wide between Great Hog Neck and Jessup Neck. There is a good unobstructed channel through Little Peconic Bay, but it narrows when approaching the 13-foot bar south of Robbins Island, where, at its narrowest part, it is a little over ¼ mile wide between the 12-foot curves. North of Robbins Island are numerous shoals and shoal spots, making this channel into Great Peconic Bay unfit for a stranger unless of less than 6 feet draft. There is deeper water through Great Peconic Bay; shoals make out from the shores, but the middle of the bay is unobstructed. The channel into Peconic River narrows, and is only 200 yards wide, with a depth of 5 feet at low water; at Jamesport it widens again to the southwestward and forms a good anchorage for vessels that are able to come so far. Above Jamesport the channel is crooked and unfit for anything but vessels of very light draft.

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*Shown on Coast and Geodetic Survey chart 115, scale $\frac{1}{80,000}$, price $0.50; Shelter Island Sound is shown on chart 298, scale $\frac{1}{40,000}$, price $0.25; the Peconic bays are shown on chart 299, scale $\frac{1}{40,000}$, price $0. 5.

Lights and other aids.—There are two lighthouses, one at each entrance to Shelter Island Sound (see Table of Lights, page 10). For a stranger bound in at night they are good guides to an anchorage in Gardiners Bay, but it is not advisable to proceed farther unless the buoys can be seen. The most dangerous shoals are buoyed (see System of Buoyage, page 5).

Pilots can be found in Gardiners Bay, or at Orient, Greenport, or Sag Harbor; they are generally fishermen or masters of small vessels trading in these waters. Pilotage is not compulsory.

Vessels bound in by the northern arm of Shelter Island Sound and desiring a pilot can set signal and either stand off and on outside the mid-channel buoy, or anchor well to the southeastward of Long Beach Bar Lighthouse.

If bound to Sag Harbor, see "Pilots" under that heading.

Towboats are seldom used in these waters; the nearest point at which they can be found is New London, Conn.

Ice obstructs navigation above Greenport in winter, but to that place the channel is nearly always open.

The **tidal currents** have considerable velocity wherever the channel is narrowed; at some such places there are sandspits making out shoal, with a strong tidal current setting across.

Tides.—At Cutchogue Harbor the mean rise and fall of tides is 2.3 feet; high water occurs 2h. 01m. after high water at New London, and low water 1h. 46m. after low water at New London. At Jamesport the mean rise and fall of tides is 2.4 feet; high water occurs 2h. 47m. after high water at New London, and low water 2h. 40m. after low water at New London. For tidal data at other places in Shelter Island Sound see headings.

Additional information of a general nature will be found on pages 9–24.

Sailing directions will be given here for the northern arm of Shelter Island Sound, the more important branch, and the one generally used by vessels bound through. For the southern arm, see directions under the separate heading "Sag Harbor."

SAILING DIRECTIONS, SHELTER ISLAND SOUND, ETC., PASSING NORTH OF SHELTER ISLAND.

Directions for approaching and entering Gardiners Bay are given in sections 1 and 1A, pages 32–33. The following directions are available for vessels drawing 16 feet or less.

1. ***Up to the Mid-channel buoy.***—Having entered Gardiners Bay as directed in section 1, bring Orient Point Lighthouse to bear **WNW.** and Little Gull Lighthouse to bear **NE.** From this position a **WSW.** course made good for 5¾ miles will lead up to the mid-channel buoy.

Remarks.—The **WSW.** course across Gardiners Bay is free from dangers. On this course Shelter Island will be directly ahead, and Ram Head, a prominent bluff on the island (see page 33), should be made a little on the port bow; well to the southward Cedar Island Lighthouse may be picked up. Long Beach Bar Lighthouse will be made on the starboard bow.

Mid-channel buoy (spar, black and white perpendicular stripes) marks the entrance to the northern arm of Shelter Island Sound. From this buoy, Long Beach Bar Lighthouse bears **NW.** by **W.** ¾ **W.**, distant 2⅛ miles.

Dangers.—**A shoal** with 17 feet over it is about ¼ mile to the northward of the buoy, and the spit of a shoal with 15 to 17 feet over it, making out from Ram Head, extends to within ¼ mile, in a direction **WSW.** from the buoy.

2. ***Mid-channel buoy to Long Beach Bar Lighthouse.***—Pass the mid-channel buoy close-to on either hand and steer **WNW.** ⅝ **W.**, with the buoy right astern, and keeping the end of Hay Beach Point (the north end of Shelter Island) a little on the starboard bow. A black spar buoy (No. 1) should be made a little on the port bow.

When Long Beach Bar Lighthouse bears **N.**, distant a little over ⅜ mile, and the red spar buoy on the starboard hand is in range with the lighthouse, change course to **NW.** ½ **N.** and pass midway between the red buoy and the black buoy. The channel here is narrow and deep, and at strength the tidal currents have considerable velocity.

Now, if bound to Orient Harbor, proceed as directed under that heading.

Remarks.—On the **WNW.** ¾ **W.** course the trees on the northern end of Hay Beach Point will be ahead; on Long Beach, to the northeastward of Long Beach Bar Lighthouse, is a large and prominent fish factory. To the northwestward of the lighthouse, on the more distant northern shore, is the village of East Marion (Rocky Point). On getting well in, Orient will open to the westward of Long Beach Point.

The **channel** narrows as the **WNW. ⅝ W.** course is followed, and near the turning point and on the **NW. ½ N.** course the shoaling is abrupt to 12 feet on either side; two buoys mark the channel here, a red spar, No. 2, at its northern edge, and a black spar, No. 1, at its southern edge.

Dangers.—**Long Beach Shoal,** left on the starboard hand, is an extensive shoal, irregular in shape, making out from Long Beach. Near its western end stands Long Beach Bar Lighthouse, and a buoy (spar, red, No. 2) marks its western edge. From the buoy the shoal makes in a southeasterly direction for nearly ¼ mile, and thence in a general easterly direction for a distance of 1¾ miles. At its eastern end the shoaling is gradual, but on the southern and western side the shoal rises abruptly from a depth of 10 and 12 fathoms to 15 feet.

Extensive flats, left on the port hand, make off from Ram Head and between it and Hay Beach Point. The northern part of this shoal ground is known as the **Hay Beach Point Flats.** A buoy (spar, black, No. 1) marks the edge of the shoal nearly ½ mile **S.** by **W. ¼ W.** from Long Beach Bar Lighthouse, and a buoy (black spar, No. 3) marks the shoal near its northern point. It has a depth from 5 to 15 feet of water, and spots with 5 and 6 feet over them are found nearly ⅜ mile off shore to the southward of buoy No. 1. From buoy No. 1 to buoy No. 3 and for about ¼ mile to southwestward of last-named buoy the shoal rises abruptly from the deep water of the channel.

3. ***Long Beach Bar Lighthouse to Greenport.***—Continue on the **NW. ½ N.** course and when up to Hay Beach Point Flats buoy (spar, black, No. 3), leave the buoy about 200 yards on the port hand. Now steer **W. ⅝ N.**, passing about 350 yards to the northward of Hay Beach Point, which has good water on its northern side; when this point is abeam, steer about **SW.** by **W.** past the end of Greenport breakwater.

If intending to anchor off Greenport, come-to in from 4 to 10 fathoms of water, between the Railroad wharf and the breakwater. (See "Off Greenport," below.)

If bound farther up the sound, proceed as directed in section 4, following.

Remarks.—When past the lighthouse, Greenport breakwater, with Greenport just beyond, will open gradually to the northward of Hay Beach Point. Care should be taken not to be set off the courses by the tidal current.

Dangers.—**A shoal** with from 6 to 10 feet over it, left on the starboard hand, makes to the eastward from Cleaves Point, on the western side of the entrance to Orient Harbor. The southeastern point of the shoal is marked by a buoy (spar, red, No. 4) and is nearly ⅝ mile **NW. ¼ W.** from Long Beach Bar Lighthouse.

Sheephead Rocks, marked by a buoy (spar, red, No. 6), have 3 feet of water over them and lie off Cleaves Point, opposite Hay Beach Point.

Greenport Flats are to the southeastward of Joshua (Youngs) Point, at the eastern end of Greenport; here is the breakwater extending nearly to the 18-foot curve. A beacon light marks the end of the breakwater.

Off Greenport the water shoals abruptly inside the depth of 24 feet.

4. ***Greenport to Little Peconic Bay.***—After passing Greenport breakwater shape the course to pass to the southward of Fanning Point (the next point on the north shore to the westward of Greenport) and to the southward of the buoy (spar, red, No. 8) off this point.

Then keep a mid-sound course, following the trend of the south shore and passing Conkling Point on the north shore and Rocky Point (the northwestern point of Shelter Island) on the south shore; give Rocky Point a berth of nearly ¼ mile on the port hand. To the westward of Rocky Point, and making into the opposite shore, is Southold Bay, with the village of Southold on its western side.

Rounding Rocky Point, the course turns more to the southward, and Hallock Point, marked by a buoy (spar, red, No. 10), will be ahead or a little on the starboard bow. Pass between Hallock Point Shoal buoy and the western shore of Shelter Island, and steer **S. ½ E.** for nearly ¾ mile, leaving Hallock Point Shoal (south) buoy (spar, red, No. 10½) on the starboard hand; then steer **SW. ½ S.**, with Jessup Neck (sand-spit, long, low, narrow, backed by trees) on the port bow; off the northern end of Jessup Neck is Jessup Neck Shoal buoy (spar, black, No. 5). Noyack Bay lies to the eastward of Jessup Neck, Little Peconic Bay to the westward.

Now, if bound into Noyack Bay, proceed as directed under that heading.

To stand on into Little Peconic Bay, pass about 150 yards to the northward of Jessup Neck Shoal buoy, and proceed as directed in section 5, following.

5. ***Through Little Peconic Bay.***—Passing 150 yards to the northward of Jessup Neck Shoal buoy (spar, black, No. 5), steer **SW. ½ S.**, passing a little more than ¼ mile to the southward of Great Hog Neck Shoal buoy (spar, red, No. 12), and when past this buoy make good the course **SW.** for about 5 miles, through little Peconic Bay; this course leads a little more than 200 yards to the southward of Little Hog Neck Shoal buoy (spar, red, No. 14) and about the same distance to the northward of Cow Neck Flat buoy (spar, black, No. 7), and nearly 200 yards to the southward of Robbins Island buoy (spar, red, No. 16).

6. ***Through Great Peconic Bay.***—In crossing the 13-foot bar which lies between Little and Great Peconic bays, stretching from Robbins Island to the south shore, pass about 200 yards to the northward of Cow Neck Flat buoy (spar, black, No. 7) and 50 to 250 yards to the southward of Robbins Island buoy (spar, red, No. 16), course about **SW.** The channel between the 12-foot curves is here about ¼ mile wide.

Passing the south point of Robbins Island thus, a mid-channel buoy (spar, black and white perpendicular stripes) should be made a little on the starboard bow. Steer for this buoy and pass it on either hand. Then steer **W. ⅛ N.** for about 3½ miles and anchor at discretion about 350 yards to the southward of Aquebogue Flat buoy (spar, red, No. 18); you will then be a little more than 1½ miles to the eastward of the mouth of the Peconic River. *If bound into the river*, take a pilot if one has not already been taken in Gardiners Bay, or at Orient, or at Greenport.

ORIENT HARBOR.*

This is a well-sheltered harbor north of Shelter Island and just inside of Shelter Island Sound, affording excellent anchorage for vessels up to 15 feet draft. It is seldom used except by vessels trading to Orient. The entrance is obstructed by flats which contract the channel to a width of ¼ mile. Strangers should not attempt to enter with vessels drawing more than 12 feet.

Orient, a village of little commercial importance, is at the northeastern end of the harbor, and has 8 feet of water at the end of the wharf at low water.

East Marion (Rocky Point) is a small village on western shore of the harbor. Pilots for Shelter Island Sound and the Peconic bays are sometimes found here.

Provisions and ship-chandler's stores can be obtained in Orient. **Greenport,** 4 miles to the westward of Orient, is the nearest place for railroad communication, or for repairs to vessels or to machinery.

Tides.—The mean rise and fall of tides is 2.5 feet; high water occurs 45m. after high water at New London, and low water 22 m. after low water at New London.

Strangers bound to Orient are advised to take a pilot in Gardiners Bay (see page 35).

GENERAL DIRECTIONS, ORIENT HARBOR.

Directions for approaching are given in sections 1–2, page 35. The following directions are available for vessels drawing 12 feet or less. On the **NW. ½ N.** course of section 2, page 35, and when a little over ¼ mile to the westward of red spar buoy No. 2, steer **N.** so as to pass a little less than ¼ mile to the westward of Long Beach Bar Lighthouse. Continue on the **N.** course until the end of the wharf in Orient bears about **NE.**, then steer for the end of the wharf. Anchor in about 15 feet (low water), soft bottom, with the beach distant a little more than ¼ mile.

Remarks.—Prominent features are mentioned on pages 34–35.

Dangers.—Long Beach Point Shoal is described on page 36. A shoal makes off to the eastward from Cleaves Point, and is marked at the eastern extremity by a buoy (spar, red, No. 4). The shoal has an average depth of 7 to 9 feet, but a 6-foot spot lies about 300 yards **NW. ¼ N.** from the buoy; this buoy is left on the port hand.

GREENPORT HARBOR.*

Greenport Harbor, in Shelter Island Sound, is just to the westward of Orient Harbor. The entrance is between Cleaves Point on the north and Hay Beach Point, the northernmost point of Shelter Island, on the south. A breakwater extends ¼ mile in a southeasterly direction from Joshua Point, nearly to the 18-foot curve, and is marked at its outer end by a beacon light (see table, page 10).

* See footnote, page 34.

During heavy easterly gales, with spring tides, the breakwater is submerged, and vessels lying alongside the eastern side of the wharves are moved to the western side to prevent chafing.

Greenport is a flourishing town on the northern side of the harbor, having extensive fishing interests and a large coasting trade; it is also engaged in shipbuilding to some extent. The carrying trade employs a considerable number of vessels, some transient and some owned in the vicinity. Greenport is the terminus of the Long Island Railroad. During the summer steamboats run to places on Long Island Sound and to Block Island.

The **least water** in the channel at mean low water is 21 feet. The deepest draft of vessels entering Greenport Harbor is 15 feet, and the usual draft not more than 12 feet. The depth of water alongside wharves at mean low water is from 7 to 20 feet, there being three wharves—Main Street Wharf, 23 feet; Railroad Wharf, 7 feet; and Union Wharf, 12 feet.

Pilots.—There are no regular pilots. The piloting is generally done by fishermen or by masters of small vessels trading in these waters, and strangers usually take one. Vessels desiring a pilot, and not having found one in Gardiners Bay, can anchor outside of Long Beach Bar Lighthouse, near the mid-channel entrance buoy, with signal flying, when one will come on board.

Towboats are rarely used, but they can be obtained from New London, Conn.

Anchorage, etc.—The usual and best anchorage is between Union and Railroad wharves. Vessels up to 1,000 tons anchor in this harbor. There are no harbor regulations or harbor dues. The custom-house landing and public landing are at Main Street Wharf.

Supplies.—Anthracite coal in limited quantity for steamers, and water, can be obtained alongside wharves. In the summer water can also be obtained from a water boat. Provisions and ship-chandler's stores can be obtained in Greenport.

Marine railways are five in number; there is one capable of hauling out vessels up to 1,000 tons. A basin, with a depth of 10 feet, is owned by one of the shipyards. This basin is used for laying up yachts out of season. Ordinary repairs to machinery can be made.

The **tidal currents** follow the general direction of the channel.

Ice.—During the winter months there is some drift ice at Greenport, but not sufficient to interfere with navigation.

Tides.—The mean rise and fall of tides is 2.5 feet; high water occurs 53m. after high water at New London, and low water 34m. after low water at New London.

Consult also pages 9–24 and 34–35.

Sailing directions are given on pages 35–36.

SOUTHOLD BAY.*

Southold Bay and the village of Southold are in a bight at the northwestern part of Shelter Island Sound, opposite Rocky Point, the northwestern end of Shelter Island. Great Hog Neck separates Southold Bay on the southward from Little Peconic Bay, narrowing this end of Shelter Island Sound to a width of ⅜ mile. The deepest draft of vessels entering Southold Bay is 10 to 14 feet. There is 8 feet of water alongside the wharves at mean low water.

Southold is on the line of the Long Island Railroad.

Pilots are usually taken by strangers (see page 35). **Towboats** are not much used.

The **best anchorage** is about ½ mile to the eastward of the wharves.

Ice obstructs navigation during the winter.

Tides.—The mean rise and fall of tides is 2.5 feet; high water occurs 1h. 48m. after high water at New London, and low water 1h. 30m. after low water at New London.

DIRECTIONS FOR ANCHORING IN SOUTHOLD BAY.

Directions for approaching are given on pages 35–36.

Rounding Rocky Point, giving it a berth of 400 yards, steer **SW. ½ S.** until the wharves in Southold bear about **W.** by **N.**; then haul over for the wharves and anchor when they are about ½ mile distant.

Remarks.—The shore for over a mile to the northeastward of the wharves at Southold should not be approached nearer than ⅜ mile, as shoal water extends out that distance and deepens very abruptly. The western part of the bay is also shoal, and strangers seeking anchorage should use the lead, and anchor when the water shoals to 18 feet, the wharves bearing to the northward of **W.**

*See footnote, page 34.

NOYACK BAY.*

This bay lies to the southward of the western end of Shelter Island, between Hog Neck on the east and Jessup Neck on the west. It makes in about 2¼ miles and the width is about the same; the average depth is about 21 feet. This bay is of no importance except for the beds of clams and scollops which are found in it. Shoals extend out from the shore about ½ mile all around the bay, but on the eastern side, ¾ mile to the southward of the northwestern point of Hog Neck, the shore can be approached to within 400 yards.

Tides.—See heading "Southold Bay."

GENERAL DIRECTIONS, NOYACK BAY.

From the Eastward.—Give the northwestern point of Hog Neck a berth of 600 yards, and steer **SSW.** Anchor at least ½ mile from the beach.

From the Northward or from the Westward.—Pass 600 yards to the eastward of the buoy (spar, black, No. 5) off Jessup Neck, and steer **SE.** Anchor at least ½ mile from the beach.

SAG HARBOR.*

Sag Harbor is south of Shelter Island and about 3 miles southwest from Cedar Island Lighthouse. It lies on the southwestern side of the bight included between Cedar Point on the east and Hog Neck on the west; this bight is full of shoals, but it has a narrow channel, well buoyed from the eastward as far as Sag Harbor, and leading to Sag Harbor and the Peconic bays.

Sag Harbr is the terminus of a division of the Long Island Railroad; in summer it has steamboat communication with places in Long Island Sound and New York.

The deepest draft of vessels entering Sag Harbor is 13 feet, the usual draft is 9 to 10 feet; 8 to 12 feet can be taken alongside the wharf. The shoalest water is on the bar, about ⅝ mile to the northward of the wharf, 10 feet at low water.

Pilots.—A pilot can be taken at Cedar Island Lighthouse; or come to anchor in Northeast Harbor and one will come from Sag Harbor in answer to signal.

Towboats are rarely used; the nearest place at which they can be found is New London. Fishing steamers sometimes do towing.

Anchorage.—The usual anchorage for vessels bound to Sag Harbor is in Northeast Harbor, to the southward and westward of Cedar Island Lighthouse, between it and Mashomuck Point; the depth is 15 feet to 6½ fathoms, hard bottom. Small craft can find snug shelter here in northerly gales with Cedar Island Lighthouse bearing **N. ¾ E.** With strong northerly winds it is not advisable for any vessel to anchor out in mid-channel between the lighthouse and Mashomuck Point, as there will be a rough sea at such times on the ebb. In the eastern part of this harbor flats rise rather abruptly. By conforming to the directions given below vessels can anchor out of the strength of the current and at the same time keep clear of these flats.

Supplies.—Anthracite coal in limited quantity for steamers, and fresh water through pipe and hose, can be had alongside the wharf. Provisions and ship-chandler's stores can be obtained at Sag Harbor.

Harbor regulations are not in force, but vessels are docked by a wharf-master.

Hospitals.—At Sag Harbor there is a relief station (Class IV) of the U. S. Marine-Hospital Service.

Tides.—The mean rise and fall of tides is 2.5 feet; high water occurs 1h. 13m. after high water at New London, and low water 1h. 05m. after low water at New London.

The tidal currents have considerable velocity at full and change; they follow the general direction of the channel.

Ice obstructs navigation in the winter.

SAILING DIRECTIONS, SAG HARBOR.

The following directions are available for vessels drawing 11 feet or less; vessels of deeper draft should anchor outside of the outer buoys off Cedar Island Lighthouse and take a pilot.

1. ***Approaching and Entering.***—Having followed the directions for entering Gardiners Bay, section 1, page 32, or section 1 A, page 33, bring Little Gull Lighthouse to bear **NE. ¼ N.** and steer **SW. ¼ S.**, or bring Plum Island Lighthouse to bear **N.** by **E. ½ E.** and steer **S.** by **W. ½ W.**, until Cedar Island Lighthouse bears **SW.** by **W. ¾ W.**

*See footnote on page 34.

Now steer for Cedar Island Lighthouse, keeping it bearing **SW.** by **W.** ¾ **W.** until up to Outer Bar buoy (spar, red, No. 2), which pass close-to on either side. From this buoy the course is **WSW.** ¾ **W.** crossing a 17-foot bar and leaving a danger buoy (spar, red and black horizontal stripes) well to the southward of the course, and the two Cedar Point Shoal buoys (spars, black, Nos. 1 and 3), on the port hand.

When black spar buoy No. 3 is about 200 yards distant on the port beam, change the course to **SW.** by **W.** ½ **W.** Give Cedar Island Lighthouse a berth of over 300 yards on the port hand and steer **S.**; anchor in Northeast Harbor in 15 to 25 feet of water, soft bottom, with the lighthouse bearing between **N.** by **E.** and **NNE.** ½ **E.**, and distant about ¼ mile (see "Anchorage," page 39). Here take a pilot if bound farther up.

Or, desiring to stand farther up without a pilot, when abreast of Cedar Island Lighthouse steer **S.** by **W.** ½ **W.** a little over 1¼ miles from the lighthouse; black spar buoy No. 7 should then be on the port beam. Leave this buoy about 120 yards on the port hand and haul more to the westward; then be guided by the chart, the buoys, and the lead.

Remarks.—In approaching on either the **SW.** ¼ **S.** or **S.** by **W.** ½ **W.** course, Long Beach Bar Lighthouse will be seen well to the westward, and Cedar Island Lighthouse will be made on the starboard bow. On the **SW.** by **W.** ¾ **W.** course the Outer Bar buoy (spar, red, No. 2) should be made in range with Cedar Island Lighthouse. A large fish factory and two high chimneys will be seen on Cedar Point.

Dangers.—**A shoal** with from 7 to 18 feet of water extends from Ram Head in a southeasterly direction nearly to the shore east of Cedar Point. The southern end of this shoal across which the channel leads is called **Sag Harbor Bar**, good for 17 feet of water; Outer Bar buoy (spar, red, No. 2) is placed as a guide for this bar.

Dangerous Rock buoy (spar, red and black horizontal stripes), well to the southward of the course, marks a rock about ¼ mile from shore.

Cedar Point Shoal extends about ⅝ mile to the northward of Cedar Point. It is marked by two buoys (both black spars, No. 1 and No. 3), both left on the port hand.

Nichol Point Shoal extends about ½ mile to the eastward of Nichol Point (the next prominent point to the southward of Ram Head). It is marked by a buoy (spar, red, No. 4) placed about ⅝ mile from shore, to the eastward of some sunken rocks; this buoy is about ½ mile **N.** from Cedar Island Lighthouse and is left well on the starboard hand.

Single Rock, marked by a buoy (spar, red, No. 6), lies nearly ½ mile **W.** from Cedar Island Lighthouse, and has four feet over it; the water is shoal to the westward of this buoy.

West Harbor Flats extend from the eastern shore to the line of Cedar Island Lighthouse and the black buoys to the southward of the lighthouse; the ruling depth over these flats is about 7 to 8 feet, with 4 to 9 feet at their western edge.

Beyond this the channel is narrow, but well marked by buoys and a spindle as far as Sag Harbor.

FISHERS ISLAND SOUND*

is at the northeastern end of Long Island Sound, and lies between the mainland of Connecticut and Fishers Island. It is a little over 7 miles long and forms one of the passages into Long Island Sound.

The **prominent landmarks** in approaching from the eastward are Watch Hill, a high bare bluff, with several large hotels and summer houses back a little from its edge, and Watch Hill Lighthouse, standing on the low point to the southward of the bluff. Fishers Island is a hilly island, bare of trees, lying to the westward and southward of Watch Hill. Chocomount, on Fishers Island, 136 feet high, 2 miles from its eastern end, is the highest land in this vicinity.

The **channels** to enter Fishers Island Sound from the eastward lead between the ledges and rocks which extend in a broken line from Watch Hill to East Point, the eastern point of Fishers Island.

Watch Hill Passage is between Watch Hill Lighthouse and Watch Hill Reef. This is the best passage for vessels coming from the eastward and is the one generally used; it is good for 17 feet of water at mean low water and is better marked than the others; near the middle of the passage is a 12-foot rock, but this is easily avoided.

Next, to the westward, is *Sugar Reef Passage*, between Watch Hill Reef and Sugar Reef. This passage is ¼ mile wide and has a least depth of 21 feet. The tidal currents set with considerable velocity directly on the reefs in this passage. Between Sugar Reef and the Catumb Rocks is the *Catumb Passage*, 250 yards wide, with a least depth of 20 feet. The tidal currents make this channel dangerous.

*Shown on Coast and Geodetic Survey charts No. 358, scale $\frac{1}{20,000}$, price $0.40; 114, scale $\frac{1}{80,000}$, price $0.50.

Lord Passage lies between East Spindle and Wicopesset Rock; it is ¼ mile wide and has a least depth of 20 feet.

Wicopesset Passage lies between Wicopesset Island and East Point. This channel is quite narrow and has a least depth of 13 feet. The tidal currents set in the direction of the channel.

Lights and other aids.—There are several lights to serve as guides through the sound at night (see Table of Lights, page 10), but strangers are advised not to run through unless the buoys can be seen readily. All the important dangers are marked by buoys or spindles.

Little Narragansett Bay, a shallow bay at the eastern end of Fishers Island Sound, is about 1¾ miles long and nearly 1 mile wide at its narrowest part. A dredged channel, 200 feet wide and 8 feet deep, leads from Fishers Island Sound to Avondale, through Little Narragansett Bay, and up the Pawcatuck River; from Avondale to Westerly the channel is 100 feet wide and 8 feet deep. Work is in progress deepening the dredged channel to a depth of 10 feet for the whole of its length. **Westerly** is a town 4½ miles above the mouth of the Pawcatuck River; vessels of 8 feet draft can go up to the town on a high tide.

Avondale is a village on the east bank of the river, about 2½ miles below Westerly. Strangers should take a pilot, and if bound to Westerly a towboat is required. A pilot or a tug may be had at Stonington. Navigation in Little Narragansett Bay is closed by ice during the winter.

Stonington Harbor and Mystic River to the northward of the sound are treated under special headings.

East Harbor, Chocomount Cove; and **West Harbor** are the names of three indentations, given in order from the eastward, in the north shore of Fishers Island. They are sometimes used as anchorages for small craft owned in the vicinity, but as the holding ground is not good and the approaches to the two latter lead over foul ground, it is not advisable for strangers to use them.

Wind signals are shown from a flagstaff close to the lighthouse on Stonington Point (see Appendix II).

Consult also pages 9–24 for information concerning lighthouses, life-saving stations, variation of the compass, tides, fogs, etc.

TIDAL CURRENTS IN FISHERS ISLAND SOUND.

In the Watch Hill Passage the current of flood sets nearly in the direction of the channel, though with a slight tendency to the northward, while the ebb shows the same tendency to the southward. Neither current will materially affect the sailing courses unless the vessel is becalmed.

South of Eel Grass Ground the current of flood has a tendency to the southward of **W.**, while the ebb runs nearly due **E.**, the average velocity being but little over 1 mile an hour.

Off Groton Long Point the flood sets nearly **W.**, while the ebb has a tendency to the southward of **E.**, the latter having a velocity of nearly 1½ miles.

In the main channel, to the northward of Wicopesset, the flood runs about **NW. ¾ W.** and the ebb nearly **SE. ¾ E.**, with the velocity of 2 miles an hour.

Off East Harbor the flood runs **W. ¾ S.** and the ebb **E. ¾ N.**, while between Horseshoe and Seaflower reefs the flood runs nearly **WNW.** and the ebb **ESE.**, with a velocity of 2 miles an hour.

In the Catumb and Sugar Reef passages the tidal current sets obliquely across the axes of the channels; and these passages should, therefore, not be attempted by strangers.

The following table will show the set and drift of the current at those positions in the sound where observations have been made by the Coast and Geodetic Survey:

TABLE.

No.	Stations.	Second quarter.		Third quarter.		Flood or Ebb.
		Set.	Drift.	Set.	Drift.	
1	Between Gangway Rock and Sugar Reef	WNW. ¾ W	1.17	WNW	1.20	Flood.
		ESE. ¾ E	1.25	ESE. ¾ E	1.10	Ebb.
2	Near Eel Grass Ground	W. ¾ S	1.22	WSW. ¾ W	1.12	Flood.
		E. ½ N. Northerly	1.05	E. ½ N. Northerly	1.25	Ebb.
3	Off Groton Long Point	W. ¼ N	1.18	W	1.22	Flood.
		SE. by E. ¾ E	1.11	ESE. ¼ E	1.43	Ebb.

SAILING DIRECTIONS, FISHERS ISLAND SOUND.

The following directions are available for vessels drawing as much as 15 feet.

Refer to page 10 for descriptions of lighthouses, and page 41 for tidal currents.

1. ***Approaching from Eastward and Southward.***—I. ***To enter by Watch Hill Passage.***—Directions for approaching through Block Island Sound have been given on pages 28 and 31. Bring Watch Hill Lighthouse, just to the northward of the entrance, on any bearing between **W.** and **N.** ½ **W.**, and steer for it. When within about ¾ mile of the lighthouse Gangway Rock buoy (marking the north side of the entrance) should be made; steer for it and pass close to the southward of it, then follow directions in section 2 following.

Remarks.—Gangway Rock buoy lies ¼ mile south of Watch Hill Lighthouse, near the extremity of a rocky ledge making out from Watch Hill Point. Nearing the entrance, the black bell buoy (marking the south side of the entrance) and the spindles marking some of the reefs lying between Watch Hill and Fishers Island should be seen.

See dangers under section 2 following.

II. ***To enter by Lord Passage.***—Passing south of the dangers between Watch Hill and Fishers Island, bring the eastern end of Stonington East Breakwater to bear **N.** by **E.** ½ **E.**, and stand in, keeping it on that bearing, and passing midway between East spindle and Wicopesset Rock spindle.

To aid in keeping the bearing pick up a range over the end of the breakwater while yet outside of the reefs.

When inside, with Latimer Reef Lighthouse bearing about **WNW.** ¼ **W.**, steer **WNW.** ⅛ **W.** for Ram Island Reef Light-vessel and follow such directions of section 2 following as apply; see also the "remarks" and "dangers" under that section.

Other directions for Lord Passage are as follows: Bring Stonington Breakwater Lighthouse to bear **N.** ¼ **W.** when it is about 3 miles distant, and steer for it, keeping on that bearing, passing about midway between East spindle and Wicopesset Rock spindle.

When Latimer Reef Lighthouse bears about **WNW.**, steer **WNW.** ⅛ **W.**, for Ram Island Reef Light-vessel, keeping it on that bearing.

Remarks.—As a strong tidal current sets diagonally across the course care must be taken to avoid being set on the shoals on either side (see tidal currents, page 41).

2. ***From Gangway Rock buoy to Ram Island Reef Light-vessel.***—Passing close to the southward of Gangway Rock buoy, steer **WNW.** ⅛ **W.** for Ram Island Reef Light-vessel, 5¼ miles distant.

Napatree Point Ledge buoy (nun, red, No. 4) should be right ahead, 1⅝ miles distant; pass 75 yards south of this buoy.

Continue the **WNW.** ⅛ **W.** course for the light-vessel, making allowance for tidal current; the course leads south of the spar buoy (red and black horizontal stripes) on the east end of Latimer Reef and 200 yards north of the spar buoy (red and black horizontal stripes) on the 13-foot spot, about ½ mile **N.** of the eastern end of Fishers Island; this buoy should be left 50 to 200 yards on the port hand.

Pass about ¼ mile to the southward of Latimer Reef Lighthouse.

When up to the light-vessel pass to the southward of it and follow the direction in section 3, following.

See tidal currents, page 41.

At night.—On the **WNW.** ⅛ **W.** course North Dumpling Light when first made will show red, but shortly after passing Latimer Reef Light a vessel should enter the white rays of North Dumpling Light and not again enter the red rays. The red rays of North Dumpling Light cover the dangers to the southward of the course after passing Latimer Reef Light.

Remarks.—Vessels becalmed just to the westward of Latimer Reef and finding that they are drifting down on the reef, should not attempt to tow to the southward, but should go to the northward of the lighthouse, as the ebb current sets to the northward and eastward on the western side of the reef.

When passing Gangway Rock buoy, Ram Island Reef Light-vessel should be made ahead, with Latimer Reef Lighthouse a little on the starboard bow, and open to the northward of the latter are the large hotel on

the southern end of Ram Island and the houses of Noank. Directly ahead, off Napatree Point, is Napatree Point Ledge buoy. Broad off the starboard bow, across Napatree Point, is Stonington. On the port bow are the spindles marking the broken line of reefs and rocks lying between Watch Hill and the eastern end of Fishers Island (the latter hilly in appearance).

Approaching Latimer Reef, North Dumpling Lighthouse will be seen on the port bow.

Dangers.—**Gangway Rock** is about ¼ mile **S.** of Watch Hill Point, has 3 feet of water over it, and is marked by a buoy (spar, red, No. 2) placed in 13 feet of water ⅛ mile to the southward of the rock. A **17-foot spot** lies about 120 yards **SSW.** from the buoy; it is not dangerous for the draft of vessels using this passage; to avoid it, pass only 50 to 100 yards to the southward of the red buoy.

Watch Hill Reef, marked by a black iron spindle with square cage, placed on a rock bare at low water, lies about ⅝ mile **SW.** by **S.** from Watch Hill Lighthouse. The reef extends a short distance to the eastward from the spindle. To the northeastward of the spindle, a little to the southward of a mid-channel line, are detached spots with 12 to 16 feet over them. Between these and the reef is a deep but narrow channel, marked by a black bell buoy. Never attempt to pass to the southward of the bell buoy.

The line of reefs and rocks which, with narrow passages between them, extends from Watch Hill to Fishers Island, includes Gangway Rock and Watch Hill Reef, just described. To the westward of the latter are the following, all of which will be left on the port hand: *Sugar Reef*, 2 to 11½ feet of water, black iron spindle, cone cage; *Catumb Rocks*, ½ foot to 18 feet of water, extending ¾ mile westward in a broken line to East spindle, a red iron spindle with cask, this spindle marking the eastern side of Lord Passage; *Wicopesset Rock*, 4 to 12 feet over it, black iron spindle with cask, ⅝ mile **E.** ½ **N.** from Wicopesset Island.

Napatree Point Ledge, marked by a buoy (nun, red, No. 4) at its southern end, extends in a cluster of shoal spots in a southwesterly direction from Napatree Point.

Middle Ground well to the northward of the course, marked off its western side by 2 buoys (spar, red, No. 4½, and nun, red, No. 6), has 9 feet of water over it and lies 1⅛ miles **NW.** by **W.** from Napatree Point. The western end of the *East Breakwater* of Stonington Harbor extends to the northern part of the Middle Ground.

Wicopesset Island, to the southward of the course, is small and surrounded by foul ground.

Latimer Reef Lighthouse marks the western end of Latimer Reef, which is 2 miles **W.** ½ **N.** from Napatree Point, and ⅞ mile **N.** of the eastern part of Fishers Island. The eastern end of the reef is marked by a buoy (spar, red and black horizontal stripes). *A spot* with 15½ feet over it lies nearly 300 yards **SW.** by **S.** from this last-named buoy and a little to the northward of a mid-channel line. *North Latimer Reef*, marked by a buoy (spar, red and black horizontal stripes), has 11 feet of water and is ⅜ mile **NE.** ¼ **E.** from the lighthouse. The sailing line leads to the southward of these dangers.

A spot with 13 feet of water, marked by a buoy (spar, red and black horizontal stripes) lies about ⅜ mile **S.** ¾ **W.** from the buoy on the eastern end of Latimer Reef, and 400 yards **NE.** by **E.** from Seal Rocks buoy.

Seal Rocks, marked off their northern side by a buoy (spar, black, No. 3), lie about ⅜ mile **NW.** from the eastern end of Fishers Island.

Youngs Rock, 1½ to 13 feet of water, marked by a buoy (spar, black, No. 5), lies about ⅝ mile **W.** from Seal Rocks buoy.

An 18-foot spot lies $\frac{5}{16}$ mile **NNW.** ½ **W.** from Youngs Rock buoy, and is a little to the southward of the course.

Eel Grass Ground is well to the northward of the course, being about ⅝ mile **NW.** ½ **W.** from Latimer Reef Lighthouse; has 8 to 14 feet of water, and is marked by two buoys, one at its northwestern end and the other at its southeastern (both spars, both red, No. 12 and No. 10).

East Clump is an islet well to the southward of the course.

Ram Island Reef Light-vessel, described on page 10, is to the southward of Ram Island Reef.

Middle Clump is an islet about ⅝ mile **S.** by **W.** ¾ **W.** from Ram Island Reef Light-vessel. A buoy (spar, black, No. 5½) is placed nearly ¼ mile **N.** by **E.** from the islet, and marks several 17-foot spots lying between them.

3. ***From Ram Island Reef Light-vessel to Long Island Sound.***—Having passed Ram Island Reef Light-vessel, bring it to bear **E.** ½ **N.** and steer **W.** ½ **S.** for Bartlett Reef Light-vessel, passing about midway between Seaflower Reef beacon and North Dumpling Lighthouse.

Remarks.—After passing Ram Island Reef Light-vessel, Seaflower Reef beacon should be seen on the **W.** ½ **S.** course, showing to the northwestward of North Dumpling Lighthouse, and New London Lighthouse will be made well on the starboard bow. To the northward is the western approach to Noank and Mystic River. To the southward and a little farther west is West Harbor; dangers lie in a broken line between Middle Clump and South Dumpling.

Dangers.—**West Clump** is a small island lying on a line between Middle Clump and South Dumpling Island. A long shoal with from 3 to 11 feet over it extends a little over ½ mile to the eastward and nearly ⅜ mile to the westward of West Clump.

Pulpit Rock, marked by a black iron spindle (barrel on top), has 5 feet of water over it, and lies near the western end of the shoal making to the westward from West Clump.

Flat Hammock is an island about ½ mile southeast of North Dumpling Lighthouse. A shoal with 1½ feet over it extends ¼ mile to the northeastward from the northern end of this island.

South Dumpling is an island lying about ¼ mile west of Flat Hammock and a little over ¼ mile **S.** by **E.** from North Dumpling Lighthouse.

North Dumpling, marked by North Dumpling Lighthouse, is an island at the western end of Fishers Island Sound, and is about 1¼ miles **SW.** ½ **S.** from Groton Long Point. A shoal with from 9½ to 16 feet of water over it makes out ¼ mile to the eastward from the lighthouse.

Seaflower Reef, marked by a large granite beacon, lies a little over ¾ mile **NW.** ¼ **N.** from North Dumpling Lighthouse. This reef is nearly ¼ mile long in a general **NE.** and **SW.** direction.

A spot with 18 feet over it lies to the northward of the course when one-third the way from Ram Island Reef Light-vessel to Seaflower Reef beacon. This spot is ½ mile **SE.** ⅝ **E.** from Groton Long Point spindle.

STONINGTON HARBOR.*

Stonington Harbor is on the northeastern side of Fishers Island Sound. In order to increase the usefulness of this harbor as a place of refuge, East Breakwater has been constructed. It begins near the southwestern end of Bartlett Reef and extends about 800 yards in a **WSW.** ½ **W.** direction to the north end of the Middle Ground.

West Breakwater, 2,000 feet long, extends in a southeasterly direction from off Wamphassuck Point, and affords protection to vessels in the upper harbor, which is small. Stonington Breakwater Lighthouse (see Table of Lights, page 10) marks the eastern end of this breakwater.

The light formerly maintained on Stonington Point has been discontinued, but the tower still remains. About 200 yards to the northward of this old tower a stone breakwater (Inner Breakwater) extends to the westward about 250 yards; on its western extremity a gray stone pyramid is erected against a square brown tower, with a bell and lantern on top. The steamboat company has the bell rung in thick weather when a steamer is expected to arrive, and maintains a small light in the lantern; this tower and Stonington Breakwater Lighthouse in line forms the range for crossing Noyes Shoal through the dredged cut.

The deepest draft of vessels entering the harbor at mean low water is 13 feet; the depth alongside wharves at mean low water is from 7 to 13 feet, according to locality.

Approaches.—The harbor is approached from the southward, southwestward, and westward; the former approach is the better, having fewer dangers, and the lighthouse serves as a guide to avoid them.

Approaching from the westward and southwestward several changes of course are necessary; the principal guides are buoys placed to mark the dangers. In the daytime, with clear weather, no difficulty should be experienced in entering by any of the approaches.

Pilots can be obtained from fishing boats, or from the shore by signaling. Fishermen bring vessels into the harbor. Strangers generally take a pilot. Vessels wishing a pilot and not finding one outside, stand off and on, or anchor between Latimer Reef and the Middle Ground, with signal flying until one comes off from shore. Pilotage is not compulsory.

Towboats are not much used; a small one tows vessels to Westerly; others may be had by telegraphing or telephoning to New London.

Anchorage is found anywhere inside the breakwaters. In the upper harbor a channel 300 feet wide must be left clear from the end of the inner breakwater to the head of the steamboat wharf.

Quarantine regulations are established by the local board of health. Vessels are not boarded by the health officer unless they have sickness on board, when they should anchor inside the East Breakwater and set signal.

Hospitals.—New London is the nearest place where seamen can apply for medical treatment. The nearest marine hospital is at Stapleton, Staten Island. (See Appendix III.)

Steamers.—The Stonington line of steamers make daily trips (Sundays excepted) between New York and Stonington, connecting with the N. Y., N. H. & H. Railroad.

Wind signals are shown on Stonington Point (see page 20, and Appendix II).

Supplies.—Anthracite coal can be obtained for steamers in limited quantity. It is put on board alongside wharf. Water can be obtained alongside the railroad wharf from hydrant through hose. Provisions and ship-chandler's stores can be had in Stonington.

Repairs.—Noank is the nearest place for repairs to hull, New London for extensive repairs to machinery.

For **variation of the compass** in Stonington Harbor see page 24.

For **tidal data** see page 22.

Ice seldom forms except in very cold weather; steamers running daily keep the channel open.

Consult also pages 9 and 41.

* Shown on Coast and Geodetic Survey charts: 358, scale $\frac{1}{20,000}$, price $0.40; 114, scale $\frac{1}{80,000}$, price $0.50.

SAILING DIRECTIONS, STONINGTON HARBOR.

The following directions are safe for vessels of 15 feet draft until abreast the old light tower on Stonington Point, when, after entering the inner harbor, the sailing line is not good for more than 11 feet. Vessels drawing 13 feet or over must exercise care in passing the Middle Ground and the shoal lying opposite it on the west side of the channel; the channel between these two shoals is only about 300 yards wide.

1. ***Approaching from the Eastward***—I. ***Having come through Watch Hill Passage.***—Follow the directions of sections 1 and 2, page 42, for Fishers Island Sound until abreast of Napatree Point Ledge buoy (nun, red, No. 4); pass to the southward of this buoy and steer **NW. ½ W.** a little over 1 mile, passing at least 150 yards to the southward of Middle Ground South buoy (spar, red, No. 4½). When this buoy is well on the quarter and Stonington Breakwater Lighthouse bears **N. ¼ E.** steer for the lighthouse on this bearing; pass about 150 yards to the westward of Middle Ground buoy (nun, red, No. 6), then follow the directions in section 2 following.

II. ***Having come through Lord Passage.***—Follow the directions in paragraph II, page 42, until Latimer Reef Lighthouse bears about **WNW.**, when edge to the westward and bring Stonington Breakwater Lighthouse to bear **N. ¼ E.** and steer for it. Pass 100 to 200 yards to the westward of Middle Ground buoy and follow the directions in section 2 following.

Remarks.—On the **NW. ½ W.** course the town of Stonington will be broad off the starboard bow behind East Breakwater; beyond this breakwater will also be seen the old light tower on Stonington Point and farther to the westward the lighthouse on the eastern end of Stonington West Breakwater.

Dangers.—**Napatree Point Ledge** and the **Middle Ground** are described on page 43.

Noyes Shoal, with from 10 to 14 feet over it, commences about 350 yards **W.** from Middle Ground buoy (nun, red, No. 6) and extends about 1¼ miles in a **NW.** by **W.** direction. The sailing line passes between this shoal and the Middle Ground buoy.

1 A. ***Approaching from the Southwestward.***—When about 1 mile to the eastward of Ram Island Reef Light-vessel, bring it to bear **W. ⅛ S.** and steer **E. ⅛ N.**, keeping it on the bearing; pass close to the southward of Eel Grass Ground (SE.) buoy (spar, red, No. 10) and take care to pass to the northward of the red and black horizontally striped spar buoy marking North Latimer Reef. When Stonington Breakwater Lighthouse bears **NE. ¾ N.** and is in range with the little brown structure on the end of Inner Breakwater at Stonington, steer for the lighthouse, keeping on the range. When Stonington Breakwater Lighthouse is less than ½ mile distant ahead, and Noyes Shoal has been crossed, haul to the eastward a little and follow the directions in section 2 following.

Remarks.—The **E. ⅛ N.** course leads almost directly for the buoys marking the SE. end of Eel Grass Ground and North Latimer Reef. A channel about 160 feet wide and 17 feet deep has been dredged across Noyes Shoal on the range of Stonington Breakwater Lighthouse and the west end of Inner Breakwater at Stonington. This channel has shoaled somewhat since it was dredged.

When crossing Noyes Shoal the depth of water should not be less than 14 feet.

Dangers.—**Eel Grass Ground** is described on page 43.
North Latimer Reef is described on page 43.
Noyes Shoal is described above.

1 B. ***Approaching from the Westward.***—Leave Ram Island Reef Light-vessel 150 yards on the port beam and steer **NE. by E. ⅝ E.**, heading for White Rock and passing about midway between the spindle on Ellis Reef and the red buoy (spar, No. 12) on the western end of the Eel Grass Ground.

When nearly up to White Rock and Stonington Breakwater Lighthouse bears **E.**, steer for the lighthouse on this course; leave White Rock 200 yards on the port hand and pass about 300 or 400 yards north of the buoy (spar, red, No. 8) on Noyes Rock. When past the buoy on Noyes Rock haul a little to the southward; give Stonington Breakwater Lighthouse a berth of at least 200 yards; then head **N. by E.**, and follow directions under section 2 following.

Or, to follow the main channel through Fishers Island Sound.—When well past Latimer Reef Lighthouse, and about 200 yards north of Seal Rocks (NE.) buoy (spar, red and black horizontal stripes) marking 13-foot spot, steer for eastern end of East Breakwater on a bearing **NE.** by **E.**, and when nearly up with the Middle Ground buoy haul to the northward. Pass about 150 or 200 yards west of the buoy on a course **N.** by **E.**, and proceed as directed in section 2 following.

Remarks.—As Ram Island Reef Light-vessel is approached, Ram Island with the large buildings on its southern end will show conspicuously. The spindle on Ram Island Reef and the red buoy to the southward of the reef will be seen to the northward and eastward of the light-vessel.

Stonington West Breakwater and the town of Stonington will be plainly seen as White Rock is approached.

Dangers.—**Ram Island Reef**, left on the port hand, lies about 400 yards **NNE.** of Ram Island Reef Light-vessel, and has from 5 to 7 feet of water over it and is marked by a red iron spindle with round cage. A buoy (nun, red, No. 14) in 18 feet of water lies 300 yards south of the spindle and just to the southward of a 6½-foot spot.

Ellis Reef, left on the port hand, marked near its eastern end by a black iron spindle, with round cage, is dry at low water. It lies **E. ¾ N.**, distant 1 mile from the southern end of Ram Island. About 300 yards to the northward of the spindle is a buoy (spar, black, No. 1) marking the entrance to Noank from the eastward.

Eel Grass Ground, left on the starboard hand, is described on page 43.

White Rock, left on the starboard hand, is a rocky islet, conspicuous on account of its solitary position. It lies **NE.** by **E. ¾ E.**, distant 2⅓ miles from Ram Island Reef Light-vessel, and **N.**, distant 1⅓ miles from Latimer Reef Lighthouse.

Noyes Rock, left on the starboard hand, is described below.

Latimer Reef, left on the port hand when passing through the main channel of Fishers Island sound, coming from the westward, is described on page 43.

2. ***From abreast Middle Ground buoy to the Inner Harbor.***—When 150 to 200 yards west of Middle Ground buoy steer **N.** by **E.** for Stonington entrance. Give the western end of East Breakwater a berth of about 250 to 350 yards and Stonington Breakwater Lighthouse (on the eastern end of Stonington West Breakwater) a berth of not less than 200 yards.

Pass between black buoy No. 1 and the western end of Inner Breakwater, and come to anchor, leaving a channel 300 feet wide from the end of the breakwater to the steamboat dock.

If desiring an anchorage inside East Breakwater, turn to the eastward and anchor to the northward of the breakwater in 12 to 16 feet of water before its eastern end bears **S.** by **E.** Vessels drawing more than 12 feet should anchor with the old light tower on Stonington Point bearing to the eastward of **NNE.**

If desiring an anchorage to the northward of Stonington West Breakwater, turn to the westward after passing Stonington Breakwater Lighthouse and anchor before passing to the northward of a line from the western end of the breakwater to the old lighthouse tower on Stonington Point.

If of less than 8 feet draft and desiring to enter Little Naragansett Bay (see description, page 41), take a pilot or tow.

Remarks.—On the **N.** by **E.** course Stonington Breakwater Lighthouse will be on the port bow and the old light tower on Stonington Point will be on the starboard bow.

Dangers.—**Noyes Rock**, marked by a buoy (spar, red, No. 8), has 9 feet of water over it, and lies ½ mile **WSW.** from Stonington Breakwater Lighthouse. Pass to the eastward of the buoy in entering from the southward.

The Shoal making out to the southward from Stonington Point is marked by a buoy (spar, red and black horizontal stripes). This buoy will be left on the starboard hand in entering the inner harbor.

Penguin Shoal buoy (spar, black, No. 1), inside of the harbor, is about 600 yards **N.** by **E. ¼ E.** from Stonington Breakwater Lighthouse, and marks **Penguin Shoal**, which has 4 to 9 feet of water over it. The shoal extends about 400 yards to the westward, and 200 yards to the southward of the buoy.

MYSTIC RIVER.*

This river flows into Fishers Island Sound about 3¾ miles to the westward of Stonington Harbor. It has a very narrow and crooked channel, but is navigable for vessels of 8 feet draft for about 1 mile above the town of Mystic. This town, about 1 mile below the head of navigation, is built on both banks of the river, which is here crossed by two bridges—town bridge (width of draw, 58 feet) and railroad bridge (width of draw, 62 feet).

Noank, a village on the western bank, at the entrance, is on the N. Y., N. H. & H. Railroad. The chief industries are shipbuilding and fishing. The deepest draft of vessels going to Noank is 18 feet; depth alongside wharves at low water, 10 feet.

Mystic, a town on both banks of the river, about 1½ miles above Noank, is on the line of the N. Y., N. H. & H. Railroad. There are several manufactories and shipyards at Mystic. The deepest draft of the vessels going up as far as this town at high water is 12 to 14 feet. The depth in the channel at low water is 15 feet, and the depth alongside the wharves at low water is 10 feet.

Prominent features.—Morgan Point (Mystic River) Lighthouse is on the southern end of Morgan Point (see table, page 10), south of the village of Noank; it is one of the guides leading up to the entrance of the river. Ram Island Reef Light-vessel is about ¼ mile to the southward of Ram Island (see table, page 10). Ram Island, about ½ mile **ESE.** from Morgan Point Lighthouse, is readily distinguished by the large hotel and buildings near its southern end.

Channels.—The entrance of the river is approached through two narrow and crooked channels, one from the eastward, passing north of Ram Island, and one from the westward and southward, passing south of Groton Long Point. These channels are both marked by spindles, beacons, and buoys, but strangers should not attempt them without a pilot. The eastern channel is generally used; vessels of 18 feet draft can enter by this channel. The deepest draft coming through the southern channel at low water is 12 feet.

Pilots are generally taken by strangers entering the river. Vessels from the westward desiring a pilot will get one by making signal off Groton Long Point. When coming from the eastward, if not boarded by a pilot, vessels sometimes anchor ¼ mile southwest of Baker Island, and wait, with signal flying, until one comes from Noank. Pilotage is not compulsory.

Towboats.—Vessels bound to Noank or Mystic generally take a tug, which can be had at Noank by telephoning to New London for one. A small Noank oyster steamer sometimes does towing.

Anchorage.—The anchorage for vessels bound into Mystic River from the eastward is about ¼ mile southwest from Baker Island—between it and the northern end of Ram Island—in 20 feet of water, soft bottom.

Small vessels of 50 to 100 tons sometimes anchor in the channel abreast of Noank. Good holding ground will be found anywhere in the channel of the river.

Repairs.—There are several well equipped shipyards and 4 marine railways at Noank; the largest railway, it is claimed, is able to haul out any class of vessel except ocean steamers. Ordinary repairs to the machinery of steamers can also be made here.

Supplies.—Anthracite and bituminous coal, in limited quantities, for steamers, and fresh water through hose, can be obtained alongside the wharves at Noank and Mystic. Provisions and ship-chandler's stores can be obtained at these places.

Tides.—The mean rise and fall of tides at Noank is 2.5 feet; high water occurs 8 m. before high water at New London, and low water 14 m. before low water at New London.

SAILING DIRECTIONS FOR APPROACHING MYSTIC RIVER.

1. ***From the Eastward.***—The following directions, if strictly observed, are good for 17 feet of water, but there are unmarked shoal spots near the sailing line, and vessels are liable to be set on these by the tidal currents. With vessels drawing more than 10 feet great care is necessary, and it is advisable to have a pilot in approaching.

When Napatree Point Ledge buoy (nun, red, No. 4) bears **N.**, distant 200 yards, make good the course **NW.** by **W.** for 3¼ miles, passing well to the southward of the red buoy (spar, No. 4½) off the southwest side of the Middle Ground and about 200 yards to the northward of North Latimer Reef buoy (spar, red and black horizontal stripes).

Pass about 150 yards to the northward of black buoy No. 1 north of the spindle on Ellis Reef, and continue on the **NW.** by **W.** course until the north shore of the northernmost of the two small islets north of Ram Island is in line with Morgan Point Lighthouse, then steer

*See footnote on page 40.

W. ¼ S. for the northern end of Ram Island. When Mason Point, the southern point of Mason Island, bears **N.**, distant a little over ⅛ mile, come to anchor in 20 feet of water, and wait for a pilot if one has not already come on board, or take a towboat.

Remarks.—On the **NW.** by **W.** course when off Napatree Point, Latimer Reef Lighthouse will be on the port bow, showing open just to the southward of Noank. Stonington and the East Breakwater will be broad on the starboard bow. When up with the buoy (spar, red and black horizontal stripes) on the North Latimer Reef the spindle on Ellis Reef will be made a little on the port bow and Baker Island will be ahead. Ram Island will be distinguished by the large summer hotel on its southern end and the outbuildings extending to the northward from the hotel.

On the **W. ¼ S.** course, heading for the northern end of Ram Island, the first islet north of Ram Island will show just clear, and Morgan Point Lighthouse will be well open to the northward of the northern end of Ram Island.

Dangers.—**Noyes Shoal,** having 10 and 11 feet over it, and not marked, is left on the starboard hand, 300 to 600 yards distant, on the **NW.** by **W.** course, until within about ½ mile of White Rock.

North Latimer Reef, left on the port hand, lies ⅝ mile **NE. ¼ E.** from Latimer Reef Lighthouse, has 11 feet of water, is of small extent, and is marked by a buoy (spar, red and black horizontal stripes).

Eel Grass Ground, left well on the port hand, is described on page 43.

White Rock and **Ellis Reef** are described on page 46.

A spot with 10 feet over it, not marked, lies about ¼ mile **NE.** by **E. ½ E.** from Gates Island and about 400 yards **S.** from the southern end of Baker Island. The sailing line passes about midway between this shoal spot and Baker Island.

Gates Island is a small island lying about ⅜ mile **S. ½ E.** from Mason Point.

1 A. *From the Westward.*—Pass about midway between North Dumpling Lighthouse and Seaflower Reef beacon, steering about **E. ½ N.** for Ram Island Reef Light-vessel and making signal for pilot. Do not go to the northward of the line of Groton Long Point spindle and Ram Island Reef Light-vessel, standing off and on until a pilot comes off. Keep well to the northward of the Clumps (see page 43).

Remarks.—The entrance to the Mystic River from the southward is buoyed, but it is advisable for a stranger, unless of very light draft, to remain outside as just directed until a pilot is obtained.

LONG ISLAND SOUND.*

Long Island Sound lies between the shores of Connecticut and New York on the north and Long Island on the south. To the eastward is Block Island Sound; at the western end Long Island Sound joins the East River between Throgs Neck and Willets Point. The distance from Little Gull Island Lighthouse to Execution Rocks Lighthouse is about 77 miles; the greatest width, nearly abreast New Haven entrance, is a little more than 16 miles, decreasing gradually to the eastward and to the westward. Long Island Sound affords sufficient room for beating to windward and has comparatively few dangers.

This large body of water is important as an approach to New York from the eastward, nearly all of the coasting vessels and steamers between New York and the Eastern States passing through bound both ways. It forms the approach to several important harbors and has a number of "tidal harbors."

A vessel drawing 25½ feet has been taken through Long Island Sound and East River, but this was exceptional. Ordinarily, the greatest draft passing through does not exceed 23 to 23½ feet; vessels of as deep draft as this, trading to New York, sometimes go to sea by way of the Sound, but generally come in by way of Sandy Hook.

Channels leading into the Sound.—The principal approach to Long Island Sound from the eastward is through Block Island Sound and The Race. Besides The Race there are two other passages leading into Long Island Sound, one to the northward through Fishers Island Sound (see page 40), and one from Gardiners Bay through Plum Gut (see page 32). Vessels of deep draft pass in through The Race. Vessels of 14 feet draft or less, with a strong, favorable breeze, sometimes pass through Fishers Island Sound with an adverse tide, the tidal current here being weaker than in The Race. Plum Gut has water for vessels of deep draft, but is not generally used by vessels over 15 feet draft on account of the strong tidal current and the dangers.

* Long Island Sound is shown, in three sheets, on Coast and Geodetic Survey charts 114, 115, 116, as follows, scale $\frac{1}{80,000}$, price, $0.50 each; 114, Eastern sheet, Newport to Plum Island, including Block Island Sound; 115, Middle sheet, Plum Island to Stratford Shoal; 116, Western sheet, Stratford Shoal to New York. Long Island Sound is also included within the limits of charts 8, 53, and A; see the footnote on page 9.

There is also a passage to the westward of Great Gull Island, between it and Plum Island, but it is dangerous and should not be attempted.

Lights and other aids.—At night, in clear weather, no difficulty should be experienced in entering through The Race and passing through the Sound, as the lights are numerous and readily distinguished; they are described on pages 10–15. In many places in the Sound 5 or 6 lights will be in sight at the same time, making navigation comparatively easy. The buoyage accords with the system adopted in United States waters (see page 5).

Pilots for the Sound and East River (Hell Gate pilots) will sometimes be found cruising in small boats near Little Gull Island Lighthouse, or just inside The Race off New London, and are sometimes to be found cruising in small boats off New Haven Harbor, Huntington Bay, Hempstead Harbor, and to the westward as far as Whitestone (see heading "East River"). A number of the Hell Gate pilots have their headquarters at City Island. To the westward of New Haven one is pretty sure to be obtained upon making signal, except in very bad weather; at such times vessels desiring a pilot and failing to pick one up generally go into Huntington Bay or Hempstead Harbor, or seek some other suitable anchorage, until the weather moderates.

Pilotage is compulsory for foreign vessels and vessels from a foreign port, and all vessels sailing under register, going to the port of New York. Extracts from the laws of Connecticut and New York, relating to Pilots and Pilotage, are given in Appendix I.

Towboats are generally to be found in the vicinity of City Island, in the western part of the Sound, and in East River. In case of necessity they can be obtained from New York by telegraphing at City Island or at Whitestone. Vessels bound to New York and intending to take a towboat should do so before going to the westward of Rikers Island (see heading "East River"). At some of the principal ports in the Sound towboats can be obtained, as stated under the several headings.

Harbors and Anchorages.—A number of the shoal harbors which were formerly used by the comparatively small vessels then engaged in the coasting trade are now of little importance. Much of the carrying trade of these places is now done by the railroads and such harbors are seldom entered for shelter merely, the sloops and very small schooners of former days having been succeeded by larger schooners, much of the coasting trade being now carried by three-masted and four-masted schooners. Under present conditions, coasters bound to the westward sometimes almost reach New Haven, and then being driven back return all the way to Niantic Bay or to New London Harbor for shelter, if they can not make the anchorage behind Duck Island breakwater. To the westward of the Norwalk Islands seagoing vessels frequently anchor on shoaling their water sufficiently toward the north shore, and with good ground-tackle thus find sufficient shelter against northerly wind and sea without attempting to make any particular harbor.

New London Harbor is the most important of the anchorages sought for shelter in the eastern part of Long Island Sound. *Niantic Bay* is used considerably, and serves as a general anchorage ground for vessels bound foreign and having unfavorable winds on reaching the eastern part of the Sound. The anchorage ground used by such vessels lies within the limits of Bartlett Reef, Hatchett Reef, and the north shore. The holding ground is good and it is easy to get in and out. This is frequently spoken of as the *anchorage off Black Point*. Smaller vessels stand farther inside, going well up into Niantic Bay. The small harbors along the north shore between Niantic Bay and New Haven, excepting Duck Island Roads, are not often entered merely for shelter. Sea-going vessels sometimes anchor off shore in northerly winds. *Off Madison* there is good anchorage sheltered from northerly winds. With westerly winds vessels sometimes anchor undef the lee of *Falkner Island* (see the detailed directions for Long Island Sound). *New Haven Harbor* is an important harbor of refuge. On the south shore there is an anchorage to the westward of *Crane Neck*, but it is dangerous in winter, and should always be left upon the first indication of a northerly or northwesterly wind. Large vessels frequently anchor in the *bight outside Bridgeport Harbor Lighthouse*, and *Black Rock Harbor* is frequently sought by light-draft vessels. *Huntington Bay*, on the south shore, is much used, and the large Sound steamers sometimes seek shelter in it. *Oyster Bay* is also used, on the south shore. *Cockenoe Island Harbor*, on the north shore, is not often entered for shelter; vessels in this vicinity prefer to make *Sheffield Island Harbor* (Norwalk Harbor), which is also often used by tows. *Captain Harbor* affords good shelter, but it is not very much used. *To the westward of the Norwalk Islands* it is usual for vessels to anchor along the north shore of the Sound, as already noted. *Hempstead Harbor* is used a great deal, and vessels of suitable draft often use *Manhasset Harbor*. *City Island Harbor* (Hart Island Roads) is a great resort for coasters; small vessels anchor between Hart and City islands, large vessels anchor to the southward of City Island. All of these harbors and others in Long Island Sound are treated of under special headings.

Repairs, etc.—Machine shops for repairs to the machinery of steamers will be found at the following places to the eastward of New York: New London, New Haven, Bridgeport, Hartford, and City Island. Vessels requiring heavy work generally go to New York. (See also pages 32 and 47.)

Marine railways and shipyards for the repair of vessels will be found at the following places: New London, capacity of railways up to 600 tons and 165 feet length of cradle; Port Jefferson, capacity of railways from 50 to 1,200 tons; Black Rock has two small marine railways; Cold Spring has two marine railways of small capacity; Northport has three marine railways, the largest with a capacity of 300 tons; City Island has five railways, capacity up to 1,000 tons; Hartford has one railway, capacity 500 tons; New Haven has one railway, capacity 400 tons. (See also pages 32 and 47.)

Quarantine.—The quarantine laws of Connecticut govern the ports in that State; local boards of health have the power to make sanitary regulations for the ports under their control. The laws of the State of New York govern the ports of that State, including those on the shore of Long Island; the quarantine laws for the city of New York control vessels to the westward of Execution Rocks Lighthouse. (See Appendix I.)

Ordinarily there is no special boarding station for vessels coming through the Sound bound to New York. During periods when the necessity for such course has been felt, health officers have been detailed and temporary boarding stations established at or near the Sound entrance of the East River. The health officer of the port of New York has his headquarters at Southfield (just above Fort Wadsworth), Staten Island, as stated in Appendix I.

The **Marine Hospital** at Stapleton, Staten Island, New York, under the charge of the Marine-Hospital Service, is the one to which seamen entitled to hospital treatment are sent from relief stations in the Sound, if there is no local hospital available. New London and New Haven have relief stations of Class III, and Hartford and Bridgeport have relief stations of Class IV of the U. S. Marine-Hospital Service. (See Appendix III.)

Wind signals.—A list of display stations of the U. S. Weather Bureau, from which wind signals are shown, is given on page 20.

Supplies.—Coal, fresh water, provisions, and ship-chandler's stores can be obtained at New London, Hartford, Bridgeport, and New Haven. Supplies other than coal can be obtained at City Island. As mentioned under their separate headings, there are other places in the Sound where coal and other supplies can be obtained, but the quantity to be had is apt to be limited and the facilities are not always good. New London is available as a coaling port for large vessels.

Reporting stations.—In the western part of the Sound there is a station at City Island from which vessels are reported. There is also one at Whitestone, Long Island (see headings "City Island Harbor" and "East River"; see also page 20).

Oyster grounds, marked off by buoys, stakes or poles, occupy a considerable part of some of the bays and harbors of the Sound, and also extend well off shore into the Sound at some points, as off New Haven entrance, where they are carried out into 5 to 8 fathoms of water.

Steamboat courses.—Each line or each steamer has its own track, which differs somewhat from others. A route sometimes followed by the steamers of one line is given as an example: Bound west, passing through The Race, the course is shaped to pass about 1 mile to the southward of Cornfield Point Light-vessel; the course is then changed so as to pass about 1 mile to the southward of Stratford Shoal (Middle Ground) Lighthouse; here the course is changed again so as to lead about 1 or 1½ miles south of Norwalk Island Lighthouse, thence heading for Execution Rocks Lighthouse.

Bound east, the reverse courses are followed.

In clear weather, bound west, after passing into the Sound through The Race, the course is sometimes shaped to pass 1½ miles to the northward of Horton Point Lighthouse (south shore), and thence to pass 1 mile to the southward of Stratford Shoal Lighthouse, as before, and continuing the route already given.

Eatons Neck is generally given a wide berth on account of the number of small vessels frequently found in its vicinity, and deep-draft vessels avoid it on account of the shoal spots lying to the northward of Eatons Point. Apart from this, the foregoing route is based mainly upon convenience in using the thick weather aids when they are needed.

A direct route, frequently used under favorable circumstances, is as follows: Having entered through The Race, when passing to the northward of Little Gull Island Lighthouse the course is shaped **W. ⅝ S.**, with Race Rock Lighthouse almost directly astern. This leads about 2 miles south of Cornfield Point Light-vessel and about 5 miles to the southward of Falkner Island Lighthouse. When Stratford Shoal (Middle Ground) Lighthouse is made, the course is shaped to pass about 1 mile to the southward of it. Vessels drawing less than 15 feet often continue the **W. ⅝ S.** course from Stratford Shoal Lighthouse, passing to the northward of the black buoys off Eatons Neck and Lloyd Neck and until past Great Captain Island Lighthouse (north shore), or until Execution Rocks Lighthouse bears **WSW.**, then heading for the latter on this bearing.

The **prevailing winds** in Long Island Sound are referred to on page 9. (For remarks concerning **fogs** in the Sound and adjacent waters see page 9.)

Variation of the compass.—The variation of the compass at different points for 1900 is given on page 24.

Tides.—The table on page 22 gives tidal data for Long Island Sound and the adjacent waters.

TIDAL CURRENTS IN LONG ISLAND SOUND.

	Locality of Station.			
	Long Island Sound, 4 miles S. from the mouth of the Connecticut River.		Long Island Sound, 8 miles S. from The Thimbles.	
	Compass direction.	Velocity.	Compass direction.	Velocity.
		Knots.		*Knots.*
Hours before H. W. at New London 2	W. ¼ N.	1.1	W. ¼ N.	0.7
Hours before H. W. at New London 1	WSW.	1.5	W. ¾ S.	0.9
Hours before H. W. at New London 0	WSW. ¼ W.	1.6	WSW. ¼ W.	1.9
Hours after H. W. at New London 1	NW. by W. ¼ W.	1.2	WSW. ¼ W.	0.7
Hours after H. W. at New London 2	E. by N.	0.0	SW. by W. ¼ W.	0.3
Hours after H. W. at New London 3	NE. by E. ¾ E.	1.1	NE. by E.	0.2
Hours before L. W. at New London 2	NE. by E.	2.1	ENE. ½ E.	0.9
Hours before L. W. at New London 1	NE. by E. ¼ E.	2.4	ENE. ¾ E.	1.2
Hours before L. W. at New London 0	NE. by E. ¾ E.	2.5	ENE. ¼ E.	1.0
Hours after L. W. at New London 1	ENE.	1.6	NE. by E. ¾ E.	0.6
Hours after L. W. at New London 2	E. ½ N.	0.8	NE. by E. ¼ E.	0.4
Hours after L. W. at New London 3	NW. by W. ¾ W.	0.3	W. ¾ N.	0.1

All along the axis of the Sound from The Race to Eatons Point ebb begins about 2 hours 20 minutes after high water, and flood begins about 3 hours after low water at New London, Conn. Farther west these intervals gradually increase, but become very uncertain.

At the eastern end of the Sound the currents turn about an hour earlier along the shores than along a line midway between the shores.

In The Race the average velocity at strength of ebb is 3.0 knots per hour, and of flood 2.5 knots; but at times it attains a velocity of 4 to 5 knots. Going westward along the axis of the Sound these velocities gradually diminish until south of New Haven, where they are 1.1 and 1.0 knots, respectively. Going farther west they increase slightly until north of Eatons Point, where they are 1.3 and 1.4 knots, respectively. Still continuing westward, the velocities again diminish until between Rye Neck and Matinicock Point, where the ebb and the flood are not distinct and the velocity of either is 0.5 knots. Westward the velocities increase slightly, and off Pelham Bay are 0.9 knots for ebb and 0.7 knots for flood. (See also table, page 23.)

ICE IN LONG ISLAND SOUND AND ADJACENT HARBORS.

In ordinary winters the floating and pack ice in this sound, while impeding navigation, does not render it absolutely unsafe. But in exceptionally severe winters, like that of 1874–75, the reverse is the case, none but powerful steamers being able to make their way. During that winter ice caused more general obstruction and delay in the movement of vessels of all classes here than in any other locality west of the Gulf of Maine.

The first large formation extended along the southern shore of the Sound from Eatons Neck to Throgs Neck, and was composed of partly local and partly drift ice. The latter (formed originally along the northern shore of the Sound) was driven across to the southern side and accumulated there, massing into large fields and remaining until removed by southerly winds, when it would drift back to the northern shore, and increased continually in area until the whole Sound was covered; and where forced upon the shore it measured from three to twelve feet in thickness.

In the western part of the Sound these formations began to interfere with navigation about the middle of January, 1875, and thence until the 23d of March they rendered the movements of sailing vessels very uncertain and dangerous, and between February 5 and March 10 altogether impossible. From February 5 to February 23 none but powerful steamers could be forced through the ice; and between the 16th and 23d even these, with one exception, were obliged either to go outside of Long Island or discontinue their trips altogether, the whole Sound being completely covered with heavy ice extending through The Race and as far to the eastward as Point Judith and Block Island, and outside of Montauk Point to a distance varying from five to fifteen miles from land.

Such conditions are of very rare occurrence.

New London Harbor.—The lower part of the Thames River is rarely much obstructed by ice. In extremely severe winters, however, the pack has been known to extend about 1¾ miles above the lighthouse. Between New London and the mouth of the river sailing vessels may navigate with comparative safety in ordinary winters; and even in severe weather there is rarely a stoppage of navigation of more than a week's duration. Steamers can nearly always enter and leave with safety. Drift ice sometimes forms a decidedly dangerous obstruction in the approaches through Long Island Sound during severe winters, especially during February and March; and sailing vessels are much hindered in their movements during the months of January, February, and March.

New Haven Harbor.—During severe winters the accumulation of ice is local, and begins to obstruct the movements of sailing vessels in December. From that month until the latter part of March it frequently bars the ingress or egress of sailing vessels without the assistance of tugboats. Except in extraordinarily severe weather, however, steamers can always enter and leave the harbor without much difficulty.

Bridgeport Harbor.—In exceptionally severe winters this harbor is liable to be completely closed to all navigation unless a channel is cut through "the pack" by ice boats. Ordinarily the regular steamers keep the channel open.

Effect of tides, winds, etc., on the ice in the Sound and the above harbors.—In Long Island Sound northerly winds drive the ice to the southern shore of the Sound and southerly winds carry it back to the northern shore. Northeasterly winds force the ice to the westward and cause formations heavy enough to prevent the passage of vessels of every description until the ice is removed by westerly winds. These winds carry the ice to the eastward, and if of long enough duration drive it through The Race into Block Island Sound, whence it goes to sea and disappears.

The Race may be said to be the only locality where tidal currents have any decided influence on the movements of the ice. Large quantities of "floe" ice usually pass through The Race during the ebb, especially if the wind be westerly; and in severe winters this ice causes serious obstructions in Block Island Sound and around Montauk Point. These obstructions are the most extensive about the middle of February.

Navigators must not depend too implicitly upon the light-vessels and buoys. In severe winters these are liable to be carried away; and in fact during every winter it is better to go by the ranges of the lights and other permanent objects than by the buoys. In New London Harbor winds from **E.** around by the northward to **W.** remove all drift ice from the approaches to the Thames River; while those from **ESE.** by the southward to **WSW.** carry the ice away. The buoys in the river are not usually disturbed; but Bartlett Reef Light-vessel is sometimes drifted from position off the mouth of the harbor and may in extreme cases remain so for several days.

In New Haven Harbor the influence of the northerly winds is to clear the harbor and its approaches unless the local formation is too heavy to be moved. Southerly winds force the drift ice in from the Sound and prevent the local formations from leaving the harbor. Tides have little effect upon the ice.

In Bridgeport Harbor winds from **N.** to **NW.** clear the harbor of drift ice, and those from **SE.** by southward to **SW.** force the ice into the harbor from the Sound. The outer buoys are apt to be carried out of position and the jetty damaged by heavy ice during severe winters.

THE RACE.

The Race is the main channel leading into the eastern end of Long Island Sound. From Race Point, the southwestern end of Fishers Island, to Little Gull Island the width is about 4 miles.

Race Rock Lighthouse marks the northern side of the passage. Little Gull Island Lighthouse marks the southern side. Between these lighthouses the only dangers are Valiant Rock and Little Gull Island Reef (see page 53).

There is also a narrow passage to the northward of Race Rock Lighthouse.

The **tidal currents** through The Race have considerable velocity, being sometimes 4 or 5 knots. The ebb current sets southeasterly and the flood sets northwesterly and westerly. The current turns from flood to ebb about 20 minutes after the moon's southing (transit), and turns to run to the westward again about 6¼ hours later (see table, page 23). There is always a strong **tide rip** in The Race except for about half an hour at slack water, during which period only is there any marked decrease in the velocity of the current.

Vessels approaching The Race with an adverse current often find it to their advantage to pass through near Race Rock, as the current turns here about an hour before it does in the middle of The Race. On the last of the ebb or the flood in the middle of The Race the current on either side will be running in the opposite direction.

During the ebb eddies are formed to the southeastward of Race Rock Lighthouse; these cover several acres. While the flood is running similar eddies are formed to the northwestward of the lighthouse. Small

craft are sometimes seen anchored in these eddies, but they always get under way as soon as the current slacks, to avoid the danger of lying in the full strength of the current during the next tide.

Vessels attempting to beat through The Race with the current against them are often unable to get through until the tide turns.

SAILING DIRECTIONS, LONG ISLAND SOUND.

General outline of arrangement.—The following are the general headings under which the directions given for Long Island Sound are arranged:

Approaching and entering through The Race.
Through courses, The Race to Execution Rocks.
Sailing directions in detail for the Sound.
General directions for beating through the Sound.

APPROACHING AND ENTERING THROUGH THE RACE.

Courses through Block Island Sound are given in sections 1 and 1 A, pages 27–28 and 30–31. When approaching and going through The Race the guides are Race Rock Lighthouse, on the northern side of The Race, and Little Gull Island Lighthouse, on the southern side (see page 10).

1. ***From the Eastward.***—Any of the following directions may be used:

I. Keep Race Rock Lighthouse on any bearing between **W. ¼ N.** and **NW.** in approaching, and pass 150 yards to ½ mile south of this lighthouse in going through The Race. ***Or,*** approaching as just directed, pass to the northward of this lighthouse, giving it a berth of 200 yards or more, and leaving Race Point buoy (spar, red, No. 2) on the starboard hand. This passage is narrow, but has good water.

NOTE.—The ***tidal current*** turns near Race Rock about an hour earlier than it does in the middle of The Race. Vessels approaching The Race with the current against them often take advantage of this, keeping Race Rock Lighthouse the best aboard, or passing to the northward of it.

II. Keep Little Gull Island Lighthouse on any bearing between **W.** by **S.** and **WNW.** (through **W.**) in approaching, and pass ½ mile to 1 mile to the northward of this lighthouse in going through The Race.

III. ***In beating,*** keep Race Rock Lighthouse bearing to the northward of **W. ¼ N.** and keep Little Gull Island Lighthouse bearing to the westward of **WNW.** in approaching. In passing through The Race, avoid Valiant Rock and give the lighthouses a berth as directed in paragraphs I and II.

IV. ***At night,*** Race Rock Light and Little Gull Island Light should be made about the same time, and any of the foregoing directions may be followed. In passing through The Race, when New London Light bears **N.** if you are on, or to the westward of, a line drawn from Race Rock Light to Little Gull Island Light, you will be clear of Valiant Rock.

The ***tidal currents*** have considerable velocity in The Race. (See the remarks immediately preceding these directions.)

Dangers.—*In the passage to the northward of Race Rock Lighthouse* the only danger is Race Point Ledge, on the northern side of the passage. Race Rock Lighthouse, on the southern side of the passage, should be given a berth of 200 yards or more.

In the main passage, between the two lighthouses, the only dangers are Valiant Rock, in the middle of The Race, and Little Gull Island Reef, on the southern side of the passage. *Cerberus Shoal,* the chief danger in approaching, is described on page 27.

Race Point Ledge makes out southwesterly for nearly ¼ mile from the southwestern end of Fishers Island. It has bowlders with from 3 to 9 feet over them at lowest tides; outside these is a buoy (spar, red, No. 2) in 17 feet water.

Race Rock, on the northern side of The Race, is marked by Race Rock Lighthouse (see page 10).

Valiant Rock, nearly in the middle of The Race, has 19 feet of water over it at mean low water. From the rock Race Rock Lighthouse bears **NE. ½ E.,** distant 1¼ miles, and Little Gull Island Lighthouse bears **WSW.,** distant 2¼ miles.

Little Gull Island Reef extends nearly ¼ mile in a northeasterly direction from Little Gull Island Lighthouse, and is marked at its eastern end by a buoy (can, black, No. 1).

Little Gull Island Lighthouse is described in the Table of Lights, page 10. For bearings and distances from it see page 19.

1 A. ***From the Southeastward.***—Courses through Block Island Sound are given on page 30. *Having passed to the northward of Cerberus Shoal*, in approaching and passing through The Race follow any of the directions given under section 1, foregoing, for vessels coming from the eastward.

Having passed to the northward of Shagwong Reef and to the *southward of Cerberus Shoal*, in approaching The Race, shape the course for Race Rock Lighthouse on any bearing from **NNW. ½ W.** to **NE. ¾ N.** (by way of **N.**), or shape the course for Little Gull Island Lighthouse on any bearing from **NW.** by **W. ¼ W.** to **N.** by **W.** In passing through The Race follow the directions of section 1, foregoing.

Dangers to be avoided when past Montauk Point and before coming up with The Race are Shagwong Reef and Cerberus Shoal (see pages 27 and 30). Dangers in The Race are described under section 1, foregoing.

1 B. ***From Gardiners Bay into Long Island Sound, through Plum Gut.***—Vessels bound into the Sound, if they have anchored in Gardiners Bay, find it a great saving in distance to go through the Gut. With a favorable strong breeze and flood current, vessels drawing 15 feet or less may pass through without danger by observing the following directions:

Pass about 400 yards south of the southern end of Pine Point, the southernmost point of Plum Island, and steer **NW. ¾ W.**, so as to pass about midway between Orient Point Lighthouse and Plum Island Lighthouse.

Or, bring Plum Island Lighthouse to bear **NNE. ¼ E.**, and keep it on that bearing, taking care not to be set nearer than 500 yards to Orient Point Lighthouse.

When Plum Island Lighthouse is ⅝ mile distant ahead, bearing **NNE. ¼ E.**, steer more westerly so as to pass midway between it and Orient Point Lighthouse.

The ***tidal currents*** through Plum Gut have great velocity. See section 1 A, page 33.

On the flood, the current sets to the westward directly on Oyster Pond Reef.

On the ebb, vessels bound to the westward through Plum Gut, and acquainted with the locality, are often able to slip through by hugging Orient Point Lighthouse as closely as is safe and keeping in with the Long Island shore, when otherwise the passage would be impracticable for them.

Dangers in Plum Gut are described under section 1 A, page 33.

SAILING DIRECTIONS, LONG ISLAND SOUND.

THROUGH COURSES FROM THE RACE TO EXECUTION ROCKS LIGHTHOUSE.

Note.—An outline is given on page 53 of the general headings under which the directions for Long Island Sound are arranged.

1. ***A direct route*** through Long Island Sound is the following, which is available for vessels of less than 20 feet draft in clear weather. In thick weather it would not be used, owing to the distance at which it passes some of the important fog signals.

With Little Gull Island Lighthouse bearing **S.**, distant a little more than 1 mile, make good the course **W. ⅝ S.** This course made good for a little more than 60 miles leads a little to the northward of the black buoy (can, No. 13) off Eatons Neck Lighthouse, and when nearing this lighthouse the course should be shaped so as to pass about ¼ mile to the northward of black buoy No. 13. Farther to the northward, off Eatons Neck, there are rocky shoal spots with 16 to 19 feet of water over them. The former of these spots is marked by a buoy (spar, red and black horizontal stripes).

When well past Eatons Neck Lighthouse, haul a little more to the northward, so as to pass ¼ mile to the northward of the black bell buoy off Lloyd Point, and when past this buoy continue the **W. ⅝ S.** course until Execution Rocks Lighthouse is made.

In approaching Execution Rocks Lighthouse, steer for it on any bearing from **SW. ¼ W.** to **WSW. ½ W.** It is usual to pass to the southward of this lighthouse. The shoal ground making out from the lighthouse is marked by buoys. Directions from Execution Rocks Lighthouse to Throgs Neck will be found under section 6 of the "Sailing Directions in detail for passing through Long Island Sound."

The *tidal currents* have considerable velocity, especially in the eastern part of the Sound, and allowance should be made for them (see table, page 23).

Prominent objects.—The following are some of the most prominent features passed, their distances when abeam or nearly so on the **W. ⅜ S.** course being given in some cases:

Left on the Port hand.	Left on the Starboard hand.
	1. Bartlett Reef Light-vessel, about 2¾ miles distant.
2. Great Gull Island.	Niantic Bay will be opened out.
3. Plum Island and Orient Point lighthouses, the former about 2 miles distant.	The Connecticut River entrance will be opened out.
4. The shore of Long Island will be about 2 miles distant until you are about 7 miles to the westward of Plum Island Lighthouse.	
	5. Saybrook (Lynde Point) Lighthouse and Saybrook Breakwater Lighthouse, distant about 4¾ and 5¼ miles.
	6. Cornfield Point Light-vessel, distant about 2¼ miles (marks the dangerous Long Sand Shoal). After passing this light-vessel Falkner Island Lighthouse may be made off the starboard bow.
7. Horton Point Lighthouse, distant about 4½ miles.	8. Six-mile Reef buoy, distant 2 miles (difficult to pick up).
	9. Falkner Island Lighthouse, distant about 5¼ miles.
10. Friar Head, a conspicuous high white pointed bluff, bearing **SSW.** from Falkner Island Lighthouse.	
	11. Southwest Ledge Light at New Haven entrance (at night), distance about 9½ miles.
	12. Stratford Point Light (at night), distant about 7 miles.
	13. Stratford Shoal (Middle Ground) Lighthouse, distant 1½ miles.
14. Old Field Point Lighthouse, distant about 3 miles. About 2 miles to the westward of this lighthouse is Crane Neck; between the latter and Eatons Neck is Smithtown Bay.	
	15. Penfield Reef and Black Rock lights (at night), the former distant about 6¼ miles.
17. Eatons Neck Lighthouse, nearly 1¼ miles distant. Pass ¼ mile to the northward of the black buoy No. 13. Shoal patches (16 to 19 feet) to the northward of the course.	16. Norwalk Island Light (at night), about 4½ miles distant.
18. Lloyd Point, distant ⅜ mile (see directions).	
To the westward of Lloyd Point, Oyster Bay will be opened out.	19. Stamford Harbor Light (at night), distant about 3¾ miles.
20. Center Island Reef buoy (spar, black, No. 15) should be left 1 mile distant on the port hand.	

Left on the Port hand.	Left on the Starboard hand.
	21. Great Captain Island Lighthouse, distant about 3 miles. Greenwich church spire may show above the outline of the hills.
22. Matinicock Point, distant ⅝ mile. Pass about ½ mile to the northward of black buoy No. 17.	
Execution Rocks Lighthouse and Sands Point Lighthouse (the latter on the south shore) should be in sight, the latter a little on the port bow. The high red tower on Davids Island may be seen.	
23. Prospect (Pulpit) Point should be given a berth of about ¾ mile or more.	

1 A. ***Having come through The Race, as in section 1,*** with Race Rock Lighthouse bearing **E. ⅝ N.**, make good the course **W. ⅝ S.** This course made good for 49 miles from Race Rock Lighthouse leads a little more than 1½ miles to the southward of Stratford Shoal (Middle Ground) Lighthouse, the sailing line thus far agreeing nearly with that already given on page 54.

Now, to avoid the shoal ground off Eatons Neck, when Stratford Shoal (Middle Ground) Lighthouse bears **N.**, distant about 1½ miles, make good the course **W. ¾ N. Westerly** for 14½ miles. This should lead 1½ miles to the southward of Norwalk Island Lighthouse.

With Norwalk Island Lighthouse bearing **N.**, distant 1½ miles, shape the course **WSW. ⅛ W.** and proceed as directed under section 5 of the "Sailing Directions in detail for passing through Long Island Sound."

The foregoing courses (1 A) carry the best water through the Sound.

The ***tidal currents*** have considerable velocity and should be allowed for.

1 B. ***Having come through The Race, and desiring to take a departure from Cornfield Point Light-vessel,*** follow the directions for the north shore given under section 1 of the "Sailing Directions in detail for passing through Long Island Sound" until close to the southward of Cornfield Point Light-vessel.

Then to pass to the *northward* of Stratford Shoal (Middle Ground) Lighthouse, make good the course **W. ⅛ N.** for about 12½ miles, or until Falkner Island Lighthouse bears **N.**, distant 1½ to 2 miles, when follow the directions of section 3 of the detailed directions.

From Cornfield Point Light-vessel, to pass to the *southward* of Stratford Shoal (Middle Ground) Lighthouse, shape the course **W. ¾ S.**; this course made good for about 34 miles leads about 1½ to 2 miles to the southward of Stratford Shoal (Middle Ground) Lighthouse, but requires great care with deep-draft vessels on account of Six-Mile Reef (19 feet). Large vessels should keep a little more to the northward or to the southward until past this reef.

In approaching Stratford Shoal Lighthouse, shape the course so as to pass about 1½ miles to the southward of it and then follow the directions (1 A), foregoing.

Six-Mile Reef is directly in the track on the **W. ¾ S.** course. This reef has a general depth of 5 to 7 fathoms. Near its western part, 6 miles **W. ½ S.** from Cornfield Point Light-vessel, is a small ledge about ¼ mile in diameter, over which the least depth is 19 feet. The ledge is marked by a buoy (nun, red and black horizontal stripes).

Tidal currents have considerable velocity in this part of the Sound, and allowance should be made for them.

SAILING DIRECTIONS IN DETAIL FOR PASSING THROUGH LONG ISLAND SOUND.

Note.—The directions for proceeding along the south shore follow after the completion of the directions for the north shore. For outline of arrangement of matter see page 53.

1. ***Along the north shore to Cornfield Point Light-vessel.***—I. ***Having come through The Race.***—Directions for approaching and passing through The Race are given in sections 1 and 1 A, pages 27, 30. The course is about **W. ⅝ N.**, until Cornfield Point

Light-vessel is made. If in coming through The Race you have favored Race Rock Lighthouse (on the north side of The Race), shape the course a little more southerly; if you have favored Little Gull Island Lighthouse (on the south side of The Race), shape the course a little more northerly.

When Cornfield Point Light-vessel (about 14 miles to the westward of The Race) is made, keep it ahead in approaching, and pass close to the southward of it. Then follow directions in paragraph I or II under section 2, following.

The *tidal currents* have considerable velocity, setting to the westward on the flood and to the eastward on the ebb (see page 23).

Remarks.—New London entrance and lighthouse (mouth of Thames River) lie about 5 miles to the northward of The Race. On the **W. ⅝ N.** course Bartlett Reef Light-vessel (3½ miles to the northwestward of The Race) will be left on the starboard hand; foul ground lies inshore from this light-vessel. Niantic Bay (high white tower at its head) will be opened to the westward of the light-vessel. To the southward, Great Gull Island and Plum Island (lighthouse on its western end) will be seen, and when farther to the westward Orient Point Lighthouse and Plum Gut, leading into Gardiners Bay, will be opened out.

Cornfield Point Light-vessel (described on page 10) will be made ahead. This light-vessel, a most important guide, is moored about 1 mile to the southward of the dangerous Long Sand Shoal, about midway of the length of the shoal.

Dangers.—**Long Sand Shoal** extends **E.** and **W.** about 5½ miles; greatest width nearly ⅝ mile; the depths over it are from 8 to 17 feet, bottom hard and lumpy; but as the lumps are shifting in position and size, spots with but 4 feet over them may sometimes be found at extreme low tides. The shoal is marked by a spar buoy (red and black horizontal stripes) on its eastern end, and by a nun buoy (red and black horizontal stripes) at its western end. Cornfield Point Light-vessel is 1 mile south of it and nearly midway between the buoys. From Long Sand Shoal (west end) buoy Saybrook Breakwater Lighthouse bears **ENE. ⅝ E.**, distant 5 miles, and Six-Mile Reef buoy (nun, red and black horizontal stripes) bears **SW.** by **W. ¼ W.**, distant 3¾ miles.

The **tidal currents** have considerable velocity over Long Sand Shoal, setting about **WNW.** on the flood and **ESE.** on the ebb.

II. ***Having come through Fishers Island Sound.***—Passing midway between Seaflower Reef beacon and North Dumpling Lighthouse, shape the course **W. ½ S.** for Bartlett Reef Light-vessel, which is to be left on the starboard hand. When past this light-vessel bring it to bear **E. ½ N.** and make good the course **W. ½ S.**; on the flood it will be necessary to steer more southerly. The **W. ½ S.** course made good about 11¾ miles from Bartlett Reef Light-vessel leads close to the southward of Cornfield Point Light-vessel; when up with this light-vessel follow directions under section 2, paragraph I or II, page 58.

1 A. ***Along the North Shore, Passing to the Northward of Long Sand Shoal.***—Strangers should not attempt this passage at night nor in thick weather. The entrance to the channel leading north of Long Sand Shoal is 8½ miles west from Bartlett Reef Light-vessel. It is about ½ mile wide and is marked by two buoys—on the north side a buoy (nun, red, No. 8) marking the southern point of a shoal making out from Saybrook Bar, mouth of Connecticut River; on the south side a buoy (spar, red and black horizontal stripes) marking the eastern end of Long Sand Shoal. The courses under the following paragraphs lead to a position about 200 yards to the southward of red nun buoy No. 8.

I. ***Having come through The Race*** from a position near Race Rock Lighthouse, make good the course **WNW. ⅞ W.** for 12 miles, until up with the buoy (nun, red, No. 8) off Saybrook entrance. Pass to the southward of this buoy, giving it a berth of about 200 yards. Then proceed as directed in section 2 A, paragraph I or II, pages 59–60.

Or, if near Little Gull Island Lighthouse, bring this lighthouse to bear **SE.** by **E. ⅝ E.**, and make good the course **NW.** by **W. ⅝ W.** for about 9½ miles from Little Gull Island Lighthouse, keeping Saybrook Lynde Point Lighthouse and Saybrook Breakwater Lighthouse well on the starboard bow until abreast of the buoy (nun, red, No. 8). Then proceed as directed in section 2 A, paragraph I or II, pages 59–60.

Or, being well to the southeastward of Saybrook entrance, or having come through Plum Gut, bring Plum Island Lighthouse to bear **SE. ¾ S.**, and Saybrook Breakwater Lighthouse to bear **NW. ¾ N.**, and steer for the latter, keeping the bearing. When up with the buoy (nun, red, No. 8) proceed as directed in section 2 A, paragraph I or II, pages 59–60.

Remarks.—The tidal currents have considerable velocity, setting to the westward on the flood, and to the eastward on the ebb.

When Saybrook Breakwater Lighthouse bears **NW. Westerly** the buoy (nun, red, No. 8) marking the entrance to the channel leading north of Long Sand Shoal is in range with this lighthouse, and the lighthouse on a bearing of **NW. ¾ N.** will lead midway between buoy No. 8 and the red and black horizontally striped buoy on the eastern end of Long Sand Shoal.

II. ***Having come through Fishers Island Sound,*** passing midway between North Dumpling Lighthouse and Seaflower Reef beacon, make good the course **W. ½ S.** for Bartlett Reef Light-vessel, which is to be left close aboard on the starboard hand; when past it, bring it to bear **E. ¼ S.** and make good the course **W. ¼ N.**, keeping the bearing. Continue the **W. ¼ N.** course until up with the buoy (nun, red, No. 8) marking the entrance and placed on the southern shoal making out from Saybrook Bar, having on this course passed about 1½ miles to the southward of Black Point and about ¾ mile to the southward of the buoy (spar, red, No. 6) marking Hatchett Reef, near the eastern end of Saybrook Bar. In approaching the buoy (nun, red, No. 8) keep it bearing a little on the starboard bow. Pass to the southward of it, giving it a berth of about 200 yards, then haul a little to the northward and pass 400 yards to the northward of the buoy (spar, red and black horizontal stripes) marking the eastern end of Long Sand Shoal. Then proceed as directed in section 2 A, paragraph I or II.

Remarks.—The remarks under section 1, on page 57, apply to this paragraph until abreast of Bartlett Reef Light-vessel; see also remarks under paragraph I immediately preceding. When past this light-vessel the course follows closer the northern shore.

Dangers.—**Bartlett Reef** is described under section 1, Sailing Directions, Niantic Bay.

Hatchett Reef, about 3½ miles **E. ½ S.** from Saybrook Breakwater Lighthouse, has 5 to 8 feet over it; it is marked by two buoys. The sailing line passes about 1 mile to the southward of it.

Saybrook Bar, obstructing the mouth of the Connecticut River, is a shifting bar with depths of 2 to 16 feet. The shoal extends to the eastward as far as Hatchett Reef, and in a southeasterly direction from Saybrook Breakwater Lighthouse for 1⅝ miles to the buoy (nun, red, No. 8). From this buoy Race Rock Lighthouse bears **ESE. ⅞ E.**, distant 12 miles; Bartlett Reef Light-vessel bears **E. ¼ S.**, distant 8½ miles; Long Sand Shoal (east end) buoy (spar, red and black horizontal stripes), **W. by S.**, ⅛ mile.

2. ***From Cornfield Point Light-vessel to Falkner Island Lighthouse.***—I. ***To pass South of the Lighthouse.***—With Cornfield Point Light-vessel bearing **N.**, distant about 200 yards, make good the course **W. ⅛ N.** for about 12½ miles, or until Falkner Island Lighthouse bears **N.**, distant about 2 miles; then follow directions under section 3 following.

The ***tidal currents*** have considerable velocity; the average maximum drift is from 1 to 2 knots. On the flood the set is to the northwestward, on the ebb to the eastward and southeastward.

See **Remarks** and **Dangers** under paragraph II following.

II. ***To pass to the northward of Falkner Island Lighthouse.***—Strangers should not attempt this passage at night, nor in thick weather. From Cornfield Point Light-vessel make good the course **WNW. ⅝ W.** for 12¾ miles. Pass nearly ¾ mile to the southward of the nun buoy (red and black horizontal stripes) marking the western end of Long Sand Shoal and to the northward of Kimberley Reef buoy (spar, red and black horizontal stripes) and Falkner Island Reef buoy (spar, black, No. 1), giving Falkner Island Lighthouse a berth of 1 mile. When Falkner Island Lighthouse bears **S.**, distant 1 mile, proceed as directed under section 3 A following.

Remarks.—**On the S. shore** Horton Point Lighthouse is passed; probably will not be distinguished. (For description see pages 12–13.) The light shows well at night.

On the N. shore Westbrook Harbor, Duck Island Roads, and Clinton Harbor are passed; none of them, except Duck Island Roads, are of importance to strangers. Next comes Hammonasset Point (the one projecting farthest has bowlders, rocky hillocks, few houses) and to the westward of it the large bight off Madison; this bight is sometimes used for anchorage. See the separate headings for these harbors.

Falkner Island Lighthouse, a little on the port bow, can be made out, on a clear day, when past Cornfield Point Light-vessel. Falkner Island has good water on its southern side, but a dangerous reef extends to the northward for ⅝ mile from the island. **Goose Island,** ⅛ mile to the westward of Falkner Island, has bad rocky patches extending ⅜ to ½ mile from it to the northward, northeastward, and eastward, and also for ¼ mile to

the southward. The **tidal currents** set across these rocks and shoals with considerable velocity and should be allowed for in approaching them; to the northward of Falkner Island the flood sets about **W.** by **S.** at strength, to the southward of the island about **WSW**. The current turns about an hour earlier to the northward of Falkner Island than it does to the southward; hence vessels having the current against them may often gain by going to the northward, although most vessels bound through pass well to the southward of the island.

Anchorage in the vicinity of Falkner Island.—*With westerly winds*, protection from wind and sea can be found by anchoring under the eastern shore of Falkner Island, in 12 to 20 feet of water, at ⅛ to ¼ mile from the shore; vessels seeking this shelter often anchor too far from the island to make a good lee, and thus, the island being small, they get the counter-swell from both sides, when by keeping closer inshore they would have smoother water. *With easterly winds*, seagoing vessels sometimes anchor to the westward of Goose Island; small craft sometimes anchor under the western side of Falkner Island, finding there good anchorage, soft bottom, but in doing so they must be careful to avoid the reefs making out to the eastward from Goose Island, and should give the western side of the southern end of Falkner Island a berth of 500 to 800 yards, thus keeping in depths of 10 to 18 feet.

Several buoys along the north shore are left on the starboard hand, and are mentioned under section 2 A, following.

Dangers.—Long Sand Shoal, to the northward of the course, has been described under section 1, paragraph I. On the flood guard against being set too far over toward the shoal. The nun buoy (red and black horizontal stripes) marking the western end of the shoal is sometimes difficult to pick up. From this buoy Cornfield Point Light-vessel bears **SE.** by **E.** ¾ **E.**, distant about 3 miles.

Six-Mile Reef, to the southward of the course, dangerous for heavy-draft vessels only, lies in the fairway of the Sound. It has a least depth of 19 feet over it, and is marked by a nun buoy (red and black horizontal stripes) not always easy to pick up. From this buoy Cornfield Point Light-vessel bears **E.** ½ **N.**, distant about 6 miles; Horton Point Lighthouse bears **S.** by **E.** ¼ **E.**, distant 6½ miles, and Falkner Island Lighthouse bears **NW.** by **W.** ⅞ **W.**, distant 7 miles.

Kimberley Reef, 1⅜ miles **E.** ¼ **N.** from Falkner Island, has 12 feet of water over it, with 5 and 6 fathoms around it, and is marked by a buoy (spar, red and black horizontal stripes).

Falkner Island Reef extends to the northward for ⅜ mile from Falkner Island. Its northern end is marked by a buoy (spar, black, No. 1). The tidal currents set across this dangerous shoal with considerable velocity.

2 A. ***From Channel Entrance buoy to Falkner Island Lighthouse.***—I. ***To pass North of the Lighthouse.***—Pass to the southward of the entrance buoy (nun, red, No. 8), giving it a berth of about 200 yards, as already directed. Now make good the course **W.** ½ **N.**, leaving the buoy (spar, red and black horizontal stripes) on the eastern end of Long Sand Shoal about 400 yards on the port beam. The course leads about 1¾ miles north of Cornfield Point Light-vessel, ⅝ mile south of the red buoy (spar, No. 10) off Cornfield Point, ⅝ mile south of the spindle on Hen and Chickens, and about ½ mile south of the red buoy (spar, No. 12) marking Crane Reef.

Continuing the **W.** ½ **N.** course, pass ½ mile south of the red buoy (spar, No. 14) on Stone Island Ledge, pass at least ¾ mile south of Hammonasset Point and 1 mile north of Falkner Island Lighthouse. Then follow the directions under section 3 A, following.

At night, keep out of the red rays of Saybrook Breakwater Light until well past Crane Reef.

To pass south of Falkner Island Lighthouse follow the directions in paragraph II following.

The ***tidal currents*** have considerable velocity, and on the **W.** ½ **N.** course care must be taken not to be set too far over toward Long Sand Shoal on the ebb, or toward the dangers along the north shore on the flood, making allowance as necessary.

Remarks.—On the **W.** ½ **N.** course, after passing the buoy (spar, red and black horizontal stripes) on the eastern end of Long Sand Shoal, Cornfield Point will be made on the starboard bow and just to the westward the houses of Westbrook (see heading "Westbrook Harbor").

To the westward of Cornfield Point the land recedes to the northward, forming Westbrook Harbor and Duck Island Harbor, the latter lying between Westbrook and Clinton (see heading "Clinton Harbor"). Clinton is a little to the eastward and inshore from Hammonasset Point.

Fish weirs.—The bights along the northern shore are obstructed by fish weirs in summer, and, except in Duck Island Harbor, there are many sunken rocks in the bights and off the projecting points; there are also outlying dangers to the northward of the course, of which special mention will be made.

To the southward of the course is Long Sand Shoal.

When off Westbrook the buoy (nun, red and black horizontal stripes) marking the western end of Long Sand Shoal is to the southward of the course. **Hammonasset Point** (bowlders, rocky hillocks, few houses) will be seen on the starboard bow, and Clinton Harbor will open out just to the eastward of it.

When abreast Hammonasset Point, Sachem Head (high, with summer houses and hotels) will be made about 7½ miles to the westward, a little on the starboard bow. Between Hammonasset Point and Sachem Head is a long bight, near the eastern end of which is the town of Madison (see heading).

Dangers.—**Long Sand Shoal**, described on page 57, is the only danger to the southward until up with Kimberley Reef; special care should be taken to avoid it.

Cornfield Point Shoal (Mid-channel Rock), with a least depth of 3 feet, lies about ⅛ mile **S.** of Cornfield Point; marked at its southeastern end by a buoy (spar, red, No. 10). There is a channel for small craft inside the buoy; strangers should never try it.

Hen and Chickens, bare in places, marked by a spindle near the southern side of the rocks, lies about ⅞ mile to the westward of Cornfield Point Shoal, and is about ⅝ mile long in an easterly and westerly direction.

Crane Reef, having a least depth of 3 feet, is ⅞ mile to the westward of the spindle marking the Hen and Chickens. A buoy (spar, red, No. 12) marks the southern side of Crane Reef.

Duck Island (small, grassy, about 10 to 15 feet high) will be seen on the starboard bow, and is surrounded by bowlders. The breakwater (with post light at its western end) shows conspicuously.

Stone Island Reef, about midway between Duck Island and Hammonasset Point, lies to the southward of Stone Island, and has depths of 10 to 12 feet over its southern part, which is marked by a buoy (spar, red, No. 14). A small spot, with 16 feet of water over it, lies nearly ⅝ mile **SW. ½ S.** from this buoy.

Hammonasset Point makes out shoal and should be given a berth of ¾ mile. About ½ mile to the southwestward of the point is a buoy (spar, red, No. 2).

Charles Reef and **Madison Reef**, marked by buoys, are in the bight off Madison and well to the northward of the sailing line.

Kimberley Reef is described on page 59.

Falkner Island Lighthouse is described on page 12; bearings and distances of prominent objects from it are given on page 19. The island has shoal water making off for ⅜ mile to the eastward, and a reef extends ⅝ mile to the northward from it, marked by a buoy (spar, black, No. 1). *Goose Island*, to the westward of Falkner Island, has rocky patches showing out of water to the southward of it; shoal water also extends ½ mile to the northward of Goose Island and between it and the black buoy just mentioned (see "Falkner Island," page 58).

Guilford Harbor (see heading) is to the northward of Falkner Island. The entrance has dangers, some of which are marked by buoys. *Southwest Indian Reef buoy* (spar, red, No. 6), the outermost one, should be given a berth of at least ½ mile. *A rock* with 6 feet over it lies nearly ¼ mile **W.** from this buoy.

II. ***To pass South of Falkner Island Lighthouse.***—Follow the **W. ½ N.** course as directed in paragraph I, foregoing, until Saybrook Breakwater Lighthouse bears **E. ⅞ N.** Then make good the course **W. ⅞ S.**, keeping the bearing, and leaving the buoy (nun, red and black horizontal stripes) on the western end of Long Sand Shoal about ⅝ mile distant on the port hand; the distance from this buoy to Falkner Island Lighthouse is about 9½ miles. Approaching Falkner Island Lighthouse, keep it well on the starboard bow. The **W. ⅞ S.** course leads nearly 2 miles to the southward of the lighthouse. Then proceed as directed under section 3 following.

The *tidal currents* have considerable velocity; note what is said of them under paragraph I, preceding. On the **W. ⅞ S.** course the tidal currents set across the course; on the flood steer more southerly, on the ebb a little more westerly. Care must be taken not to be set to the southward.

Remarks.—The dangers, prominent objects, etc., are those described under paragraph I, foregoing, but the course leads farther off shore.

3. ***From a Position South of Falkner Island Lighthouse to Stratford Shoal (Middle Ground) Lighthouse.***—With Falkner Island Lighthouse bearing **N.**, distant about 2 miles, make good the course **W. ⅝ S.** for about 21½ miles. This course will lead about 1¾ miles north of Stratford Shoal Lighthouse; then proceed as directed under section 4 following.

The *tidal currents* have a moderate velocity, setting to the westward on the flood and to the eastward on the ebb.

Remarks.—Stratford Shoal Lighthouse should be given a berth of at least 1 mile, and deep-draft vessels should give Stratford Point Lighthouse a berth of not less than 2¼ miles, but vessels of 14 feet draft can approach it to within 2 miles.

When off New Haven entrance, or a little farther to the westward, Stratford Point Lighthouse (on the north shore) and Stratford Shoal Lighthouse (in mid sound) will be made. The distance across from one to the other is 5½ miles.

Fuller mention of prominent features and dangers will be found under section 3 A immediately following.

Dangers.—Stratford Point makes out shoal for 1½ miles; a buoy (spar, red, No. 16½), in 14 feet of water, marks a 12-foot spot near the southern edge of the shoal. There are several outlying shoal spots, with 16 to 18 feet over them, from 1½ to 2 miles off shore and from ⅝ mile to 1¼ miles to the southeastward, southward, and southwestward of the red buoy just mentioned. There are also spots with 19 to 21 feet over them lying about 2½ miles off shore and bearing about **N.** by **W.** from Stratford Shoal (Middle Ground) Lighthouse.

Stratford Shoal Middle Ground extends for about ⅜ mile to the northward and to the southward of the lighthouse marking it, with depths of 8 to 16 feet; there are outlying shoal spots of 14 to 18 feet reaching out 1 mile to the northeastward and northward of the lighthouse. A buoy (spar, black, No. 1) is placed about 1 mile to the northward of the lighthouse to guide clear.

3 A. ***From a Position North of Falkner Island Lighthouse to Stratford Shoal (Middle Ground) Lighthouse.***—Having followed the directions under paragraph II, section 2, or paragraph I, section 2 A, when Falkner Island Lighthouse bears **S.**, distant about 1 mile, shape the course **WSW. ⅞ W.** This course made good for nearly 22 miles leads about 1¾ miles north of Stratford Shoal Lighthouse, whence proceed as directed in section 4 following.

Remarks.—See remarks under section 3. The course leads clear of all dangers.

On this course Sachem Head will be left on the starboard hand. The Thimble Islands, about 2½ miles to the westward of Sachem Head, will be made. **Branford Reef beacon** will be made broad off the starboard bow; it is not easily distinguished until pretty well up with it. On a clear day the monument on **East Rock**, at the head of New Haven Harbor, will be plainly seen above the outline of the hills. Branford Harbor, to the northwestward of Branford Reef beacon, will be passed. The old New Haven Light tower and the lighthouses on the ends of the breakwaters (Southwest Ledge and Outer Breakwater lighthouses) at entrance to New Haven Harbor will be made broad off the starboard bow.

After passing New Haven entrance, Stratford Point Lighthouse will be made on the starboard bow and Stratford Shoal Lighthouse on the port bow. As Stratford Point is approached, on a clear day, the entrances to Bridgeport and Black Rock harbors may be made to the westward of the point, and Penfield Reef Lighthouse, Black Rock Lighthouse, and Bridgeport Harbor Lighthouse will be on the starboard bow, the latter nearest to Stratford Point.

The lighthouses are described on pages 12–13.

On the eastern side of Stratford Point is the entrance to the Housatonic River, on which are the towns of Stratford, Derby, and Shelton.

Dangers.—Well to the northward of the sailing line are **East Reef, Browns Reef, Wheaton Reef,** and **Northwest Reef,** all described under heading "Thimble Islands Harbor." East Reef, the southernmost, has a rock awash at low water and is marked by a buoy (spar, red, No. 10), left about 2 miles on the starboard hand.

Branford Reef beacon is left 2 miles on the starboard hand; the beacon is on the shoalest part of **Branford Reef,** which extends ¼ mile to the northward and about ⅛ mile to the southward of the beacon, with depths of less than 16 feet. *Depths of less than 6 feet* extend 100 yards to the northward and about 75 yards to the southward of the beacon. The red rays of Southwest Ledge Lighthouse cover this reef; vessels can avoid the reef by keeping in the white rays of the light.

Townshend Ledge, 18 feet, marked by a buoy (spar, red and black horizontal stripes), lies 2½ miles **W.** ½ **S.** from Branford Reef beacon and 2¾ miles **SE.** ¼ **E.** from Southwest Ledge Lighthouse; this ledge is left 2¼ miles on the starboard hand.

Stratford Point Shoal and **Stratford Shoal (Middle Ground)** are described under section 3 preceding.

4. ***From Stratford Shoal (Middle Ground) Lighthouse to abreast Norwalk Island Lighthouse.***—Having followed the directions in sections 3 or 3 A until about 1¾ miles to the northward of Stratford Shoal Lighthouse, shape the course **W. ½ S.** This course made good for about 14½ miles will lead 1½ to 1¾ miles south of Norwalk Island Lighthouse. Then proceed as directed under section 5 following.

Remarks.—Stratford Point is marked on its southeastern end by Stratford Point Lighthouse. To the westward of Stratford Point is a bight, in the northern part of which is Bridgeport Harbor and the lighthouse marking the entrance (see heading "Bridgeport Harbor"). A little over 5 miles to the westward of Stratford Point Lighthouse, in the northwestern part of the bight just mentioned, is Black Rock Harbor and lighthouse (see heading). Nearly 6 miles **W.** by **S.** from Stratford Point Lighthouse is Penfield Reef Lighthouse and beacon, off the end of Fairfield Bar. Nearly 2 miles to the westward of Penfield Reef Lighthouse is Pine Creek Point. To the northwestward of Pine Creek Point is a bight in which is the entrance to Mill River (Southport Harbor; see heading). About 6½ miles **W.** ¾ **S.** from Penfield Reef Lighthouse is Cockenoe Island, the easternmost of the Norwalk Islands; this island can be distinguished by the two hillocks on its southern and eastern sides. The entrance to Saugatuck River (Westport Harbor; see heading) lies north of Cockenoe Island. Just to the westward of Cockenoe Island is Cockenoe Island Harbor, which is the eastern passage into Norwalk River. Norwalk Island Lighthouse, on Sheffield Island, the westernmost of the Norwalk Islands, is 5¾ miles

N. from Eatons Neck Lighthouse, and is the guide into Sheffield Island Harbor (Norwalk Harbor), the western entrance to Norwalk River. The entrance to Five-Mile River, a small and unimportant stream, is 1⅝ miles **NW.** by **W.** from Norwalk Island Lighthouse.

Dangers.—**Stratford Point Shoal** is described on page 61. Vessels drawing more than 16 feet should pass at least 2¾ miles to the southward of Stratford Point. Vessels drawing 14 to 16 feet should here give the north shore a berth of at least 2 miles. Vessels drawing less than this should give this point a berth of 1½ miles.

Stratford Shoal, in the middle of the Sound, is described on page 61. Vessels passing to the northward of the shoal should give Stratford Shoal Lighthouse a berth of 1 mile while it bears from **WSW.** to **S.**

Fairfield Bar is a long sand spit, bare at low water, which extends out from Shoal Point in a southeasterly direction 1⅛ miles. The eastern end of Fairfield Bar is marked by a beacon.

Penfield Reef, which is a part of the shoal making out to the southeastward from Shoal Point, is to the southward of the eastern extremity of Fairfield Bar and is marked by Penfield Reef Lighthouse.

Pine Creek Point Shoal extends in a southerly direction ⅝ mile from Pine Creek Point; it is marked on its southern end by a buoy (spar, red, No. 18).

Cockenoe Island Shoal extends 1⅝ miles easterly from Cockenoe Island. *Georges Rock,* at the eastern end of the shoal, is awash at low water. Nearly ⅝ mile to the southward of Georges Rock the shoal is marked by a buoy (nun, red, No. 20); this buoy should be left ½ mile on the starboard hand and the islands should not be approached nearer than in 4 fathoms water.

Great Reef lies ½ mile to the southwestward of Norwalk Island Lighthouse, and is marked by a red spindle on its eastern side. Pass at least ¼ mile to the southward of the spindle.

Greens Ledge makes out to the westward for 1 mile from the western end of Sheffield Island; near an 8-foot spot close to its western end it is marked by a red bell buoy. Passing this buoy it should be given a berth of at least ¼ mile.

Budd Reef, small, with 27 feet over it, lies a little more than 1¼ miles **SW. ½ S.** from Norwalk Island Lighthouse. It is not marked, and has deeper water all around it.

5. ***From abreast Norwalk Island Lighthouse to Execution Rocks Lighthouse.***—The distance to Execution Rocks Lighthouse is about 17 miles. Passing 1½ to 1¾ miles to the southward of Norwalk Island Lighthouse, steer about **WSW. ⅛ W.,** shaping the course a little more southerly or a little more westerly according to the distance from this lighthouse. When Execution Rocks Lighthouse is made steer for it, keeping it on any bearing from **SW. ¼ W.** to **WSW. ½ W.** When nearing Execution Rocks Lighthouse change the course so as to pass to the southward of the lighthouse, passing about midway between it and Sands Point Reef buoy (spar, black, No. 21, off Sands Point Lighthouse). Stamford Harbor Lighthouse and Great Captain Island Lighthouse are left well on the starboard hand. When past the latter the course favors the southern shore. In thick weather use the lead in passing Matinicock Point and Prospect Point.

Having passed to the southward of Execution Rocks Lighthouse, proceed as directed under section 6 following.

Remarks.—Just to the westward of Norwalk Island Lighthouse is the entrance to Sheffield Island Harbor (see heading) and to Five-Mile River. About 2¾ miles to the westward of Norwalk Island Lighthouse is Long Neck Point, the eastern point at the entrance to Darien River. About 5 miles to the westward of Norwalk Island Lighthouse and ¾ mile to the eastward of Stamford Harbor Lighthouse is Shippan Point (large yellow building on this point). Nearly 6 miles to the westward of Norwalk Island Lighthouse is Stamford Harbor Lighthouse, at the entrance to Stamford Harbor and Mill River (see heading), and about 4 miles to the westward of Stamford Harbor Lighthouse is Great Captain Island Lighthouse. Midway between these lighthouses is Greenwich Point, to the westward of which is the entrance to Captain Harbor, Greenwich Cove, and Coscob Harbor. A large white residence with red roof and a white clock tower just to the eastward show up very prominently to the westward of Coscob Harbor, bearing about **N.** by **E.** from Great Captain Island Lighthouse. A tall gray spire in the town of Greenwich shows very conspicuously while in this part of the Sound; it rises well above the outline of the hills to the northward and can be distinguished farther than any other object in that direction. Between Greenwich Point and Great Captain Island Lighthouse is Little Captain Island, the western point at the entrance to Captain Harbor (see heading).

To the westward of Great Captain Island Lighthouse is the entrance to Port Chester. When abreast Great Captain Island Lighthouse, on a clear day, the red tower on Davids Island, Execution Rocks Lighthouse, and Sands Point Lighthouse will be made to the southwestward. About 4¼ miles to the westward of Great Captain Island Lighthouse is Rye Neck, the eastern point at the entrance to Mill Creek and Mamaroneck Harbor (see heading). The houses on Hart Island, looking like barracks, will now be seen to the westward of Execution Rocks Lighthouse. Two miles to the westward of Rye Neck is Long Beach Point, the eastern point at the entrance to Larchmont Harbor, described under a separate heading.

Vessels standing close along the north shore, with strong northerly winds, should conform to the directions for beating through this part of the Sound as given under a separate heading.

Dangers and aids.—*Great Reef spindle*, left on the starboard hand, is an iron spindle with cage: it is placed ½ mile **SSW.** ¾ **W.** from Norwalk Island Lighthouse, marking a rocky ledge.

Budd Reef is described on page 62.

Several buoys are passed, placed off the north shore to mark the through passage in this part of the Sound. Following the directions just given, some of these buoys may be seen in very clear weather, though the course leads well to the southward of them.

Norwalk Island (west end) or Greens Ledge buoy (bell, red) marks the western end of the ledge making off nearly 1¼ miles to the westward from Sheffield Island.

Smith Rock buoy (spar, red, No. 22) is off the southern end of a ledge a great part of which is bare at low water; the ledge obstructs the western approach to Darien River entrance; the buoy is nearly 1 mile **SW.** by **W.** from Long Neck Point.

The Cows buoy (nun, red, No. 24) is about 1 mile **S.** from Shippan Point, marking the southern side of the Cows, a group of detached rocks, bare at low water. About 3½ miles **SSE.** from the Cows buoy and off the south shore is *Lloyd Point Shoal buoy* (bell, black).

Bluefish Shoal buoy (spar, red, No. 26) will not be seen except in beating, or in following the north shore more closely than on the sailing line here given. This buoy is about 1¼ miles **SW.** by **W.** ¾ **W.** from Great Captain Island Lighthouse and ½ mile **ENE.** from Glover Reef, which is marked by a buoy (spar, red, No. 28).

Porgy Shoal buoy (spar, red, No. 28½) marks an 8-foot spot ½ mile **ENE.** ¾ **E.** from Parsonage Point.

Execution Rocks are marked by Execution Rocks Lighthouse. The limits of the shoal ground are also marked by several buoys. On the *northern end* of the shoal ground is a spar buoy (red and black horizontal stripes); vessels entering the southern channel should give this buoy a wide berth. On the *eastern side* of the shoal is a red spar buoy (No. 30), and on the *southwest end* of the shoal is a third spar buoy (red and black horizontal stripes). The directions given lead to the southward of the lighthouse, but there is also a good channel to the northward.

6. ***From Execution Rocks Lighthouse to Throgs Neck Lighthouse.***—Passing midway between Execution Rocks Lighthouse and the black buoy (spar, No. 21) off Sands Point Lighthouse, steer about **SW.** by **W.**, heading for the houses near the southern end of Hart Island. When Execution Rocks Lighthouse bears **NE.** ¾ **N.**, steer **SW.** ¾ **S.**, heading for Stepping Stones Lighthouse and keeping on the line of these two lighthouses until abreast the southern end of Hart Island. Throgs Neck Lighthouse will be a little open to the westward of Stepping Stones Lighthouse.

When abreast the southern end of Hart Island, steer a little more westerly so as to pass about ¼ mile to the northwestward of Stepping Stones Lighthouse, and when this lighthouse bears **SE.** turn to the southward, course about **S.** by **W.** ½ **W.**, keeping Throgs Neck Lighthouse on the starboard bow.

Round Throgs Neck Lighthouse, giving it a berth of about ¼ mile when passing to the southward of it. Now conform to the general directions for the East River. If a pilot or a towboat is required, one should be taken before reaching Rikers Island. (See "Pilots," page 49, also heading "East River.")

If desiring to anchor after reaching the western end of Long Island Sound, Hempstead Harbor and City Island Harbor are available and convenient (see page 49, see also these headings). Farther to the westward (see heading "East River") vessels frequently anchor on Hammond Flats (north shore, to the westward of Throgs Neck), and also off Whitestone (south shore).

Remarks.—After passing Execution Rocks Lighthouse a group of islands will be seen to the northward; the high red tower is on Davids Island. Nearly in range and bearing about **SW.** are Gangway Rock buoy (spar, black, No. 23), Stepping Stones Lighthouse, and Throgs Neck Lighthouse. Hart Island, showing a little to the westward of this range, will be recognized by its large barrack-like building, and over Hart Island will generally be seen the masts of vessels lying in City Island Harbor (Hart Island Roads). As Hart Island is approached, Manhasset Harbor will be opened on the south shore, and when past this, City Island Harbor will open to the westward of Hart Island and the wharves and shipyards on the eastern shore of City Island will be seen. When abreast of City Island Harbor, Little Neck Bay will be opened to the southward and the fort at Willets Point (the western point at entrance to Little Neck Bay and directly opposite Throgs Neck) will be distinguished. Opposite Stepping Stones Lighthouse and west of City Island is East Chester Bay, shallow, forming the approach to East Chester Creek (Hutchinson River). Fort Schuyler, the granite fort on Throgs Neck, will appear behind Throgs Neck Lighthouse.

Caution.—On the walls of the granite fort on Willets Point is the following notice: *Torpedoes: don't anchor.* This is to prevent vessels anchoring near or to the northeastward of the fort.

Dangers and aids.—*Gangway Rock buoy* (spar, black, No. 23) and *Success Rock spindle* (red, to the southeastward of the buoy) should be left on the port hand; these aids mark the outer part of a rocky ledge making out from Barker Point, the eastern point at the entrance to Manhasset Harbor.

City Island Shoal buoy (spar, red, No. 32) marks a cluster of rocks to the southwestward of the southern end of City Island; *Big Tom*, one of this cluster, is awash at low water. This buoy is left well distant on the starboard hand.

Stepping Stones Lighthouse marks the outer part of a dangerous reef, with depths of 2 feet in places, which extends to the southeastward of the lighthouse and from it to the shore. The shoal extends nearly 200 yards to the northward and northwestward of the lighthouse, with depths of 6 to 13 feet.

Extensive flats occupy East Chester Bay, to the westward of the course. Their eastern edge, rising abruptly, with depths of 10 to 13 feet, follows nearly the line of Throgs Neck Lighthouse and the southeastern end of City Island.

Throgs Neck Shoal buoy (spar, red, No. 34) marks a shoal making out from Throgs Neck Lighthouse. Pass to the southward of this buoy, giving it a berth of not less than 50 yards.

The entrance to Little Neck Bay, to the southward of the course, is shoal, the edge of the shoal ground extending to the northeastward from Willets Point, with depths of 10 and 12 feet. By keeping to the westward of the line of Stepping Stones Lighthouse and the fort on Willets Point (bearing **N.** by **E.** ¼ **E.** and **S.** by **W.** ¼ **W.** from each other) you will be well to the westward of the edge of the shoal.

SAILING DIRECTIONS ALONG THE SOUTH SHORE OF LONG ISLAND SOUND.

1. ***From The Race to Roanoke Point Shoal.***—In clear weather, having come through The Race and desiring to stand along the south shore, the following directions are available. In thick weather the south shore should be given a much wider berth.

With Little Gull Island Lighthouse bearing **S.** distant 1¼ miles, make good the course **W.** ⅝ **S.** for 5⅛ miles, until Plum Island Lighthouse bears **S.**, distant about 2 miles; then change course to **WSW.** ⅝ **W.** for 25 miles, until Falkner Island Lighthouse bears **NNE.** and the black buoy (spar, No. 5) on the northern end of Roanoke Shoal is 1 mile distant on the port beam. Then proceed as directed under section 2 following.

A good general rule to follow is to keep at least 2 miles from the south shore between Horton Point and Old Field Point.

The ***tidal currents*** have considerable velocity, setting to the westward on the flood and to the eastward on the ebb. A vessel passing the opening to the westward of Great Gull Island and that to the westward of Plum Island (Plum Gut) may be drawn inshore on the ebb (see page 54).

Caution.—To the westward of Plum Island Lighthouse, following the **WSW.** ⅝ **W.** course, note that this course, if held too long, would lead directly for Herod Point Shoal (5½ miles to the westward of Roanoke Point Shoal); on the flood a vessel would overrun her reckoning, and if Roanoke Point Shoal buoy were not picked up she might stand on too far before changing course. (See "Tidal Currents," page 23.)

Remarks.—On the **W.** ⅝ **S.** course, Great Gull Island and Plum Island will be left a little over 1 mile to the southward; foul ground between these islands. Plum Island Lighthouse is on the western end of the island, with the opening of Plum Gut and Orient Point Lighthouse just to the westward of it.

When the course is changed to **WSW.** ⅝ **W.**, Rocky Point will be a little on the port bow. A little broader off the port bow will be Terry Point (round, smooth high hill, large house on its top); back of it is Orient.

As Rocky Point is approached Horton Point Lighthouse will be opened out (see pages 12–13). After passing Horton Point Lighthouse there are no marked features for a long distance on the south shore by which a stranger could locate himself. Beginning about 5 miles to the westward of Horton Point Lighthouse, the shore shows a succession of yellow bluffs varying in height and crowned with trees; in places the shore slopes to the water gradually, or there is a level space between the bluffs where a small stream flows into the sound. Such features continue as far as Old Field Point Lighthouse (not reached, however, under the directions of this section). Friar Head shows more distinctive features than the other bluffs.

Dangers.—**Orient Shoal**, between Terry Point and Rocky Point, is marked on its northern side by a buoy (spar, black, No. 3); the shoal has from 7 to 16 feet of water over it. From this buoy Plum Island Lighthouse bears **E.** ⅝ **N.**, distant nearly 5¾ miles, and Cornfield Point Light-vessel bears **N.** by **W.** ¼ **W.**, distant 4¼ miles.

The shore between Rocky Point and Horton Point Lighthouse can be approached to within ⅛ mile. For a distance of 6 miles to the westward of Horton Point the shore should be given a berth of at least 1 mile, shoals with 5 to 17 feet extending out ¼ mile from the shore to the westward of Horton Point.

Roanoke Point Shoal, 12½ miles to the westward of Horton Point Lighthouse, makes out from the shore about 1¼ miles; the shoal has from 12 to 18 feet of water on it to within ⅝ mile of the beach, where it shoals to 8 feet. The northern end of this shoal is marked by a buoy (spar, black, No. 5). There is from 11 to 18 fathoms of water to the northward of this shoal, which is very abrupt on its northern side.

Friar Head, near which Roanoke Point Shoal makes out, is 244 feet high and quite prominent. Its upper part has stronger markings and a sharper point than the other bluffs near it.

2. ***From Roanoke Point Shoal to Old Field Point.***—With the black buoy (spar, No. 5) off Roanoke Point Shoal on the port beam, distant about 1 mile, steer **W. ½ N.**, keeping from 2 to 3 miles off shore until nearly up to Old Field Point Lighthouse, which is passed, leaving it about 1 mile on the port hand. Then proceed as directed under section 3 following.

Remarks.—The south shore between Roanoke Point and Mount Misery, about 2 miles to the eastward of Old Field Point, is a line of yellowish sand bluffs covered with trees, and broken at intervals by low land where small streams flow into the Sound.

The entrance to Port Jefferson is just to the westward of Mount Misery; between Gardiners Bay and Huntington Bay this is the only harbor on the south shore which can be entered at low water by vessels of over 5 feet draft; to carry in the best water local knowledge is necessary. (See heading "Port Jefferson Harbor.")

Old Field Point when seen from the eastward appears quite low, as the land to the eastward of Port Jefferson is comparatively high. In the daytime the lighthouse and keeper's dwelling do not show plainly until within 3½ miles of the point; they are backed by the high land of Crane Neck. A tabular description of lighthouses is given on pages 10–17.

Dangers.—**Roanoke Point Shoal** is described above.

Herod Point Shoal lies about 5½ miles to the westward of Roanoke Point Shoal, and makes out from the land for a distance of 1¼ miles; it has from 10 to 16 feet of water over it. A 10-foot spot lies 1½ miles from the shore, and just to the northward of this shoal spot is placed a black buoy (spar, No. 7). The course leads about 1 mile north of the shoal.

A shoal, with from 12 to 16 feet over it, lies 6 miles to the westward of the buoy on Herod Point Shoal. This shoal is about 3 miles long in an **E.** and **W.** direction, and it extends 1¼ miles from the shore at its farthest point, and off its northern edge is a buoy (spar, black, No. 9). **A 2-foot spot,** ½ mile off shore, lies in a **NE.** direction from Miller Landing and ¼ mile **NW.** from Miller Rock.

Mount Misery Shoal has from 7 to 9 feet over it, and lies to the northward of Mount Misery Point, distant about ¾ mile from the shore. This is a small patch about ⅜ mile long in an **ENE.** and **WSW.** direction, and ¼ mile broad, marked at its northeastern end by a black buoy (spar, No 11). There is a channel with from 18 to 17 feet of water between this shoal and the point, but it is not used except by small vessels bound in or out from Port Jefferson.

There is a 17-foot spot lying about ½ mile to the northeastward of Old Field Point Lighthouse.

Shoal water extends to the northward from Old Field Point for a distance of nearly ¼ mile.

3. ***From Old Field Point to Eatons Point.***—Passing about 1 mile to the northward of Old Field Point Lighthouse, shape the course **W. ⅜ N.** for about 12½ miles; this should lead about 1¼ miles to the northward of Eatons Neck Lighthouse and not over ¼ mile to the northward of the black buoy (can, No. 13) marking the shoal which makes off from Eatons Point, and about ¼ mile to the southward of the red and black horizontally striped spar buoy marking the 16-foot spot. Passing ¼ mile to the northward of black buoy No. 13, the depth should not be less than 22 feet. Farther to the northward there are shoal patches (16 to 21 feet).

Then proceed as directed under section 4 following.

Remarks.—Between the buoy on Mount Misery Shoal and Old Field Point is the entrance to Port Jefferson (see heading). About 2 miles to the westward of Old Field Point Lighthouse is Crane Neck Point, the eastern point of Smithtown Bay (see heading). Eatons Neck Lighthouse bears **W. ⅜ N.** from Old Field Point Lighthouse, distant 12½ miles.

Dangers.—**Mount Misery Shoal** is described under section 2 preceding.

Off Old Field Point, about ⅝ mile **NE. ½ E.** from the lighthouse, is a 17-foot spot which is not marked. Shoal water extends ¼ mile in a northwesterly direction from Old Field Point and ¼ mile in a northwesterly direction from Crane Neck Point.

Stratford Shoal, in the middle of the Sound, and marked by Stratford Shoal Lighthouse, is described on page 61. Vessels passing to the southward of the lighthouse should give it a berth of at least ⅜ mile.

The Shores of Smithtown Bay should not be approached nearer than 1 mile, as shoal water extends out over ¾ mile in places, except along the west shore of Crane Neck and along the east shore of Eatons Neck; the south shore makes out shoal for a distance of over ¾ mile and the shoaling is abrupt.

To the northward of Eatons Point are several rocky patches with 16 to 21 feet over them; to avoid them vessels should either pass not more than about ¼ mile to the northward of the black buoy (can, No. 13) off the point, or they should pass at least 3 miles to the northward of the lighthouse, keeping closer to Norwalk Island Lighthouse than to Eatons Neck Lighthouse. The spot with 16 feet of water over it is marked by a buoy (spar, red and black horizontal stripes) placed nearly 1⅝ miles **N.** by **W.** ⅛ **W.** from Eatons Neck Lighthouse.

4. ***From abreast Eatons Point to Execution Rocks Lighthouse.***—The distance to Execution Rocks Lighthouse is about 17 miles. The directions of this section should carry not less than 23 feet of water. Passing about ¼ mile to the northward of Eatons Point Shoal buoy make good the course **W.** ⅛ **N.** for about 4 miles, leaving Lloyd Point Shoal buoy (bell, black) about ½ mile on the port hand (Stamford Harbor Lighthouse on the north shore will bear about **NNW.** ¾ **W.**).

Then shape the course **WSW.** ¾ **W.** for Execution Rocks Lighthouse, passing at least ¼ mile to the northward of Matinicock Point Shoal buoy (spar, black, No. 17), placed about ¼ mile north of Matinicock Point. When about 1 mile distant from Execution Rocks Lighthouse, head so as to pass to the southward of this lighthouse, and proceed as directed under section 6, page 63.

Remarks.—Eatons Neck Lighthouse stands on a high bluff. To the westward of the point is Huntington Bay. About 4¼ miles to the westward of Eatons Neck Lighthouse is Lloyd Point, the eastern point at the entrance to Oyster Bay; when Oyster Bay is well opened, Cooper Bluff, 180 feet high, seen to the southward within the bay, will show as a high yellow sand bluff with trees covering the top. Cold Spring Harbor Lighthouse will be seen over toward the eastern shore of the bay. About 7¼ miles to the westward of Lloyd Point is Matinicock Point, the eastern point at the entrance to Hempstead Harbor. This harbor when opened will be distinguished by four yellow sand bluffs joining each other and covered with trees on top; these bluffs are on the western shore, about midway between Mott Point and Prospect Point. When approaching Matinicock Point the red tower on Davids Island, Execution Rocks Lighthouse, and Sands Point Lighthouse will be made to the westward, and the houses on Hart Island, to the westward of Execution Rocks Lighthouse, will be made after passing the point.

Dangers and aids.—*Several buoys* are passed on the south shore between Eatons Neck Lighthouse and Execution Rocks Lighthouse.

Eatons Point Shoal buoy (can, black, No. 13) marks the shoal which makes to the northward and northeastward from Eatons Point. The shoal is rocky, and patches with from 3 to 5 feet over them will be found about ¼ mile off shore.

About 1 mile **NW.** from Eatons Point Shoal buoy is **a rocky patch** with 16 feet of water over it, marked by a red and black horizontally striped spar buoy; and from 1 to 1¾ miles **N.** ½ **E.** from Eatons Point Shoal buoy are **several rocky patches** with a least depth of 21 feet.

Lloyd Point Shoal, marked at the northeastern edge by a buoy (bell, black), is the shoal ground making out nearly ¾ mile in a northerly direction from Lloyd Point. About ½ mile east of the Point is **Morris Rock** with 2 feet of water over it.

Center Island Reef, marked on its northwestern edge by a buoy (spar, black, No. 15), is the reef making to the northward from the western point at the entrance to Oyster Bay. **Rocks awash** at low water are found ⅝ mile off shore. The depth of 18 feet is found nearly ⅛ mile to the northward of the buoy.

Matinicock Point Shoal, making out about ¼ mile to the northward of the point, is marked by a buoy (spar, black, No. 17).

Prospect Point, about ¾ mile to the eastward of Sands Point, has rocky shoal ground making out nearly ½ mile from it to the northward. It shoals abruptly from a depth of 10 fathoms to 17 feet, and has bowlders, the farthest and most important one, the **Old Hen** (about ¼ mile off shore), is awash at low water. The northern extremity of this shoal is marked by a buoy (spar, black, No. 19).

Sands Point Reef, marked by a buoy (spar, black, No. 21), ¼ mile off shore, is the shoal making out from Sands Point.

GENERAL DIRECTIONS FOR BEATING THROUGH LONG ISLAND SOUND.

While to the eastward of Bartlett Reef Light-vessel (see page 10), when standing to the northward, go about when this light-vessel bears **SW.** by **W.** ¾ **W.**, or before, and give the northern shores a berth of at least 1 mile. Give the Gull Islands a berth of at least ½ mile.

To the westward of Bartlett Reef Light-vessel, in approaching the north shore, go about before this light-vessel and Race Rock Lighthouse come in range bearing **SE.** by **E.**; in approaching Black Point keep at least ⅝ mile to the southward of it, and give the shores to the westward of the point a wide berth.

When past Great Gull Island, in standing to the southward, go about when Little Gull Island Lighthouse bears **E.**

To the westward of Black Point the north shore should not be approached nearer than 1¼ miles. At night, in standing to the northward, a good rule is to go about when on a line between Bartlett Reef and Cornfield Point light-vessels.

In passing to the southward of Long Sand Shoal, while to the eastward of Cornfield Point Light-vessel in approaching the shoal, go about when this light-vessel bears **WSW. ½ W.**, or before; while to the westward of Cornfield Point Light-vessel, in approaching the shoal, keep this light-vessel bearing to the eastward and northward of **E.** by **S.** Vessels of deep draft should avoid *Six-Mile Reef* (19 feet), which lies 6 miles **W. ½ S.** from Cornfield Point Light-vessel.

Between Plum Island Lighthouse and Horton Point Lighthouse the south shore should be given a berth of about 1¼ miles, which will insure keeping clear of Orient Shoal.

To the westward of Long Sand Shoal you can approach the north shore until on a line between Saybrook Breakwater Lighthouse and Falkner Island Lighthouse (bearing **E. ¼ N.** and **W. ¼ S.** from each other), and then going about; this gives the north shore a berth of not less than 1 mile. When within 1½ miles of Falkner Island Lighthouse, and to the eastward of it, go about when this lighthouse bears **W. ½ N.**, and keep at least ½ mile to the southward of Falkner Island and Goose Island until to the westward of the latter. It is not advisable for a stranger to beat through to the northward of Falkner Island.

Between Horton Point Lighthouse and Duck Pond Point, about 4½ miles to the westward of the former, the south shore should be given a berth of at least 1½ miles. Between Duck Pond Point and Roanoke Point Shoal the shore can be approached to within 1 mile, going about when in 6 fathoms, but near Roanoke Point Shoal, or when Falkner Island Lighthouse bears between **N.** by **E.** and **NNE. ¼ E.**, keep off shore at least 1¾ miles; the lead can not be depended on to keep clear of Roanoke Point Shoal, as it rises abruptly on its northern side.

Being to the westward of Falkner Island Lighthouse, distant 1½ miles or more, go about when this lighthouse bears **E. ½ S.**, and so continue until past Townshend Ledge, or until Southwest Ledge Lighthouse (on East Breakwater at New Haven entrance) bears **NW.**, when the north shore can be approached until Stratford Point Lighthouse bears **WSW.** *Or*, being to the westward of Falkner Island Lighthouse, in approaching the north shore go about on shoaling the water to 8½ fathoms, and so continue until past New Haven entrance. *The southern side of Stratford Point* should be given a berth of 2 miles or more, according to draft (see page 61), and give the northern and eastern side of Stratford Shoal (Middle Ground), marked by a lighthouse, a berth of 1 mile.

To the westward of Roanoke Point a stranger should give the south shore a berth of at least 2 miles until within 5 miles of Old Field Point, when the shore may be approached to within 1 mile. At night, go about when Old Field Point Light bears **W.** until within 2 miles of the light, and then go about when Eatons Neck Light bears **W. ¼ S.** Keep at least ½ mile to the southward of Stratford Shoal (Middle Ground) Lighthouse in passing south of it.

When to the westward of a line between Stratford Shoal Lighthouse and Bridgeport Harbor Lighthouse, go about when Penfield Reef Lighthouse bears **W.** by **S.**, and do not approach Penfield Reef Lighthouse closer than ¾ mile from the southwestward. When 1 mile or more to the westward of Penfield Reef Lighthouse, go about when this lighthouse bears **ENE.**

In passing the Norwalk Islands, in standing to the northward, do not approach Cockenoe Island (see page 61) nearer than 1½ miles, and give the other islands of the group a berth of ¾ mile or more. Very large vessels should avoid Budd Reef (27 feet over it, see page 62).

Between Old Field Point and Crane Neck Point the south shore can be approached to within ½ mile, but the south shore of Smithtown Bay should be given a berth of not less than 1 mile. In beating, no stranger should approach Eatons Neck Lighthouse nearer than 1 mile. At night, in standing to the southward while between Old Field Point Lighthouse and Eatons Neck Lighthouse, go about when the former bears **E. ¼ S.**, or when the latter bears **W.**, and give Eatons Neck Lighthouse a berth of at least 1 mile.

Off Eatons Neck there are rocky patches having 16 to 21 feet over them, and covering a considerable area. These extend to the northward nearly to the middle of the Sound, and deep-draft vessels beating through should keep in the northern part of the Sound in passing between Norwalk Island Lighthouse and Eatons Neck Lighthouse.

Being to the westward of Norwalk Island Lighthouse, keep this lighthouse bearing to the northward of **NE.** by **E.** ¾ **E.** until past Stamford Harbor Lighthouse, and then keep Great Captain Island Lighthouse bearing to the northward of **W.**, and do not approach it nearer than ¼ mile in passing.

When to the westward of Great Captain Island Lighthouse, keep it bearing to the northward of **NE.** ½ **E.**, and so continue until up to Execution Rocks Lighthouse; this clears the dangers along this part of the north shore, giving them a good berth.

When to the westward of Eatons Point, the eastern shore of Huntington Bay for 2 miles to the southward of the point can be approached as close as ¼ mile, but give the shores on the western side of the entrance a berth of ¾ mile or more, between East Point and Lloyd Point. When past the black bell buoy off Lloyd Point give Center Island Point, the northern point on the west side of Oyster Bay entrance, a berth of at least 1¼ miles, keeping well to the northward of the black buoy (spar, No. 15) which marks Center Island Reef. The shore to the westward of Center Island Reef buoy (spar, black, No. 15) should not be approached closer than ¾ mile until past the black buoy (spar, No. 17) off Matinicock Point; or, at night, go about when Execution Rocks Light bears **WSW.** ½ **W.** The eastern shore of Hempstead Harbor should not be approached closer than ¼ mile, as the water shoals rapidly within that limit. Give the western shore of this harbor a berth of ½ mile, and give Prospect Point a berth of ¾ mile.

If you do not desire to beat through to the westward of Execution Rocks Lighthouse, where the room available for beating is much narrowed, good anchorage can be found in Hempstead Harbor.

In approaching Execution Rocks Lighthouse, if bound through to the westward, keep this lighthouse bearing from **SW.** ¼ **W.** to **WSW.** ½ **W.** Pass to the southward of this lighthouse, being guided by the buoys marking the limits of Execution Rocks and by the black buoy (spar, No. 21) off Sands Point.

To the westward of Execution Rocks Lighthouse, be guided by the buoys and by the directions on page 63.

THAMES RIVER AND NEW LONDON HARBOR.*

The Thames River flows into the eastern end of Long Island Sound, to the northwestward of the western end of Fishers Island Sound. The entrance forms New London Harbor, the most important harbor of refuge in this part of Long Island Sound. Vessels of deep draft find anchorage here in any weather. The river is buoyed to Norwich, 13 miles above its mouth.

A very large **drawbridge** crosses the river at New London. Its western end is at **Winthrop Point** (upper part of New London). This bridge carries a double track of the N. Y., N. H. & H. Railroad (Shore Line route). The central span of this bridge is 502 feet, the draw pier is about 75 feet, thus leaving a clear passage over 200 feet wide on each side of the pier.

New London, a city on the west bank of the river, 2 miles above the mouth, has considerable trade by water. The average draft of the vessels trading to New London is about 14 feet; 7 to 18 feet can be taken alongside the wharves at low water.

Groton, a town on the east bank, opposite New London, has several granite quarries.

The **U. S. Naval Station** is situated on the east bank, about 2 miles above New London.

Norwich, a city at the head of navigation on the Thames River, at its junction with the Shetucket and Yantic rivers, is about 11 miles above New London. The deepest draft going to Norwich is about 13 feet, the usual draft is not more than 10 feet; depths of 8 to 15 feet of water are found alongside the wharves. There is a daily line of steamers running between New York and Norwich when the river is not closed by ice. **Thamesville** is a suburb of Norwich, about 1 mile below the city, on the west bank. Sailing vessels bound up the river generally take a towboat at New London. Strangers always take a pilot or a towboat.

*Shown on Coast and Geodetic Survey chart 359, Thames River, Harbor of New London and Approaches, scale $\frac{1}{20,000}$, price $0.40. The lower part of the river and the Harbor of New London are also shown on chart 114, scale $\frac{1}{80,000}$, price $0.50. See the footnote on page 9.

The Entrance to the Thames River, or to New London Harbor, is between **Avery Point** on the east and **Lighthouse Point** on the west; its least width is ½ mile, abreast **Eastern Point,** just inside the entrance.

Prominent objects seen from the southward are New London Lighthouse (see page 10), the monument at Fort Griswold on the east bank, and Fort Trumbull on the west bank. Above Fort Trumbull the spires and houses of New London appear. The N. Y., N. H. & H. Railroad bridge, which crosses the river at New London, is a prominent feature.

The channel as far up as the U. S. Naval Station is straight, with a least depth of 24 feet, and follows the eastern shore; it is ½ mile wide at the entrance, and contracts gradually to 200 yards abreast the Naval Station; above this the channel is narrow and crooked, with several bars, and, although buoyed, is unfit for strangers. For a distance of 5½ miles above New London the channel has a depth of 16 feet and over, and from thence to Norwich its depth is 14 feet. These depths were obtained by dredging, and training walls have been constructed to maintain them.

Pine Island Channel, at the entrance, leading in from the eastward close along shore, is often used by those who are well acquainted with its dangers, if they have come through Fishers Island Sound in small vessels. Strangers should never use it. *An inshore channel* also leads into the entrance from the westward; it is dangerous, is only available for very small vessels, and strangers do not attempt it.

Anchorage.—Vessels anchoring in New London Harbor come to at will anywhere in the channel from the mouth of the river up to New London. A good rule is to keep to the eastward of a line drawn from the wharf at the Pequot house (**W.** bank, near mouth) to Winthrop Point (**W.** bank, upper part of New London), and to give the eastern shore a berth of 200 yards.

Vessels of light draft, 7 feet or less, can anchor in Greens Harbor by keeping 250 yards from the western shore, when abreast the Pequot house, and following the western shore at not less than that distance.

Vessels of 12 feet draft or less will find good anchorage in 14 feet water, soft bottom, between Fort Trumbull and the city of New London, favoring the latter. Many vessels anchor off New London.

Above New London anchorage is found anywhere in the channel.

Pilots are not generally employed by strangers, but if one is desired he may be had by making signal and coming to anchor outside of the entrance until boarded. Strangers bound to Norwich take a pilot at New London, anchoring off the city with signal set until boarded.

Pilotage is compulsory for all vessels in foreign trade drawing 9 feet of water and over, if spoken. There are no regular fees for pilotage.

Extracts from the laws of Connecticut relating to pilots and pilotage will be found in Appendix I.

Towboats will be found at New London, and when likely to be needed will be found near the entrance. Strangers entering do not require a towboat unless with a head wind and contrary tide. Vessels bound up the river to Norwich generally take a towboat at New London.

Quarantine regulations for New London are prescribed as necessary by the local board of health (see Appendix I). Quarantine is in force for all vessels arriving from foreign ports, and from April 1 to November 1 for vessels from domestic ports south of the capes of Virginia and from the British provinces; vessels subject to inspection must anchor with New London Lighthouse bearing to the northward of **W.** until boarded by the health officer.

At all seasons vessels from infected ports or having sickness on board must anchor outside the same limit until boarded by the health officer. The foreign trade of New London being small, the health officer seldom has occasion to board vessels. His fee for this service when performed is $5.00.

The Marine Hospital at Staten Island, N. Y., is the nearest one. Seamen entitled to treatment are furnished transportation to it when necessary; otherwise they are treated by an acting assistant surgeon of the Marine-Hospital Service at New London, quarters, subsistence, and nursing being provided when required (see Appendix III).

Harbor regulations.—No special harbor regulations are in force for New London Harbor, except that a clear passage across the river must be left for the ferry between New London and Groton; this is above the usual anchorage. The harbor master has authority to berth vessels, shifting them if necessary, but occasion for doing so seldom arises (see Appendix I).

Supplies.—Coal for steamers can be had alongside the wharves at New London and at Norwich, or in lighters in the stream at New London. Water can be obtained from water boats at New London, or alongside the wharves at New London and at Norwich; provisions and ship-chandler's stores at New London and at Norwich.

New London is available as a coaling port for large vessels; to the eastward the nearest one for such vessels is Newport, R. I., to the westward, New York.

Repairs to vessels and to machinery of steamers can be made in New London, where there are 4 marine railways; the largest has a capacity of about 600 tons (register tonnage), and can haul out a vessel of 175 feet keel. Noank is the nearest place where larger vessels can be hauled out (see page 47).

Wind signals are displayed from a staff on the custom-house, and can be seen by vessels at anchor in the harbor.

Buoy depot.—One of the depots of the Third Lighthouse District (see page 10) is at the custom-house wharf, New London.

Communication between New York and New London is by two lines of steamers and by the N. Y., N. H. & H. Railroad. The northern division of the Vermont Central Railroad makes northern connections.

Ice does not endanger navigation; it seldom forms below the U. S. Naval Station. Above the Naval Station ice obstructs navigation about two months each year (see also page 52).

Freshets usually occur in the river during February and March.

Currents.—The tidal currents follow the general direction of the channel and are not usually strong. During freshets, and when the river is high, the resulting current sometimes has considerable velocity, and vessels are often embarrassed in light winds, after getting in past the lighthouse, by a strong surface current setting out even on the flood.

Tides.—The mean rise and fall of tides at New London is 2.4 feet. The mean high-water lunitidal interval is 9h. 26m., and mean low-water lunitidal interval is 3h. 32m. (see also page 22). Daily predictions for New London are given in the tide tables published annually by the U. S. Coast and Geodetic Survey.

For **variation of the compass** see page 24.

Consult also pages 9–23 and 48–52.

TIDAL CURRENTS OFF NEW LONDON ENTRANCE.

Locality.	Second Quarter.		Third Quarter.		Flood or Ebb.
	Set.	Drift.	Set.	Drift.	
1½ miles **S.** by **E.** ½ **E.** from New London Lighthouse	W. ½ N	1.00	W. ¾ N	1.05	Flood.
	ENE. ¾ E	1.05	NE. by E. ¾ E	1.15	Ebb.
Near Bartlett Reef Light-vessel	W. ½ N	1.50	WNW. ½ W	2.00	Flood.
	E. ¼ S	1.80	W. Southerly	1.25	Ebb.

The observations for currents were made, as far as possible, when the influence of the wind was small. The bearings are magnetic; the drift, in nautical miles per hour.

SAILING DIRECTIONS, NEW LONDON HARBOR.

The following directions, except where otherwise stated, are good either in the daytime or at night for vessels of 20 feet draft. Strangers of deeper draft should take a pilot.

1. ***Approaching from the Eastward.***—I. ***Having come through The Race.***—Directions for approaching The Race are given on pages 53 and 54. Vessels may pass either to the northward or to the southward of Race Rock Lighthouse, giving it a berth of at least 150 yards and being careful not to be swept closer by the tidal current.

When through The Race haul to the northward and steer for New London Lighthouse on any bearing from **N.** ½ **E.** to **NNW.**, keeping between these limits. This leads to the eastward of Sarah Ledge buoy and to the westward of Black Ledge beacon and Southwest Ledge buoy; several other buoys farther to the eastward and to the westward are also passed.

Or, with Race Rock Lighthouse bearing **S.** by **E.**, directly astern, steer **N.** by **W.** for New London Lighthouse, directly ahead, keeping on this line. Then proceed as directed in section 2.

The ***tidal currents*** have considerable velocity, and allowance must be made for them.

Remarks.—Standing for the entrance, with New London Lighthouse ahead as directed, there will be seen on the starboard bow the high granite monument at Groton, opposite New London and Black Ledge beacon; farther to the eastward are Seaflower Reef beacon and North Dumpling Lighthouse at the western end of Fishers Island Sound, and showing open to the northward of Fishers Island. Broad off the port bow Bartlett Reef Light-vessel (about 4 miles **NW.** by **W.** from Race Rock Lighthouse) will be made.

When within 2 miles of New London Lighthouse the buoys marking the dangers on both sides of the entrance will be readily picked up by day.

Dangers.—**Sarah Ledge,** marked by a buoy (bell, red and black horizontal stripes) has 15 feet of water over it, and is about 1¼ miles **S.** by **W.** from New London Lighthouse; the buoy is on the southern side of the ledge, which is about 80 yards long, **N.** and **S.** To the southwestward and to the northwestward of Sarah Ledge buoy are other buoys marking dangers mentioned under section 1 A, following.

Black Ledge, to the eastward of the course, is marked by a large granite beacon (with red spindle, having double-cone cage), by a red buoy (nun, No. 2) at its southwestern end, and by a black buoy (spar, No. 1, colored and numbered as a Pine Island channel buoy) on its northern side. The ledge has 2 to 17 feet of water over it and extends ⅝ mile **N.** and **S.** and ¼ mile **E.** and **W.** The beacon is on the western part of the ledge and is a little over 1 mile **SE.** ½ **S.** from New London Lighthouse.

Southwest Ledge, to the eastward of the course, is marked by a buoy (nun, red and black horizontal stripes), has 7 feet of water over it, and is about 150 yards long **NE.** by **N.** and **SW.** by **S.**; it lies ⅞ mile **SSE.** ½ **E.** from New London Lighthouse.

II. ***Having come through Fishers Island Sound.***—Directions for Fishers Island Sound are given on pages 42–44.

When Seaflower Reef beacon bears **N.**, distant about ⅜ mile, steer **NW.** by **W.** ½ **W.**, with North Dumpling Lighthouse astern, and pass over ¼ mile to the southward of Black Ledge beacon.

Leave the buoy (nun, red, No. 2) on **SW.** point of Black Ledge and also Southwest Ledge buoy (nun, red and black horizontal stripes) about 400 yards on the starboard hand. When New London Lighthouse bears **N.** by **W.**, steer **N.** ½ **E.**; round Southwest Ledge buoy, giving it a good berth on the starboard hand; standing to the northward, follow the directions of section 2.

The ***tidal currents*** have considerable velocity.

Remarks.—On the **NW.** by **W.** ½ **W.** course Black Ledge beacon, New London Lighthouse, and the entrance to the harbor will be a little on the starboard bow. To the eastward, Pine Island and Groton monument will show, the latter over the land. On the port bow Bartlett Reef Light-vessel should be made; this light-vessel bears **W.** ⅞ **S.**, distant nearly 4⅝ miles from Seaflower Reef beacon.

The dangers to be considered, etc., have been described under paragraph I immediately preceding.

1 A. ***Approaching from the Westward.***—I. ***Intending to go to the Southward of outlying dangers.***—Passing about 250 yards to the southward of Bartlett Reef Light-vessel, steer **NE.** by **E.** ½ **E.**, keeping Black Ledge beacon on the port bow; this course leads about 400 yards to the southward of Rapid Rock buoy (spar, red and black horizontal stripes), and the same distance to the southward of Sarah Ledge buoy (bell, red and black horizontal stripes). When the entrance is well opened out, or when New London Lighthouse bears to the westward of **N.**, haul to the northward and keep the lighthouse bearing between **N.** ½ **E.** and **NNW.**, until abreast Black Ledge beacon and Southwest Ledge buoy (nun, red and black horizontal stripes) on the starboard hand. Pass to the westward of Southwest Ledge buoy and proceed as directed in section 2 following.

Remarks.—When 250 yards to the southward of Bartlett Reef Light-vessel, heading **NE.** by **E.** ½ **E.**, Seaflower Reef beacon and North Dumpling Lighthouse will be on the starboard bow, Fishers Island to the southward of this lighthouse, and Race Rock Lighthouse just to the southward of Fishers Island. Black Ledge beacon will be a little on the port bow, and New London Lighthouse, to the northward and westward of the beacon, will be broad off the port bow. As Black Ledge beacon is approached the harbor will open out to the eastward of New London Lighthouse.

At Night.—On the **NE.** by **E.** ½ **E.** course the vessel will be crossing the red sector in new London light. Some time before the light bears **N.** ⅞ **E.** it will have the appearance of being half red and half white, or it may appear as if it is all white. To be sure that the vessel is in the white rays of the light it should bear to the northward of **N.** ⅞ **E.** When New London Lighthouse bears **N.** a **N.** by **E.** course should lead fair into the entrance of the river.

Dangers.—**Extensive Shoals** make out from and inclose Goshen Point, to the northeastward of Bartlett Reef Light-vessel and to the southwestward of New London Lighthouse, about midway between the two. Black buoys Nos. 1, 3, and 5 mark the southern edge. *Rapid Rock* and *Sarah Ledge*, both buoyed, are outlying dangers to the southward and southeastward of these shoals. The course leads to the southward of all these dangers.

Rapid Rock, marked by a buoy (spar, red and black horizontal stripes), has 13 feet of water and lies nearly ¼ mile **SSE.** from Goshen Point.

Sarah Ledge, Southwest Ledge, and **Black Ledge** are described under section 1 preceding.

II. *Passing North of Rapid Rock and Sarah Ledge.*—The following directions are available by day, at any stage of the tide, for vessels drawing 15 feet or less. Pass Bartlett Reef Light-vessel close-to, and when past this light-vessel bring it to bear **SW. ¾ W.** over the stern and make good the course **NE. ¾ E.**, keeping the bearing. This course continued for 1¾ miles from the light-vessel leads well to the southward of Little Goshen Reef buoy (spar, black, No. 1), and leads fair between Goshen Ledge buoy (spar, black, No. 3) and Rapid Rock buoy (spar, red and black horizontal stripes); continued for ⅝ mile farther, the **NE. ¾ E.** course leads fair between the black buoy (spar, No. 5) marking a ledge off Cormorant Rock and the buoy (bell, red and black horizontal stripes) marking Sarah Ledge.

When up with Sarah Ledge haul to the northward, course about **NE.** by **N.**, and leave Southwest Ledge buoy (nun, red and black horizontal stripes) about ½ mile on the starboard hand, proceeding as directed in section 2 following.

The *tidal currents* have considerable velocity and allowance must be made for them.

In smooth water it is probable that the bell buoy on Sarah Ledge will not ring.

Dangers.—Note the descriptions of dangers, etc., under paragraph I preceding. On the **NE. ¾ E.** course Rapid Rock and Sarah Ledge are left on the starboard hand. The shoals off Goshen Point are left on the port hand; Little Goshen Reef, Goshen Ledge, Cormorant Rock, and the ledge off it are parts of these shoals.

Little Goshen Reef, marked near its southern end by a buoy (spar, black, No. 1), has a least depth of 2½ feet; the buoy is in 18 feet of water and is nearly 1½ miles **NE.** from Bartlett Reef Light-vessel.

Goshen Ledge, marked at its southern end by a buoy (spar, black, No. 3), has 10 feet of water over it, and is nearly ⅝ mile **SSE.** from Goshen Point.

Cormorant Rock, showing out of water, is ½ mile **E. ¼ S.** from Goshen Point. A buoy (spar, black, No. 5) is placed ¼ mile **ESE.** from Cormorant Rock; the buoy is in 18 feet of water and marks the eastern end of ledge.

2. *Entering and Proceeding up the River.*—When New London Lighthouse is about ¾ mile distant, Black Ledge beacon and Southwest Ledge buoy (nun, red and black horizontal stripes) will be in range on the starboard hand bearing about **E.** by **S.** Now shape the course so as to pass about ¼ to ½ mile to the eastward of the lighthouse (or, go midway between the lighthouse and the eastern shore) and stand up the river, course about **N. ½ E.**, favoring the eastern shore but giving it a berth of 200 yards. Anchor at discretion. Consult "Anchorage" and "Quarantine Regulations," page 69.

If bound to the Naval Station, favor the eastern shore and be guided by the chart.

If bound to Norwich, take a pilot or towboat.

Remarks.—Frank Ledge buoy (spar, red and black horizontal stripes), to the northward of Black Ledge, is on the starboard hand, and nearly ⅜ mile beyond it is Black Rock, an islet lying off the eastern shore. When fair between New London Lighthouse and Black Rock, heading about **N. ½ E.**, the monument at Groton, opposite New London, will be a little on the starboard bow. Fort Trumbull, with the city of New London beyond, will be a little on the port bow. The railroad drawbridge will show prominently right ahead. Greens Harbor will show open to the southward and southwestward of Fort Trumbull; several small islands and rocks extend to the southward in a broken line from the fort.

Dangers.—**Frank Ledge,** marked by a buoy (spar, red and black horizontal stripes), is small, has a least depth of 13½ feet over it, and is ⅝ mile **NNW. Northerly** from Black Ledge beacon.

Black Rock is a high rock, out of water, lying nearly ¼ mile **SSE.** from Eastern Point.

A rock with 3 feet over it lies about 200 yards **NW.** by **W.** from the western end of Black Rock; just outside the depth is 18 feet or more.

The western shore, for ½ mile to the southward and the same distance to the northward of New London Lighthouse, has a number of scattered rocky heads; all of them will be avoided by giving the shore in this vicinity a berth of 400 yards.

Farther to the northward, but to the southward of Fort Trumbull and to the westward of the channel, are *Hog Back, White Rock, Goose* and *Powder islands*, and *Melton Ledge*.

Hog Back, a small rocky ledge in Greens Harbor, marked by black buoy, No. 5½, has a depth of ¼ foot, and lies about ⅜ mile **S. ¼ W.** from the southeastern end of Fort Trumbull.

White Rock, an islet, lies about 200 yards **NE.** from Hog Back and about 350 yards **SSW.** from Melton Ledge buoy.

Melton Ledge, marked by a buoy (spar, black, No. 7), has ¼ foot of water over it, and is about 400 yards **SSE. ¼ E.** from the southeastern end of Fort Trumbull and about 150 yards to the eastward of Powder Island.

Powder Island and **Goose Island,** both small, are to the southward of Fort Trumbull and close in with the northern shore of Greens Harbor.

NIANTIC BAY AND RIVER.*

Niantic Bay, lying 4½ miles to the westward of Thames River entrance (New London Harbor), is a good anchorage, sheltered against winds from **W.**, through **N.**, to **E.** It is important as a harbor of refuge, and is often available for vessels unable to get into New London Harbor (see also page 49). From 25 to 30 feet of water will be found just inside of Black Point (the western point at the entrance to the bay), but the general depth in the bay is about 19 feet, the water shoaling gradually to the northward; the 12-foot curve extends a little over ¼ mile from the shore at the head of the bay. The entrance is 1¼ miles wide, and the most dangerous shoals are marked by buoys.

Prominent objects—Points at entrance.—The chief guide in approaching from the eastward is Bartlett Reef Light-vessel (see page 10). The most prominent mark in entering is a high white tower in Niantic, at the head of the bay. *Black Point*, the western point at the entrance, is flat, with a number of cottages near its end and showing a steep side to the southward. *Millstone Point*, the eastern point at the entrance, is rocky and irregular in shape; a stone quarry (houses and derricks near the end of the point) will be distinguished from the southward.

Niantic, on the N. Y., N. H. & H. Railroad, is at the head of the bay; it is a popular place of residence in summer, but of little commercial importance. The depth alongside wharf at Niantic is 9 feet at mean low water.

Niantic River, shallow and unimportant, flows into the head of the bay through a narrow gut crossed by two bridges, one the N. Y., N. H. & H. Railroad bridge and the other carrying the county road. Above the gut the river widens, and 1½ miles from the bridge a branch makes off in a **NNE.** direction; the main river continues **N.** to the village of **East Lyme**, about 4 miles above the entrance. Vessels of 7 feet draft go up the river as far as East Lyme, crossing the bar and passing through the bridges near the time of high-water slack. The width of the draw in the county road bridge is 27 feet; the other is wider.

Pilots and towboats.—Strangers bound into the river take a pilot at Niantic, anchoring in the bay until one comes on board in response to signal. Towboats are sometimes used by vessels bound to East Lyme; they may be had from New London.

Ice closes navigation in the river during the winter.

Tides.—The mean rise and fall of tides is 2.7 feet; high water occurs 6m. after high water at New London, and low water 2m. after low water at New London.

Consult also pages 9–24 and 48–52.

SAILING DIRECTIONS, NIANTIC BAY.

1. ***Approaching and Entering from the Eastward.***—I. ***Passing to the Southward and Westward of Bartlett Reef Light-vessel.***—Having come through Fishers Island Sound, as directed on pages 42–43, or through The Race, as directed on pages 53–54, steer for Bartlett Reef Light-vessel and pass 200 yards to the southward of it; then steer about **NW.**, leaving Bartlett Reef buoy (spar, red, No. 4) 200 yards on the starboard hand. Anchor at discretion on the **NW.** course.

Desiring to stand farther up the bay, continue the **NW.** course for 2¾ to 3¼ miles until the high white tower at Niantic bears between **N.** and **N.** by **E.** ¾ **E.**; then steer for the tower, keeping it between these bearings. Anchor according to draft; 16 feet of water will be found ½ mile from the northern shore of the bay; do not go farther inshore. If bound into the river take a pilot.

At night, when to the westward of Bartlett Reef Light-vessel, keep Race Rock Light showing open to the southward of Bartlett Reef Light-vessel. Continue thus until Little Gull Island Light bears **SSE.**, when steer **NNW.**, keeping this bearing, and anchor as soon as the water shoals to 20 feet (low water).

The ***tidal currents,*** until well within the bay, have considerable velocity; in the bay the currents are scarcely noticeable, vessels at anchor usually swinging to the wind.

Remarks.—On the **NW.** course the red buoy on the southern end of Bartlett Reef (spar, No. 4, about ½ mile to the northwestward of the light-vessel) and Two-Tree Island will be left on the starboard hand. Three-Foot Rock buoy (spar, black, No. 5), on the western side of the bay, will be directly ahead. Black Point, the western point at the entrance of Niantic Bay, will be on the port bow; the white tower (high, very prominent) and the houses in Niantic on the starboard bow. There are no dangers on the port hand in approaching from the eastward while on the **NW.** course.

*Niantic Bay is shown on Coast and Geodetic Survey chart 114. See footnote on page 48.

Dangers.—**Bartlett Reef,** marked at its southern end by a red buoy (spar, No. 4) and at its northern end by a black buoy (spar, No. 1), is about 1⅝ miles long in a general **N.** and **S.** direction, and about ⅜ mile wide at its southern end. At low water it is bare in spots. Bartlett Reef Light-vessel (see page 10) is placed nearly ½ mile to the southward of the southern end of the reef.

Two-Tree Island is a small bare island 1¾ miles **NNW.** ¼ **W.** from the light-vessel and about ¾ mile **SE.** by **S.** from Millstone Point, the eastern point at the entrance to Niantic Bay. Shoal water extends to the eastward and to the southward from the island, and also to the northward, where the limit is marked by a buoy (spar, black, No. 3), a guide for Two-Tree Island Channel.

White Rock is an islet about ½ mile to the westward of the southern end of Millstone Point. A red buoy (spar, No. 4) is placed near a small rock off the southeastern end of White Rock.

Black Rock, small and bare, is about ⅜ mile to the northward of White Rock. Still farther to the northward, in the northeastern part of the bay, is Waterford Island, also small and bare.

Three-Foot Rock, marked off its eastern side by a buoy (spar, black, No. 5), is about ¼ mile from the western shore and nearly 1¼ miles to the northward of the end of Black Point; vessels should not pass inshore of this buoy. About ¾ mile **NNE.** from Three-Foot Rock is **Wigwam Rock** (Indian Clump), in the northwestern part of the bay; to the southwestward of Wigwam Rock, and about 400 yards off shore, is a small rock, bare at low water.

II. ***Passing through Two-Tree Island Channel.***—This channel may be used to advantage by vessels having come through Fishers Island Sound or from New London Harbor, but strangers are advised not to use it, and should never attempt to beat through. With either tide the current sets through this channel with much greater velocity than outside. The channel is well buoyed and is often used to advantage by small vessels going with the tide.

Being to the westward of North Dumpling Lighthouse, bring this lighthouse to bear **E.** ¾ **S.,** and steer **W.** ¾ **N.** On this course Sarah Ledge buoy (bell, red and black horizontal stripes) and Rapid Rock buoy (spar, red and black horizontal stripes) will be left on the starboard hand, as will other buoys near these but farther inshore.

Pass 200 yards to the southward of Rapid Rock buoy (spar, red and black horizontal stripes) and when it bears about **NE.** by **E.,** distant about 400 yards, steer **WNW.,** for about ½ mile, until past Little Goshen Reef buoy, which is left about 300 yards on the starboard hand.

Now keep the black buoy marking the northern end of Bartlett Reef (spar, No. 1) on the port bow, course about **NW.** ½ **W.** Leave this last-mentioned buoy about 350 yards on the port hand, passing about midway between it and the northern shore, and turn very gradually to the westward so as to leave Two-Tree Island Shoal buoy (spar, black, No. 3) 350 yards on the port hand.

Pass to the southward of the two red buoys which will be on the starboard bow (both spars, No. 2 and No. 4) and to the southward of White Rock. Then turn to the northward, keeping the high white tower near Niantic bearing between **N.** and **N.** by **E.** ¾ **E.,** and anchor in about 16 feet (low water).

Dangers.—**Sarah Ledge, Rapid Rock,** and **Little Goshen Reef,** left on the starboard hand in carrying out the foregoing directions, are described on pages 71–72.

Bartlett Reef, Two-Tree Island Shoal, and **White Rock** are described under paragraph I foregoing.

Whitestone Creek entrance is passed and left on the starboard hand. **Flat Rock,** bare at low water, lies in the eastern side of the entrance. **High Rock,** bare at low water, with ledges and sunken rocks about it, is about 600 yards to the westward of Flat Rock.

Millstone Point Reef, marked by a buoy (spar, red, No. 2), makes off about ⅛ mile to the southward of **Millstone Point.**

1 A. ***Approaching and entering from the Westward.***—Passing close to Cornfield Point Light-vessel, steer **ENE.** ½ **E.** This course made good for about 8½ miles passes about ½ mile to the southward of Black Point. When the high white tower at Niantic bears between **N.** by **E.** ¾ **E.** and **N.,** head in for the tower, keeping it between these bearings, and anchor as directed under section 1 foregoing.

The ***tidal currents,*** until well within the bay, have considerable velocity. The flood has a tendency to set a vessel to the northward, and the ebb to the southward.

Remarks.—**The ENE. ½ E. course leads to the southward of Long Sand Shoal, Saybrook Bar, Hatchett Reef, and Black Boy Rock, of which all but the last are described on pages 57 and 58. The lighthouses at Saybrook entrance are left well on the port beam. Black Point will be made a little on the port bow, and Bartlett Reef Light-vessel on the starboard bow.**

Dangers and aids.—The following buoys are passed, all left on the port hand and nearly ¾ mile distant: *Long Sand Shoal east end buoy* (spar, red and black horizontal stripes); *Starboard Bar buoy* (nun, red, No. 8), marking eastern side of entrance to passage leading north of Long Sand Shoal; *Hatchett Reef* buoys, one on the northeastern end of the reef (spar, black, No. 1) and the other on the southeastern end (spar, red, No. 6), the latter left about ½ mile distant.

Black Boy Rock, marked by a buoy (spar, red, No. 2) at its southern end, is about ¾ mile **W. ¼ S.** from Black Point. It is a ledge bare in places at low water. The sailing line passes nearly ¾ mile to the southward of it.

Two-Tree Island, White Rock, etc., are described under section 1 preceding.

CONNECTICUT RIVER.*

This river, one of the largest and most important in the New England States, empties into Long Island Sound about 11½ miles to the westward of Thames River entrance. It is navigable as far as the City of Hartford, and a large tonnage, mostly steamers and barges, is employed in the commerce of the cities, towns, and villages on its banks.

The entrance to the Connecticut River is obstructed by a bar of shifting sand and gravel, known as Saybrook Bar. At the western side of the entrance jetties have been built under Government appropriations, and in 1890 a channel 130 feet wide and 12 feet deep at low water had been dredged between the jetties, but a depth of more than 9 or 10 feet can not be depended upon.

East and West jetties.—The inner end of the **East Jetty** is at a stone beacon ¼ mile **SE.** from Saybrook Lighthouse; this jetty extends to the southwestward and then to the southward. The inner end of the **West Jetty** is on the beach to the westward of Saybrook Lighthouse; it first extends to the southeastward and then **S. ¾ W.** to the Breakwater Lighthouse.

The **channel** in the river up to Hartford has been dredged in places, and dikes built to prevent, as much as possible, the formation of bars. The project for the improvement of the river contemplates the maintenance of a channel 9 feet deep at mean low water up to Hartford.

The only channel to enter the river for strangers of over 5 feet draft is the one dredged between the jetties. The bar to the eastward of the jetties has several channels with 6 feet of water, but they shift and are not reliable, lumps with from 4 to 5 feet of water forming sometimes in the middle of them.

Between **Saybrook** and **Middletown** the river banks are hard and in some places rocky, but between Middletown and **Hartford** the river flows through alluvial bottom land, and the channel changes in places after each freshet and ice jam.

The river is crossed by **three drawbridges** below Hartford—the N. Y., N. H. & H. Railroad bridge 1¼ miles above Saybrook Point (width of draw about 115 feet in the clear), the N. Y., N. H. & H. Railroad bridge at Middletown,† 35 miles above the entrance (width of draw about 125 feet in the clear), and the town bridge from Middletown to Portland (width of draw about 200 feet in the clear). At Hartford a bridge crosses the river, connecting with East Hartford.

Saybrook is a village on the western shore of the river to the westward of Saybrook Point and just inside the entrance. **Saybrook Point**, a village to the eastward of Saybrook, is about 1 mile to the northward of Lynde Point (the western point at the entrance to the river, marked by Saybrook Lighthouse), and is the first landing in the river. Vessels of 13 feet draft go to Saybrook Point; there is 9 feet of water alongside the wharves at low water.

Essex, a village with several manufactories, is on the western shore, about 5 miles above the entrance.

Middletown is a city on the western bank of the river, 35 miles above the entrance; 13 feet is the deepest draft taken up to the city, and 9 to 10 feet the usual draft.

Portland, a town on the east bank of the river, opposite Middletown, is noted for its stone quarries; it has communication with Middletown over a railroad bridge and a town bridge.

Hartford, 50 miles above the entrance, is an important manufacturing city and is a port of entry. The greatest draft usually taken up the river to Hartford is 9½ feet; the average draft is not more than 8 feet, but during freshets vessels drawing 12 feet have sometimes gone up to the city; the depth alongside wharves is 11 feet.

Prominent objects.—Saybrook (Lynde Point) Lighthouse and Saybrook Breakwater Lighthouse are described on page 10.

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*Connecticut River is shown on Coast and Geodetic Survey charts 253, 254, 255, 256, scale $\frac{1}{20,000}$, price of each $0.25. Shown also on chart 115, scale $\frac{1}{80,000}$, price $0.50.

† The piers of the railroad bridge at Middletown have dangerous projecting parts below the line of low water; 12 feet in the clear should be allowed between vessel's rail and the part of pier showing above water.

Saybrook Point, 1 mile north of Saybrook Lighthouse and on the western shore, is distinguished by the large railroad shed and numerous houses near the eastern end of the point.

Griswold Point, the eastern point at the entrance to the river, is low and level and has no prominent distinguishing features.

Anchorage is found inside the jetties, about 200 to 300 yards off shore, in from 20 to 30 feet of water, soft bottom, Saybrook Lighthouse bearing **W.** or to the southward of **W.**

Farther up, the best anchorage for vessels of less than 10 feet draft, with plenty of room, is found opposite and to the northward of the North Cove, about 300 yards above the coal docks at the cove entrance.

Strangers seldom enter the river merely for shelter.

Pilots and towboats.—Strangers entering the river and bound above Saybrook should take a pilot or a towboat either outside the bar or off Saybrook Point. Pilotage is not compulsory. Each towboat carries two licensed pilots, and one may be had with or without the tug. The headquarters for pilots and tugs is at the steamboat wharf at Saybrook Point, where the steamboat wharf agent will attend to any orders given.

Towboats will be found at various points along the river. Sailing vessels bound in usually take a towboat outside the bar, and sometimes even remain outside Long Sand Shoal, lying off and on, until a tug comes out in response to signal.

Supplies.—Coal for steamers can be had in limited quantities alongside the wharves at Saybrook Point, and in unlimited quantity at Hartford. Water can be obtained alongside wharves at Saybrook Point, Middletown, and Hartford through pipe and hose. Provisions and ship-chandler's stores can be obtained at the towns and villages along the river.

Repairs to vessels and machinery can be made at Hartford, where there is one marine railway capable of hauling out vessels of 300 tons (register tonnage).

Hospitals.—At Hartford there is a relief station (Class IV) of the U. S. Marine-Hospital Service (see Appendix III.)

Ice closes navigation in the river above Saybrook during the winter. From December 1 to April 1 navigation is entirely closed or unsafe.

Freshets occur in April and May, and sometimes in November and December. The spring freshets are the highest; at Hartford their usual height is about 20 feet and the greatest recorded height 29 feet.

The **currents** at the entrance have great velocity at times, and always require careful attention, but they are so irregular that no definite rule can be given regarding them. The action of the currents is much affected by variations in the height of the water level in the river. Off the southern end of the jetties and close to them the tidal current of the Sound often sets directly across, at right angles, to the current setting out or in between the jetties. In the river the velocity varies from 2 to 5 miles per hour, according to the state of the river, whether high or low.

For **tides** see page 22.

Below Hartford, at low stages of water, the Connecticut River is influenced by tides; at Hartford the mean annual rise is about 1 foot, but when the water level is raised above 5 feet by freshets the influence of the tide is not felt.

For **variation of the compass** see page 24.

SAILING DIRECTIONS, CONNECTICUT RIVER AND SAYBROOK HARBOR.

Directions for the eastern part of Long Island Sound are given on pages 55–58.

The following directions, sections 1 and 1 A, are available for any vessels that can enter the Connecticut River.

1. ***Approaching from the Eastward.***—With Cornfield Point Light-vessel bearing between **W.** by **N.** and **WSW. ½ W.**, steer for it until Saybrook Breakwater Lighthouse (the outer one of the two Saybrook Lighthouses) bears **NW. ¾ N.** Then steer for this Breakwater Lighthouse, bearing **NW. ¾ N.**; Plum Island Lighthouse will be directly astern. Pass about ¼ mile to the westward of the nun buoy (red, No. 8) on the southern side of the shoals making out from Saybrook Bar, and give Long Sand Shoal (east end) buoy a good berth on the port hand. When past these buoys haul a little more to the westward, with signal up for pilot or tug if intending to take one. Keep Saybrook Breakwater Lighthouse a little on the starboard bow in approaching; the depth should not be less than 20 feet. To enter follow the directions in section 2.

If necessary to wait for pilot or towboat, anchor to the southwestward of the Breakwater Lighthouse, distant ⅓ to ¾ mile. A vessel anchored to the southwestward of this lighthouse has better holding ground than is found directly to the southward, and is out of the variable currents due to the flow of the river.

Remarks.—When steering for Cornfield Point Light-vessel between a **W.** by **N.** and **WSW.** ½ **W.** bearing all dangers are avoided. On the **NW.** ¾ **N.** course, Saybrook Lighthouse, the beacon at the inner end of the east jetty, and the houses at Saybrook Point will be on the starboard bow; Saybrook Breakwater Lighthouse will be directly ahead with the largest building on Lynde Point (the hotel) open a little to the right of it; the course leads to the westward of Saybrook Bar and the shoals making out from it.

Dangers.—**Hatchett Reef,** marked at its southeastern end by a buoy (spar, red, No. 6) and at its northeastern end by a buoy (spar, black, No. 1), is described on page 58.

Saybrook Bar is described on page 58.

Long Sand Shoal is marked at its eastern end by a buoy (spar, red and black horizontal stripes). This buoy is left on the port hand on the **NW.** ¾ **N.** course. The shoal is described on page 57.

1 A. ***Approaching from the Westward.***—When about 1 mile south of Hammonasset Point (see page 59) steer **E.** ½ **S.**, and as soon as Saybrook Breakwater Lighthouse (at outer end of W. jetty) bears **E.** by **N.**, steer for this lighthouse, keeping the bearing. When the Breakwater Lighthouse is about ½ mile distant, haul a little to the southward, so as to pass about 300 yards south of the outer end of the W. jetty.

If intending to take a towboat or a pilot outside, and having signal up, anchor, if necessary, as directed in section 1 preceding.

Intending to stand in, proceed as directed in section 2 following.

Remarks.—On the **E.** ½ **S.** course, Stone Island Reef buoy (spar, red, No. 14), at the eastern side of the entrance to Clinton Harbor, will be left ¼ mile on the port hand.

On the **E.** by **N.** course, Long Sand Shoal is left on the starboard hand, and Crane Reef buoy (spar, red, No. 12), the spindle on Hen and Chickens, and Cornfield Point Shoal buoy (spar, red, No. 10) will be left on the port hand, the latter distant about 300 yards.

Dangers.—**Crane Reef, Hen and Chickens, and Cornfield Point Shoal** are covered by the red sector of Saybrook Breakwater Lighthouse. These shoals are described on page 60.

2. ***Entering the River.***—The directions given in this section are available for vessels drawing less than 7 feet. If strictly followed they will carry about 10 feet of water through the dredged channel, but this is narrow, and a stranger drawing more than 7 feet is advised to take a pilot or a towboat outside.

In approaching and entering avoid the outer end of the E. jetty, as lumps tend to form about it. When the entrance between the two jetties is opened fully, stand in, favoring a little the outer end of the W. jetty, and steer about **N.** by **E.** ¼ **E.** This course draws over slightly toward the E. jetty, so that when up with the angle of this jetty the vessel should be about midway between the two jetties, or favoring slightly the angle of the eastern one. Continue the **N.** by **E.** ¼ **E.** course, hauling a little to the eastward and passing 300 yards to the eastward of Saybrook Lighthouse. The water will deepen; when the depth is 18 to 24 feet, head up for the eastern end of Saybrook Point (railroad wharf, large building, very prominent), course about **N.** by **W.** ¾ **W.** Continue this course until up to Saybrook Point and anchor in the channel just above the railroad wharf about 300 yards from the shore.

Remarks.—Above Saybrook Lighthouse there are sunken piers and rocks on both sides of the channel, and off the northeastern end of Lynde Point the channel is very narrow for vessels of over 7 feet draft.

Note the remarks on currents, page 23 and page 57; see also description of entrance to the river, pages 75–76.

WESTBROOK HARBOR.*

Westbrook Harbor is an open bight on the northern side of Long Island Sound, about 5 miles to the westward of Saybrook Breakwater Lighthouse, and just to the eastward of Menunketesuck Point, a point formed by several low narrow islands, connected at low water and surrounded by bowlders.

*Shown on Coast and Geodetic Survey charts 357, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

The town of **Westbrook**, on the north side of the harbor, is of no commercial importance. A tall gray church spire is the most conspicuous object, and can be seen from a long distance. **Salt Island**, a small island, is connected with the main land at low water, and has on its southwestern side a wharf with 4 feet of water at the end; the island is about 1¼ miles east of Menunketesuck Point, abreast of the town.

Vessels of from 30 to 200 tons sometimes anchor in Westbrook Harbor, but strangers seldom do so; the anchorage to the westward of Menunketesuck Point, behind Duck Island Breakwater, is better. During the spring and summer Westbrook Harbor is obstructed by fish weirs, which are removed in the fall. There are also sunken rocks which are not marked.

Tides.—See heading "Duck Island Roads."

GENERAL DIRECTIONS, WESTBROOK HARBOR.

From the Eastward, being to the Northward of Long Sand Shoal.—In approaching, note the directions, pages 56–58. When to the westward of Crane Reef buoy (spar, red, No. 12) steer **N.** by **W.**, heading for Salt Island, a low rocky islet lying close to the northern shore. Anchor in 11 or 12 feet (low water) about ¼ mile to the southward of this island.

From the Westward, do not approach Salt Island on any bearing to the eastward of **NE.** by **N.**

Do not go inshore of the lines indicated, as there are sunken rocks, not marked.

DUCK ISLAND ROADS*

is 6½ miles to the westward of Saybrook Breakwater Lighthouse and just to the westward of Westbrook Harbor. It has been made a fair harbor of refuge, for vessels of 15 feet or less draft, by the construction of a breakwater, which (in 1899) extended 2,755 feet to the westward from **Duck Island**, and affords shelter from all except southwest winds; even in southwest gales a few vessels may find shelter when anchored close behind the breakwater near Duck Island. The depth of water behind the breakwater ranges from 15 to 17 feet, shoaling gradually toward the shore to the northward. There is a post, with red lantern light, on the west end of the breakwater (see table, page 12).

In the spring and summer a part of this harbor is taken up by fish weirs, which are removed in the fall. The entrance to the westward of Duck Island is free from dangers.

A channel, about 250 yards wide between the 12-foot curves, leads between Menunketesuck Point and Duck Island, but strangers should not attempt it, as the anchorage is more easily made from the westward.

Tides.—The mean rise and fall of tides is 4.5 feet; high water occurs 1h. 20m. after high water at New London, and low water 59m. after low water at New London.

GENERAL DIRECTIONS, DUCK ISLAND ROADS.

From the Eastward.—In approaching, note the directions on page 57. Pass about ½ mile to the southward of Duck Island; when the west end of the breakwater bears **N.**, stand for it on the bearing until it is about 300 yards distant ahead, then haul to the westward so as to give the end of the breakwater a berth of at least 50 yards. Round the end of the breakwater and anchor inside in 15 to 16 feet (low water).

Remarks.—When standing for the west end of the breakwater, care should be taken, especially in a rough sea, to avoid two 16-foot spots lying respectively 290 and 580 yards **S. by W. ½ W.** from the west end of the breakwater.

Shoal water extends for a distance of 450 yards to the southward of Duck Island, and also about the same distance in a **N. by E.** direction from the island. There are no dangers to the northward of the breakwater.

From the Westward.—Passing at least ⅜ mile south of Stone Island Reef buoy (spar, red, No. 14), steer **NE.** for the west end of the breakwater. Give the end of the breakwater a berth of at least 50 yards and anchor inside.

See the remarks preceding.

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*Shown on Coast and Geodetic Survey charts 257, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

CLINTON HARBOR AND HAMMONASSET RIVER.*

Clinton Harbor is on the north shore of Long Island Sound, 9 miles to the westward of Saybrook, and on the eastern side of Hammonasset Point. It is the entrance to Hammonasset River, a stream of no commercial importance. The harbor affords protection against northerly and northwesterly winds for light-draft vessels, but is not available for strangers.

Clinton, a town on the Shore Line Division of the N. Y., N. H. & H. Railroad, is at the head of the harbor and at the mouth of Hammonasset River; the greatest draft carried up to Clinton does not exceed 8 feet; the depth alongside the wharves is 6 feet at mean low water; the depth of water over the bar at mean low water is about 6 feet.

Hammonasset Point, the western point at the entrance, is described on page 59. There is a buoy marking the channel below the bar, but strangers should not attempt to go to Clinton without a pilot.

Pilots can be obtained by making signal outside the harbor, and vessels desiring a pilot either lie off the entrance or anchor until they are boarded by one. Towboats are not much used; they can be obtained at Saybrook.

Ice extends to Sandy Point in the winter. There is not much drift ice.

Tides.—See heading "Duck Island Roads."

GENERAL DIRECTIONS, CLINTON HARBOR.

From the Eastward.—Directions for this part of the Sound are given on pages 58–60. Give Stone Island Reef buoy (spar, red, No. 14) a berth of ¼ mile on the starboard hand, and stand in, course about **NNW. ¼ W.** for Wheeler Rock buoy (spar, red, No. 4). Anchor in about 14 feet of water, to the southward of the buoy. Here take a pilot.

Dangers.—**Stone Island Reef** is described on page 60.

Wheeler Rock, with 1 foot of water, marked by a buoy (spar, red, No. 4), lies near the head of the outer harbor. The bottom outside of the bar is generally hard and poor holding ground.

From the Westward.—Passing ¾ mile to the southward of Hammonasset Point, round the point at this distance and stand in, course **NE.** by **N.**, for Wheeler Rock buoy (spar, red, No. 4). Anchor in 14 feet of water, to the southward of the buoy.

ANCHORAGE OFF MADISON, CONN.†

A broad bight, sometimes used as an anchorage, makes into the north shore to the westward of Hammonasset Point. This bight is about 10 miles to the westward of Saybrook (Connecticut River) and about 15 miles to the eastward of New Haven entrance. It affords shelter in northerly and northeasterly winds, in from 16 to 23 feet of water, excellent holding ground (mud and shells). Southwesterly winds, when across the flood, often cause considerable sea. The anchorage is not recommended, as Duck Island Harbor, to the eastward, and Thimble Islands Harbor, to the westward, afford better shelter.

Madison, a town of no commercial importance, is on the north shore of the bight, on the Shore Line Division of the N. Y., N. H. & H. Railroad; it has two landings, from each of which a road leads into the town; the wharves have 3 feet of water alongside them at low water.

Tuxis Island, a small island close inshore, abreast the village of Madison, is a conspicuous mark in entering.

Fish weirs.—During the spring and summer many fish weirs are put down in the bight; they are removed in the autumn.

Tides.—The mean rise and fall of tides is about 5.4 feet; high water occurs 1h. 28m. after high water at New London, and low water 1h. 05m. after low water at New London.

SAILING DIRECTIONS FOR THE ANCHORAGE OFF MADISON.

1. ***Approaching and Entering from the Eastward.***—Give Hammonasset Point a berth of ¾ mile or more, and round this point, passing about ¼ to ¾ mile to the westward of Hammonasset Point Reef buoy (spar, red, No. 2) off the western side of point.

Now steer for Tuxis Island, keeping the island on any bearing from **NW.** to **NW.** by **N.** Be careful to keep within these limits, the best course being about **NW. ½ N.**, with Tuxis Island directly ahead.

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*Shown on Coast and Geodetic Survey charts **258**, scale $\frac{1}{10,000}$, price $0.50; **115**, scale $\frac{1}{80,000}$, price $0.50.

†Shown on Coastand Geodetic Survey charts **259**, scale $\frac{1}{10,000}$, price $0.50; **115**, scale $\frac{1}{80,000}$, price $0.50.

Continue thus until past Madison East Reef buoy (spar, black, No. 1), which is left well on the port hand. When past this buoy keep a little more to the westward, and anchor about ¼ mile to the southward or southeastward of Tuxis Island, in 19 to 24 feet of water (low water), to the northward of Madison Reef.

Remarks.—When rounding Hammonasset Point, Tuxis Island will be readily recognized as the only rocky island in this vicinity; the high-water mark of the island shows white, and the top of the island, which has a round appearance, is covered with trees. The houses of Madison will be seen behind Tuxis Island and open to the eastward of it.

Dangers.—When well past Hammonasset Point there are two dangers to be kept especially in mind, a rocky patch (10 feet) and a rock (2 feet), whose descriptions follow below immediately after that of Madison Reef. The directions given clear these two dangers, the sailing line passing between them.

Madison Reef lies about ⅝ mile to the southward of Tuxis Island, extending **E.** and **W.** This reef has from 4 to 10 feet of water over it, and consists of several rocky patches with deeper water between them. The eastern part of the main reef is marked by a black buoy (spar, No. 1); the western end of the reef is marked by a red buoy (spar, No. 2), bearing **SW. ¾ W.** from Tuxis Island, distant nearly 1 mile.

The least depth (4 feet) is found over a rock known locally as Tuxis Island Reef, about midway between the buoys.

A rocky patch, with 10 feet of water over it, lies a little over ¼ mile **E. ½ S.** from the position of the black buoy (spar, No. 1) marking the eastern part of the main reef. Vessels passing to the eastward of this buoy should either give it a berth of only about 200 yards, or should pass at least ⅝ mile to the eastward of it (as on the sailing line of the directions) to clear the 10-foot spot.

A rock, with 2 feet of water over it, lies about ⅝ mile **SE. by E. ½ E.** from Tuxis Island, and ⅝ mile **S. by W.** from Madison East wharf.

1 A. ***Approaching and Entering from the Westward.***—Passing about 1 mile to the southward of Sachem Head, steer **E.**, heading for the extremity of Hammonasset Point.

When Falkner Island Lighthouse bears **S. by E. ¾ E.** and Indian Reef buoy (spar, red, No. 6) is abaft the port beam, distant about ½ mile, steer **ENE.**, heading for Tuxis Island on this bearing. Keep the bearing, leaving Charles Reef buoy (spar, red, No. 4) about ⅜ mile on the starboard hand and Madison Mid-reef buoy (spar, red, No. 2) about ¼ mile on the starboard hand. When Tuxis Island is about ¾ mile distant, haul to the eastward and anchor in accordance with the directions already given for approaching from the eastward.

On the flood be careful not to be set to the northward, and *on the ebb* be careful not to be set to the southward of the sailing line, especially while passing Charles Reef. Note that Charles Reef buoy is on the south side of the reef.

Remarks.—When off Sachem Head, on the **E.** course, Hammonasset Point will be directly ahead, Tuxis Island on the port bow and close in to the mainland, and Lobster Rock (locally, White Top), distinguished by a small hut upon it, will be broad off the port bow. As Sachem Head is passed, Guilford Harbor will be opened out and the houses of Guilford will appear. The buoys of Guilford Harbor entrance will be left on the port hand.

Dangers.—**Chimney Corner Reef, Indian Reef,** and **Charles Reef** are described under heading "Guilford Harbor."

Several shoal spots, with 6 to 12 feet over them, lie a little over ½ mile **NW. by W.** from Charles Reef. The sailing line passes to the southward of these spots.

GUILFORD HARBOR.*

Guilford Harbor, on the north shore of Long Island Sound, about midway between Saybrook and New Haven, lies due **N.** from Falkner Island. Only small light-draft vessels, of 20 to 200 tons, enter the harbor, the greatest draft being 9 feet.

The entrance is much obstructed by rocks and shoals, also during spring and summer by fish weirs, and strangers going up to Guilford should always take a pilot.

Guilford, a small town on the Shore Line Division of the N. Y., N. H. & H. Railroad, is at the head of the harbor, on a stream called **West River**; 5 feet is the greatest draft carried up to Guilford at high water. Another stream, the **East River,** flows into Guilford Harbor and has the best water, the depth over the bar at its mouth being 3½ feet; at high water 9 feet can be carried into East River for 1½ miles above its mouth.

Channels.—There are two channels leading in, both buoyed, but they are unfit for strangers.

*Shown on Coast and Geodetic Survey charts 359, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

Anchorage.—There is no anchorage that can be described so as to be of use to a stranger. The anchorage off Madison is much better than any offered by Guilford Harbor.

Pilots.—Vessels from the westward, bound to Guilford, sometimes stop at New Haven and take a pilot, but pilots can be had by making signal and lying off the harbor until one comes out. The piloting is generally done by fishermen.

Towboats are not much used; they can be obtained at New Haven or at Saybrook.

Supplies.—Anthracite coal for small steamers can be obtained at the lower dock in the East River. Provisions can be obtained at Guilford.

Tides.—See heading "Madison."

SAILING DIRECTIONS, APPROACHING GUILFORD HARBOR.

1. ***From the Eastward.***—Passing 1 mile south of Hammonasset Point, steer **WNW.** ½ **W.** 5½ miles. The course leads well to the southward of the buoys marking Madison and Charles reefs. Continue the **WNW.** ½ **W.** course until Falkner Island Lighthouse bears **S.** ¼ **W.** and Northwest Indian Reef buoy (spar, red, No. 2) is nearly ahead, distant ½ mile, then take a pilot, coming-to if necessary.

Remarks.—Approaching Guilford Harbor on the **WNW.** ½ **W.** course, **Lobster Rock** (known locally as **White Top**, and distinguished by a small hut or watchhouse) will be made a little on the starboard bow, and the houses of Guilford will be seen to the northward of Lobster Rock.

Dangers.—**Hammonasset Point Shoal** is described on page 60.

Madison Reef, marked by two buoys, is described on page 80.

Charles Reef, to the southwestward of Madison Reef, has 7 feet of water over it, and is marked at its southern end by a buoy (spar, red, No. 4).

Half Acre Rock is a mass of bare rocks off the eastern point at the entrance to Guilford Harbor. Bare rocks and sunken ledges extend to the north shore.

Guilford Shoals is the name applied to the numerous rocks and ledges, many of them bare at low water, which lie in the entrance of the harbor; **Indian Reef,** marked by two buoys, one (spar, red, No. 6) at its southwestern extremity and another (spar, red, No. 2) at its northwestern end, and **Lobster Rock** form parts of the shoals.

A spot with 6 feet of water over it lies nearly ½ mile **W.** from Indian Reef buoy (spar, red, No. 6).

1 A. ***From the Westward.***—Passing ¼ mile south of East Reef buoy (spar, red, No. 10), south of Thimble Island, steer **E.** This course should lead ⅝ mile south of Sachem Head and ¼ mile south of Chimney Corner Reef, also passing ⅜ mile south of Southwest Indian Reef buoy (spar, red, No. 6). When Falkner Island Lighthouse bears **S.** ¼ **W.**, steer **N.** ¼ **E.** until nearly up with the outermost buoys at the entrance, when take a pilot, coming-to if necessary.

Remarks.—On the **E.** course, Sachem Head will be made a little on the port bow, and after passing Sachem Head the houses of Guilford will be seen to the northward as the harbor opens out.

To the northward of Sachem Head are two bights, **Joshua Cove (Great Harbor)** and **Sachem Head Harbor**; the latter is the headquarters of a yacht club, but the former is shallow and of no importance.

Dangers.—**Goose Rocks Shoal,** marked by a buoy (bell, red), and **Goose Rocks** lie to the southwestward of Sachem Head, and are described under heading "Thimble Islands Harbor."

Chimney Corner Reef is about ⅜ mile south of Sachem Head, and has a least depth of 9 feet of water over it. This reef is not marked; from it the northern Goose Rock bears **NW.** ¾ **W.** A rule to insure clearing the reef, in passing to the southward of it, is to keep the large lone tree on Thimble Island (Two-Tree Island) open to the southward of Goose Rocks Shoal buoy. To the eastward of Sachem Head a narrow channel leads up to Guilford Harbor, but this is not available for strangers on account of the many rocks and ledges which obstruct it.

When approaching Indian Reef buoy (spar, red, No. 6), the 6-foot spot lying nearly ½ mile **W.** from the buoy should be avoided.

SACHEM HEAD HARBOR.*

This is a very small harbor, about ¼ mile long and ⅛ mile wide, on the western side of Sachem Head; it affords shelter for small vessels against all but southwesterly winds, which sometimes throw a heavy sea into the harbor. The depth is 6 to 12 feet at low water, soft bottom. The harbor is now the headquarters of a yacht club.

*Shown on Coast and Geodetic Survey charts **260**, scale $\frac{1}{10,000}$, price $0.50; **115**, scale $\frac{1}{80,000}$, price $0.50.

The directions given are available for vessels of 7 feet or less draft.

Tides.—The mean rise and fall of tides is about 5.6 feet; high water occurs 13m. before high water at Willets Point, and low water 37m. before low water at Willets Point.

SAILING DIRECTIONS, SACHEM HEAD HARBOR.

1. ***From the Eastward.***—Steer so as to pass about ½ mile south of Sachem Head, and when the northern and largest of the Goose Rocks bears **NW. ½ N.** steer for it on that bearing. When Joshua Point bears **N.** steer for it on that bearing until the harbor is opened out, when steer about **ENE. ½ E.**, heading midway between Joshua Point, the western point of Sachem Head, and the small island at the southern point at the entrance, and anchor according to draft when inside the points.

See Dangers under section 1 A, Guilford Harbor.

1 A. ***From the Westward.***—Pass about 300 yards south of East Reef buoy (spar, red, No. 10), south of the Thimble Islands, and steer **E. ¾ N.**; this should lead about 200 yards south of Goose Rocks Shoal buoy (bell, red). Continue this course about 600 yards to the eastward of the bell buoy, and then steer **NE. ½ E.** for the entrance to the harbor; when the harbor is opened out follow directions given above for entering.

THE THIMBLES.*

A group of islands called **The Thimbles** lies about midway between Sachem Head Harbor and Branford Harbor. The most important of these islands, mentioned in order from the southward, are—

Two-Tree Island, has a very prominent tree, which is seen when past Sachem Head.

Horse Island, has small islands and rocks to the eastward of it, but is bold-to on its western side.

Pot Island, which may be distinguished by the tall framework observatory near the middle of the island.

Money Island, to the northeastward of Pot Island, has numerous summer houses and a hotel. To the northeastward of Money Island other islands extend almost to the mainland, with narrow passages between them; these passages are unfit for strangers, as they wind among numerous unmarked rocks and shoals, but they are used by yachts and small craft owned in the vicinity.

High Island, to the northwestward of Pot Island, long and narrow, is covered with trees and shows a rocky water line.

Numerous **rocky islets** and **shoal spots** lie between The Thimbles and the shore to the northwestward and westward. The quarry on Hoadley Neck, known as Leetes Island Quarry, ships considerable stone to places along the Sound. The stone docks at the quarry have sufficient water for the vessels loading at them.

THIMBLE ISLANDS HARBOR*

is a small and well-sheltered anchorage lying between Pot and Money islands to the eastward and High Island to the westward, and is about 7 miles to the eastward of New Haven entrance. It is much frequented by yachts in summer, and fishing steamers anchor here for the night when fishing in the vicinity; it is occasionally used by tows. Vessels up to 12 feet draft can find shelter here, but, as the entrance is narrow and there is no room for working when inside, it is necessary for sailing vessels to have a favorable wind entering and leaving by the only channel available for strangers. Although the harbor is open to the **SW.**, yet even from that direction the sea loses much of its force before reaching the anchorage.

Stony Creek, a village on the Shore Line Division of the N. Y., N. H. & H. Railroad, is 1 mile **N.** of Thimble Islands Harbor. It has several hotels and is a summer resort.

For **tides** see page 22.

SAILING DIRECTIONS, THIMBLE ISLANDS HARBOR.

1. ***Approaching and Entering from the Eastward.***—Passing about ½ mile **S.** of Sachem Head, steer **WNW. ½ W.**, heading for the southernmost of the Thimble Islands. Round the Outer Thimble and Two-Tree Island, giving them a berth of at least 100 yards on the starboard hand; the Outer Thimble is a large bare rock just to the southeastward of Two-Tree Island.

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* Shown on Coast and Geodetic Survey charts 360, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

When the northern end of Two-Tree Island bears **ESE.**, and is distant about 150 yards, steer **NE. ¾ E.**, heading so as to have the high frame observatory on Pot Island a little on the starboard bow, thus favoring the Pot Island shore. When nearly up to the observatory steer a little more to the northward, so as to pass about midway between the islands.

Anchor when off the northern end of Pot Island in about 18 feet, soft bottom.

In following these directions the depth of the water is not less than 13 feet.

Remarks.—Two-Tree Island (see page 82) will be easily distinguished when abreast Sachem Head.

After rounding Two-Tree Island, High Island, sometimes called Kidd Island, will be opened out to the northward. The channel leads well to the eastward of the small cluster of rocks which will be seen lying about 300 yards **SW.** of High Island.

Dangers.—**Chimney Corner Reef** is described on page 81.

Goose Rocks, several rocks showing out of water, lie ¼ mile **W.** of Sachem Head. **Goose Rocks Shoal** extends ¼ mile to the southwestward of the Goose Rocks, and has a spot with 2 feet of water on it. A buoy (bell, red) is placed on the southern end of the shoal, and should be left on the starboard hand.

A spot with 15 feet over it lies ⅝ mile **SW. by W. ½ W.** from the buoy marking Goose Rocks Shoal.

There are **many rocks** to the eastward and northward of the Thimbles, some of them showing bare at low water.

East Reef, Wheaton Reef, Browns Reef, and **Northwest Reef** lie in a detached cluster about ½ mile to the southwestward of Two-Tree Island. Approaching from the eastward they are all left on the port hand, the course leading between them and Two-Tree Island. **East Reef**, with a rock awash at low water, is marked at its southeastern end by a red buoy (spar, No. 10). **Wheaton Reef**, with a least depth of 1 foot, is marked at its northwestern end by a black buoy (spar, No. 1). **Browns Reef**, awash at low water, is not marked; it lies about 500 yards to the southward of Wheaton Reef buoy and is about 600 yards to the westward of East Reef buoy. **Northwest Reef** is a small detached spot, with 7 feet over it, lying about 600 yards **W. by S.** from Wheaton Reef buoy.

Inner Reef, marked by a buoy (spar, red, No. 2) off its southern end, is a small cluster of rocks, showing bare in places at low water, lying 700 yards to the westward of Two-Tree Island. Inner Reef buoy is generally left on the port hand in entering.

A rock with 3 feet of water over it lies **E.** from the southern end of High Island, about 80 yards from the shore of the island. The entire distance across from High Island to Pot Island is here about 200 yards. The rock is just abreast a noticeable vertical crevice in the cliffs of High Island, and is avoided by keeping well over to the shore of Pot Island in passing; the northwestern side of Pot Island is steep-to.

1 A. ***Approaching and Entering from the Westward.***—Steer so as to pass about ⅝ mile north of Branford Reef beacon, leaving Negro Heads buoy about 200 yards on the port beam. When this buoy bears abeam, distant 200 yards, steer **E. ½ N.**, heading for the southern end of Two Tree Island; pass 100 yards to the southward of Inner Reef buoy. When this buoy bears on the port beam, steer **NE. ¾ E.**, favoring the islands on the starboard hand; anchor as directed in coming from the eastward.

Remarks.—For appearance in approaching, see description of The Thimbles. The **E. ½ N.** course leads midway between black buoy No. 1, on **Wheaton Reef**, and red spar buoy No. 2, on Inner Reef.

Dangers.—**Branford Reef** is described on page 61.

Negro Heads, a dangerous rocky ledge, partly out at low water, is about 1 mile north of Branford Reef beacon, and is marked off its southern end by a buoy (spar, red, No. 4). The ledge extends to the northward to the islands lying off Indian Neck.

Gangway Rock, a small detached rock with 5 feet of water over it, lies nearly ⅝ mile **ENE. ½ E.** from Negro Heads buoy. This rock is not marked, but it lies a little to the southward of a line from Negro Heads buoy to Hooker Rock buoy.

Northwest Reef, Wheaton, Browns, East, and **Inner reefs** are described above.

A spot with 8 feet of water over it, not marked, lies nearly ⅝ mile **NW. by W. ¾ W.** from Inner Reef, on a line from the buoy on this reef to the buoy marking Hooker Rock. There is a channel 500 yards wide, having a least depth of 15 feet, between this spot and Inner Reef.

Hooker Rock, bare at low water, lies ⅝ mile **NW. by W. ¾ W.** from Inner Reef, and is marked by a buoy (spar, red, No. 2½). There is a clear passage ¼ mile wide with 16 feet of water between this rock and the spot with 8 feet just described.

A rock with 3 feet of water over it lies in the channel off High Island; it is described under section 1 foregoing.

BRANFORD HARBOR.*

Branford Harbor, on the north shore of Long Island Sound, about 4 miles to the eastward of New Haven entrance, is a shallow cove between Jeffrey Point and Johnson Point, affording an anchorage for vessels up to 10 feet draft. The entrance is somewhat obstructed by ledges and rocks, but all these are either buoyed or show plainly. **Branford River**, a narrow and crooked stream, enters at the head of the harbor. **Branford**, a town on the Shore Line Division of the N. Y., N. H. & H. Railroad, is 1½ miles above the mouth of the river. The deepest draft of vessels entering the harbor and going up to Branford is 8 feet; vessels of 7 feet draft can go up at mean low water; the depth alongside the wharves is 9 feet.

Anchorages.—A well sheltered anchorage, in from 6½ to 9 feet of water, is found to the northward of the Mermaids, but it should not be attempted by strangers without a pilot.

An anchorage in 10 to 14 feet of water, protected against all but southerly winds, will be found about 400 yards north of Taunton Rock, and about midway between Bird Rock buoy and Jeffrey Point (eastern shore).

Pilots and towboats.—Strangers frequently take a pilot, making signal and anchoring outside Taunton Rock until they are boarded by one. Towboats are sometimes used by strangers who go to Branford; they can be obtained at New Haven.

Tides.—The mean rise and fall of tides is 5.6 feet; high water occurs 9m. before high water at Willets Point, and low water 31m. before low water at Willets Point.

SAILING DIRECTIONS, BRANFORD HARBOR.

The following directions are good for vessels of less than 9 feet draft.

1. ***Approaching and Entering from the Eastward.***—Passing about ¼ mile south of East Reef buoy, steer **WNW. ½ W.**; this course passes about 200 yards south of Negro Heads buoy (spar, red, No. 4) and leaves Branford Reef beacon nearly ¾ mile distant on the port hand.

When Negro Heads buoy bears **NE.**, distant about 250 yards, steer **NW.**, heading for Taunton Rock. Pass 200 yards to the eastward of Taunton Rock, steering **N.**, with Bird Rock buoy broad off the port bow; continue the **N.** course, and anchor according to draft in from 10 to 15 feet of water.

Give the shores a berth of ⅛ mile and keep at least this distance to the southward of the Big Mermaid (the islet seen to the northward in entering, about midway between the shores where the harbor narrows somewhat).

Remarks.—The Thimble Islands (see page 82) will be left about ¾ mile on the starboard hand. Branford Reef beacon (see page 61) will be left about ¾ mile on the port hand. When abreast of Negro Heads buoy (spar, red, No. 4), Branford Harbor will open out to the westward of **Jeffrey Point** (low, rocky, several small rocky islands off its southern end, the southernmost known as **Jeffrey Rock**). To the eastward of Jeffrey Point and north of Negro Heads several small islands will be seen, the most prominent of which are, named in the order from the eastward, **Spectacle Island, Sumac Island,** and **Clam Island**. On the **NW.** course, with **Taunton Rock** (see dangers) ahead, **Johnson Point** (low, covered with trees) will show open a little to the southward of Taunton Rock. On approaching Taunton Rock the harbor will fully open out, and the houses and hotel on the western shore will be seen.

Dangers.—**East, Wheaton, Browns,** and **Northwest reefs** are described on page 83.

Branford Reef, marked by a beacon, is described on page 61.

Negro Heads are described on page 83. Shoals and islands lie between the Negro Heads and Jeffrey Point, and vessels should keep to the southward of a line drawn from Negro Heads buoy (red, No. 4) to Jeffrey Rock.

Five-Foot Rock, marked by a buoy (spar, red, No. 6) off its southern side, lies nearly ⅜ mile **SW.** from Taunton Rock. The **NW.** course for Taunton Rock leads well to the eastward of this buoy, which can be passed on either hand giving it a berth of 150 yards, thus clearing the rock and shoal water surrounding it.

Jeffrey Rock is the southernmost rock making out from Jeffrey Point. It is quite bold-to on its southern and western sides, and can be approached to within 75 yards from these directions.

Taunton Rock, a large bare rock at the entrance of the harbor, shows conspicuously when approaching from any direction. Coming from the eastward this rock is left on the port hand in entering. It lies a little over ¼ mile **W.** from Jeffrey Rock. Blyn Rock is nearly ¼ mile to the northwestward of Taunton Rock.

Bird Rock, marked by a buoy (spar, red, No. 2) near its southwestern end, has a least depth of 5 feet. It is a small detached reef about 600 yards **E.** by **N.** from the southern end of Johnson Point. A spot with 12 feet of water over it lies about 100 yards **E.** of the buoy.

* Shown on Coast and Geodetic Survey charts 261, scale $\frac{1}{10,000}$; 115, scale $\frac{1}{80,000}$; price of each $0.50.

1 A. ***Approaching and Entering from the Westward.***—With Southwest Ledge Lighthouse bearing **N.**, distant about 1 mile, steer **E.** by **N.**, passing about 150 yards south of the Cow and Calf. When the Cow and Calf bear abaft the port beam, distant about 300 yards, steer **NE.** ¾ **E.**, leaving Five-Foot Rock buoy (spar, red, No. 6) about 350 yards on the starboard hand, and passing about midway between Taunton Rock and Blyn Rock. Continue the **NE.** ¾ **E.** course and anchor, according to draft, as directed in coming from the eastward.

Or, when the Cow and Calf bear **NW.**, distant 250 yards, steer **NE.** by **N.**, heading about midway between Blyn Rock and Johnson Point, and when on a line between them make good the course **E.** ½ **N.**; leave Blyn Rock about 100 yards on the starboard hand and anchor when to the northward or northeastward of Taunton Rock.

Remarks.—On the **E.** by **N.** course Round Rock buoy (spar, red, No. 12) will be left about ½ mile on the port hand. Branford Reef beacon will be made well on the starboard bow. The Cow and Calf will be made a little on the port bow. When nearly up to the Cow and Calf Branford Harbor will be opened out. When off the entrance Taunton Rock will show conspicuously.

Dangers.—**Cow and Calf** is the name of two remarkable rocks lying nearly ¾ mile **SW.** by **S.** from Johnson Point; they are close to each other, and Cow, the larger, always shows out of water. Shoal spots with 11 and 12 feet over them extend 450 yards in a northwesterly direction from these rocks. A lighted buoy, painted red, is placed just to the southward of Cow and Calf.

Five-Foot Rock is described under section 1 foregoing.

Blyn Rock is a small rock showing plainly about midway between Taunton Rock and Johnson Point; it can be approached to within 50 yards in 16 feet of water. At high water of unusually high tides Blyn Rock is just awash.

Taunton Rock and **Bird Rock** have been described under section 1 foregoing

Johnson Point is comparatively bold-to on its eastern side; the 12-foot curve makes out 100 yards from the shore about 200 yards north of the southern end of the point. **A spot** with 9½ feet over it lies about 100 yards **SW.** from the southern end of the point.

NEW HAVEN HARBOR.*

New Haven Harbor, the approach by water to the city of **New Haven,** is commercially one of the most important harbors in Long Island Sound. At its head is the junction of the Mill and Quinnipiac rivers. The port has a very large carrying trade, the chief item being coal. Many vessels enter the harbor for shelter, particularly during the spring and autumn. The deepest draft of vessels entering or going up to the city is 20 feet.

Improvements.—To improve this harbor and increase its usefulness as a harbor of refuge a *dike* and *three breakwaters* have been built under Government appropriations. The *dike* makes out from Sandy Point (opposite Fort Hale) for about ⅜ mile to the eastward and thence runs to the southward parallel with the channel for a distance of about ⅜ mile. The *East Breakwater* is 3,450 feet in length; it extends from Southwest Ledge Lighthouse northeasterly to and across **Quixes Ledge** and terminates in a depth of 16 feet of water at the northeastern point of Quixes Ledge. The *Luddington Rock, or Middle, Breakwater* crosses Luddington Rock (which lies about 1,200 yards **W.** by **S.** from Southwest Ledge Lighthouse) in a northeasterly and southwesterly direction, commencing at a point 250 yards northeasterly from Luddington Rock and extending in a southwesterly direction. This breakwater is ¾ mile long and marked at its eastern end by a post light showing a white light, and at its western end by a post light showing a red light. The *West, or Outer, Breakwater* extends 500 yards in a general **NW.** by **W.** and **SE.** by **E.** direction, leaving an opening about 600 yards wide between it and the western end of the Luddington Rock Breakwater. A lighthouse is (in 1899) being erected just inside the eastern end of the West Breakwater.

The depth of water in the channel is about 15 feet at its shoalest part, a bar of sand, gravel, and mud extending across below Fort Hale and above the old lighthouse tower (both on the eastern shore). The present channel through this bar has a depth of 15 to 17 feet and width of 200 feet, and was obtained by dredging. From abreast Fort Hale to the wharves there is not less than 14 feet in a channel from 400 to 600 feet wide.

The depth to be found at some of the more important wharves are as follows: Belle dock, 14 feet; Canal wharf, 12 feet; Steamboat wharf, 14 feet; Long wharf, 12 feet—all at mean low water.

*Shown on Coast and Geodetic Survey charts 362, scale $\frac{1}{20,000}$, price $0.20; 115, scale $\frac{1}{80,000}$, price $0.50.

The **channel** has no sharp changes in direction; its least width, with a depth of 15 to 17 feet, is 200 feet, and with a depth of 13 feet is 400 feet; the outer part is ½ to ¾ mile wide. Throughout its length it is bordered by mud flats and sand spits making out well off shore.

Oyster grounds, marked off by stakes, occupy the flats on either side of the channel, and also reach a considerable distance outside off the entrance; stake buoys mark off the outer grounds.

Prominent objects.—With a favorable light the old lighthouse tower on the eastern point at the entrance is the best defined object seen when approaching in the daytime. Outside of this is Southwest Ledge Lighthouse (see page 12) and the breakwaters (see description). When well in toward the entrance the Soldiers' and Sailors' Monument on the summit of East Rock is well defined in clear weather, showing above the outline of the hills to the northward of the harbor.

Range.—The white coal elevator just to the left of the bridge at the head of the harbor, kept directly under the Soldiers' and Sailors' Monument on East Rock, forms the range for standing up the harbor through the dredged channel over Fort Hale Bar. The compass direction of this range is **N. by E. ⅝ E.**

Pilots are not needed and are not generally taken except by vessels subject to compulsory pilotage (foreign vessels and vessels sailing under register). There are licensed pilots, and one can be obtained, if desired, by making signal when off the entrance. If a pilot be taken the pilotage is as follows for vessels drawing more than 9 feet: Draft 9 feet to 12 feet, $0.75 per foot; 12 feet to 15 feet, $1.50 per foot; 15 feet and upward, $2 per foot.

Extracts from laws relating to pilots and pilotage are given in Appendix I.

Towboats are much used, and can always be had by making signal; only a small proportion of the vessels entering merely for anchorage take a towboat.

Anchorage. Vessels seeking shelter anchor anywhere along the channel from just inside the breakwaters up to Long wharf. **Morris Cove,** though somewhat obstructed by fish weirs, affords good anchorage, and is much used by yachts.

Many vessels, especially those bound to the city, anchor on the west side of the channel above the innermost black buoy (Shag Bank buoy, spar, No. 5), between it and Long wharf.

Above the Railroad wharf (the next large one above Long wharf) is an anchorage used by very small craft. Large yachts often anchor below Long wharf.

There are no special regulations prescribing the limits within which vessels must anchor, except that a clear channel should be left. The extreme upper part of the harbor off the wharves is under the immediate supervision of the harbor master, who gives his attention to the berthing of vessels there when necessary, in order to keep a clear channel for the steamers. **Harbor regulations** are not strictly defined except as just indicated. The harbor master's headquarters are at the steamer wharf just below Tomlinson bridge.

Quarantine regulations are adopted when any special necessity arises. Ordinarily vessels are not boarded; but those having sickness on board, or coming from an infected port, must not go above the innermost black buoy (Shag Bank buoy, spar, No. 5) until boarded by the health officer, to whom such vessels can be reported through any tug which may pass. (See also Appendix I.)

Supplies of all kinds, coal, water, etc., can be obtained. Water is taken from tugs and steam water boats.

Marine railway.—There is a marine railway on which vessels of 400 tons or less can be taken out.

Hospitals.—The nearest U. S. Marine Hospital is at Staten Island, New York. Mariners at the port of New Haven, entitled to hospital treatment, are sent to a hospital in the city; those entitled to medical care receive the attention of an acting assistant surgeon of the Marine-Hospital Service. (See Appendix III.)

Bridges.—At the head of the harbor proper is Tomlinson bridge, width of draw 84 feet; about ¼ mile above this, and crossing Mill River, is Chapel Street bridge, width of draw 60 feet; about ⅛ mile farther up is Grand Street bridge, the head of navigation on Mill River.

Quinnipiac River is crossed by two bridges; the first, about ½ mile above Tomlinson bridge, has a draw 76 feet wide; the second, about ⅛ mile farther up, is the head of navigation on the Quinnipiac River.

Wind signals are displayed at the old light tower at the entrance to the harbor and at the city of New Haven.

Steamboat and railroad communication.—Steamboats run between New York and New Haven, and a number of railroads converge at New Haven.

Ice generally obstructs navigation to a considerable extent from December to March, frequently extending to the mouth of the harbor. During this period it is very often necessary for sailing vessels, bound in or out, to employ towboats. Steamers can generally enter and depart, except in very severe weather. (See also page 52.)

In New Haven Harbor northerly winds have a tendency to clear the harbor of ice if the formation is sufficiently light; southerly winds are apt to force in drift ice from the Sound.

For **variation of the compass** see page 24.

Lists of lighthouses and wind signal stations, with other general matters, will be found on pages 9–24.

Tides, see page 22.

The **tidal currents** have considerable velocity and must be considered in approaching and entering. Coming from the westward, when well up with the entrance, the current sets across the course, and must be allowed for. Farther in the ebb is somewhat affected by the dike on the western side of the channel, and tends to set a vessel over on the flats on the eastern side of the channel.

TIDAL CURRENTS OFF NEW HAVEN ENTRANCE.

Locality.	Second Quarter.		Third Quarter.		Flood or Ebb.
	Set.	Drift.	Set.	Drift.	
2¾ miles **SSW.** from Southwest Ledge Lighthouse	NW. ⅝ W.	1.27	NW. by W.	0.95	Flood.
	E. ¾ N.	1.20	ENE. ¾ E.	0.95	Ebb.

The observations of currents were made, as far as possible, when the influence of the wind was small. The directions are magnetic, and the drift in nautical miles per hour.

SAILING DIRECTIONS, NEW HAVEN HARBOR.

The following directions are available at low water for vessels of less than 14 feet draft bound up to the city. They are therefore frequently available, according to the stage of the tide, for vessels of greater draft. Vessels of the deepest draft can find shelter behind the breakwaters; if of over 18 feet draft, they should anchor behind the western end of the Luddington Rock Breakwater or behind the West Breakwater.

Vessels of less than 16 feet draft can anchor behind any of the breakwaters by following the directions.

1. ***Approaching from the Eastward to enter between the East and Luddington Rock Breakwaters.***—I. ***From a position to the Southward of Falkner Island.***—With Falkner Island Lighthouse bearing **N.**, distant 1 to 2 miles, steer **W.** for 1 mile and then shape the course **W.** by **N.** for about 8½ miles. Southwest Ledge Lighthouse should then be on some bearing between **NW.** and **NNW.**, distant 3 to 4 miles.

Then steer for Southwest Ledge Lighthouse on any bearing to the northward of **NW.** Pass about 200 to 600 yards to the westward of the lighthouse and proceed as directed in section 2. The depth until past the lighthouse should not be less than 18 feet.

Remarks.—The courses given lead well clear of all dangers. Falkner Island Lighthouse, Goose Island, Branford Reef beacon, and Townshend Ledge buoy (spar, red and black horizontal stripes) are well off on the starboard hand. The breakwaters (see improvements, page 85,) will be plainly visible as the lighthouse is approached. On a clear day the **monument** on **East Rock**, a high hill inshore of the head of New Haven Harbor, will be seen.

II. ***Approaching closer along shore.***—When Branford Reef beacon is made, steer so as to pass about ½ mile to the southward of it; then steer **WNW. ½ W.** until Southwest Ledge Lighthouse bears to the northward of **NW.**; now steer so as to pass from 200 to 600 yards to the westward of the lighthouse or midway between the breakwaters, and proceed as directed in section 2.

Remarks.—On the **WNW. ½ W.** course Southwest Ledge Lighthouse should be a little on the starboard bow and Luddington Rock Breakwater ahead; the course leads about ⅝ mile north of Townshend Ledge buoy (spar, red and black horizontal stripes) and about ⅜ mile south of Round Rock buoy (nun, red, No. 12).

The course, when heading up so as to pass a little to the westward of Southwest Ledge Lighthouse, leads about midway between the lighthouse and Luddington Rock Breakwater. The monument on East Rock should be opened out between the breakwaters.

Dangers.—**Branford Reef**, marked by a beacon, and **Townshend Ledge**, are described on page 61.

Round Rock, 1⅝ miles **E. ½ S.** from Southwest Ledge Lighthouse and ½ mile from the shore, is a bare rock surrounded by sunken ledges, and marked by a buoy (nun, red, No. 12), which is placed ¼ mile to the southward of the rock; 17 feet of water will be found ⅛ mile to the southward of this buoy.

1 A. ***Approaching from the Westward to enter between the East and Luddington Rock breakwaters.***—Pass at least 1½ miles to the southward of Stratford Point Lighthouse and shape the course **NE.** by **E.** ½ **E.** Vessels drawing 14 feet or more should give Stratford Point Lighthouse a berth of 2 miles while to the southward or southwestward of it. On the flood, guard against a northerly set when to the eastward of Stratford Point.

When Southwest Ledge Lighthouse is made, shape the course for it, keeping this lighthouse bearing to the northward of **NE.** by **E.** ½ **E.** This course leads to the southward of the black bell buoy off the entrance and to the southward and nearly parallel to Luddington Rock Breakwater. When Southwest Ledge Lighthouse is about 500 to 600 yards distant, turn to the northward, course about **N.** by **E.** ⅜ **E.**, passing about midway between Southwest Ledge Lighthouse and Luddington Rock Breakwater, and proceed as directed in section 2.

Vessels of 16 feet or less draft may pass to the northwestward of West and Luddington Rock breakwaters, by following the line of Luddington Rock Breakwater when inside of it and giving it a berth of less than ¼ mile until clear of its eastern end.

Remarks.—The course leads well to the southward of Charles Island (Milford Harbor), Cedar Point, and Pond Point, and the buoys placed off them. Coming from the westward by day, the old lighthouse tower (white) on Five-Mile Point will be the first conspicuous mark at New Haven entrance, and should be made a little on the port bow. Southwest Ledge Lighthouse (see page 12) will be made to the southward of the old tower.

1 B. ***Approaching from the Southward or Westward to anchor behind the breakwaters.***—Being to the eastward of Stratford Point Lighthouse, stand for the eastern end of the West Breakwater (lighthouse being erected in 1899) on any bearing from **WNW.**, through **N.**, to **ENE.**

Give the ends of the breakwaters a berth of at least 60 yards, and come to anchor behind the breakwater that affords the best lee.

Remarks.—These directions are good either in the daytime or at night and lead clear of all dangers. There is a black bell buoy placed about 60 yards from the eastern end of West Breakwater.

2. ***Entering and Standing up the Harbor.***—With Southwest Ledge Lighthouse bearing **E.**, distant about 500 yards, steer about **N.** by **E.** ⅜ **E.**; the monument on East Rock should be ahead and in range with the white coal elevator (see range, page 86). This should lead fair up the channel, leaving Adams Fall buoy (nun, red, No. 2) on the starboard hand, Party Bar buoy (can, black, No. 3) and Sandy Point dike on the port hand, and Fort Hale buoy (spar, red, No. 4) on the starboard hand. When Fort Hale buoy is on the starboard beam, distant 75 yards, steer about **N.** ½ **W.** until Shag Bank buoy (spar, black, No. 5) is about 75 yards distant on the port beam, then steer **N.** ¾ **E.**, heading for the end of Long wharf. Anchor on the west side of the channel between Shag Bank buoy and the end of Long wharf, in 8 to 16 feet (low water), soft bottom.

To anchor behind the breakwaters.—Round the ends of the breakwaters, giving them a berth of at least 60 yards, and anchor behind the one that affords the best lee. Do not stand over ¼ mile to the eastward of Southwest Ledge Lighthouse when behind the East Breakwater; this is to avoid Old Head Reef.

To anchor in Morris Cove.—On the **N.** by **E.** ⅜ **E.** course, when Adams Fall buoy (nun, red, No. 2) is off the starboard beam, haul to the eastward, heading for Forbes Bluff, to the eastward of Fort Hale, giving the shore of Five-Mile Point a berth of 300 yards or more. Anchor, according to draft, anywhere in the cove between Five-Mile Point and Fort Hale, keeping clear of the fish weirs.

Remarks.—Below Fort Hale oyster stakes and oyster buoys are found in many places in the channel and on the flats. The eastern edge of the channel above Fort Hale is fairly defined by the oyster stakes, which cover the flats and extend to the edge of the channel.

Dangers.—**Quixes Ledge** is crossed by the East Breakwater, but extends about 400 yards in a southeasterly direction from the northeastern end of the breakwater; it is a danger only for light-draft vessels entering to the northward of the East Breakwater.

Old Head Reef, lying about 500 yards **WNW.** from the eastern end of the East Breakwater, has 7 to 9 feet over it and is not marked.

West Haven Flats, with 6 to 8 feet of water, extend out 1 mile from the shore on the western side of the entrance. A spar buoy (black, No. 1) is placed near the southeastern edge of the 12-foot curve.

Adams Fall, about ½ mile **N.** by **E.** ½ **E.** from Southwest Ledge Lighthouse, is a rocky ledge about 120 yards in diameter, and has a least depth of 5 feet, with 17 feet or more all around it; a buoy (nun, red, No. 2) is placed off the western side of the ledge.

Party (Pardee) Bar is the name given to the part of West Haven Flats which extend to the eastward from Sandy Point. A buoy (can, black, No. 3) marks the eastern edge of the bar.

Black Rock lies about ⅛ mile from the northern shore of Morris Cove; it is bare at low water. On the eastern edge of the channel, abreast of Fort Hale, is placed a spar buoy (red, No. 4).

Shag Bank is the long spit, bare at low water, making to the northeastward from Sandy Point; off its northeastern end, on the west side of the channel, is placed a spar buoy (black, No. 5).

GENERAL REMARKS ON APPROACHING NEW HAVEN HARBOR AT NIGHT.

When Southwest Ledge Lighthouse is made it may be safely approached on any bearing between **NE.** and **NW.** by **N.** (through **N.**) until nearly up with it. If beating, vessels, when to the eastward of the entrance, should go about on entering the red rays of Southwest Ledge Lighthouse, and if of heavy draft keep a lookout for Townshend Ledge buoy. The red rays of the lighthouse cover Branford Reef and other dangers to the eastward of the entrance.

Pass 200 to 600 yards to the westward of Southwest Ledge Lighthouse, or about midway between it and the light on Luddington Rock Breakwater, and steer about **N.,** keeping a good lookout for Adams Fall buoy (nun, red, No. 2) on the starboard bow, and come-to in about 3 fathoms. If Adams Fall buoy can be seen, vessels drawing 12 feet or less, after passing to the westward of it, can steer **NNE.** ½ **E.** for about ¾ mile, coming to at the mouth of Morris Cove in 13 to 16 feet. Or, if desiring to anchor behind the breakwaters, see the directions under section 2 preceding.

MILFORD HARBOR.*

This is a bight on the north side of Long Island Sound, about 6½ miles to the westward of Southwest Ledge Lighthouse (New Haven entrance) and about 3½ miles to the northeastward of Stratford Point Lighthouse. The harbor affords anchorage in from 6 to 14 feet, sheltered from all but southerly and southeasterly winds. *Cedar Point* (Welch Point), the eastern point at the entrance, is marked by the very high brick chimney of a fish-oil factory. *Charles Island,* on the western side of the entrance, is low, irregular in shape, covered with scrubby trees near its northern end, and has two poplars near its southwestern side; near the middle of the island are several small houses.

Milford River, or Wepowage River, a narrow and shallow stream, empties into the head of the harbor. On the eastern side of the mouth of the river a jetty has been constructed and improvements made under Government appropriations. A channel 8 feet deep and 100 feet wide has been dredged across the bar and the entrance is marked by two buoys, painted black and white in perpendicular stripes.

The depth of water in the channel inside the jetty is about 3 feet for a width of about 40 feet. The deepest draft of vessels entering the river at high water is 9 feet, and the usual draft not more than 8 feet. There is 10 feet at low water alongside the wharf, where water, through hose, can be obtained, and coal for small steamers can also be procured.

Milford, a town on the Milford River, is about ¾ mile above the mouth. It is of little commercial importance. The principal trade is in coal and oysters. Vessels of 9 feet draft can go as far as Milford at high water; there is 3 feet of water at the town wharf at low water.

Towboats.—Strangers and vessels bringing cargoes usually take a towboat. Tugs can be had at New Haven, at Bridgeport, or at Milford. Vessels desiring a towboat or a pilot anchor in the harbor and signal, when one will come out from Merwin wharf.

Tides.—The mean rise and fall of tides is 6.6 feet; high water occurs 4m. before high water at Willets Point, and low water 22m. before low water at Willets Point.

*Shown on Coast and Geodetic Survey charts 263, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

SAILING DIRECTIONS, MILFORD HARBOR.

These directions are available for vessels drawing 11 feet or less. Vessels drawing 13 feet or more should give Stratford Point more of a berth than is here indicated by the directions for approaching from the westward; but such vessels would not enter Milford Harbor.

1. ***From the Eastward.***—With Southwest Ledge Lighthouse bearing **N.**, distant about 1 mile, steer **W.** ½ **S.** for about 6 miles, and when the high chimney on Cedar Point bears **N.** by **E.** steer **NNW.** When inside Cedar Point anchor, according to draft, about midway between Charles Island and the eastern shore.

Or, being 1 mile to the westward of Goose Island (see page 58), with Falkner Island Lighthouse bearing **E.** ⅜ **S.**, make good the course **W.** ⅜ **N.**; when the high chimney on Cedar Point bears **N.** by **E.** stand in, course about **NNW.**

Remarks.—Charles Island will be made a little on the starboard bow. As Cedar Point is approached, a long wharf will be seen making out to the westward from the oil works and the harbor will be opened out. The buoy off Pond Point and the buoy off Cedar Point will be left on the starboard hand.

On the **NNW.** course the jetty at the head of the harbor will be on the starboard bow, and the course leads about midway between the buoy (spar, red, No. 16) off Cedar Point and the buoy (spar, black, No. 1) east of Charles Island.

Dangers.—**Pond Point Reef** extends about ⅜ mile to the southward from Pond Point, and is marked at its southern end by a buoy (spar, red, No. 14).

Cedar (Welch) Point Reef extends ⅝ mile south from Cedar Point, and is marked at its southern end by a buoy (spar, red, No. 16).

Charles Island Rocks is the name given to the rocky shoal extending to the southward for ⅝ mile and to the eastward about 200 yards from Charles Island; the southern side of these rocks is marked by a buoy (bell, black).

About 250 yards to the northeastward of Charles Island a buoy (spar, black, No. 1) is placed on the eastern end of the shoal which makes out to the eastward from Charles Island.

1 A. ***From the Westward.***—Pass about 1½ miles south of Stratford Point. When Stratford Point Lighthouse bears **N.**, distant 1½ miles, steer **NE.**, pass ½ mile to the southward of Charles Island, giving the bell buoy a berth of 200 yards, and then haul to the northward. Pass midway between the buoy (spar, black, No. 1) off the eastern end of Charles Island and the buoy (spar, red, No. 16) off Cedar Point and steer about **NNW.** and anchor, according to draft, as above directed.

Remarks.—On the **NE.** course Charles Island will be made on the port bow, and the tall chimney on Cedar Point will be seen open to the southward of the island and on the port bow. As Charles Island is approached, the harbor will be opened out and the jetty at the head of the harbor will show distinctly. There is a red post on the west end of the jetty, from which a light is shown (see table, page 12).

Dangers.—**Stratford Point Shoal** is described on page 61.

Other dangers to be considered are mentioned under section 1 foregoing.

HOUSATONIC RIVER.*

The mouth of this river is about 4 miles to the eastward of Bridgeport entrance and is on the eastern side of Stratford Point.

There are a number of bars in the river and one at the entrance. Under Government appropriations a breakwater has been built extending from Milford Point about 5,821 feet in a **S.** by **E.** direction; a red lantern light marks the end of this breakwater. Dredging has also been done to increase the depth across the bar and in the river; it is proposed to obtain a channel 200 feet wide and 7 feet deep across the bar at the entrance, and a channel 100 feet wide and 7 deep up the river to **Derby**. In 1898 the depth on the bar at the entrance was 8 feet, but on some of the bars in the river the depth was only 4 or 5 feet.

The river is navigable for a distance of 13 miles above the entrance, to the towns of Derby and Shelton, but the channel is so narrow and crooked and the currents so strong and so irregular, that sailing vessels are obliged to take a towboat to pass above Stratford.

*The lower part of Housatonic River falls within the limits of Coast and Geodetic Survey charts 364, scale $\frac{1}{10,000}$, price $0.50; 115, scale $\frac{1}{80,000}$, price $0.50.

About 2¼ miles above its entrance the river is crossed by a footbridge (width of draw 50 feet); ¼ mile above the footbridge a railroad bridge crosses the river (width of draw 70 feet).

Stratford, a town of little commercial importance, is on the western bank, a little over a mile above the entrance.

Derby, a town on the eastern bank of the river, 13 miles above the entrance, is of little importance.

Shelton, a town on the western bank of the river, and connected with Derby by two bridges, has many important manufactories. Coal and lumber are brought here in sailing vessels, and sometimes a steamer runs to New York in the summer. Vessels of 9 feet draft can go up as far as Derby and Shelton at high water, and there is 6 feet of water alongside the wharves at low water.

Prominent objects.—Stratford Point Lighthouse (round white tower, with detached white dwelling; see table of lights, page 12) is a guide up to the entrance. A large granite day beacon, with shaft and ball, is located about ⅜ mile **N. ¾ E.** from the lighthouse.

The **anchorage** outside the bar affords no protection against storms; vessels only anchor here to wait for the tide to cross the bar.

Pilots and towboats.—All strangers, if bound to Stratford, take either a pilot or a towboat. If bound to Derby or to Shelton they take a towboat, generally anchoring outside of Bridgeport, and there take a tug, as it is the nearest place from which one can be obtained. Vessels desiring a pilot anchor outside the bar and signal, when one will come out from Stratford.

The **currents** in the river and at the entrance have considerable velocity, making local knowledge necessary to keep in the channel. **Freshets** occur in the river in March and April. **Ice** obstructs navigation during the winter, usually above Stratford, but sometimes to the entrance.

Tides.—See heading "Milford Harbor."

GENERAL DIRECTIONS, APPROACHING HOUSATONIC RIVER.

From the Eastward.—Steer for Stratford Point Lighthouse on any bearing from **WSW.** to **N.** by **W.** Keep at least ½ mile distant from the lighthouse, and anchor in 20 to 25 feet water outside the buoys, with the lighthouse bearing about **WSW.**, distant ½ to ¾ mile.

From the Westward.—Pass at least 1½ miles south of Stratford Point, and when to the eastward of the line of Stratford Point Lighthouse and Stratford Shoal (Middle Ground) Lighthouse turn to the northward. Give Stratford Point Lighthouse a berth of at least ½ mile, and anchor as directed in coming from the eastward.

Vessels drawing 13 feet or more should give Stratford Point a much wider berth than is here indicated, but vessels of such draft do not enter the Housatonic River.

The entrance to the channel across the bar is marked by a buoy painted black and white in perpendicular stripes, and a number of red buoys mark the channel, but strangers should not attempt to enter without a pilot.

PORT JEFFERSON HARBOR.*

This harbor, on the south shore of Long Island Sound, opposite Bridgeport, Conn., and just to the eastward of Old Field Point, is one of the best protected in the Sound, but is seldom used by vessels seeking shelter only, as the narrow entrance, between the jetties, requires some local knowledge and a favorable state of wind or current for sailing vessels; the tidal current runs with great velocity at the entrance.

Inside the entrance the harbor is 1½ miles long and about ¾ mile wide at its widest part, and is surrounded by high hills on three sides, the northern side being protected by two low points of land, between which is the narrow opening affording a passage from the Sound into the harbor.

The deepest draft of vessels entering the harbor is about 16 feet; at low water 10 feet is the greatest depth that can be carried through the channel between the jetties; 13 feet can be taken to the end of Darling Dock, Port Jefferson, at low water. Under Government appropriations the jetties were repaired and dredging was done to obtain a channel 12 feet in depth; this is the general depth, but there are spots with 10 feet over them.

Port Jefferson, at the southern end of the harbor, is on a branch of the Long Island Railroad, and has direct communication with New York City. The principal industry is ship building and repairing, for which there are excellent facilities. Many vessels come here for repairs, and yacht owners find it a desirable place

* Shown on Coast and Geodetic Survey chart 361[4], Port Jefferson, scale $\frac{1}{10,000}$, price $0.30. Shown also on chart 116, scale $\frac{1}{80,000}$, price $0.50.

to lay up their vessels in the winter and to refit in the spring. Port Jefferson has some trade in coal, wood, lumber, and general merchandise, carried both by strangers and by vessels owned in the vicinity, the size of vessels ranging from 50 to 600 tons; a steamer carrying freight and passengers runs daily during the summer to Bridgeport, Conn., and makes occasional trips in winter.

Adjacent waters.—**Conscience Bay**, a shallow tidal basin off the northwestern part of Port Jefferson Harbor, is of no importance, and can only be entered by small boats. **Setauket Harbor** is a shallow inlet making into the western part of Port Jefferson Harbor; a narrow crooked channel, with about 2 feet at low water in its shoalest part, leads from Port Jefferson Harbor to the village of **Setauket**, on the south shore of Setauket Harbor, about 1 mile above the entrance.

Prominent objects.—Old Field Point Lighthouse marks the western approach to the harbor and Mount Misery the eastern; the latter is a hill 180 feet high, sloping gradually toward the Sound and breaking off abruptly at the water edge, leaving a bare bluff about 40 feet high with a very large bowlder near high-water mark.

Two jetties of riprap, the eastern about 300 yards long, the western 250 yards long, extend out in a northerly direction from the entrance. Two beacons (lighted at night, one showing a red, the other a white light) lead up to the entrance between the jetties, but not through the channel. The East Breakwater beacon is on the north end of the east jetty and the West beacon is on the low gravelly point on the west side of the entrance inside the jetties (see table, page 12).

The **channel** into Port Jefferson Harbor, between the two jetties, is very narrow, and requires local knowledge to carry the best water through. A channel buoy (spar, black and white perpendicular stripes) is placed outside the jetties.

Anchorage in 9 to 10 feet of water, soft bottom, will be found close up to the town; 21 to 27 feet of water, soft bottom, will be found ¾ mile from the head of the harbor and **ENE.** from the pavilion on the western shore.

Pilots.—Strangers are advised to take a pilot or towboat. Vessels desiring a pilot, if the weather is fair, anchor outside to the northward of the jetties and make the usual signal, when a pilot will come out to them; one can always be had in the daytime. There are no regular pilots.

Towboats.—There are no regular towboats, but the steamer running to Bridgeport frequently tows vessels in and out.

Supplies.—Coal in small quantities, water through pipe and hose, and provisions can be obtained at Darling Dock, at the head of the harbor.

Repairs.—There are 5 marine railways, the largest capable of hauling out a vessel of 1,200 tons; some of the others are available for vessels of 300 to 400 tons. There are no facilities for repairing machinery of steamers nearer than New Haven or Bridgeport.

Ice.—In very cold weather the entire harbor is frozen over, but the ice does not endanger shipping in the harbor.

For **tides** see page 22.

The **tidal currents** have great velocity through the entrance between the jetties, keeping the general direction of the channel. In the harbor the velocity of the current is not great.

GENERAL DIRECTIONS, PORT JEFFERSON HARBOR.

The following directions are good for a vessel of 9 feet or less draft at low water, and strangers are advised to select slack water when entering. Strangers with a greater draft than 9 feet should take a pilot.

Give the shore of Long Island a berth of at least 1 mile and steer so as to be about 1 mile off shore when the vessel is 1 mile to the eastward of Old Field Point Lighthouse. When the beacon on the end of the east jetty is sighted, steer for it on any bearing between **SE.** and **S.** by **W.**, and when Offshore buoy (spar, black and white perpendicular stripes) is sighted steer so as to pass about 25 yards to the westward of it.

From Offshore buoy steer about **S.** by **E.** ¼ **E.**, heading for the pavilion (hexagon-shaped, low building with small cupola) which will be seen on the west shore of the harbor; the cupola should be kept just under a marked nick in the trees on the hills back of it. Stand in between the jetties, keeping on the range of the cupola and nick in trees, and pass about 50 yards to the eastward of the high-water mark of the low point on the west side of the entrance.

Continue on the range, taking care not to be set off it by the currents, and when the pavilion is less than ½ mile and a little more than ¼ mile distant ahead haul more to the eastward, and stand up the middle of the harbor heading for the wharves at its head. Anchor according to draft, but good anchorage in 12 feet of water, soft bottom, is found 250 to 300 yards from the head of the harbor.

Remarks.—If the velocity of the current is great, which is the case except during a limited period of slack, special attention must be paid to the steering so as to keep on the range; at this time vessels should not attempt to pass each other while in the entrance. Near the time of low water the shoals can be seen on the starboard hand when entering and when inside the western point. The long wharf on the west shore of the harbor will assist to locate the pavilion which is at its inshore end. When the vessel is at the Offshore buoy the pavilion should show between the low points at the entrance and bear S. by E. ¼ E. from the buoy.

For the dangers off the entrance see the sailing directions along the south shore of Long Island Sound, section 2, page 65.

Shoals lie on both sides of the channel inside the points at the entrance, and at low water a large area of them is bare.

BRIDGEPORT HARBOR.*

Bridgeport Harbor, on the north shore of Long Island Sound, at the mouth of the Pequannock River, is nearly 15 miles to the westward of New Haven. It is chiefly important as the approach to the large manufacturing city of **Bridgeport,** but also, particularly during the fall and winter, affords shelter to many vessels whose masters know the channel. The carrying trade by water is large; the principal cargoes are coal, lumber, and iron; most of the coal is brought in canal boats and coal boxes.

The depth of water in the channel up to the Railroad wharf at Bridgeport is 12 feet, from thence to the first (lower) bridge the depth is 10 to 11 feet, and thence to the head of the harbor about 9 feet. The deepest draft, loaded, of the vessels entering is 18 feet; average draft about 12 feet. At high water, vessels drawing as much as 8 feet go as far up as Berkshire Mill, the head of navigation, 2 miles above Bridgeport proper, on the Pequannock River. At mean low water the depth alongside the Railroad wharf is 12½ feet; alongside the City dock, 9 feet, and alongside the wharves above the first bridge, 8 and 9 feet.

Prominent objects.—The chief guides in approaching are Stratford Point Lighthouse to the eastward and Penfield Reef Lighthouse to the westward; the chief guide to the immediate entrance is Bridgeport Harbor Lighthouse (see page 12). The latter, the first beacon, and the Breakwater Lighthouse are left on the port hand on entering. On the eastern side of the entrance a stone breakwater extends in a westerly direction from Long Beach Point. A breakwater extends from Tongue Point to the edge of the channel and is marked at its eastern end by Bridgeport Breakwater Lighthouse.

The **channel** across the outer bar (marked by the lighthouse) has a depth of 15 feet and a width of 220 feet from the bar to the end of Tongue Point Breakwater. From the end of this breakwater to the Railroad wharf the width of the 12-foot channel is 600 feet, but there are spots with 10½ feet of water over them in the western part of this channel. There is one bend in the channel, at the end of the breakwater. A mid-channel course gives the Outer beacon a berth of about 175 yards and leads 50 yards to the eastward of the lighthouse on the breakwater; this course leads directly for Bridgeport beacon (red, pile dolphin). The eastern edge of the dredged channel is marked by two red spar buoys.

Pilots.—Vessels of more than 10 feet draft should take a pilot, unless a towboat be taken. Vessels desiring a pilot should make signal and anchor to the southward of the lighthouse, outside the bar, until one comes on board. There are two branch pilots. Pilotage is compulsory only for foreign vessels and vessels sailing under register.

Towboats are always taken by large vessels, and will come out if signal be made. They can be found alongside the wharves.

Anchorage.—The usual and best anchorage is on the western side of the channel, between Bridgeport Breakwater Lighthouse and the Railroad wharf. Small vessels (sloops, etc.) can anchor above the Railroad wharf, taking a berth on the eastern side of the channel, opposite the city.

There is practically no anchorage above Bridgeport Harbor Lighthouse except along the edge of the dredged channel. Vessels sometimes come-to outside the outer bar (marked by the lighthouse) for shelter in strong northerly winds; good holding ground will be found in 14 to 20 feet of water, with the lighthouse bearing about N., distant ½ to ¾ mile.

Harbor regulations prescribe the anchorage limits as follows: Vessels of any kind anchoring to the southward of the Railroad wharf must anchor on the western side of the channel, leaving sufficient room for vessels

*Shown on Coast and Geodetic Survey charts 265, scale $\frac{1}{10,000}$, price $0.50; 116, scale $\frac{1}{80,000}$, price $0.50.

to pass in and out of the harbor. Any and all vessels anchoring above the Railroad wharf must anchor close to the east bank, leaving room to get under way when the wind is to the westward.

Quarantine regulations are issued, when necessary, by the board of health (see Appendix I). There is no regular boarding station. Only vessels having sickness on board, or coming from infected ports, are boarded by the health officer; such vessels must come-to near the Breakwater Lighthouse and there await the health officer.

Supplies, provisions, and ship-chandler's stores can be procured at Bridgeport. Coal can be obtained in unlimited quantities for steamers; if of less than 15 feet draft they can take it directly from the coal yards above the first (lower) bridge. Water can be taken in through hose at the elevator dock or from a water boat.

Repairs to machinery can be made in Bridgeport. For repairs to hull, small vessels can go to Black Rock (West Bridgeport), where there are two small marine railways. (See also "Repairs" under heading "Port Jefferson Harbor.")

Hospitals.—The nearest U. S. Marine Hospital is at Staten Island, New York. At Bridgeport there is a relief station (Class IV) of the U. S. Marine-Hospital Service. (See Appendix III.)

Wind signals are displayed at Bridgeport.

Bridges.—Four drawbridges cross the Pequannock River at Bridgeport. The first (lower) one is a city bridge, the second is a railroad bridge; the others are city bridges. The width of draw, in the clear, is for the first (lower) bridge about 60 feet, for the second (railroad) bridge about 42 feet, for each of the others about 60 feet.

Steamboat and railroad communication.—Two steamers carrying passengers and freight run to New York. One steamer, passengers and freight, makes trips from Port Jefferson, Long Island, during the summer, and runs occasionally during the winter. Bridgeport is on the line of the N. Y., N. H. & H. Railroad.

Ice does not, as a rule, interfere seriously with navigation; the steamers keep the channel open.

Variation of the Compass, see page 24.

Tides, see page 22.

Tidal currents.—The velocity of the tidal currents is not great. Vessels passing in or out on the last of the flood are liable to be set to the northwestward.

Information concerning lighthouses, wind signal stations, tides, fogs, etc., will be found on pages 9–24; see also pages 48–53.

SAILING DIRECTIONS, BRIDGEPORT HARBOR.

The following directions are available for vessels drawing 10 feet or less; it is advisable for vessels drawing more than 10 feet to have a towboat or a pilot.

These directions lead through the middle of the dredged channel, and if followed exactly are good for a depth of 14 feet at mean low water as far as the end of Tongue Point Breakwater; above this and to the anchorage the least depth in the channel is 10½ feet.

1. ***Approaching and entering from the Eastward.***—Pass about 2½ miles to the southward of Stratford Point Lighthouse, and when Black Rock Lighthouse bears **NW.**, steer for it on that bearing until Bridgeport Harbor Lighthouse bears **N.** Steer for Bridgeport Harbor Lighthouse bearing **N.** until it is about ½ mile distant, and when West Flats buoy (can, black, No. 1) is made and is about ¼ mile distant bring it to bear **NNE.**, and steer for it on this bearing. Leave West Flats buoy about 20 yards on the port hand and continue on the **NNE.** course, heading for the red pile dolphin which will show just to the right of the lighthouse on the end of the breakwater.

Leave the two red spar buoys about 30 yards on the starboard hand and pass from 50 to 100 yards to the eastward of the lighthouse on the breakwater. Then steer **NNW. ½ W.**, heading for the end of the Railroad wharf; leave the red pile dolphin well on the starboard hand and anchor on the west side of the channel on a line between the lighthouse on the breakwater and the Railroad wharf. Mud flats rise abruptly on both sides of the channel.

In approaching and rounding Bridgeport Breakwater Lighthouse the Railroad wharf is readily distinguished, being long and unmistakable. Beyond it can be seen the high elevator at the elevator dock; the base of the elevator will here be shut out by the long shed on the Railroad wharf.

Remarks.—Standing to the westward and passing to the southward of Stratford Point Lighthouse, as directed, Penfield Reef Lighthouse should be made on the starboard bow, and to the northward of it will appear Black Rock Lighthouse. Bridgeport Harbor Lighthouse and the spires and tall chimneys in Bridgeport will be seen farther to the northward and eastward.

Dangers.—**Stratford Point Shoal,** marked near its southern edge by a buoy (spar, red, No. 16½), is described on page 61.

Other dangers and their marks have been sufficiently indicated already, and need not be described further. The entrance and harbor are occupied by flats and shoals, with the exception of the channel already described.

1 A. ***Approaching from the Westward.***—Keep Penfield Reef Lighthouse open a little on the port bow and pass about ½ mile or more to the southward of it, steering **NE.**, with Bridgeport Harbor Lighthouse on the port bow. When West Flats buoy (can, black, No. 1) is made, bring it to bear **NNE.** and proceed as already directed in section 1 above.

Remarks.—Approaching Penfield Reef Lighthouse, Black Rock Lighthouse will be made well to the northward of it. About ⅝ mile to the northeastward of Penfield Reef Lighthouse is Black Rock beacon, the lighthouse and beacon marking dangers near the extremity of Fairfield Bar, which extends from them to the shore to the westward. These dangers are described under the heading "Black Rock Harbor." In the bight to the northeastward of these objects is Bridgeport Harbor Lighthouse.

BLACK ROCK HARBOR.*

The harbor, on the Connecticut shore, is the next to the westward of Bridgeport Harbor. Vessels of from 50 to 500 tons sometimes use it for shelter, especially during the spring and fall. Yachts often use this anchorage in summer. It is exposed to easterly and southeasterly winds. The harbor also forms the approach to **Black Rock** (West Bridgeport).

The depth of the water at the entrance is 22 to 24 feet, decreasing to 7 feet at the head of the harbor, the northern end of **Fayerweather Island.** Under Government appropriations a breakwater has been built connecting the northern end of Fayerweather Island with the mainland to the eastward, and a channel 6 feet deep and 80 feet wide dredged from the head of the harbor into Cedar Creek. The deepest draft, laden, of vessels entering the harbor is about 12 feet, average draft 7 or 8 feet. Vessels drawing 11 feet may, at high water, go up to the forge company's wharf, but they will lie aground at low water.

Prominent objects.—On Fayerweather Island, on the northeastern side of the entrance, is Black Rock Lighthouse. On the southern side of the entrance is Penfield Reef Lighthouse, built a little to the southward of the eastern end of Fairfield Bar; there is no passage between this lighthouse and the western shore.

Pilots and towboats.—Pilots are not needed for the anchorage. Vessels bound in beyond the anchorage (as those going to the Fairfield chemical works or to the forge company's wharf) require a towboat, and nearly always take one; the usual custom in such cases is to anchor in Black Rock Harbor and telephone to Bridgeport for a towboat, or one may be obtained before entering by standing well in toward Bridgeport entrance and making signal (see page 93).

Good anchorage for small vessels is found in mid harbor, with Black Rock Lighthouse bearing about **ENE.**; the depth here is about 10 to 14 feet; bottom, mud and sand. Larger vessels anchor farther out.

Supplies can be obtained from Bridgeport. Coal can be obtained in Black Rock Harbor, at the upper wharf, if it be clear. Fresh water would have to be gotten from wells on shore. Vessels in need of coal or water should go to Bridgeport.

Marine railways.—There are two small marine railways; they are only capable of hauling out vessels of ordinary size (see heading "Port Jefferson Harbor").

Tides.—The mean rise and fall of tides is 7.1 feet; high water occurs 1m. before high water at Willets Point, and low water 11m. before low water at Willets Point.

Ice does not form to any great extent, as a rule; ordinarily there is none in the outer part of the harbor in winter.

Lists of Lighthouses and Weather Bureau wind signal stations, with other general matters, will be found on pages 9–24. (See also pages 48–53.)

SAILING DIRECTIONS, BLACK ROCK HARBOR.

1. ***Approaching and Entering from the Eastward.***—Passing about 2 miles south of Stratford Point Lighthouse, steer about **W. ¾ N.**, for Penfield Reef Lighthouse. Keep this course until Bridgeport Harbor Lighthouse bears **NNE.**, when the course should

*Shown on Coast and Geodetic Survey charts 265, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each, $0.50.

be changed to **NW. ¼ W.** Anchor in 18 to 20 feet of water, soft bottom, when Penfield Reef Lighthouse bears **S.**

These directions will answer for both day and night.

Vessels of 7 feet draft or less, when on the **NW. ¼ W.** course, can stand in until Penfield Reef Lighthouse bears **S.** by **W.**, and then steer **N.** by **E.**, keeping Penfield Reef Lighthouse over the stern. Anchor in 8 to 10 feet of water, soft bottom, abreast the long wharf on the western shore of the harbor.

Remarks.—Heading for Penfield Reef Lighthouse, Black Rock Lighthouse (white tower; see Table of Lights, page 12) will be on the starboard bow, and vessels should pass at least 900 yards to the southward of it in entering the harbor; the hotels and cottages at Black Rock, on the western shore of the harbor, will be seen back of this lighthouse.

With Penfield Reef Lighthouse over the stern, heading **N.** by **E.**, West Bridgeport will be ahead and the harbor will be fully opened out; this course leads about 350 yards west of Point Rock Shoal buoy (spar, red, No. 2) and the same distance west of Black Rock Lighthouse.

Dangers.—**Point Rock Shoal** extends 800 yards south from Black Rock Lighthouse, and has 16 feet on its southern end, where it is marked by a buoy (spar, red, No. 2).

Fairfield Bar is bare at low water; it extends about 1 mile in a southeasterly direction from the west shore, forming a natural breakwater against southwesterly winds.

Penfield Reef is about 700 yards south of the eastern end of Fairfield Bar; it is marked by a lighthouse (see Table of Lights, page 12).

Black Rock lies 600 yards **NE.** by **E.** from Penfield Reef Lighthouse, and is marked by a beacon (iron piles with large cage, red).

The Cows are a cluster of rocks lying off the end of Fairfield Bar.

The Little Cows are a cluster of rocks, some bare at low water, lying about 300 yards north of Black Rock beacon.

A Rock with 6 feet over it lies about 250 yards **S.** by **W.** from the end of the long wharf in Black Rock Harbor; it is about 80 yards outside the western edge of the channel.

1 A. ***Approaching and Entering from the Westward.***—Keep Penfield Reef Lighthouse a little on the port bow, steering about **ENE.** Pass about ½ mile south of this lighthouse, and continue to the eastward until Black Rock Lighthouse bears **N. ½ W.**; then steer for Black Rock Lighthouse on this bearing until Penfield Reef Lighthouse bears **SW.**; then steer **NW.** by **W.**, and anchor in 18 to 20 feet of water, soft bottom, when Penfield Reef Lighthouse bears **S.** These directions will answer for both day and night.

Vessels of 7 feet draft or less can follow the above directions until Penfield Reef Lighthouse bears **S.** by **W.**, and then follow directions under section 1.

Remarks.—Approaching Penfield Reef Lighthouse, Black Rock Harbor and Lighthouse will be seen over Fairfield Bar. Black Rock beacon (iron piles with large cage on top, red) will be seen to the northeastward of Penfield Reef Lighthouse.

Shoal water makes off ¾ mile to the southwestward all along Fairfield Bar.

Other dangers have been described under section 1 foregoing.

SMITHTOWN BAY.*

This bight, on the south side of Long Island Sound, makes into the Long Island shore to the westward of Crane Neck Point. The bay is about 7 miles long in an **E.** and **W.** direction, and 1½ to 2 miles **N.** and **S.**; the southern shore has shoals making out to a distance of 1 mile in several places, the water shoaling abruptly from 7 fathoms to 18 feet.

A good summer anchorage in 5 to 8 fathoms of water, sheltered from easterly winds, is found about 1 mile south of Crane Neck Point; in strong westerly or northwesterly winds it is unsafe, and vessels anchored here get under way on the first indications of such winds.

Stony Brook Harbor is a shallow bay in the southeastern part of Smithtown Bay. The entrance is narrow and obstructed by a shifting sand bar, having 2½ feet of water at low water. The channel inside the bar is narrow and crooked, and the tidal currents tend to set a vessel on the shoals. Strangers bound into the harbor take a pilot, anchoring, with the pilot signal flying, 1 mile from the shore in 6½ to 8 fathoms water, with Stony

* Shown on Coast and Geodetic Survey chart 116, scale $\frac{1}{80,000}$, price $0.50.

Brook Church spire bearing **SSE.** A short distance inshore from this position the water shoals abruptly from 6½ fathoms to 6 feet. A pilot will come out from Stony Brook to a vessel making signal.

The village of **Stony Brook**, ½ mile above the entrance, is of little importance; it has some trade in firewood. The deepest draft that can be taken in at high water does not exceed 9 feet; the usual draft entering is not more than 7 feet; there is from 2 to 6 feet of water alongside the wharves.

Nissequague River is a shallow crooked stream, the mouth of which is about 4 miles to the westward of Stony Brook. This river can only be entered at high water, on account of the shoals which extend 1 mile to the northward from the entrance, with only 1 foot of water over them at low water. About 1 mile to the northward of the entrance the water shoals abruptly from 6 fathoms to 6 feet. **Nissequague**, a village about ½ mile above the entrance, is of little importance; only small craft trade there. Strangers bound in must take a pilot.

Tides.—The mean rise and fall of tides is 6.7 feet: high water occurs 5m. before high water at Willets Point, and low water 20m. before low water at Willets Point.

Information concerning lighthouses, tides, fog, variation of the compass, etc., will be found on pages 9–24; see also pages 48–53.

SOUTHPORT HARBOR.*

This is a shallow bight on the north side of Long Island Sound, about 3 miles to the westward of Penfield Reef Lighthouse between Kensie Point on the east and Frost Point on the west. It is at the entrance of Mill River, a narrow, shallow, and unimportant stream which empties into its northern part. A breakwater has been built, under Government appropriations, from the eastern shore at the entrance of the river, extending in a southwesterly direction to the inner beacon.

Southport, a village inside the entrance to the river, has some trade in merchandise and produce; provisions can be obtained here. The deepest draft of vessels going to Southport is 8 feet; the depth alongside the wharves at low water is 1½ to 2 feet.

Beacons.—The entrance is marked by two large granite beacons, the outer one with iron shaft and ball, the inner one with wooden spindle and red cask; the best water is to the eastward of the outer beacon.

The **anchorage** outside the breakwater for vessels bound to Southport is to the southward of the outer beacon. This anchorage is sheltered only from northerly winds and is not much frequented; Black Rock Harbor and Bridgeport Harbor, both to the eastward, afford better shelter.

Pilots and towboats.—Strangers entering the river bound to Southport generally take a pilot or a towboat. Pilots can be obtained off the entrance, vessels anchoring outside the beacons with signal set until boarded by one. Towboats can be obtained at Bridgeport.

Ice closes the river to the entrance, during the winter, in very cold weather.

Tides.—See heading "Westport Harbor."

SAILING DIRECTIONS, SOUTHPORT HARBOR.

1. ***From the Eastward.***—Steering **W. ¼ N.**, pass about ¾ mile **S.** of Penfield Reef Lighthouse and about ½ mile **S.** of Pine Creek Point Buoy; this buoy is about 1¾ miles to the westward of Penfield Reef Lighthouse. When the buoy is cleared, steer **NW.** by **W.** until the two beacons, which will be seen on the starboard bow, are in range. Then stand for the beacons and anchor to the southward of the outer beacon, in 12 to 18 feet of water, and if bound in take a pilot. The water shoals abruptly inside of 10 feet.

Pine Creek Point Shoal extends about ⅛ mile to the southward of Pine Creek Point, and is marked at its southern end by a buoy (spar, red, No. 18); this rocky shoal is bare in places at low water. The water shoals rapidly from 12 to 6 feet off the western side of Pine Creek Point.

1 A. ***From the Westward.***—Passing about ¾ mile to the southward of Norwalk Island Lighthouse, make good the course **ENE. ¾ E.** for 3 miles; then change course to **ENE.** for 1¾ miles, when Cockenoe Island Shoal buoy (nun, red, No. 20) should be on the port beam, distant a little over ½ mile.

When past this buoy, head for the outer beacon at Southport entrance, course about **NE. ¾ N.**; this course leads about ¾ mile to the southeastward of Frost Point, off which rocky heads, bare at low water, extend for ¼ mile. Anchor in 12 to 18 feet of water to the southward of the outer beacon.

The shoals and dangers extending to the eastward and to the southward from Norwalk Islands are described on pages 62, 99.

*Shown on Coast and Geodetic Survey charts 266, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

WESTPORT HARBOR.*

This harbor, at the entrance to the Saugatuck River, on the north shore of Long Island Sound, is about 6 miles to the westward of Penfield Reef Lighthouse and 4½ miles to the eastward of Norwalk Island Lighthouse. The harbor is exposed to southeasterly winds. The entrance to the Saugatuck River is between two low and marshy points, fringed with a sand beach, the eastern one (Cedar Point) being rocky off its extreme southern end.

Saugatuck is a village about 2 miles above the mouth of the river, on the line of the N. Y., N. H. & H. Railroad.

Westport, a town at the head of navigation, about 2 miles above Saugatuck, has several manufactories and has some trade by water. The depth on the bar at the entrance to the river, at mean low water, is 6 feet. The deepest draft of vessels entering the harbor is 10 feet; in 1899 a draft of 10 feet can be taken up to Westport at high water through a dredged channel 40 to 60 feet wide.

Pilots, etc.—Strangers generally take a pilot outside of the harbor; oystermen, who usually pilot vessels in, can almost always be found outside. If a pilot is not found outside, an anchorage is made to the southeastward of Cedar Point. Pilotage is not compulsory. The harbor and river are not buoyed, and there are no artificial aids to assist strangers in entering. The channel in the river is narrow and crooked.

Towboats can be had at Bridgeport and sometimes at Norwalk, but are seldom used except by canal boats.

Supplies.—Limited quantities of anthracite coal can be obtained alongside the dock at Saugatuck. Provisions, etc., can be obtained at Saugatuck and Westport.

Freshets sometimes occur in February, when the mill ponds break up. **Ice** forms in winter the whole length of the river to its mouth.

Tides.—The mean rise and fall of tides is 7 feet; high water occurs 3m. before high water at Willets Point, and low water 12m. before low water at Willets Point.

SAILING DIRECTIONS, WESTPORT HARBOR.

These directions are available for vessels drawing 9 feet or less. Vessels drawing 13 feet or more should give Stratford Point more of a berth than is here indicated by the directions for approaching from the eastward.

1. ***From the Eastward.***—Passing 1½ miles south of Stratford Point, steer **W.** and leave Penfield Reef Lighthouse ½ mile on the starboard hand. Pass 200 yards south of Pine Creek Point Shoal buoy and continue the **W.** course for about 4 miles farther, until nearly on a line between the eastern end of Cockenoe Island and Cedar Point; then, being a little over ¼ mile distant from the rock off Cedar Point, anchor in 15 to 20 feet water.

Remarks.—On the **W.** course, when past Penfield Reef Lighthouse, Pine Creek Point Shoal buoy (spar, red, No. 18) will be made a little on the starboard bow. As this buoy is approached the beacons in the head of Southport Harbor will be opened out to the northward. Passing Southport Harbor, the entrance to the Saugatuck River will be made ahead, and Cedar Point (low and marshy, with a large pile of rocks off its southern end) will be on the starboard bow. Cockenoe Island (one of the largest of the Norwalk Islands) will be on the port bow. Penfield Reef and Pine Creek Point Shoal are described on page 62.

The points along the north shore to the westward of Southport should receive a berth of at least ⅛ mile, as shoals and rocks extend out to that distance. **A spot** with 12 feet of water over it lies about ⅝ mile **S.** by **E.** from Sherwood Point (the first prominent point about 1¼ miles to the eastward of Cedar Point). To avoid this spot keep about ½ mile to the southward of Sherwood Point.

1 A. ***From the Westward.***—When Norwalk Island Lighthouse bears **N.**, distant about ¾ mile, steer **ENE. ¾ E.** for 3 miles; then change course to **ENE.** for 1¾ miles, when Cockenoe Island Shoal buoy (nun, red, No. 20) should be on the port beam, distant about ½ mile. When well past this buoy, steer **N.** for about 1⅛ miles, giving the buoy and Georges Rock (about ¼ mile to the northward of it) a berth of at least ¼ mile on the port hand. When the rocks on Cedar Point bear **NW.** by **W.**, steer for the rocks, making good a **NW.** by **W.** course, and when the eastern end of Cockenoe Island bears **SW.** steer **W.**, and anchor as directed under section 1, foregoing.

*Shown on Coast and Geodetic Survey charts 267, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{30,000}$; price of each $0.50.

Remarks.—The Norwalk Islands will be left well to the northward. Cockenoe Island Shoal buoy (nun, red, No. 20) will be made on the port bow, and on the **ENE.** course Penfield Reef Lighthouse should be made ahead, or a little on the port bow. On the **N.** course Sherwood Point will be a little on the port bow and the entrance of the Saugatuck River will be open to the westward of Cedar Point.

Dangers.—**Cockenoe Island Shoal.**—This is an extensive and dangerous shoal lying to the eastward and southward of Cockenoe Island. It has numerous rocks scattered over it, some of them showing at low water. Georges Rock, awash at low water, lies about 1¼ miles **ESE. ½ E.** from the northeastern end of Cockenoe Island, near the eastern end of the shoal. A red buoy (nun, No. 20) is placed a little over ¼ mile to the southward of Georges Rock and marks the southeastern end of the shoal. The northeastern end of this shoal bears **E.**, distant 1⅛ miles from the northeastern end of Cockenoe Island, and has from 8 to 18 feet of water over it. The shoal extends for a distance of nearly 1 mile to the southward of Cockenoe Island.

To the westward of Cockenoe Island is Cockenoe Island Harbor.

COCKENOE ISLAND HARBOR.*

This is a small harbor lying to the westward of Cockenoe Island; it has anchorage for vessels of less than 9 feet draft, but is not used by strangers seeking shelter. It is also an *eastern passage* into Norwalk River, but this passage requires local knowledge, as the channel is narrow and crooked and is not buoyed. With an easterly wind, vessels bound up the Norwalk River sometimes take a pilot while to the southward of Cockenoe Island, and are taken into the river through the eastern passage. The *western passage* into Norwalk River is through Sheffield Island Harbor. There is also a *middle passage,* which leads in to the eastward of Sheffield and Ram islands; it is only used by those thoroughly acquainted with the locality.

The **channel** to Cockenoe Island Harbor leads across the shoal ground extending to the southward from Cockenoe Island; at mean low water 13 feet can be taken in as far as the black buoy to the westward of Cockenoe Island (Peck Ledge buoy, spar, black, No. 1).

The **depth of water** at the anchorage is 7 to 10 feet at low water. Vessels of 12 feet draft have been taken through the eastern passage at high water.

Pilots can be had by making signal, when to the southward of Cockenoe Island, and standing off and on until one comes from Tavern Island or from the river.

Tides.—See heading "Westport Harbor."

SAILING DIRECTIONS, COCKENOE ISLAND HARBOR.

The following directions are available for vessels drawing 8 feet or less. Vessels of 8 to 12 feet draft, bound in this passage, can anchor about ¾ mile to the southeastward of Peck Ledge (buoyed).

1. ***From the Eastward.***—After passing Penfield Reef Lighthouse, bring it to bear **ENE. ½ E.** over the stern, and steer **WSW. ¼ W.** As soon as you make the red buoy on the eastern end of the Norwalk Island reefs (Cockenoe Island Shoal buoy, nun, No. 20), steer so as to pass about 400 yards to the southward of this buoy, and continue the **WSW. ¼ W.** course. As soon as the buoy (spar, black, No. 1) on the northern end of Peck Ledge (to the westward of Cockenoe Island) bears between **NW.** by **W.** and **NNW. ¾ W.**, head for the buoy on any course between these bearings, and after having passed Channel Rock buoy (spar, red, No. 2), haul a little to the northward, so as to pass about 200 yards to the eastward of Peck Ledge buoy. Stand in past the buoy and come to anchor in about 10 feet water (low water) when the northeasternmost of the two hillocks on Cockenoe Island bears about **E.**

Remarks.—Cockenoe Island has two small hillocks on its southeastern side which serve to distiguish it, the rest of the island being low and level. After passing red buoy, No. 20, the black buoy marking Peck Ledge (spar, No. 1) and Channel Rock buoy (spar, red, No. 2) will be seen just to the westward of Cockenoe Island. When approaching, the rock to be guarded against on the north side of the channel is **Channel Rock** (with 2 feet of water over it), which lies 500 yards **SSW. ¾ W.** from the westernmost hillock on Cockenoe Island, and is marked by a buoy (spar, red, No. 2) placed 300 yards to the southwestward of the rock; the depth between this rock and the island is 2 to 8 feet.

Dangers.—**Peck Ledge,** dry at low water, lies about 400 yards **NNE. ¼ E.** from Goose Island. Just to the northward of the buoy marking this ledge there is a depth of 14 to 25 feet.

*Shown on Coast and Geodetic Survey charts 267, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{30,000}$; price of each $0.50.

1 A. ***From the Westward.***—Passing ¾ mile south of Norwalk Island Lighthouse, steer **ENE. ¼ E.** When the northeastern hillock on Cockenoe Island bears **NNE.**, head for it on this bearing. As soon as the buoy (spar, black, No. 1) to the westward of Cockenoe Island bears **NNW. ¾ W.**, steer for this buoy as directed in section 1 preceding and follow the directions already given for coming to anchor.

Remarks.—After passing Norwalk Island Lighthouse and Great Reef spindle the islands should not be approached nearer than in 24 feet of water, as the shoals rise abruptly in places inside this depth. Peck Ledge buoy (spar, black, No. 1) and Channel Rock buoy (spar, red, No. 2), to the westward of Cockenoe Island, will be made after passing Copp Island, the former buoy nearly in range with Goose Island and the northwestern point of Cockenoe Island. (See also the remarks under directions for approaching and entering from the eastward.)

SHEFFIELD ISLAND HARBOR (NORWALK HARBOR) AND NORWALK RIVER.*

Sheffield Island Harbor, now more generally known as Norwalk Harbor, is about 13½ miles to the westward of Bridgeport Harbor and 17¾ miles to the eastward of Execution Rocks Lighthouse. It is formed by the mainland of the north shore and by the western Norwalk Islands; on the southern side of the western part of the harbor is the reef which extends to the westward from these islands. This harbor affords shelter to vessels drawing less than 17 feet; tows frequently seek refuge here, and the harbor is much used, especially in the fall and winter.

Norwalk River is generally approached from Long Island Sound through Sheffield Island Harbor; there is also an eastern passage through Cockenoe Island Harbor; and a middle passage is sometimes used by those acquainted with the locality (see page 99). This river has a very narrow and crooked channel which, under Government appropriations, has been improved by dredging a channel to the town of Norwalk, a little over 2½ miles above its mouth. Above South Norwalk the river is crossed by two bridges (least width of draws 60 feet).

Wilson Point, on the north shore of Sheffield Island Harbor, is an important point for the shipment of coal oil, which is brought here in tank barges and shipped away on tank cars. A large wharf and oil houses are its noticeable features.

Under Government appropriations a channel 15 feet deep at mean low water has been dredged from the western part of Sheffield Island Harbor to abreast the railroad docks at Wilson Point. For a distance of 750 feet south from Wilson Point the channel is about 880 feet wide, and thence to Sheffield Island Harbor about 480 feet wide. The channel close to the wharf, dredged by the railroad company, is 12 feet deep at mean low water.

South Norwalk, a city about 1½ miles above the mouth and on the western bank of the river, has manufactories and is of some commercial importance. During the summer there is a daily line of steamers to New York. The deepest draft of vessels going to South Norwalk is 13 feet, the usual draft is about 10 feet (at high water).

East Norwalk is on the opposite side of the river from South Norwalk.

Norwalk, a small town on both banks of the river, about 1¼ miles above South Norwalk, has some trade, principally coal, lumber, iron, and general merchandise. The deepest draft of vessels going up to Norwalk is 11 feet at high water; there is 5 feet of water alongside the wharves at low water.

Prominent features.—Norwalk Island Lighthouse, a gray octagonal tower on the gable end of a granite dwelling (see table, page 12), is situated near the western end of Sheffield Island, the largest and westernmost of the Norwalk Islands. **Norwalk Islands** is the name of the irregular group of islands, surrounded by shoals, lying off the mouth of the Norwalk River. These islands and shoals extend about 5 miles in an **ENE.** direction from Norwalk Island Lighthouse.

Tavern Island, a small island in Sheffield Island Harbor, is to the northward of Norwalk Island Lighthouse and to the southeastward of Wilson Point. It has small summer houses on each end, and there is a flagstaff near the house of a pilot who lives on the island. Strangers should not attempt to go above Tavern Island without a pilot or a towboat.

The **channel** up to Tavern Island is good for 10 feet at low water; above the island 8 feet can be taken into the river at low water and 12 to 13 feet at high water. The channel into the river is marked by a beacon and buoys, but a stranger can not attempt it without risk on account of the numerous rocks on both sides of the channel. Under Government appropriations a channel has been dredged 100 feet wide and 8 feet deep to South Norwalk, and from 60 to 100 feet wide and 6 feet deep up to the town of Norwalk. It is proposed to dredge the channel to South Norwalk to a width of 150 feet and depth of 10 feet at mean low water.

*Shown on Coast and Geodetic Survey charts 267, 268, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

Anchorages.—The anchorage for vessels bound into the Norwalk River, or seeking shelter, is in Sheffield Island Harbor, to the northward of Sheffield Island. Vessels of 10 feet draft or less can anchor as far up the harbor as to a line drawn from Tavern Island to the large yellow house on Sheffield Island and giving the shore of Sheffield Island a berth of about 300 yards. Vessels of 12 to 13 feet draft should not anchor inside a line drawn from Norwalk Island Lighthouse to Norroaton Rock buoy (spar, red and black horizontal stripes, off Norroaton Point). Anchorage in 17 feet water will be found 700 yards S. of Norroaton Point. Between Norroaton Point and Wilson Point is an anchorage for vessels of light draft, much used by oyster steamers and sloops.

Pilots.—Strangers generally take a pilot or a towboat when bound up the river. Standing into the harbor with signal set, a pilot will generally come on board before the vessel reaches Tavern Island. If not boarded by a pilot, anchor in the channel according to draft.

Extracts from the laws of Connecticut relative to pilots and pilotage will be found in Appendix I.

Towboats.—Sailing vessels frequently take a towboat. The channel is too narrow for anything but very small vessels, except with a favorable wind. Oyster steamers do the towing, but can not be depended upon to tow whenever required; in case of emergency a towboat can be obtained from Bridgeport by telegraphing. Oyster steamers will usually be found at the entrance, or off Five-Mile River, or at South Norwalk.

Supplies.—Coal for steamers, either anthracite or bituminous, in quantities, and fresh water through pipe and hose, can be had at the wharves of South Norwalk and Norwalk. Provisions and ship chandler's stores can be obtained at both places.

Repairs.—Repairs to the machinery of small steamers can be made at South Norwalk; for extensive repairs vessels generally proceed to New York.

Ice forms in the river and usually obstructs navigation for about six weeks in winter.

Variation of the compass off Norwalk Island Lighthouse, see page 24.

Tides.—See page 22.

Description of lighthouses, with other general matters, will be found on pages 9–24; see also pages 48–53.

SAILING DIRECTIONS, SHEFFIELD ISLAND HARBOR.

1. ***Approaching and Entering from the Eastward.***—In approaching, note the directions on page 61. When Norwalk Island Lighthouse is made, shape the course so as to pass about ¾ mile to the southward of this lighthouse. With Norwalk Island Lighthouse bearing **N.**, distant about ¾ mile, steer **W. ¼ N.** Pass ¼ mile south of Greens Ledge bell buoy (red), nearly 1⅝ miles to the westward of Norwalk Island Lighthouse. Round the buoy, keeping it on the starboard hand and giving it a berth of ¼ mile. When this buoy bears **S.**, distant about ¼ mile, steer about **ENE. ¼ E.**, passing about 300 yards south of Norroaton Rock buoy (spar, red and black horizontal stripes, off Norroaton Point). Anchor according to draft (see "Anchorages").

If bound up the Norwalk River, take a pilot or a towboat.

Remarks.—The course leads to the southward of Penfield Reef Lighthouse and to the southward of Cockenoe Island, the easternmost of the Norwalk Islands. Cockenoe Island will be distinguished by two small hillocks on its southeastern end; the other parts of the island are low, flat, and grassy. Norwalk Island Lighthouse will be made on the starboard bow, and as the lighthouse is approached the spindle on Great Reef, about ⅝ mile to the southwestward of the lighthouse, will be seen on the starboard bow.

On the **W. ¼ N.** course, Long Neck Point (low, with cluster of rocks off its southern end) will be made on the starboard bow, or nearly ahead. To the northward Five-Mile River will be seen about ¾ mile to the westward of Norroaton Point. Norroaton ("Roton") Point has several large buildings near its southern end. Tavern Island will be seen to the eastward of Norroaton Point, and between them Wilson Point will be distinguished by the large wharf and buildings. Greens Ledge bell buoy (red) will be made on the starboard bow, and when rounding this buoy Norroaton Point will shut out Wilson Point.

On the **ENE. ¼ E.** course, Norroaton Rock buoy (spar, red and black horizontal stripes) will be on the port bow, off Norroaton Point; as it is approached, Tavern Island Flats buoy (spar, black, No. 1) will be seen.

Norwalk Islands.—About ⅝ mile **SW.** from *Cockenoe Island* is *Goose Island*, a low, rocky islet at high water; it uncovers at low water, showing an increased area; passing this island it should be given a berth of ⅝ mile. *Copp Island* (small, hilly, covered with grass, loose bowlders around the shore) lies ¾ mile **SW.** from Goose Island and ¾ mile **ENE.** from the eastern end of Sheffield Island; this island should be given a berth of at least ⅝ mile when passing to the southward of it. *Sheffield Island* is distinguished by the lighthouse near its western end; the southern shore of the island, to the eastward of the lighthouse, can be approached to as close as ¼ mile.

Dangers.—Cockenoe Island Shoal has been described on page 99.

Great Reef, marked on its eastern side by a spindle, makes out to the southward nearly ⅜ mile from the western end of Sheffield Island.

Greens Ledge extends nearly 1¼ miles **W.** by **S.** from the western end of Sheffield Island. It has 8 feet of water near its western end, and is marked by a bell buoy (red) placed to the westward of the 8-foot spot.

Norroaton Point Shoal.—Shoals make out to the southward from Norroaton Point; a ledge with a least depth of 8 feet over it lies ⅝ mile **SW.** by **W.** from the extremity of the point; about 500 yards **SE.** by **E.** from Norroaton Point is a spar buoy (red and black horizontal stripes), placed to mark a rock, which is reported to have 4 feet over it.

A ledge makes out to the southwestward from Tavern Island and is marked off its southwestern end by Tavern Island Flats buoy (spar, black, No. 1).

1 A. ***Approaching from the Westward.***—Passing about ¼ mile south of the red buoy (nun, No. 24), off the Cows, make good the course **NE.** by **E.** ⅝ **E.** for about 4 miles. Leave Greens Ledge bell buoy on the starboard hand, giving it a berth of ¼ mile, and stand in, course about **ENE.** ¼ **E.**, proceeding as directed under section 1, foregoing.

Remarks.—After passing the Cows buoy (nun, red, No. 24, off Shippan Point), Smith Rock buoy (spar, red, No. 22) will be made on the port bow, and should be left about ⅜ mile on the port hand; Norwalk Island Lighthouse will be made on the starboard bow; Long Neck Point will be passed, and should be given a berth of ½ mile on the port hand. After passing Long Neck Point, Greens Ledge bell buoy (red) will be made on the starboard bow; passing this buoy, leave it ¼ mile on the starboard hand. Tavern Island will show conspicuously on the port bow, and after passing Greens Ledge buoy Wilson Point will be gradually opened out from behind Norroaton Point.

Dangers.—The Cows are a cluster of detached rocks, bare at low water, lying about 1 mile **SE.** by **E.** from Stamford Lighthouse; off their southern end is a buoy (nun, red, No. 24).

Smith Rock is a cluster of rocks ⅜ mile long in a **N.** and **S.** direction and 200 yards wide, showing bare in places at low water. This danger lies about 2¼ miles **E.** ¾ **N.** from Stamford Harbor Lighthouse and nearly 1 mile **SW.** by **W.** from Long Neck Point. A buoy (spar, red, No. 22) is placed on the southern end of the rock.

Shoal water extends 500 yards to the southward of Long Neck Point.

Other dangers are described under section 1, foregoing.

HUNTINGTON BAY.*

This large bay, on the south shore of Long Island Sound, just to the westward of Eatons Neck, is an excellent anchorage, with 18 feet to 6 fathoms of water. The entrance to the bay is between *Eatons Point* (marked by Eatons Neck Lighthouse, see table on page 12) on the east and *Lloyd Point* on the west. The bay is about 2½ miles long in a **N.** and **S.** direction, and is about 1 mile wide abreast West Beach (now called Port Eaton). Vessels of the largest size anchor in Huntington Bay for shelter, the bay being protected against all but northerly winds; in bad weather it is frequently used by the large Sound steamers, both in summer and winter.

Port Eaton (West Beach), on the east side of the bay, about 2 miles to the southward of Eatons Point, is a place from which gravel is shipped. Deep cuts are made in the beach by the gravel dredges, and vessels of 7 to 10 feet draft load in these cuts or at their entrance. Large piles of gravel, and houses for the workmen employed on the dredges and in loading vessels, are the distinguishing features of Port Eaton.

Lloyd Harbor is a shallow body of water, full of oyster beds, on the west side of Huntington Bay; a long narrow arm extends to the westward from Lloyd Harbor nearly to Oyster Bay. Lloyd Harbor Lighthouse (see table, page 12) is on the northern side of the entrance to the harbor, and is also one of the guides into Huntington Bay. Vessels during northwesterly gales anchor to the eastward of the lighthouse, as close in as their draft will allow, and those of light draft (less than 7 feet) anchor to the southwestward of the lighthouse. The harbor is of no commercial importance.

Huntington Harbor is a long irregular cove, the entrance to which is ⅜ mile to the southward of Lloyd Harbor Lighthouse. The entrance is buoyed, but the channel is crooked and full of dangers and strangers should not attempt it. Only small vessels well acquainted with the locality enter this harbor, going up to the village of **Huntington** at its head. A dredged channel 8 feet deep and 175 feet wide leads from the entrance to the Old Town dock.

Variation of the compass, see page 24.

Descriptions of lighthouses, tidal data, and other general matters will be found on pages 9–24; see also pages 48–53.

*Shown on Coast and Geodetic Survey charts 368, scale $\frac{1}{80,000}$, price $0.20; 116, scale $\frac{1}{80,000}$; price $0.50.

NORTHPORT BAY AND HARBOR.*

Northport Bay is a large bay opening from the southeastern end of Huntington Bay. The western part of Northport Bay has good anchorage in 4 to 8 fathoms of water; the eastern end is shoal, having a depth of 8 to 11 feet. The entrance to Northport Bay from Huntington Bay is through a narrow buoyed channel having a least depth of 20 feet.

Centerport Harbor is a shoal bight in the south shore of Northport Bay, just to the eastward of the entrance. Little Neck (a hilly point, covered with trees) is on the eastern side of the harbor. The village of **Centerport**, at the head of the harbor, is of no commercial importance.

Duck Island Harbor is a small shallow cove in the northern part of Northport Bay, opposite Centerport Harbor. A channel with 9 feet of water leads into this cove between Duck Island Bluff on the east and Winkle Point on the west, but it is only used by very small craft as the cove itself is very shallow.

Northport Harbor is a cove in the southeastern part of Northport Bay, with numerous oyster beds, and has from 7 to 10 feet of water, shoaling gradually toward its head to 1 foot.

Northport is a village on the eastern shore near the head of Northport Harbor. It has some water-borne trade, consisting of coal, lumber, oysters, sand, gravel, fire clay, and produce, carried partly by strangers. The greatest draft taken to Northport is 14 feet, the usual draft 8 to 12 feet, and 6 feet can be taken alongside the wharves at low water. Northport is on the line of the Long Island Railroad, and has a steamer running to New York in summer.

Vessels anchor anywhere in the harbor in 7 to 10 feet, low water; the bottom is soft mud.

Strangers sometimes take a pilot; making signal while in Huntington Bay will bring a pilot from the shore, or from one of the oyster boats in the vicinity.

Repairs to vessels can be made at Northport; there are three shipyards with marine railways, the largest of which is capable of hauling out vessels of 500 tons.

Anthracite coal in limited quantities and water through pipe and hose can be had at Northport alongside the wharves. Provisions and ship-chandler's stores can be obtained.

Ice closes Northport Harbor about two months each winter; there is no danger from drift ice.

SAILING DIRECTIONS, HUNTINGTON BAY.

1. ***Approaching and Entering from the Eastward.***—Pass a little over 1 mile north of Eatons Neck Lighthouse, steering about **W.** ½ **S.**, and leaving Eatons Point Shoal buoy (can, black, No. 13) about ¼ mile on the port hand. When ¼ mile to the westward of this buoy, steer **SW.** until the bay is fully opened out, when the course should be changed to about **S.** by **W.**, keeping the eastern shore a little the best aboard, but giving it a berth of not less than ¼ mile.

Anchor according to draft and the direction of the wind. Vessels drawing less than 18 feet can anchor with Lloyd Harbor Lighthouse bearing **W.**, distant from ⅜ to 1⅛ miles; if of deeper draft, anchor before Lloyd Harbor Lighthouse bears **W.** Vessels sometimes anchor with Eatons Point Lighthouse bearing from **ENE.** to **NE.**, coming to in 5 or 6 fathoms of water.

If bound to Northport, see section 2.

At night.—*Vessels drawing less than 14 feet* can bring Old Field Point Light (see table, page 12) to bear **E.** ¾ **S.** over the stern, and steer **W.** ¾ **N.**, passing about 1¼ miles north of Eatons Neck Light. When Norwalk Island Light bears **N.** ⅝ **E.**, steer **S.** ⅝ **W.**, keeping Norwalk Island Light on the bearing. Anchor as already directed.

Or, such vessels can bring Stratford Shoal (Middle Ground) Light to bear **E.** by **N.**, and steer **W.** by **S.**, keeping the bearing. This leads nearly 1¼ miles to the northward of Eatons Neck Light. When Norwalk Island Light bears **N.** ⅝ **E.**, steer **S.** ⅝ **W.**, keeping the bearing. Anchor as already directed.

Vessels drawing 14 feet or more should keep a mid-sound course, steering about **W.** ½ **S.**, with Stratford Shoal (Middle Ground) Light bearing **E.** ½ **N.** until Norwalk Island Light bears **N.** ⅝ **E.**, and then steer **S.** ⅝ **W.**, keeping the bearing as before.

Remarks.—When passing Eatons Point in the daytime, Huntington Bay will be opened out and Lloyd Harbor Lighthouse (square white tower with attached white dwelling, see page 12) will be made on the western shore near the head of the bay; several large bowlders near the western shore to the northward of this

*Shown on Coast and Geodetic Survey charts 368, scale $\frac{1}{30,000}$, price $0.20; 116, scale $\frac{1}{80,000}$, price $0.50.

lighthouse will show conspicuously. Entering the bay, steering **S.** by **W.**, the houses and gravel dredges at Port Eaton (on the eastern shore, nearly 2 miles to the southward of Eatons Point) will be conspicuous; to the southward of Port Eaton the entrance to Northport Bay will be opened out.

Dangers.—To the northward of Eatons Point there are outlying shoal spots with 16 to 21 feet over them, lying to the northward of the sailing line. They are described on page 66, with directions to avoid them.

Eatons Point Shoal makes out to the northward and northeastward of Eatons Neck Lighthouse. A depth of 6 feet is found ⅝ mile to the northeastward of the lighthouse. Off the northern end of the shoal is a buoy (can, black, No. 13), but immediately to the southward and also to the westward are spots with only 16 feet over them.

The middle of Huntington Bay is free from dangers, but the 18-foot curve extends ¼ mile from the eastern shore, and about ⅝ mile from the western shore to the northward of Lloyd Harbor Lighthouse. A long narrow spit with 16 to 18 feet of water makes ¾ mile to the northward from the south shore, about midway between the eastern shore and Lloyd Harbor Lighthouse.

1 A. ***Approaching and Entering from the Westward.***—Pass about 1 mile **N.** of Lloyd Point, leaving Lloyd Point Shoal buoy (bell, black) ⅜ mile on the starboard hand, and steer **SE.** by **E.** ¾ **E.**, heading about midway between Eatons Neck Lighthouse and the houses of Port Eaton. When Lloyd Harbor Lighthouse opens out bearing **SW.** by **S.** steer **S.** by **W.**, and anchor according to draft and direction of wind (see section 1, foregoing).

If bound to Northport, see section 2, following.

At night.—Pass Lloyd Point, keeping Eatons Neck Light bearing to the southward of **E.** by **S.** When Stamford Harbor Light (see table, page 12) bears **NW.** ¼ **N.**, steer **SE.** ¼ **S.**, keeping the light on the bearing until Lloyd Harbor Light bears **SW.** ¼ **W.** (abeam), then steer **S.** by **W.**, and anchor as already directed.

Remarks.—By day, on the **SE.** by **E.** ¾ **E.** course, the north shore of Lloyd Neck will be left about ⅞ mile on the starboard hand. Lloyd Harbor Lighthouse will be opened out a little abaft the starboard beam. Steering **S.** by **W.**, give both shores a berth of not less than ⅜ mile.

Lloyd Point Shoal is described on page 66; for reference to other dangers see section 1, foregoing.

2. ***Having entered Huntington Bay bound into Lloyd Harbor or into Northport Harbor.***—Light-draft vessels bound into Lloyd Harbor can steer for Lloyd Harbor Lighthouse, bearing **W.**, and pass about 250 yards to the southward of the lighthouse, anchoring when the lighthouse bears **NE.**, distant ¼ mile.

If bound to Northport Harbor, continue to the southward as directed under sections 1 and 1 A, foregoing, until Lloyd Harbor Lighthouse bears **WNW.**, when shape course about **ESE.**, heading for the black spar buoy at the entrance to Northport Bay.

Pass about 30 yards to the southward of West Beach Flats buoy (spar, black, No. 1) and steer about **E.** ¾ **N.**, heading for West Beach Flats buoy, east end (spar, black, No. 3), leave this buoy 30 yards on the port hand and Great Neck Flats buoy (spar, red, No. 2), about 50 yards on the starboard hand. When abreast of the latter buoy, steer about **NE.** by **E.**, and pass between Little Neck Point and Duck Island Bluff, keeping the latter a little the best aboard; the depth should not be less than 20 feet. When on a line between Little Neck Point and Duck Island Bluff, steer about **SE.** by **S.**, and give the western shore a berth of about 350 yards. Anchor according to draft off the wharves of Northport. The channel from Huntington Bay into Northport Bay is too narrow for a sailing vessel to beat through, and the currents here have considerable velocity.

Remarks.—Standing on the **ESE.** course, West Beach Flats, south end, buoy (spar, black, No. 1) will be made ahead. The channel leads about 120 yards from the south shore abreast the old brickyard.

When on a line between the northern end of Little Neck and Duck Island Bluff, and heading **SE.** by **S.**, the village of Northport will be right ahead.

Dangers.—West Beach Flats make to the southward from West Beach for over ¼ mile; this shoal ground has from 1 to 11 feet of water, and shoals abruptly on its southern side. The shoal is marked by a buoy at its southwestern end (spar, black, No. 1) and by a buoy on its southern end (spar, black, No. 3).

Great Neck Flats make ⅜ mile to the eastward from the old brickyard, on the point at the south side of the entrance, and shoal abruptly on the northern side; at the northeastern end is placed Great Neck Flats buoy (spar, red, No. 2).

Little Neck Point Shoal makes ⅜ mile to the northward from Little Neck Point; it has from 5 to 16 feet of water, and is not marked.

A shoal with only 4 feet of water over it makes out about 700 yards in an **ESE.** direction from Winkle Point.

The eastern shore of Little Neck should not be approached nearer than 350 yards.

FIVE MILE RIVER.*

This is a narrow inlet on the north shore of Long Island Sound about 1¼ miles **NW. by W.** from Norwalk Island Lighthouse. It is about 1 mile long and from 100 to 300 yards wide. About ¾ mile above its mouth it runs dry at low water; at the mouth the depth is about 3 feet at mean low water.

A dredged channel 8 feet deep at mean low water, and about 100 feet wide extends from the 8-foot curve in the sound to the lower wharves in the harbor; this depth has slightly decreased in spots. The river is used mostly by oystermen. The channel is not marked, and local knowledge is necessary to follow it to the wharves.

Tides.—See heading "Westport Harbor."

GENERAL DIRECTIONS, APPROACHING FIVE MILE RIVER.

Follow the directions sections 1 and 1 A (pages 101–102) for Sheffield Island Harbor, until Greens Ledge bell buoy bears **S. ½ W.**, then bring it over the stern and steer **N. ½ E.** Use the lead and anchor in 8 to 11 feet off the mouth of the river.

Dangers.—**A shoal spot with 2 feet over it lies about ⅞ mile W. ½ S. from Norroaton Point and ¾ mile N. ⅝ W. from Greens Ledge bell buoy in a surrounding depth of 14 feet. On the N. ½ E. course it will be left about 400 yards on the port hand.**

Ballast Reef, a cluster of rocks, dry at low water, lies 400 yards W. ¾ S. from Pine Point. These, on the course given, will be left 350 yards on the starboard hand.

DARIEN RIVER.*

This is a small shallow stream, 3 miles to the westward of Norwalk Island Lighthouse, entering Long Island Sound between Long Neck Point on the east and Norroaton Neck on the west. At low water about 2¼ feet can be carried into the river, and 7 feet is the greatest draft that can enter at high water.

Darien, a village on the N. Y., N. H. & H. Railroad, is situated just above the entrance. Vessels of 6 feet draft or less, partly strangers, are engaged in the carrying trade, which consists of cargoes of coal and oysters.

Ring End, a small settlement about 1 mile above the mouth of the river, is the head of navigation; to it 6 feet can be taken at high water.

Strangers take a pilot; if one is not found outside, they anchor between Long Neck Point and Smith Rock and get one from Darien.

Ice in winter forms to Long Neck Point.

Tides.—See heading "Sheffield Island Harbor."

SAILING DIRECTIONS, DARIEN RIVER.

1. ***From the Eastward.***—Passing ¾ mile south of Norwalk Island Lighthouse steer **W. ¼ S.** for about 2¾ miles, until to the southward of Long Neck Point about ⅝ mile to the eastward of Smith Rock buoy (spar, red, No. 22). Then a **NW.** by **N.** course will lead fair between Smith Rock buoy and Long Neck Point; steer that course for a little over ¼ mile, and anchor in 20 to 24 feet of water, soft bottom, with Long Neck Point bearing about **NE.** by **E.**, distant ⅜ mile.

Remarks.—**In approaching from the eastward, Great Reef spindle and Greens Ledge bell buoy (see page 62) will be left on the starboard hand. Long Neck Point will be made on the starboard bow; shoal water extends in a southerly direction for 500 yards from Long Neck Point. Smith Rock buoy (spar, red, No. 22) will be made almost directly ahead, and Stamford Harbor Lighthouse will be a little on the port bow.**

* Shown on Coast and Geodetic Survey charts 368, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each, $0.50.

1 A. ***From the Westward.***—Passing south of the red buoy on The Cows (nun, No. 24), steer **NE.** by **E.** ½ **E.**, with Norwalk Island Lighthouse a little on the starboard bow. When the red buoy on Smith Rock (spar, No. 22) bears well abaft the port beam, haul to the northward and anchor as directed above, between Long Neck Point and Smith Rock buoy.

Remarks.—The Cows (see page 63), about 1 mile **SE.** by **E.** from Stamford Harbor Lighthouse, and marked by a red buoy (nun, No. 24), should be left on the port hand. Smith Rock, marked off its southern end by a red buoy (spar, No. 22), lies about ⅞ mile **SW.** ½ **W.** from Long Neck Point; a cluster of rocks extends ⅜ mile in a northerly direction from the buoy.

STAMFORD HARBOR.*

This small harbor, on the north shore of Long Island Sound, is about 5½ miles to the westward of Sheffield Island Harbor. It is shoal and much obstructed by ledges and sunken rocks, and is of no importance as an anchorage. At the head of the harbor is the mouth of Mill River, a shallow stream. A little to the eastward of Mill River entrance is the "Ship Canal," a dredged channel also leading to Stamford, and having a depth of about 9 feet and width of 50 to 100 feet; this channel is not marked.

Stamford, a town on the N. Y., N. H. & H. Railroad, is near the mouth of Mill River, and has some trade by water. The deepest draft of the vessels which go to Stamford by river is about 15 feet at high water. The principal cargo is coal, brought from New York in tows. The depth alongside wharves at low water is about 7 feet.

Mill River has a general course about **N.** from the upper part of the harbor, but the channel is crooked. About 1 mile above its mouth the river is dammed at Oliver Street bridge. A channel 150 feet wide and 7 feet deep has been dredged from the wharves to the deeper water at the entrance to the river; this channel is well marked by a lighted beacon and a number of buoys.

Prominent objects.—Stamford Harbor Lighthouse is in the middle of the entrance. **Shippan Point,** the eastern point at the entrance, is distinguished by a large and prominent structure on the western shore of the point.

Pilots are necessary for strangers, who should make signal and anchor to the southward of the lighthouse.

Towboats can not be obtained ordinarily. Sometimes a small oyster steamer can be employed.

Repairs.—Minor repairs to the machinery of small steamers—light work only—can be made at Stamford. South Norwalk has better facilities for such work (see heading "Sheffield Island Harbor").

Tides.—(See heading "Sheffield Island Harbor.") The tidal currents have little velocity.

Ice generally obstructs navigation from January to March, frequently extending down to the lighthouse, and sometimes beyond.

SAILING DIRECTIONS, STAMFORD HARBOR.

1. ***From the Eastward.***—Passing ½ mile to the southward of Norwalk Island Lighthouse, steer **WSW.** ½ **W.** for about 5¼ miles, passing about 400 yards to the southward of the red buoy (nun, No. 24) on the southern end of The Cows. When Stamford Harbor Lighthouse bears **NNW.** ¾ **W.** steer for it, and anchor in 26 feet water about 300 yards **SSE.** from the black buoy (can, No. 1) on Harbor Ledge. Make signal and wait for a pilot if bound to Stamford.

Remarks.—On the **WSW.** ½ **W.** course, Stamford Harbor Lighthouse will be made well on the starboard bow, and the red buoy on The Cows (nun, No. 24) will be a little on the starboard bow.

The Cows are described on page 63.

Harbor Ledge is marked by Stamford Harbor Lighthouse; black buoy No. 1 is off the southeastern end of the ledge.

1 A. ***From the Westward.***—Passing ½ mile to the southward of Great Captain Island Lighthouse, steer **ENE.** ½ **E.**, passing ½ mile to the southward of Greenwich Point. When Stamford Harbor Lighthouse bears **NNE.**, steer **NE.**, so as to pass to the southward of the black buoy (can, No. 1) on Harbor Ledge. Anchor as directed above.

*Shown on Coast and Geodetic Survey charts 269, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

Remarks.—On the **ENE. ½ E.** course, Captain Harbor will be passed. Greenwich Point will be on the port bow, and Stamford Harbor Lighthouse will be opened out to the southward of Greenwich Point.

Shoals and rocks make out from the southeastern end of Greenwich Point for ⅝ mile, the shoals extending all along the south shore of the point to that distance. The bight between Stamford Harbor Lighthouse and Greenwich Point is comparatively free from dangers while keeping the lighthouse bearing to the northward of **E. ½ N.** and giving it a berth of over 300 yards.

OYSTER BAY.*

This bay, on the south side of Long Island Sound, about 5 miles to the westward of Eatons Neck Lighthouse, is separated from Huntington Bay by Lloyd Neck; the entrance is between Lloyd Point on the east and Center Island Point on the west, and is about 1¼ miles wide at its narrowest part. From the middle of the entrance Stamford Harbor Lighthouse bears **N. by W.**, distant nearly 5 miles.

Oyster Bay and the adjacent waters afford excellent anchorage, but the channel being narrowed by Center Island Shoal, causes difficulty in entering or passing out without a leading wind. Vessels from 300 tons down to small sloops anchor in the bay, mostly during the summer.

Adjacent waters.—**Settlements.**—**Oyster Bay Harbor** is a long crooked arm on the western side of Oyster Bay, running to the westward between Center Island and Cove Neck. Good anchorage, sheltered from all winds, in from 10 feet to 6 fathoms of water, is found in this harbor. The village of **Oyster Bay** is on the south shore of Oyster Bay Harbor. During the summer a steamer running to New York and intermediate places stops at the village.

Cold Spring Harbor is the southern end of Oyster Bay, and extends about 2¼ miles south of Cooper Bluff. This harbor is free from dangers, and the depth is regular, 15 to 18 feet, to near its head. **Cold Spring** is a village on the eastern shore near the head of the harbor. Vessels of 12 to 15 feet draft can go up as far as Cold Spring at low water; there is a depth of 6 to 8 feet alongside the wharves. A depot of the Port Jefferson branch of the Long Island Railroad is 2 miles above the head of the harbor.

Prominent features.—Cold Spring Harbor Lighthouse (see Table of Lights, page 12) is near the eastern extremity of the shoal making out over 1¼ miles to the eastward from **Center Island Point.** **Northwest Bluff** (high and covered with trees) is about 1⅛ miles to the southward of Lloyd Point, on the eastern shore and about ⅞ mile to the northward of Cold Spring Harbor Lighthouse. **Cooper Bluff** (the northeastern point of **Cove Neck,** and showing a high barefaced sand bluff) is a prominent feature seen when entering; it is 1¼ miles **SSW.** from Cold Spring Harbor Lighthouse. There is a wharf on the eastern shore, to the eastward of Cold Spring Harbor Lighthouse, which is readily distinguished when entering. **The Brickyards** is a cluster of houses and long sheds on the eastern shore, east of Cooper Bluff. A low gray stone tower is on the southern end of Plum Point about 1 mile **SW. ¼ W.** from Cold Spring Harbor Lighthouse.

Channel.—The channel is about 300 yards wide at its narrowest part, between Cold Spring Harbor Lighthouse and the eastern shore.

Anchorages.—Anchorage in 18 feet to 7 fathoms of water, sheltered against easterly winds, will be found between Lloyd Point and Northwest Bluff, about ¼ to ⅜ mile off the shore. Good anchorage in 15 to 24 feet of water, sheltered against all but northerly winds, will be found anywhere in Cold Spring Harbor, south of the wharf on the eastern shore, by keeping 250 yards from the shore and giving the north shore of Cove Neck a berth of 550 yards. An excellent anchorage in 10 feet to 6 fathoms of water will be found in the channel in Oyster Bay Harbor, but sailing vessels seldom enter it on account of the difficulty in leaving, unless with a favorable wind.

Pilots and towboats.—Pilots are sometimes employed by strangers, but are not necessary. Towboats are seldom used; they may be had from New York by telegraph in case of necessity.

Ice.—During two months in the winter ice usually extends the whole length of the bay, and in exceptionally severe winters it extends out into the sound.

Tides.—See page 22.

The **tidal currents** have moderate velocity, and are dangerous to vessels only when near Center Island Shoal; they set across this shoal with considerable velocity during both ebb and flood.

Description of lighthouses, with other general matters, will be found on pages 9–24; also see pages 48–53.

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*Shown on Coast and Geodetic charts **367**, scale $\frac{1}{30,000}$, price $0.20; **116**, scale $\frac{1}{80,000}$, price $0.50.

SAILING DIRECTIONS, OYSTER BAY.

The directions in sections 1 and 1 A following are available for vessels of 20 feet draft if strictly followed.

1. ***Approaching and Entering from the Eastward.***—Pass ¾ to 1 mile to the northward of Lloyd Point and ½ mile north of Lloyd Point Shoal buoy (bell, black). When well to the westward of this buoy shape the course about **SSW.**, keeping at least 500 yards from the eastern shore. When Cold Spring Harbor Lighthouse bears **SE.** by **S.** steer so as to round this lighthouse, giving it a berth of at least 250 yards, and passing about midway between it and the eastern shore.

Anchor anywhere to the southward and within ½ mile of the lighthouse.

Or, if desiring to enter Cold Spring Harbor or Oyster Bay Harbor proceed as directed under section 2, following.

At night, when off the entrance bring Cold Spring Harbor Lighthouse to bear **SSE. ½ E.** and steer for it. When nearly up to it haul to the eastward and give it a berth of at least 250 yards. The red sector of this light covers Center Island Reef and Center Island Shoal, and vessels should keep out of it.

Remarks.—Rounding Lloyd Point, and when on the **SSW.** course, first Cooper Bluff and then Cold Spring Harbor Lighthouse (see "Prominent Features," page 107) will be opened out to the southward. When heading for the lighthouse care must be taken not to approach it too closely; the eastern shore abreast the lighthouse can be approached as close as 125 yards.

Dangers.—**Lloyd Point Shoal** is described on page 66.

Shoal Water makes out for a distance of nearly 500 yards from the eastern shore, from Lloyd Point to ¼ mile south of Northwest Bluff; to the southward of this the edge of the channel gradually draws nearer the shore, the 18-foot curve being less than 125 yards from the shore abreast the lighthouse.

Center Island Reef makes out nearly 1 mile to the northward from Center Island; it has from 3 to 18 feet of water over it, and is marked by a buoy (spar, black, No. 15) placed nearly ⅞ mile to the northward of Center Island Point and near the extremity of the reef.

Center Island Shoal is the name given to the shoal water extending 1⅝ miles to the eastward from the northern part of Center Island. On this shoal, about 225 yards from its eastern end, is Cold Spring Harbor Lighthouse (see table, page 12). For some distance to the westward of this lighthouse the shoal has from 7 to 9 feet of water over it, and vessels drawing 7 or 8 feet are often taken across it by those well acquainted with the locality. A buoy (spar, red, No. 2) is placed on the south side of the shoal near a 5-foot spot.

1 A. ***Approaching and Entering from the Westward.***—Pass about 1¼ miles north of Center Island Point and ½ mile north of Center Island Reef buoy (spar, black, No. 15) and when Cold Spring Harbor Lighthouse bears **SE.** by **S.** steer for it, keeping the bearing until the lighthouse is about ½ mile distant ahead, then haul more to the eastward. Pass about midway between the lighthouse and the eastern shore, giving the lighthouse a berth of at least 250 yards in rounding it. Haul to the southward and westward as the lighthouse is rounded and anchor as directed under section 1, or follow the directions under section 2.

Remarks.—The northern end of Center Island (Center Island Point) is a 40-foot-high sand bluff, but has no distinguishing features. (See "Prominent Features," page 107.)

Dangers are described under section 1, foregoing.

2. ***From Cold Spring Harbor Lighthouse***—I. ***If bound to Cold Spring Harbor.***—Having rounded Cold Spring Harbor Lighthouse as directed in section 1 or 1 A preceding, bring the lighthouse to bear **N. by W. ⅛ W.** and steer **S. by E. ⅛ E.** with it over the stern. When about ¾ mile south of the lighthouse the water will shoal to 17 and 18 feet, but 16 feet can be carried nearly to the head of the harbor.

Remark.—Good anchorage in 15 to 18 feet will be found anywhere in Cold Spring Harbor by giving the shores a berth of 400 to 500 yards.

II. ***If bound to Oyster Bay Harbor.***—Round Cold Spring Harbor Lighthouse as directed in sections 1 or 1 A preceding, and when the lighthouse bears **N.**, distant about 300 yards,

steer **SW. ¾ W.** with the gray stone tower on Plum Point a little on the starboard bow and Cove Point Shoal buoy (spar, black, No. 1) directly ahead. Pass to the northward of this buoy and then steer **SSW. ⅞ W.**, with the long wharf at Oyster Bay village directly ahead and the red buoy off Moses Point a little on the starboard bow.

Anchor 300 to 600 yards to the southward of Moses Point, in 22 to 34 feet of water. If drawing 8 feet or less good anchorage in 9 to 10 feet will be found in the bight to the westward of Cove Neck. At night keep out of the red rays of Cold Spring Harbor Light until past Plum Point.

Remarks.—Plum Point is bold-to on its southern side, and the shore of Center Island between Plum Point and Moses Point may be approached as close as 350 yards. A narrow channel with a least depth of 19 feet runs about 175 yards from the southern shore of Center Island, around to an anchorage in 18 to 28 feet of water to the northwestward of the brickyard on **Sopers Point** (the southwestern point of Center Island).

Dangers.—**Shoals** extend 550 yards to the northward from **Cove Neck** (the neck of land separating Cold Spring Harbor and Oyster Bay Harbor) leaving a channel about 350 yards wide between the buoy (spar, black, No. 1), on the northern end of the shoal, and Plum Point.

CAPTAIN HARBOR.*

This harbor, on the north shore of Long Island Sound, 10 miles to the eastward of Execution Rocks Lighthouse, lies to the northward of Great and Little Captain islands and affords shelter against all winds. The harbor is entered for shelter by vessels drawing 12 feet or less, and by barges being towed through the Sound. A depth of 15 to 25 feet is found to the northward of Little Captain Island, and from 7 to 15 feet on the flats; the bottom is soft mud.

Greenwich Cove opens into Captain Harbor from the eastward, just north of Flat Neck Point; it is of no commercial importance, and is frequented only by small craft. The village of **Sound Beach** (formerly Old Greenwich) is on Greenwich Cove.

Coscob Harbor opens into the northeastern part of Captain Harbor; 8 feet is the greatest draft of vessels entering; the general depth at the anchorage inside the entrance is about 7 feet. The village of **Coscob** is about 1¼ miles above the entrance of Coscob Harbor. A railroad bridge crosses at Coscob (width of eastern draw 50 feet, western 40 feet.) The village of **Mianus**, on the Mianus River, is a little over ½ mile above Coscob. The deepest draft carried to Mianus, the head of navigation, is 7 feet.

Greenwich Harbor is about 1 mile to the westward of Coscob Harbor, and just to the eastward of **Field Point**; there are coal and lumber yards near the head of the harbor; 12 feet is the greatest draft of vessels trading here. The town of **Greenwich**, on the N. Y., N. H. & H. Railroad, is about 1 mile inland from the head of the harbor. Improvements are contemplated; a dredged channel, 9 feet deep and 90 feet wide, is to lead to the lower docks, and 6 feet deep to the head of the harbor.

Rocky Neck Creek, small and unimportant, enters the head of Greenwich Harbor. On the eastern side of the entrance to Greenwich Harbor are two shallow coves, **Chimney Corner** the eastern one, and **Indian Harbor** the western.

Prominent objects seen in entering are Great Captain Island Lighthouse, the large white residence with red roof and white clock tower, to the eastward of Greenwich Harbor, and a high church spire of Greenwich, which from off shore shows conspicuously above the outline of the hills in the distance. **Little Captain Island** is a small hillock with bowlders around the base; a white tripod is erected on the island.

Two Channels lead into Captain Harbor. *The eastern one*, between Flat Neck Point and Little Captain Island, is buoyed and easy of access. *The western channel* leads between Great Captain Island and Manursing Island, and south of Calf Islands; this channel is buoyed, but it is narrow, and the many oyster buoys of this locality are liable to cause uncertainty in picking up the buoys placed to mark the channel.

Anchorage for vessels of 8 feet draft or over is found about ½ mile to the northwestward, northward, and northeastward of Little Captain Island. Vessels of less than 7 feet draft anchor on the flats, either under Field Point or under the eastern shore, according to the direction of the wind.

Pilots are not needed for vessels entering Captain Harbor from the eastward. A stranger bound into any of the adjacent harbors or coves should always take a pilot, setting signal off the entrance and standing off and on, or anchoring in Captain Harbor. There are no regular pilots; sometimes one is obtained from the lighthouse; frequently one of the oystermen of the vicinity is employed.

*The eastern part of the harbor is shown on Coast and Geodetic Survey chart **269**, and the western part on **270**; scale of each $\frac{1}{10,000}$; price of each $0.50. Shown also on **116**, scale $\frac{1}{80,000}$, price $0.50.

Towboats are not to be had here. Vessels are sometimes towed here from other places, and engage tugs from elsewhere to take them out again.

Repairs.—There are three small marine railways at Coscob, capable of hauling out small craft only. The nearest place where repairs to machinery can be made is Stamford, Conn., and the facilities there are limited.

Wind signals are displayed at Greenwich. (See Appendix II.)

Dangerous freshets sometimes occur in the Mianus River in March and April.

Tides.—(See page 22.) The **tidal currents** have little velocity in the harbor and do not affect navigation, except in the channel between Jones Rocks and Cormorant Reef, where at times the currents have considerable velocity.

Ice forms in winter in all the coves and over the greater part of Captain Harbor; it sometimes extends out to the line of Little Captain and Great Captain islands.

Variation of the compass off Great Captain Island. (See page 24.)

SAILING DIRECTIONS, CAPTAIN HARBOR.

The following directions are available for vessels drawing 12 feet or less, approaching and entering through the eastern passage.

1. ***From the Eastward.***—Passing south of the buoy on The Cows (nun, red, No. 24) and south of Stamford Harbor Lighthouse, bring Great Captain Island Lighthouse to bear **W. ½ S.**, and run for it on this bearing.

When the large white residence, with a red roof and a white clock tower just to the eastward of it, bear between **NW.** and **NW.** by **N.**, steer for them, bearing about **NW. ½ N.**, and when Great Captain Island Lighthouse bears **SW.** by **W.**, steer **W. ½ S.** with Calf Islands ahead. Anchor in 15 to 30 feet of water, soft bottom, when to the northward of Little Captain Island.

At night.—Steer for Great Captain Island Light, bearing **W. ½ S.** until the lighted buoy (showing a white light) marking Little Captain Island East Reef, bears four points (**NW. ½ W.**) on the starboard bow, then steer **NW.** by **N.**, passing 300 yards to the eastward of Little Captain Island East Reef lighted buoy. When Great Captain Island Light bears **SW. ½ W.**, steer **W.** by **S.** and anchor as directed above.

Remarks.—Stamford Harbor Lighthouse should be left at least 1 mile on the starboard hand. As the large white residence comes on a bearing of **NW. ¼ W.**, Flat Neck Point Shoal buoy (spar, red, No. 2) will be about in range with it. Little Captain Island (small hillock surrounded by bowlders) will be a little on the starboard bow while heading for Great Captain Island Lighthouse. The shore of Greenwich Point should receive a berth of at least ½ mile.

Standing in for the white residence on the **NW. ½ N.** course, Greenwich Cove will be opened on the starboard beam, Coscob Harbor broad off the starboard bow, and Field Point will be on the port bow. Calf Islands will be seen to the southwestward of Field Point. Greenwich Harbor will be opened between the large white residence and Field Point.

Dangers.—**The Cows** are described on page 63.

Shoal water makes to the eastward and southward from Greenwich Point for a distance of nearly ¼ mile, and the shore should be given a berth of at least that distance while passing to the southward of it.

Flat Neck Point Shoal makes out to the westward from the western extremity of Flat Neck Point; it is marked at its western end by a buoy (spar, red, No. 2), and has bare and sunken rocks,

Little Captain Island East Reef extends to the eastward from Little Captain Island; it has many bare rocks and bowlders bare at low water, and is marked at its eastern end by a buoy (lighted, black, No. 1). A group of these rocks and bowlders lying about ¼ mile **NE.** by **N.** from Little Captain Island are called the Hen and Chickens, and are marked by a small spindle. About ¼ mile **NE. ½ E.** from Hen and Chickens is a shoal spot with only 10 feet over it; the sailing line leads between the two.

Red Rock lies about ⅝ mile **SE. ¼ S.** from the large white residence to the eastward of Greenwich Harbor, and about 500 yards from the shore of Finch Island; this rock shows bare at half tide and is surrounded by shoal water; it is marked by a small spindle.

Newfoundland Reef has 8 feet over it and lies 1 mile **NNE. ¾ E.** from Little Captain Island and nearly ¾ mile **W. ½ S.** from Pelican Island, the small island lying in the entrance of Greenwich Cove; the reef is marked by a buoy (spar, red, No. 4). To the northward of Newfoundland Reef lie a number of rocks and islets in the entrance to Coscob Harbor; the channel into this harbor is narrow and leads to the westward of these dangers.

1 A. ***From the Westward.***—Bring Stamford Harbor Lighthouse to bear **NE.** by **E.** ½ **E.** and steer for it on this bearing. When the large white residence to the eastward of Greenwich Harbor bears **NW.** ½ **N.**, or the white tripod on Little Captain Island bears four points on the port quarter steer for the large residence, course about **NW.** ½ **N.** and follow directions under section 1, foregoing.

Remarks.—Great Captain Island Lighthouse should be left ⅛ mile on the port hand. The prominent features and dangers have been described under section 1.

1 B. ***From the Westward through the Western Channel.***—Bring Great Captain Island Lighthouse to bear **NE.** ½ **E.** and steer for it on this bearing; as the lighthouse is approached the red spar buoys marking Glovers Reef and Bluefish Shoal should be left about ⅜ mile on the port hand. When Bluefish Shoal buoy bears **N.** by **W.** ½ **W.** and is in range with Port Chester beacon light, steer **NNE.** ¼ **E.** heading for the beacon light on Jones Rocks (black iron skeleton structure with square day mark on top). When up to this beacon leave it 100 yards on the port hand and steer **NNE.** ¾ **E.** heading for a white pole on the southern end of Field Point. Leave red spar buoy No. 2½, on Cormorant Reef, about 100 yards on the starboard hand and steer about **E.** by **N.**

Anchor to the southward of Field Point; or, if of light draft, haul to the northward and anchor to the eastward of Field Point, in 8 to 10 feet of water, off the entrance to Greenwich Harbor.

Remarks.—The **NE.** ½ **E.** course leads well to the southward of all dangers. When Great Captain Island Lighthouse is about 1½ miles distant ahead, the breakwater and beacon light at the entrance to Port Chester Harbor will be seen to the northward. When Bluefish Shoal buoy (spar, red, No. 26) bears **N.** by **W.** ½ **W.** it should be distant about 600 yards.

The **NNE.** ¼ **E.** course heading for Jones Rocks beacon leads midway between red spar buoy No. 2, marking Great Captain Island West Reef, and the red and black horizontally striped spar buoy on Four-Foot Rocks. As the beacon is approached, the red spar buoy (No. 2½) on the north end of Cormorant Reef will be seen on the starboard bow; this buoy is left on the starboard hand when on the **NNE.** ¾ **E.** course.

Dangers.—Numerous rocks and shoals lie to the northward of the sailing line between Parsonage Point and Great Captain Island.

Porgy Shoal, a small spot with 8 feet of water over it, lies nearly ½ mile **ENE.** ¾ **E.** from Parsonage Point and is marked by a buoy (spar, red, No. 28½). To the northeastward of this shoal is Forbes Rock, which shows bare at low water.

Glovers Reef, lying a little over ¼ mile to the southeastward of the south point of Manursing Island, has a depth of 3 feet over it and is marked by a buoy (spar, red, No. 28) placed to the southward of the reef.

Bluefish Shoal has a depth of 14 feet near its southern end, which lies ¾ mile **E.** ½ **N.** from the south end of Manursing Island. A buoy (spar, red, No. 26) is placed near the 14-foot spot.

Four-Foot Rocks lie nearly ⅝ mile **W.** from the western end of Great Captain Island; a buoy (spar, red and black horizontal stripes) is placed near the rocks; there is a 10-foot spot about 100 yards to the southeastward of the buoy.

Jones Rocks lie on the northern side of the channel at its narrowest part; some of these rocks show bare at all stages of the tide. The beacon is near the southern end of the rocks and is **N.** by **W.** ½ **W.**, distant about ½ mile from the west end of Great Captain Island. A 4-foot shoal lies 350 yards **WSW.** from the beacon on Jones Rocks; from this point the shoal extends to the northward to Calf Islands.

Cormorant Reef lies to the northward of Great Captain Island, and parts of it show bare at all stages of the tide. A buoy (spar, red, No. 2½) is placed to the northward of the main part of the reef and close to a rock which shows bare at about half tide.

Bowers Island, the small round island to the eastward of the Calf Islands, is surrounded by rocks and shoals which extend about 175 yards to the southward from the island.

PORT CHESTER HARBOR AND BYRAM RIVER.*

Port Chester Harbor, on the north shore of Long Island Sound, is the anchorage for vesssels bound up the Byram River to Port Chester. The harbor lies to the northward of Manursing Island and about 1½ miles **W.** by **N.** from Great Captain Island Lighthouse; it is obstructed by sunken rocks and is not used by strangers.

Byram River is a narrow shallow stream emptying into Port Chester Harbor.

* Shown on Coast and Geodetic Survey charts 270, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

Under Government appropriations improvements have been made in the harbor and river, giving an available channel 6 feet deep at mean low water and 60 to 75 feet wide from the entrance to the steamboat dock, and 2½ feet deep to the head of navigation. Dredging is in progress to obtain a channel 70 feet wide and 12 feet deep to the Town Dock and 60 feet wide and 9 feet deep up to the steamboat dock. A breakwater extends from Sunken Rock to high-water mark on **Byram Point** (the northeastern point at the entrance), and is marked at its southern end by a beacon (lighted).

Port Chester, at the head of Navigation, about ¾ mile above the entrance, is on the line of the N. Y., N. H. & H. Railroad. Several hundred vessels, partly strangers, are annually employed in the carrying trade, which comprises cargoes of coal, iron, lumber, and general merchandise. There is a daily line of steamers to New York.

The deepest draft of vessels entering and bound up to Port Chester is about 10 feet.

Pilots.—Strangers should not enter the river without a pilot, and should anchor outside if not boarded by one promptly in response to signal. The piloting is done by oystermen, etc. **Towboats** are not used except by barges and canal boats towed from New York.

Anchorage.—The usual anchorage for those acquainted with the locality is between the southern end of Byram Point and the southern end of the Calf Islands. There is a small anchorage with a depth of about 7 feet inside the breakwater.

Supplies.—Coal can be supplied to small steamers and towboats in limited quantity. Water can be obtained at the propeller dock, and provisions and ship-chandler's stores at Port Chester.

Ice forms the whole length of the river to Byram Point in winter.

Tides.—See heading "Captain Harbor."

GENERAL DIRECTIONS, APPROACHING PORT CHESTER HARBOR.

The following directions are available for vessels drawing 9 feet or less:

1. ***From the Eastward.***—Pass at least ¼ mile south of Great Captain Island Lighthouse, and when this lighthouse bears **N.**, steer **W. ½ S.** for about ½ mile until abreast the red buoy (spar, No. 2) marking Great Captain Island West Reef. Round this buoy, leaving it 200 yards on the starboard hand, and steer **NW. ¾ N.** leaving Four-Foot Rocks buoy (spar, red and black horizontal stripes) about 300 yards on the port hand. Anchor to the southwestward of Calf Islands, in 12 to 16 feet (low water), soft bottom, with the beacon on Port Chester Breakwater bearing about **WSW. ¾ W.**, distant ⅜ mile.

If bound to Port Chester, take a pilot.

Remarks.—On the **W. ½ S.** course Manursing Island will be ahead, and just to the northward of the island Port Chester Harbor will be opened out.

Dangers.—**Great Captain Island West Reef**, marked at its western end by a red buoy (spar, No. 2), extends to the westward from Great Captain Island for about 300 yards.

Four-Foot Rocks, marked by a buoy (spar, red and black horizontal stripes), lie about ⅞ mile **W. ¼ S.** from Great Captain Island Lighthouse. This buoy, to the westward of the rocks, can be left on either hand in entering, but when passing to the eastward of it gave it a berth of at least 200 yards.

Great Captain Rocks, showing bare at half tide, lie from 400 to 600 yards southeastward from the outer end of Port Chester Breakwater. These rocks are not marked.

Channel Rock, showing bare near low water, and **Boat Rock** lie nearly in an **E.** by **N.** direction, distant 300 yards from the outer end of the breakwater. There is a narrow channel with 11 feet of water between these rocks and Great Captain Rocks.

1 A. ***From the Westward.***—Bring Great Captain Island Lighthouse to bear **NE. ½ E.** and steer for it on that bearing. Continue this **NE. ½ E.** course until the red buoy (spar, No. 26) on Bluefish Shoal bears **N.** by **W. ½ W.** and is in range with Port Chester Breakwater beacon. Then steer **N. ¼ E.**, pass 250 yards to the eastward of red buoy No. 26, and the same distance to the westward of the buoy marking Four-Foot Rocks (spar, red and black horizontal stripes).

Continue on the course, and anchor as directed in section 1.

Remarks.—On the **NE. ¼ E.** course, to the northward of Great Captain Island Lighthouse, Greenwich Church spire will be seen showing conspicuously above the outline of the trees.

When up to Bluefish Shoal buoy, the Calf Islands will be seen bearing **NNE.** from the buoy.

The **Bight** between Rye Neck and Manursing Island is full of rocks and the shore should be given a berth of at least ⅝ mile.

See "**Dangers**" under section 1, preceding, and the remarks and dangers under section 1 B, page 111.

HEMPSTEAD HARBOR.*

This harbor, on the south side of Long Island Sound, about 1½ miles to the eastward of Sands Point Lighthouse, makes in for about 4½ miles and is 4 miles wide at its entrance, decreasing in width to its head. It is free from dangers, the shores being given a berth of ¼ mile, and is much used by vessels seeking shelter in any but strong northerly winds, affording excellent anchorage with good holding ground.

Glen Cove is a village about 2 miles back from the eastern shore of the bay, and can be reached by small boats going up **Mosquito Cove** (a narrow shallow creek about 1¼ miles south of Redspring Point). Glen Cove steamboat wharf is about ⅞ mile south of Redspring Point and **ENE. ½ E.** from Mott Point. Under Government appropriations a breakwater has been built to 4 feet above high water, extending from this wharf 1,465 feet in a **WSW.** direction toward Mott Point. It is proposed to make this breakwater 2,900 feet in length. The object is to make it possible for light-draft vessels to enter **Mosquito (Glen) Cove** in all kinds of weather, and to afford shelter for vessels waiting for a favorable tide. There is only about 1 foot of water on the bar at the entrance to this cove, and about 2 feet inside, so vessels must enter during high water, and this they were unable to do while the entrance remained unprotected from northerly winds and sea.

Sea Cliff is a settlement on the top of a steep hill on the eastern shore, about ⅞ mile south of Glen Cove steamboat wharf, and on the south side of the entrance to Mosquito Cove. A steamboat wharf and the inclined railway from the steamboat wharf to Sea Cliff, by which, in the summer, passengers ascend the hill, are prominent features in this part of the harbor.

Glen Cove and Sea Cliff have each a post office; provisions can be obtained at either place.

Roslyn, or Hempstead, on the line of the Long Island Railroad, is a village at the head of the harbor; it is of no commercial importance. A narrow channel leads up to a wharf on the eastern shore, about 1 mile above **Bar Beach** (a narrow sandy strip extending 600 yards to the eastward from the western shore of the harbor, about 2 miles to southward of Mott Point). The harbor above Bar Beach can be navigated only by those perfectly acquainted with the locality.

Prominent features.—Matinicock Point is the eastern point at the entrance, and Prospect Point, about ⅞ mile to the eastward of Sands Point Lighthouse, is the western. Mott Point is about 2 miles **SE.** by **E.** from Prospect Point. Between Prospect Point and Mott Point, on the western shore, is a long line of bluffs showing bare faces; the upper outline presents four rounded sweeps and is unmistakable when seen from the northward or eastward. Redspring Point, on the eastern shore, is about 1¾ miles southwest from Matinicock Point and 2⅜ miles east of Prospect Point. The eastern shore south of Redspring Point is high as far as Mosquito (Glen) Cove.

Anchorage.—Vessels can anchor in any part of the harbor according to draft and direction of the wind. A good anchorage for vessels drawing 20 feet or less is just inside of a line from Mott Point to Glen Cove steamboat wharf. It is well not to anchor more than ¼ mile to the southward of this line, in order to avoid the foul odors coming from Mosquito Cove, the headquarters of the Glen Cove starch works. A good depth will be found, however, by favoring the western shore for 1¾ miles above Mott Point. Vessels waiting for high water to enter Mosquito Cove may anchor to the southward of the breakwater.

Tides.—See page 22.

GENERAL DIRECTIONS, HEMPSTEAD HARBOR.

No detailed sailing directions are needed for entering in the daytime. When within the entrance stand to the southward, keeping about 600 yards from the shore on either side of the harbor, and anchor at discretion.

Remarks.—Coming from the eastward or from the northward, the high barefaced bluff between Prospect and Mott points will show conspicuously, and when up to Redspring Point the high hill and inclined railway and steamboat wharf at Sea Cliff will be made on the eastern shore; farther to the northward is Glen Cove steamboat wharf and the breakwater.

* Shown on Coast and Geodetic Survey charts 366, scale $\frac{1}{20,000}$, price $0.20; 116, scale $\frac{1}{80,000}$, price $0.50.

Dangers.—**Matinicock Point Shoal** makes out ¼ mile to the northward from the point and is marked by a buoy (spar, black, No. 17).

Prospect Point Shoal is described on page 66. **Shoals** make out from the shores of the harbor from 200 to 600 yards. By giving the shores a berth of 600 yards all dangers will be cleared.

Picket Rock, awash at low water, ¼ mile to the northward of Mott Point, should be especially avoided.

A spot with 11 feet over it, in a surrounding depth of 15 to 17 feet, lies in the middle of the southern part of the harbor nearly ½ mile **WSW.** from the wharf at Carpenter Point and about ⅞ mile **SE.** by **S.** from Mott Point. This spot can be avoided by keeping the western shore considerably the best aboard.

At night.—*Coming from the Eastward.*—Standing through the Sound, when Great Captain Island Light bears **NNE.** ¼ **E.**, steer **SSW.** ¼ **W.** until Execution Rocks Light bears **W.** ¾ **N.** Now steer **S.** ¼ **W.**, and anchor according to draft, either in the middle of the harbor or to the southward of the breakwater.

From the Westward.—Passing south of Execution Rocks, bring Execution Rocks Lighthouse to bear **W.**, and steer **E.** until about 1½ miles to the eastward of this lighthouse. Now make good a **SE.** ½ **E.** course, heading for the end of the breakwater and giving the shore on the starboard hand a berth of ⅜ mile; anchor according to draft, as directed above.

Caution.—When north of Prospect Point give the point a berth of ½ mile, and when inside a line from Prospect to Matinicock points do not approach the shores nearer than 600 yards.

There is a lantern on a post on the end of the breakwater, which is maintained by the engineer in charge of construction.

MILL CREEK.*

Mill Creek is a small and unimportant stream on the north shore of Long Island Sound, between Port Chester Harbor and Mamaroneck Harbor. The entrance lies about 3⅝ miles **NE.** by **N.** from Execution Rocks Lighthouse, and is marked by Rye Point and the Scotch Caps on the east and Hen Island on the west. The creek is very shallow and is only navigable for small vessels at high water.

Milton, a small village, is about 1 mile above the entrance and has a small trade by water. The deepest draft of vessels bound to Milton is 7 feet, the average draft is not more than 6 feet; the depth alongside the wharves at mean low water is 1 foot.

Strangers should take a pilot, anchoring off the mouth of the creek with signal up until one comes out from Milton, or proceeding to City Island and obtaining a pilot there.

Ice extends out to the Scotch Caps in winter.

Tides.—See heading "Mamaroneck Harbor."

GENERAL DIRECTIONS, MILL CREEK.

Approaching from the Eastward.—Follow the directions for approaching Mamaroneck Harbor, and when Mill Creek opens between the buoy off the Scotch Caps (spar, red, No. 2) and the buoy on Ship Rock (spar, red and black horizontal stripes), come to anchor outside the buoys and wait for a pilot.

From the Westward.—Bring Execution Rocks Lighthouse to bear **SW.** by **S.** and steer **NE.** by **N.** Come to anchor as directed above.

For dangers see heading "Mamaroneck Harbor and River."

MAMARONECK HARBOR AND RIVER.*

Mamaroneck Harbor, on the north shore of Long Island Sound, about 5 miles to the westward of the boundary line between the States of Connecticut and New York, is a shallow bight between Hen Island on the east and Delancey Point on the west. It is open to southerly winds, but affords shelter against northerly winds for vessels drawing less than 10 feet; the important dangers are buoyed, enabling an anchorage to be made with safety. The depth in the outer harbor is from 7 to 12 feet at low water. **Mamaroneck River** is a shallow and unimportant stream or tidal inlet.

Mamaroneck, a village on the N. Y., N. H. & H. Railroad, is about ¼ mile above the mouth; at low water the village can only be reached by boats. The dredged channel to the upper steamboat wharf has a depth of 6 feet and width of 60 feet at mean low water; from there to the other wharves the depth gradually decreases

*Shown on Coast and Geodetic Survey charts 371, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

to 1 foot. It is proposed to dredge a channel 100 feet wide and 7 feet deep from the upper steamboat wharf to the other wharves. The deepest draft entering the river is about 9 feet.

Strangers can not enter the river without a pilot; one can be obtained off the entrance or at City Island.

Tides.—The mean rise and fall of tides is about 7.5 feet. For other tidal data in this vicinity, see page 22.

SAILING DIRECTIONS, MAMARONECK HARBOR.

The following directions are available for vessels drawing 10 feet or less:

1. ***From the Eastward.***—With Great Captain Island Lighthouse bearing **N.**, distant ¾ mile (Stamford Harbor Lighthouse bearing **NE.** by **E.** ½ **E.**), make good the course **SW.** by **W.** ½ **W.** for a little over 4 miles. Pass ½ mile south of the Scotch Caps and steer **W.**, leaving Scotch Caps buoy (spar, red, No. 2) and Ship Rock buoy (spar, red and black horizontal stripes) on the starboard hand. When Ship Rock buoy bears abaft the starboard beam steer **N.**, and anchor according to draft before passing the line joining Outer Steamboat Rock buoy (spar, black, No. 3) and Turkey Rock buoy (spar, red and black horizontal stripes). If bound up the river take a pilot.

Remarks.—On the **SW.** by **W.** ½ **W.** course, Rye Neck and the Scotch Caps will be made on the starboard bow. The tall brick tower on Davids Island should be made nearly ahead, or a little on the port bow. Passing the Scotch Caps, Mamaroneck Harbor will be opened out on the starboard beam and Mill Creek entrance will show just to the westward of the Scotch Caps, stretching in a northeastly direction on the west side of Rye Neck. Scotch Caps buoy and Ship Rock buoy should be given a good berth on the starboard hand.

Dangers.—**Rye Neck.**—The eastern shore along Rye Neck should receive a berth of over ½ mile on account of the numerous rocks and ledges that lie scattered along from the Scotch Caps to Manursing Island.

Scotch Caps are a group of rocky islets extending ⅛ mile in a southwesterly direction from Rye Neck. A buoy (spar, red, No. 2) is placed to the southwestward of the islands and marks the entrance to Mill Creek.

Ship Rock, ⅝ mile **SSW.** from Hen Island, has 2 feet of water over it and is marked by a buoy (spar, red and black horizontal stripes); this buoy is nearly ¼ mile **NNW.** ½ **W.** from Scotch Caps buoy.

Turkey Rock, marked by a buoy (spar, red and black horizontal stripes), is bare at low water and lies ¼ mile **W.** by **N.** from the western end of Hen Island.

Outer Steamboat Rock, with 4 feet over it, lies nearly ¼ mile to the westward of Turkey Rock and is marked by a buoy (spar, black, No. 3).

A rock, bare at low water, lies about 230 yards **NW.** by **W.** ½ **W.** from Turkey Rock and is not marked.

Delancey Point Ledge is the shoal making to the southward and eastward from Delancey Point; it is bare in places at low water, and is marked at its southern end by a buoy (spar, black, No. 1) and on its eastern side by a black spindle.

The western shore of the harbor is foul and should receive a berth of about 500 yards.

1 A. ***From the Westward.***—Bring Execution Rocks Lighthouse to bear **SSW.** ¼ **W.** and steer **NNE.** ¼ **E.**, keeping the lighthouse on the bearing. Anchor as directed under section 1, foregoing.

Remarks.—On the **NNE.** ¼ **E.** course, Long Beach Point Reef will be left on the port hand and the harbor should be open ahead.

Dangers are described under section 1, foregoing.

LARCHMONT HARBOR.*

This is a deep cove making into the north shore of Long Island Sound, the middle of the entrance bearing **N.** ¼ **E.** from Execution Rocks Lighthouse. This bearing leads directly across Hen and Chickens, which has bare rocks and rocks awash, and obstructs the approach, but there is a good channel on either side.

The harbor affords anchorage for light-draft vessels, and is the headquarters of the Larchmont Yacht Club.

Under Government appropriations, 64 feet of a breakwater was built on Huron Rock and 74 feet of a breakwater on Umbrella Rock. The yacht club maintains a red light on a spindle on each of these pieces of breakwater, and also a number of spindles on the rocks on the western side of the harbor. A breakwater to extend 1,440 feet in a southerly direction from Long Beach Point is under construction, and Huron Rock is to be removed to a depth of 14 feet.

* Shown on Coast and Geodetic Survey charts 271, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

Huron Rock and **Umbrella Rock** are each marked by a piece of breakwater. The entrance between these rocks is about 300 yards wide and the depth 14 to 15 feet; farther in, the water shoals to 9, 7, and 6 feet; the best water inside is toward the western shore.

The anchorage has soft and sandy bottom; farther in the cove are ledges and rocks, some of which are marked by spindles placed by the yacht club.

Larchmont railroad station and the post office are 1½ miles from the yacht clubhouse.

Tides.—See heading "Mamaroneck Harbor."

SAILING DIRECTIONS, LARCHMONT HARBOR.

These directions are good only in the daytime; strangers should not attempt to enter at night.

1. ***Approaching and Entering from the Eastward.***—With Great Captain Island Lighthouse bearing **N.**, distant about ¾ mile, steer **SW.** by **W.** ½ **W.** Pass ½ to ¾ mile south of Rye Neck, and when Scotch Caps buoy (spar, red, No. 2) bears **N.**, distant about ¼ mile, steer **W.** Pass about 300 to 400 yards to the southward of Long Beach Point, leaving Long Beach Point buoy (nun, red, No. 2) about 100 yards on the starboard hand.

Continuing the **W.** course, Huron Rock and Umbrella Rock breakwaters will be seen on the starboard bow; haul to the northward and pass between them and anchor in 7 to 13 feet of water, to the southward of a line drawn from the first wharf on the western side of Long Beach Point to the clubhouse on the west side of the harbor.

Remarks.—On the **SW.** by **W.** ½ **W.** course, **Rye Neck** (a rocky point with several small islands and detached rocks extending to the southward) should be made on the starboard bow. The high, square brick tower on Davids Island should be made nearly ahead, or a little on the port bow. Scotch Caps buoy (spar, red, No. 2) will be left about ¼ mile on the starboard hand. On the **W.** course, **Long Beach Point** (large summer residence and well-kept lawn at its southern end) will be made on the starboard bow; Mamaroneck Harbor and the buoys marking its entrance will be left on the starboard hand, and the buoys marking Hen and Chickens will be made on the port bow and left on the port hand.

Dangers.— **Hen and Chickens**, a ledge of rocks, bare in places at low water, lies off the entrance to the harbor, 1⅛ miles **N.** by **E.** from Execution Rocks Lighthouse. It is about ⅝ mile long in a **N.** and **S.** direction, and 600 yards wide. The part having less than 12 feet over it is about 700 yards long and 550 yards wide. This ledge is marked by four buoys; at its eastern limit by a black lighted buoy, at its northern end by black spar buoy No. 3, near its southern limit by red spar buoy No. 2, and at its western limit by red nun buoy No. 4.

1. A. ***Approaching and Entering from the Westward.***—Bring Execution Rocks Lighthouse to bear **E.**, distant about ⅝ mile, and steer **N.** by **E.** heading a little to the westward of the entrance of the harbor. The red buoys on the south and west limits of Hen and Chickens should be made a little on the starboard bow; pass to the westward of both these buoys, and when the western one (nun, red, No. 4) bears **SE.**, distant about 100 yards, steer **NE.** ¾ **N.** for the end of the first wharf inside of Long Beach Point. Umbrella Rock Breakwater will be made on the port and Huron Rock Breakwater on the starboard bow; when to the southeastward of the former haul to the northward and pass between them. Anchor as directed under section 1, preceding.

Remarks.—On the **N.** by **E.** course, Whortleberry Island will be left about 700 yards on the port hand.

The **NE.** ¾ **N.** course leads nearly 200 yards to the northward of black spar buoy, No. 3, on the northern end of Hen and Chickens.

See "**Dangers**" under section 1, foregoing. See also description of the harbor and improvements.

ECHO BAY.*

Echo Bay or Harbor, also known as Upper New Rochelle Harbor, and sometimes called Kellogg Cove, is a small bay lying 2 miles **NNW.** ½ **W.** from Execution Rocks Lighthouse. This bay has anchorage in 5 to 15 feet of water, and is sheltered from all but southeasterly winds. It is the headquarters of the New Rochelle Yacht Club. The upper part of the harbor has been improved under Government appropriations by the removal of a part of **Sheepshead Reef**, the removal of **Start Rock** to a depth of 7 feet, and the dredging of a channel 4 feet deep and 40 feet wide from the bay to within 300 feet of the head of the harbor.

*Shown on Coast and Geodetic Survey charts 271, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

New Rochelle, a village on the N. Y., N. H. & H. Railroad, is on the northwestern and western shores of the cove.

Pilots.—Strangers generally take a pilot when bound into Echo Bay. Pilots will be found at City Island; generally one can also be obtained from the oyster boats of the vicinity.

Tides.—See heading "Mamaroneck Harbor."

SAILING DIRECTIONS, ECHO BAY.

The following directions are, if closely followed, available for vessels drawing 12 feet or less.

1. ***Approaching and Entering from the Eastward.***—From a position about ¾ mile **S.** of Great Captain Island Lighthouse, steer **SW.** by **W.** ½ **W.** Pass about ⅝ mile **S.** of Rye Neck, and when Scotch Caps bear **NW.** ½ **N.**, distant about ⅝ mile, steer **WSW.**, passing about 300 yards to the southward of the red buoy (spar, No. 2) on the southern end of the Hen and Chickens.

Continue the course until Eight-Foot Spot (Hicks Ledge) buoy (spar, red and black horizontal stripes) bears **N.** by **W.**, distant about 400 yards. Now steer **NW.** by **W.** directly into the bay, passing about midway between Bailey Rock (marked by a spindle) on the western side, and the buoy (spar, red, No. 2) and spindle on the eastern side of the entrance. Anchor in 15 to 17 feet of water when inside a line between the buoy and spindle on Bailey Rock.

Remarks.—On the **WSW.** course, a high red brick tower on Davids Island will be a little on the port bow and farther to the southward Whortleberry Island and Execution Rocks Lighthouse will be seen. On the **NW.** by **W.** course, **Duck Point** will be directly ahead, and **Gut Island** and **Echo Island** (on the northern side of the entrance) will be a little on the starboard bow.

Dangers.—**Hen and Chickens** are described on page 116.

Hicks Ledge, **an 8-foot spot,** marked by a buoy (spar, red and black horizontal stripes), lies about 900 yards **SE.** of Premium Point, and ¼ mile **NE.** of Middle Shoal.

Middle Shoal is a circular shoal about 500 yards in diameter, partly bare at low water, lying about ⅝ mile **NNW.** of Whortleberry Island, and 1⅝ miles **NW.** by **N.** from Execution Rocks Lighthouse. The northern extremity of this shoal is marked by a buoy (spar, black, No. 1).

Gut Island has a ledge, bare at low water, extending 130 yards to the westward from its western side. It is marked at its western extremity by a buoy (spar, red, No. 2). Spindle Rock, near the western end of the ledge is marked by a small spindle.

The northeastern point of Davenport Neck, on the southern side of the entrance to the harbor, has a **rocky shoal,** bare in places at low water, extending out 180 yards to the eastward; Bailey Rock is near the eastern end of this shoal and is marked by a spindle.

1 A. ***Approaching and Entering from the Westward.***—Passing to the northward of Execution Rocks Lighthouse, bring the lighthouse to bear **S.** by **E.** ⅝ **E.** and steer **N.** by **W.** ⅝ **W.**, keeping Execution Rocks Lighthouse in range with Sands Point Lighthouse. This course will lead up to Eight-Foot Spot (Hicks Ledge) buoy (spar, red and black horizontal stripes); pass 200 to 300 yards to the westward of the buoy and steer **NW.** by **W.** and enter as directed in section 1, preceding.

Dangers.—See under section 1, foregoing.

NEW ROCHELLE HARBOR.*

This is a small and narrow body of water between Davenport Neck, Davids Island, Glen Islands, and the mainland. It lies off the southerly part of the town of New Rochelle. A few vessels enter this harbor yearly with coal and building material. The draft of vessels trading at New Rochelle Harbor ranges from 5 to 9 feet.

The channels leading to the harbor are narrow and full of dangers, and a stranger should not attempt to enter without a pilot; one can be had at City Island, or from some of the oyster boats in this vicinity.

Wind signals are displayed at New Rochelle.

Sailing directions for this harbor would not be of practical use.

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*Shown on Coast and Geodetic Survey charts 272, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

MANHASSET HARBOR.*

Manhasset Harbor, often called Cow Bay, makes into the north shore of Long Island at the western end of the Sound. The entrance is about 1¼ miles to the westward of Sands Point Lighthouse, and lies between Barker Point on the east and Hewlett Point on the west. It affords shelter for light-draft vessels, but is of little commercial importance; oysters cultivated in the bay, and sand taken from the bluffs and towed to New York in barges, comprise the cargoes carried.

Port Washington is a village at the head of the bight in the eastern part of the bay.

Manhasset is a village at the head of the bay; vessels of less than 6 feet draft can go there at high water; at low water this part of the bay is bare for ½ mile from its head.

Anchorage in from 18 to 24 feet of water, sheltered against easterly winds, is found just inside and to the westward of Barker Point; the depth in the western half of the entrance is 10 to 18 feet. Vessels will find 13 to 15 feet water ½ mile to the southward of Barker Point, with shoaler water nearer the eastern shore. *Vessels of 8 feet draft or less* will find shelter from all winds ½ mile **SSE.** from Plum Point; a little farther to the eastward are flats over which the depth is but 6 feet. Vessels drawing less than 8 feet can also anchor in 10 to 12 feet of water between Mott Point and Mitchell Bluff. The bottom is soft mud in all parts of the bay.

Tides.—See table, page 22.

The **tidal currents** are not of sufficient velocity to affect navigation. **Ice** closes the bay about two months each winter.

SAILING DIRECTIONS, MANHASSET HARBOR.

The following directions are available for vessels drawing 10 feet or less, except as specially noted:

1. ***From the Eastward.***—Following the directions for Long Island Sound, Execution Rocks to Throgs Neck, page 63, until past Gangway Rock buoy (spar, black, No. 23), and when the high brick tower on Davids Island bears **NNW.** steer **SSE.**, and when past Barker Point anchor at discretion, according to draft. *If drawing 8 feet or less*, desiring to stand well in, continue the **SSE.** course past Plum Point, giving the shore of the point a berth of at least 200 yards, and when approaching Mott Point give the western shore a berth of ¼ mile, and when nearly up to the point stand to the eastward and anchor in 10 to 14 feet water.

Remarks.—On the **SSE.** course Mott Point (low, wooded, the farthest land seen on the western shore of the bay) will be made right ahead. Plum Point (low sand spit extending to the southward, about 1 mile south of Barker Point) should be left about 220 yards on the port hand. On the south shore of the bight, to the eastward of Plum Point, is the village of Port Washington.

The eastern part of the bay has the best water from Barker Point until below Plum Point.

Toward the Northern shore of the bight, east of Plum Point, the water is shoal. From 10 to 14 feet will be found 300 to 1,200 yards east of Mott Point.

Dangers.—**Gangway Rock**, marked by a buoy (spar, black, No. 23), is at the northern extremity of a broken line of rocks and shoal water extending over ⅝ mile in a **NNW.** ¼ **W.** direction from Barker Point. **Success Rock**, marked by a red spindle, is one of this broken line of rocks. These dangers are left on the port hand in entering. After passing to the northward and westward of Gangway Rock buoy, give Barker Point a berth of at least 250 yards in entering.

1 A. ***From the Westward.***—Leave Stepping Stones Lighthouse 300 yards on the starboard hand and steer **NE.** ¼ **E.**, passing about ⅝ mile to the northward of Hewlett Point. When abreast the middle of the entrance stand into the bay, keeping the eastern shore the best aboard, and anchor as directed in entering from the eastward.

Remarks.—On the **NE.** ¼ **E.** course Sands Point Lighthouse will be a little on the starboard bow, and the spindle on Success Rock should be about in range with it. Hewlett Point (steep, moderately high, and backed by woods) will be on the starboard bow.

Dangers.—**Shoal water** makes out about 850 yards to the northward from Hewlett Point; the point should receive a berth of not less than 400 yards, and in entering the bay leave this point at least ⅝ mile on the starboard hand.

Other dangers have been mentioned under section 1.

*Shown on Coast and Geodetic Survey charts 272, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

CITY ISLAND HARBOR (HART ISLAND ROADS).*

Hart Island Roads, as it is generally called, lies in the western end of Long Island Sound, about 2¾ miles southwest from Execution Rocks Lighthouse. This anchorage, between Hart Island on the east and City Island on the west, is approached from the southward. It is well sheltered against easterly and westerly gales.

This is a most important anchorage, and is a great resort for coasters. Besides serving as a harbor of refuge, it is often used by vessels desiring pilots or towboats, or delayed by unfavorable winds or other causes, or waiting for orders.

Hart Island, on the eastern side of the harbor, is of no commercial importance; there are a number of red buildings, resembling barracks, on its southern end.

City Island is nearly 1½ miles long in a **N.** and **S.** direction, and at its northern end is connected with the mainland by a drawbridge. Its population is engaged principally in shipbuilding and dredging for oysters; there is very little commerce.

Anchorage.—The usual anchorage for vessels of deep draft, and those waiting for orders, is to the southeastward of City Island, to the southward of a line drawn from the south end of Hart Island to the south end of City Island.

Vessels of 12 to 16 feet draft anchor to the southward of a line drawn from the southern end of the houses on Hart Island to Piepgrass dock (the most southern one on the eastern side of City Island). Vessels of light draft, 8 to 12 feet, can anchor anywhere to the southward of a line drawn from the northernmost dock on Hart Island to Town dock on City Island.

The limits here indicated are not fixed by regulation, but are based upon the depth of water in different parts of the roads, and are used locally as a convenient guide.

The western shore of Hart Island should not be approached closer than 120 yards. The southern shore of City Island can be approached to within 120 yards; the eastern side of City Island, south of Piepgrass dock, should be given a berth of 150 yards; above Piepgrass dock keep well to the eastward of a line running through the ends of the wharves. The bottom is soft.

Pilots.—City Island is one of the headquarters for East River and Sound pilots. Pilots for small harbors on the Connecticut and Long Island shores, as far east as Great Captain Island, can also be found here.

Towboats.—Vessels desiring a towboat, and not having met with one before reaching City Island, can telegraph to New York from the Signal Service station, should any unusual conditions make it necessary, and get a towboat in one and one-half hours. Ordinarily there is no difficulty in getting a towboat in this part of the Sound or in East River.

U. S. Weather Bureau display station.—Wind signals are displayed from a staff on the cupola of a brown house near the southern end of City Island. Vessels passing City Island are reported, by direct wire, at the Maritime Exchange, New York City, and to the Associated Press. Foreign vessels, if their signal letters are flying while between Sands Point and the Stepping Stones, will be reported at the Maritime Exchange as soon as their letters are made out. Foreign steamers expected to arrive, passing City Island in the night, will be reported if they give four blasts on the steam whistle as they pass the island. Masters of vessels coming to the roads for orders can communicate with their consignees or owners by telegraph from the signal station. (See also "Whitestone," under heading "East River.")

Supplies.—Provisions and ship-chandler's stores can be had at City Island. Water can be had from water boats and alongside of the dock.

Repairs.—Repairs to vessels and to the machinery of steamers can be made at City Island. There are five marine railways; the largest railway is capable of hauling out a vessel of about 800 tons.

Quarantine.—The quarantine regulations are the same as for the port of New York. The headquarters of the health officer for the port of New York is at Staten Island. (See "Quarantine," page 121, and consult Appendix I.)

Tides.—The mean rise and fall of the tides is 7.4 feet; high and low water occur the same time as at Willets Point. For other tidal data see page 22.

Ice.—In the winter drift ice sometimes interferes with navigation to the extent that sailing vessels are obliged to take a towboat.

Description of Lighthouses and other general matters will be found on pages 9–24; see also pages 48–53.

*Shown on Coast and Geodetic Survey charts 272, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

SAILING DIRECTIONS, CITY ISLAND HARBOR.

1. ***From the Eastward.***—In approaching, follow the directions given for Long Island Sound. When the harbor is opened out, head to the northward and anchor, according to draft, between Hart and City islands (see "Anchorage" on the preceding page).

Remarks.—The southern end of Hart Island should receive a berth of at least 200 yards when to the eastward of it and 150 yards when to the southward. On passing the southern point of Hart Island a small, dark, rocky islet (**Rat Island**) will be seen lying nearly midway between Hart and City islands, in the northern part of the harbor. **High Island** is a small island, the highest part of which, near its eastern end, has a small hut near the top; this island is backed by a few trees, and lies about 350 yards **NE.** of the northern end of City Island. The hut on High Island in range with Rat Island leads through a channel with 21 feet of water to an excellent anchorage in 20 to 30 feet water, about 450 yards **E.** by **N.** from the upper wharf on City Island.

1 A. ***From the Westward.***—Round Throgs Neck and steer **N.** by **E.** ¾ **E.**, heading fair between Hart and City islands. Anchor, according to draft, between the islands (see "Anchorage" on the preceding page).

Remarks.—Stepping Stones Lighthouse should be left at least 200 yards on the starboard hand.

Big Tom, a rock lying 600 yards **WSW.** ¾ **W.** from the southern point of City Island, is awash at low water, and is marked near its southern end by a red buoy (spar, No. 32); this buoy should be left at least 700 yards on the port hand.

Caution.—Large vessels frequently anchor to the southeastward of City Island. Such vessels should keep clear of *Deep Reef*. This is a small rocky patch with about 5 fathoms of water over it and 9 to 13 fathoms all around it. The marks for this spot are the northern wharf on the east side of City Island in range with the little hut on High Island, and the sea wall on the southern end of City Island in range with a dark church spire in Westchester. A vessel at anchor with her cable across this reef is apt to lose her anchor if caught in a gale.

EAST CHESTER BAY.*

East Chester Bay is a shallow bay, full of oyster beds, the entrance to which lies between City Island and Throgs Neck. Only vessels of light draft (less than 8 feet) can lie afloat in the bay at low water. **East Chester Creek**, or Hutchinson River, is a shallow stream emptying into the head of the bay. Under Government appropriations a channel has been dredged from the entrance of the river to a point 3,000 feet above Lockwoods with a depth of 9 feet at mean high water. Vessels of 8 feet draft, carrying coal and lumber, go up as far as Lockwoods, lying in the mud at low water while unloading. Strangers generally take a pilot; one can be had at City Island. The usual anchorage for vessels waiting for a tide or a fair wind is to the southwestward of City Island, south of Big Tom buoy (spar, red, No. 32).

Tides.—See heading "City Island Harbor."

Sailing directions would not be of practical use; the dredged channel is only 90 to 100 feet wide in some places.

LITTLE NECK BAY.*

Little Neck Bay makes into the north shore of Long Island at the eastern end of the East River, where the latter joins Long Island Sound. The bay is about 2 miles long, with an average width of about ¾ mile. Its eastern point at the entrance is Elm Point, which is about ¾ mile southeast of the Stepping Stones Lighthouse, and on the western side of the entrance is Willets Point, marked by a fortification and barracks (see "Caution," page 14). The depth of water decreases from 9 feet abreast of Willets Point, leaving the upper part of the bay bare at low water. Vessels bound up to the village of **Little Neck** can only go up at high water; 5 feet is their greatest draft.

Strangers bound up to the wharf at the head of the creek require some one acquainted with the locality to pilot them. Pilots will be found at City Island. The entire bay is closed by ice during the winter.

EAST RIVER †

is the name given to the narrow strait which connects Long Island Sound with New York Bay and separates

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* Shown on Coast and Geodetic Survey charts 272, scale $\frac{1}{10,000}$; 116, scale $\frac{1}{80,000}$; price of each $0.50.

† Shown on the following Coast and Geodetic Survey charts: 369*, Hudson and East rivers, W. 67th street to Blackwells Island, scale $\frac{1}{10,000}$; price $0.50; 369*, Hell Gate and East River from Blackwells Island to Lawrence Point, scale $\frac{1}{5,000}$, price, $0.50; 272, Throgs Neck to Randall Island, scale $\frac{1}{10,000}$, price $0.50. Shown, also, in whole or in part, on charts 369, New York Bay and Harbor, scale $\frac{1}{40,000}$, price $0.75; 116, Long Island Sound, Stratford Shoal to New York, scale $\frac{1}{80,000}$, price $0.50; 120, New York Bay and Harbor, scale $\frac{1}{80,000}$, price $0.50.

Long Island from Manhattan Island (borough of Manhattan). At its eastern end the river is about ⅝ mile wide between Throgs Neck and Willets Point, and thence its course is to the westward and southwestward for about 14 miles, being in many places extremely narrow, and in no place more than 1 mile wide. Its channel is much obstructed by rocks and islands and the current runs with great velocity, especially in the narrow passage between Wards Island and Hallets Point, known as Hell Gate. Strangers in sailing vessels should not attempt to pass through Hell Gate without a pilot or towboat.

Descriptions of lighthouses, with other general matters, will be found on pages 9–24; consult also pages 48–53. The **quarantine regulations** for East River are the same as for the Port of New York. The headquarters of the health officer for the Port of New York is at Southfield, Staten Island, just above Fort Wadsworth (see Appendix I).

Throgs Neck, on the north shore, at the eastern entrance to the East River, is opposite Willets Point (large granite fort near water's edge). At the southern end of the neck is Throgs Neck Lighthouse (see "Table of Lights," page 14), and back of it is a granite fort (Fort Schuyler). During thick weather vessels bound into the East River frequently anchor to the eastward and northeastward of the lighthouse, within hearing distance of the fog bell (1 blow every 15 seconds), or they round the neck and anchor on Hammond Flats (see "Anchorages," East River). In winter there is much drift ice off Throgs Neck at times, but it seldom prevents vessels from being towed through the East River.

Caution.—On the walls of the granite fort on Willets Point is the following notice: "*Torpedoes! Don't anchor.*"

Whitestone is on the south shore, 1 mile to the westward of Throgs Neck. The New York Herald has a telegraph and boarding station at the landing. Vessels passing through the river are spoken by a boat and reported; square-rigged vessels are boarded and reported. At the railway depot is a telegraph office and also a telephone station.

On **Whitestone Point**, to the westward of Whitestone, is a fixed white post light and fog bell (see "Table of Lights," page 14).

Pilots for the East River and Long Island Sound can be found at Whitestone, and towboats can be had from New York by telegraphing. (See also "Anchorages.")

College Point is on the south shore, 1½ miles to the westward of Whitestone. A ferry runs from here to 99th street, New York. Other steamers also make trips to New York. There is 11 feet of water at the end of the wharf, where coal and water for tugs or other small steamers can be obtained. College Point has some trade; 8 to 10 feet of water can be carried in at low water; 9 feet is found alongside the principal wharves; 12 feet is deepest draft entering.

Strangers bound to College Point from the eastward generally take a pilot or a towboat at City Island or at Whitestone; if from the westward, a towboat is generally taken at New York.

Flushing Bay, on the south shore, between College Point on the east and Sandford Point on the west, is a shallow bay, 1¾ miles long in a **NNW.** and **SSE.** direction, and 1 mile wide between the points at the entrance, narrowing gradually to ¼ mile at its head.

Under supervision of United States Army Engineers, a channel about 100 feet wide and 6 feet deep was dredged across the flats to the entrance of Flushing Creek; a dike built of piles driven in the mud runs along the western side of the dredged channel for a distance of 4,663 feet, but a part of the northern end of the dike was destroyed by ice and has not been rebuilt. A fixed red light is shown from a lantern suspended from a mast on the north end of the dike. The depth in the channel is maintained by dredging.

Flushing Creek, a narrow, crooked stream, empties into the head of the bay. *Flushing*, a village having some trade in coal, lumber, and building material, is about ¼ mile above the entrance on the east bank of Flushing Creek. There is a line of steamers running from Flushing to New York.

The average draft of vessels bound to Flushing is 8 feet; draft that enters at low water, 5 feet; there is from 8 to 10 feet of water alongside the wharves.

White Pot Landing is at the head of navigation on Flushing Creek; only small light-draft vessels go up to the landing. Strongs road bridge crosses the creek at Flushing; about ¼ mile farther up the railroad bridge crosses, and 1 mile above the railroad bridge is a narrow road bridge; the estimated width of draws in these bridges is about 80 feet.

Strangers bound to Flushing take a pilot or a towboat; if of over 50 tons they take a towboat. Pilots can be had at City Island, at Whitestone, or at New York city. Towboats can be found in the East River or at Flushing.

In the winter ice obstructs navigation, generally during January and February, and sometimes Flushing Bay is frozen over from its head to College Point.

Rikers Island lies 1⅜ miles to the westward of College Point. The main channel passes to the northward of this island. A channel leads across the entrance of Flushing Bay south of Rikers Island and south of South Brother Island, joining the main channel of East River between South Brother Island and Lawrence Point, where it is marked by several buoys and 2 post lights (which also serve as day beacons), one at Lawrence Point Ledge, just south of the channel, and the other on South Brother Ledge, near the eastern edge of the channel. The channel has a depth of 18 feet, but there are several spots with only 8 and 9 feet over them, and others with 11 to 16 feet. Strangers should not attempt to pass through south of Rikers Island.

North Brother Island lies **NW.** by **W.** ½ **W.** from the northern end of Rikers Island, distant ¼ mile; North Brother Lighthouse (see table, page 14) is on its southwestern end. The channel with best water leads north of this island. A channel with a least depth of 15 feet at low water leads south of the island, between it and South Brother Island. This latter channel is the one most used by vessels, as it is the more direct.

Port Morris lies northwest from North and South Brother islands.

Randall Island is the island to the southwestward of Port Morris, *Bronx Kills*, a narrow, shallow body of water separating them. The house of refuge and other municipal buildings are scattered over the island. *Sunken Meadow*, marked on its eastern side by a post light, lies to the eastward of the island, and is separated from it by a body of water about 120 yards wide.

Lawrence Point lies on the eastern side of the East River channel opposite Randall Island.

Wards Island lies to the southward of Randall Island and Sunken Meadow, and is separated from them by Little Hell Gate, a narrow and shoal body of water leading into Harlem River. The insane asylum and emigrants' and homeopathic hospitals are located on this island.

Hallets Point is to the southward of Wards Island. A light is shown and fog bell rung from a pyramidal wooden tower on the northern end of the point (see table, page 14, Hell Gate Post light). The main channel leads close past this point. **Pot Cove** is the bight to the eastward of Hallets Point.

Hell Gate is the name of the part of East River south of Wards Island and north of the northern end of Blackwells Island. The great velocity of the tidal currents and the irregularity of their direction make this part of the river dangerous for sailing vessels to navigate. Under the supervision of the United States Army Engineers, the most dangerous rocks in the channel have been removed or cut down so as to have from 18 to 23½ feet over them at low water, and there is now a clear channel over 140 yards wide with a least depth of 26 feet, and 300 yards wide with a depth of 18 feet.

Flood Rock lies about 300 yards **W.** ½ **N.** from the post light on Hallets Point. The least water over it is 18 feet.

Mill Rock lies to the northwestward of Hallets Point and is protected by a sea wall. The shore of Astoria, to the southward of Hallets Point, is rocky but has deep water 30 yards outside the wharf line.

Blackwells Island divides East River, forming two channels, one on the east side of the island and one on the west; the western channel is the wider and has the better water. The northern end of the island is marked by a lighthouse; a sea wall is built along on both sides to its southern end. Off the southern end is Man-o'-War Rock (spindle, red lantern at night).

Opposite the eastern side of Blackwells Island are the villages of Astoria and Ravenswood (all a part of New York City), and opposite the western side is the borough of Manhattan. The insane asylum for women, workhouse, almshouse, penitentiary, and charity hospital buildings are located on this island.

Newtown Creek empties into the East River on the eastern shore, about ¾ mile to the southward of the southern end of Blackwells Island. Improvements are in progress under the supervision of the United States Engineers. In 1899 a channel with a depth of 18 feet and width of 125 feet had been dredged to the head of the creek, and to Grand street bridge on the East Branch, and 900 feet up the West Branch.

The **United States Navy Yard**, on Wallabout Bay, is on the south shore below Newtown Creek, where the East River makes a bend to the westward.

Suspension Bridge crosses the East River 1 mile below the navy yard. The height of this bridge above mean high water is 135 feet at the center and 119 feet at the piers. Allowing for changes of temperature, a masted vessel when passing under the bridge should not depend on a greater height than 130 feet, at mean high water, for a width of about 400 feet at the center of the bridge.

The **Battery** is the southernmost point of the borough of Manhattan. It is a small grassy park with tall trees, and faced on the water side by a sea wall. The barge office and custom house landing are to the eastward of the park on the East River, and Castle Garden and the building of the New York Department of Docks to the westward of the park on the Hudson River (North River).

Governors Island lies in the middle of the East River, where it joins the Upper bay. Fort Columbus and the fortifications and buildings belonging to it cover the entire island. A post light (2 red lights at night) and

fog signal (see table, page 16) are located on the northwestern point of the island. The main channel leads north of the island. *Buttermilk Channel*, with a least depth of 24 feet, leads along the wharves of Brooklyn south of the island. This channel is buoyed.

East River Channel between the Battery and Governors Island.—This channel is good at all stages of the tide for vessels of 23 feet draft or less, care being taken not to approach too close to Governors Island or the Battery. There is a good range leading through the deeper water of this channel which should be used by all vessels of over 23 feet draft. The range is the northwest corner * of the upper structure of the Central Elevator (yellow structure on pier 9, Brooklyn), in line with the center of the northwest tower of St. Margaret's Hotel (most prominent brick building, with three towers, south of Brooklyn Bridge) in Brooklyn.

Vessels of 25 to 26 feet draft can pass through this channel at low water, but they must keep close on the range, as for a distance of 800 feet along the range to the westward of a line through the end of pier 3 (New York) and the Produce Exchange tower, the northern end of Diamond Reef is only 150 feet to the southward of the range, and the shoals making off from the Battery are 300 feet to the northward of the range. At high water vessels of 25 to 26 feet draft pass through the middle of a channel about 870 feet wide by keeping on the range.

Vessels of 26 to 30 feet draft at high water must also keep close on the range, and take care not to be set on to Diamond Reef, the northern end of which is only 150 feet to the southward of the range. The shoals making off from the Battery are 300 feet to the northward of the range.

Pier numbers.—The New York City piers are numbered. Pier No. 1 of the East River system is near the Battery, the numbering being continued from it to the northward. Many of the piers have their numbers painted on the pier head, showing plainly from the river. This plan is followed up to pier 70, East River; to the northward of this the number of the street from the foot of which the pier extends is painted on the pier head.

ANCHORAGES IN EAST RIVER.

Rules and regulations, with a map showing the prescribed anchorage limits in the East River and New York Bay and Harbor, are given in Appendix I.

Vessels find good anchorage on either shore from Throgs Neck to Rikers Island. The north shore is more used in winter, the south shore in summer.

Hammond Flats, just to the westward of Throgs Neck, on the north shore, is an excellent anchorage for all classes of vessels, in about 5 fathoms, with good holding ground. Toward Old Ferry Point (the next point to the westward of Throgs Neck, on the north shore) the water deepens abruptly to 16 and 18 fathoms. Vessels anchoring here should come-to in the eastern half of the bight. There are no dangers, but the water shoals suddenly close inshore from 18 feet to 4 or 5 feet.

Off **Whitestone** good anchorage, in 18 feet to 8 fathoms, is found to the eastward of the point. There are no dangers, but the water shoals abruptly closely inshore. Avoid Whitestone Point, which makes off rocky to the northward for about 175 yards and is shoal on its western side.

The stretch between **Whitestone Point** and **College Point** is not much used as an anchorage.

Flushing Bay is available for light-draft vessels. Deep-draft vessels may anchor in the deep channel off the entrance to Flushing Bay, between College Point and Rikers Island, in 5 to 7 fathoms of water. The flats in Flushing Bay are soft mud, and afford excellent anchorage for vessels of light draft.

To the westward of **Rikers Island** the channel is narrow, the water deep, with poor holding ground, and the tidal currents are very strong, making it unsafe for vessels to anchor before reaching the wharf at the foot of East Thirty-first street, New York City.

A good anchorage in 4 to 10 fathoms of water is found between East Thirty-first street and East Twenty-fourth street wharves, on the New York side of the river, about 200 yards from the ends of the wharves.

TIDES IN EAST RIVER.

The table on page 22 gives tidal data for East River. The tidal system of New York Bay and that of Long Island Sound meet near Throgs Neck, or somewhat to the westward of Throgs Neck, between it and Rikers Island. The point at which the New York Bay and Long Island Sound tides meet varies somewhat with different conditions.

* This corner is marked by a white post with a white target 3 feet square and having a black center.

TIDAL CURRENTS IN EAST RIVER.

	Locality of Station.					
	East River, New York, off Old Ferry Point.		East River, New York, between Lawrence Point and Middle Ground.		East River, New York, off Polhemus Dock.	
	Compass direction.	Velocity.	Compass direction.	Velocity.	Compass direction.	Velocity.
		Knots		*Knots.*		*Knots.*
Hours before H. W. at Governors Island 2	W. ¼ N.	1.5	NE. ½ E.	3.2	NE.	3.0
Hours before H. W. at Governors Island 1	W. ¼ N.	1.2	NE. ½ E.	3.2	NE.	3.0
Hours before H. W. at Governors Island 0	W. ¼ N.	0.7	NE. ½ E.	2.4	NE.	2.2
Hours after H. W. at Governors Island 1	E. by N.	0.1	NE. ½ E.	1.1	NE.	1.2
Hours after H. W. at Governors Island 2	E. by N.	0.6	SW. by W.	0.6	SW.	0.0
Hours after H. W. at Governors Island 3	E. by N.	1.1	SW. by W.	2.0	SW.	1.7
Hours before L. W. at Governors Island 2	E. by N.	1.4	SW. ½ W.	2.3	SW.	2.3
Hours before L. W. at Governors Island 1	E. by N.	1.0	SW. ½ W.	1.9	SW.	2.0
Hours before L. W. at Governors Island 0	E. by N.	0.4	SW. ½ W.	1.2	SW.	1.4
Hours after L. W. at Governors Island 1	W. ¼ N.	0.3	SW. ½ W.	0.3	SW.	0.7
Hours after L. W. at Governors Island 2	W. ¼ N.	1.0	NE. ½ E.	1.3	NE.	0.5
Hours after L. W. at Governors Island 3	W. ¼ N.	1.4	NE. ½ E.	2.6	NE.	2.1

Old Ferry Point.—The slack before ebb lasts about twenty minutes and the slack before flood about eighteen minutes.

The currents are quite irregular in this region.

Between Lawrence Point and Middle Ground.—Slack water usually lasts less than ten minutes.

The current flows directly along the channel.

Off Polhemus Dock.—Slack water usually lasts from five to ten minutes.

The currents follow the channel.

Close to Polhemus Dock, within 200 feet, eddy currents are often found.

	Locality of Station.					
	North end of Blackwells Island, Western Channel.		Northern end of Blackwells Island, Eastern Channel.		Off Twenty-third street, New York.	
	Compass direction.	Velocity.	Compass direction.	Velocity.	Compass direction.	Velocity.
		Knots.		*Knots.*		*Knots.*
Hours before H. W. at Governors Island 2	NE.	3.8	NE. ½ N.	4.2	N. ½ E.	2.6
Hours before H. W. at Governors Island 1	NE.	4.1	NE. ½ N.	4.1	N. ½ E.	2.6
Hours before H. W. at Governors Island 0	NE.	3.3	NE. ½ N.	3.4	N. ½ E.	2.2
Hours after H. W. at Governors Island 1	NE.	1.8	NE. ½ N.	1.8	N. ½ E.	1.3
Hours after H. W. at Governors Island 2	SW.	0.8	SW.	1.0	S. by W.	0.4
Hours after H. W. at Governors Island 3	SW.	3.1	SW.	3.2	S. by W.	2.1
Hours before L. W. at Governors Island 2	SW.	4.4	SW.	4.0	S. by W.	2.8
Hours before L. W. at Governors Island 1	SW.	4.1	SW.	3.5	S. by W.	2.6
Hours before L. W. at Governors Island 0	SW.	3.2	SW.	2.5	S. by W.	2.0
Hours after L. W. at Governors Island 1	SW.	1.7	SW.	0.9	S. by W.	0.9
Hours after L. W. at Governors Island 2	NE.	0.3	NE. ½ N.	1.6	N. ½ E.	1.0
Hours after L. W. at Governors Island 3	NE.	2.5	NE. ½ N.	3.4	N. ½ E.	2.2

Blackwells Island, Western Channel.—Slack water usually lasts less than ten minutes.

The current follows the channel.

The currents at different points along the East River turn at nearly the same time.

Between Halletts Point and Hogs Back 6 knots per hour have been measured on the flood; but elsewhere between Lawrence Point and Blackwells Island 3 and 4 knots at strength of ebb and flood are characteristic.

Between Halletts Point and Flood Rock the most rapid current on the ebb is very close to Flood Rock.

Between Flood Rock and Hallets Point shore the currents are direct and strong, with comparatively few eddies.

Off Halletts Point both ebb and flood set directly toward the Frying Pan Shoal.

The flood current (setting to the eastward) sweeps close around Halletts Point and makes less eddy in the cove to the eastward than is found there on the ebb.

Between Great Mill Rock and Wards Island the flood current has numerous though not violent eddies. The slack water is of only a few minutes' duration. The main stream passes to the southward of Flood Rock.

Blackwells Island, Eastern Channel.—Slack water usually lasts less than five minutes. The current generally begins to follow the channel within thirty minutes of its slack. It has at no time any considerable velocity crosswise the channel.

On the Blackwells Island side the current is about the same as in the channel, even to within a few feet of the sea wall.

Both on the ebb and flood there is little current in the vicinity of the sea wall on the Long Island side.

There are strong eddies off Blackwells Island Lighthouse and off Hatter's Dock (the northern point of entrance to Halletts Cove).

In the Main Channel, off Rylanders Reef, the slack water lasts twenty minutes. The flood current is weak, but ebb current is direct and strong.

In the Middle Channel the ebb current is broad and rapid, with numerous eddies.

Between Wards Island and Ringgold's Dock slack water lasts twenty-five minutes.

Off Twenty-third street.—The currents at different points along the East River turn at nearly the same time. Slack water lasts from four to eight minutes.

GENERAL RULE.

(Covering the whole scheme of tidal circulation, New York Harbor and East River.)

The "*ebb*" flows into New York Harbor from Long Island Sound during nearly the same period that it flows out over the bar into the ocean; and at the *southing of the moon* this continuous stream reaches its *strength* in the East River and in the East Channel over the bar, while in the Swash, Main, and Gedney channels it is about one hour earlier. About six hours later the continuous "*flood*" stream reaches its *strength* on a reverse course in the East River. In the Swash, Main, and Gedney channels its *strength* occurs about five hours, and in the East Channel about six hours, and in The Narrows about seven hours, after the *southing of the moon*.

The variation of the compass at different points for 1900 is given on page 24.

GENERAL DIRECTIONS, EAST RIVER.

General directions for the East River are here given, but owing to the strong currents through Hell Gate and the number of vessels passing through, strangers in sailing vessels should take a towboat or a pilot.

Coming from the eastward, round Throgs Neck, leaving Throgs Neck Lighthouse about ¼ mile on the starboard hand. When Throgs Neck Lighthouse bears about **N.**, ¼ mile distant, steer about **WNW. ¾ W.**, heading so as to pass about 250 yards to the northward of Whitestone Point (the first prominent point on the south shore). Old Ferry Point (on the north shore, 2 miles **W.** by **N.** from Throgs Neck) will be a little on the starboard bow and should not be approached nearer than 150 yards. When the post light and fog signal on Whitestone Point bears **S.**, distant 300 yards, steer about **W.**, heading for a point on Rikers Island about 400 yards from its northern end. Clauson Point (the next point to the westward of Old Ferry Point) will be left about ¼ mile on the starboard hand. College Point (about **SSW.** from Clauson Point) has a black buoy (spar, No. 1) placed on the northern end of the shoal making out from the point; this buoy will be left 200 yards on the port hand. Flushing Bay lies to the westward of College Point. Rikers Island lies 1½ miles to the westward of College Point, and has a shoal, with 5 to 9 feet on it, extending 1 mile **ESE. ½ E.** from its eastern side (a channel with a least depth of 18 feet leads to the southward of Rikers Island). Hunts Point (the next point to the westward of Clauson Point, on the north shore) should be given a berth of at least 200 yards. A sunken pier marked by a buoy (spar, red,

No. 2), lies 125 yards off this point, which will be left on the starboard hand. When this buoy is on the starboard beam, distant about 250 yards, change course to **NW.** by **W.** ½ **W.**, giving the north shore of the island a berth of 250 to 300 yards, and steer so as to pass from 135 to 300 yards north of North Brother Island (the island with a lighthouse on its southwestern end); the post light on Oak Bluff should be a little on the starboard bow. Round North Brother Island, keeping it 135 to 300 yards on the port hand.* The distance across from the northern end of North Brother Island to Oak Bluff, on the opposite shore to the northward, is nearly 400 yards.

When the northern end of North Brother Island bears **E.**, distant about 225 yards, steer about **SW.** ½ **W.**, heading for the large hospital on the southeastern side of Wards Island. Several black spar buoys and post lights, marking Lawrence Point Ledge and the channel south of South Brother Island, will be left on the port hand as the post light on Sunken Meadow is approached. Leave the post light on Sunken Meadow 50 to 100 yards on the starboard hand, and the black buoy on western edge of the Middle Ground on the port hand, and then keep in the middle of the channel. The buoys marking the Middle Ground often tow under when the current is at its strength.

Round Hallets Point, giving it a berth of from 50 to 300 yards. The *tidal currents* between Hallets Point and the opposite shore to the northeastward, and from this to the northern end of Blackwells Island, set with great velocity, forming swirls and eddies, thus making this part of the passage dangerous.

Steer so as to pass 150 yards to the westward of the lighthouse on the northern end of Blackwells Island and follow a mid-channel course, or favor the shore on the starboard hand.†

When nearing the southern end of Blackwells Island, Blackwells Island Reef will show several bare rocks extending to the southward. The spindle on Man-o'-War Rock (red lantern at night), about ½ mile southwest from the southern end of Blackwells Island, will be left at least 60 yards on the port hand.

Beyond this specific directions are not of much service; the great number of passing vessels render frequent changes of course necessary. If intending to anchor, note the Anchorages on page 123, and conform to the authorized anchorage limits (see Appendix I). Vessels intending to anchor for more than a few hours generally stand-on through East River and come-to below Governors Island, out of the channel, on either the eastern or western side of the main channel of New York Upper Bay.

From the spindle on Man-o'-War Rock steer about **S.**, gradually approaching the wharves on the port hand. Off Twenty-sixth street a red and black horizontally striped spar buoy will be left on the starboard hand. Off Nineteenth street another red and black horizontally striped spar buoy will be left on the starboard hand. Off Tenth street, 400 yards from the end of the wharf, a red buoy (spar, No. 6) marks the eastern edge of Shell Reef; this buoy will be left on the starboard hand. After passing red buoy, No. 6, it is well to keep within 300 yards of the Brooklyn shore until past Houston street ferry-slips, then following a mid-channel course past the Brooklyn Navy Yard and under the Suspension bridge.

When under the Suspension bridge the course is about **SW.** by **W.** ½ **W.** for the round castle on the western end of Governors Island. The Staten Island ferry-slip should be given a berth of about 200 yards on the starboard hand, and the sea wall of the southwest face of the Battery should be given a berth of 350 to 400 yards.

Vessels of 23 feet or more draft should use the range when passing out of the East River.

Directions for passing out of the East River on the range.—When clear of the Brooklyn Bridge, favor the Brooklyn side of the channel, and look for the Central Elevator (on pier 9, Brooklyn) opposite Wall street ferry (New York side). Put the vessel on the range astern and be pointed on it by the time the vessel has pier 8 (New York) on line looking up the pier. Keep the range close astern, and when Red Hook chimney opens to the westward of Castle William the vessel will be in the deep water of the upper bay.

See the description of the range on page 123.

* This route, passing to the northward of North Brother Island, carries the best water. Most vessels use the channel (good for 15 feet of water) to the southward of the island; their draft enables them to do so, and it is more direct.

† This channel, to the westward of Blackwells Island, is the wider and has the better water. There is another channel, leading to the eastward of Blackwells Island, in which the best water is nearest the Blackwells Island shore.

HARLEM RIVER*

enters Hell Gate on the western side of Wards Island. From the mouth it extends in a northerly direction, joining **Spuyten Duyvil Creek***, the latter connecting with Hudson River 11¾ miles above the Battery. The channel of Harlem River is narrow and crooked, and navigable only for steamers or vessels towing. This river is of considerable commercial importance. Harlem River and Spuyten Duyvil Creek are being improved by the Government; in 1898 the channel was 15 feet deep with a least width of 150 feet from the East River to Central Bridge, and 12 feet deep with a least width of 180 feet from Central Bridge to the Hudson (North) River.

Between High Bridge and the entrance the river is crossed by 6 bridges with draws ranging from 100 feet to 164 feet in width. The center of the arches of High Bridge are 100 feet above mean high water and the span of the arches is 77.7 feet; the clear waterway between the piers is 55 feet. Washington Bridge, a little over ¼ mile above High Bridge, has an arch span 500 feet wide and 136 feet above mean high water in the center. Hudson River Railroad bridge, crossing Spuyten Duyvil Creek where it enters the Hudson, has a draw 50 feet wide, but this bridge is to be replaced by one having a wider draw. Sailing vessels entering the river take a towboat, the master of the towboat being the pilot. If coming from the eastward, a towboat is taken in the East River to the eastward of Rikers Island. If from the westward, a towboat is taken below Blackwells Island. Towboats will also be found at the wharves in the river to tow vessels out.

SOUTH COAST OF LONG ISLAND.†

The south coast of Long Island has a general course about **WSW. ½ W.** for 68½ miles from Montauk Point to Fire Island Inlet; and thence about **W. ½ N.** for a little over 35 miles to Norton Point, the southwestern end of Coney Island (at Gravesend Bay) and the northern point at the entrance to the Lower Bay of New York. It is a clean shore, and may be safely approached within ¾ mile with not less than 5 fathoms anywhere between Montauk Point and Rockaway Inlet. When viewed from seaward it presents but few characteristic features. This south coast is composed of a series of sand hillocks backed by low dark woods; and the only break in the monotony of the outline is made by the inlets and the small villages near the beach. There are a number of **life-saving stations** on this coast; a list of them will be found on page 21. **Wind signals** are displayed at Montauk Point, Bayshore, and Manhattan Beach.

Montauk Point, the eastern extremity of the island, will appear, when seen from seaward, as a high sandy bluff with perpendicular faces and somewhat undulating surface covered only with grass. Perched upon the top of the bluff and close to its edge stands the lighthouse (see table, page 14) with the keeper's dwelling and the fog signal at its base. To the northward the country gradually descends, while to the southwestward several small coves cut the line of cliffs so as to present an appearance of low grassy lands alternated with high sandy bluffs.

Bearings and distances from Montauk Point Lighthouse are given on page 19.

For **variation of the compass**, see page 24.

About 14 miles to the westward of Montauk Point and ½ mile back from the beach is the village of **Amagansett**, and to the westward of this, along the whole line of the Long Island Railroad and some distance back from the beach, are a number of towns and villages. **South Hampton** is 27 miles to the westward of Montauk and 1½ miles to the eastward of Shinnecock Bay, sometimes called **Great West Bay.**

The eastern end of **Shinnecock Bay** is about 28½ miles to the westward of Montauk; this is a large but shallow bay, about 8 miles long, and is separated from the ocean by a narrow sand beach. This part of the coast is well known to navigators, from the **Shinnecock Hills**, about 2½ miles back from the beach, and from Shinnecock Lighthouse on the north side of the bay (see table, page 14). This lighthouse is on **Ponquogue Point**, about midway between the eastern and western ends of the bay.

From Shinnecock Lighthouse to Fire Island Lighthouse the coast presents an unbroken line, composed of innumerable sand hillocks backed by woods. This appearance is caused by a narrow strip of sand from 200 to 800 yards in width, which separates from the ocean the large but shallow bays known as **Moriches Bay** and **Great South Bay.** The former, which is the easternmost and smaller, begins about 2 miles to the westward of Shinnecock Bay and extends nearly 12 miles to the westward to Smith Point.

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*Shown on Coast and Geodetic Survey chart 274, scale $\frac{1}{10,000}$, price $0.25. See also footnote on page 120.

†This coast is shown on Coast and Geodetic Survey charts A, Sailing chart, scale $\frac{1}{1,200,000}$, price $0.50; 8, Approaches to New York, Gay Head to Cape Henlopen, scale $\frac{1}{400,000}$, price $0.50; 52, Montauk Point to New York and Long Island Sound (Mercator projection), price $0.50; 117, 118, 119, Southern coast of Long Island, 3 sheets, scale, $\frac{1}{80,000}$, price $0.50 each sheet.

About 23 miles to the westward of Shinnecock Lighthouse is the easternmost of the high sand hillocks which mark the approach to Fire Island Inlet, known as **Watch Hill**. It is the first hill of any prominence met with to the westward of Shinnecock; and hence to the westward as far as Fire Island Inlet the shore shows a series of sand hills of various heights and steep faces. Prominent among these are the **Head and Horns**, 4 miles to the westward of Watch Hill; and **Ruland Hills**, which stretch in a line about 1 mile long between 2 and 3 miles to the westward of the Head and Horns and about 6 miles to the westward of Watch Hill.

FIRE ISLAND INLET.*

Fire Island Inlet is easily recognized by Fire Island Lighthouse with its broad black and white bands (see "Table of Lights," page 14) to the eastward of the inlet. It is the principal entrance to Great South Bay, and is about 800 yards wide between **East Point** (the western end of Fire Island Beach) and **West Beach Point** (the southeastern end of Oak Island Beach). Both shores of the inlet are low sand-beach. To the northward of it is **Oak Island** and to the northeastward are **Sexton and Fire islands**. The entrance to the inlet is obstructed by a sand bar, the buoyed channel over which (in 1899) has a depth of about 12 feet; this depth, however, is liable to change. The bar is apt to shift in easterly gales, and the buoys are changed accordingly. Strangers should not attempt to enter without a pilot except in case of urgent necessity, when be guided by buoys. By making the usual signal, a pilot may always be obtained when it is possible to cross the bar.

Great South Bay, which extends from **Smith Point** (the western extremity of Moriches Bay) to the **Line Islands** (in South Oyster Bay), is 28 miles long and of very irregular shape, its width varying from ½ mile to 3½ miles. Although so large and wide, it is shallow, being good for but 8 feet at low water. It forms a natural harbor for the light-draft fishing boats of the island and the numerous small yachts owned in the vicinity. The northern shore of the bay is well settled—the villages of **Bellport, Patchogue, Sayville, Islip, Bayshore, Babylon,** and **Amityville** being situated close to the shore. Navigation of the bay is impossible without the assistance of local pilot. There is some trade in coal and building material to the towns on the bay. The deepest draft taken in is about 8 feet; a draft of 8 feet can be taken to Patchogue, Bayshore, and Babylon.

At the eastern extremity of Great South Bay is **Bellport Bay**, and at the western extremity is **South Oyster Bay**.

Tides.—Outside of Fire Island Inlet the mean rise and fall of tides is about 3.5 feet. In the inlet the mean rise and fall of tides is 1.8 feet; high water occurs 11m. later and low water 3m. earlier than high and low water, respectively, at Sandy Hook.

GENERAL REMARKS.

Fire Island Inlet is the only harbor of refuge on the southern coast of Long Island. The approaches have no outlying natural dangers, and in working along this coast for the inlet it is safe to go within ¾ mile of the shore, with not less than 5 fathoms.

Strangers should not attempt to enter the inlet without a pilot. The bar across the entrance shifts and new channels form frequently. No reliable directions can be given.

Fire Island Light-vessel, lying 9¾ miles S. from Fire Island Lighthouse, is a prominent aid to navigators approaching New York Bay from the eastward.

Fire Island Whistling buoy is a mammoth nun, painted red and surmounted by a whistle. It is a guide for vessels bound to New York, being nearly on the sailing line from outside Nantucket Shoals. From this buoy Fire Island Lighthouse bears **N. ¼ E.**, distant 6 miles.

Fire Island Bell buoy is nun-shaped, with lattice body, and is painted black and white in perpendicular stripes. It is placed outside of heavy weather breakers, in 8 fathoms of water. Inside it the water shoals suddenly. It is a guide both for coasters and for vessels bound into the inlet.

ROCKAWAY INLET.†

From Fire Island Inlet to Rockaway Inlet the distance is 28½ miles and the direction a little to the northward of W. This stretch of coast has several inlets; all of them are shallow, and shifting sand bars obstruct their entrances. The principal are Jones Inlet, New Inlet (closed in 1899), and Hog Island Inlet (also called Cable or East Rockaway Inlet). These have buoys, shifted as necessary to show the best water over the bars, but even the smallest vessels require a pilot.

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*Shown on Coast and Geodetic Survey chart 119, scale $\frac{1}{80,000}$, price $0.50.

†Shown on Coast and Geodetic Survey charts 542, scale $\frac{1}{20,000}$, price $0.50; 369, scale $\frac{1}{40,000}$, price $0.75; 120, scale $\frac{1}{20,000}$, price $0.50.

Rockaway Inlet makes into Jamaica Bay, between Rockaway Beach on the east and **Duck Bar** and Barren Island on the west and north. To enter the inlet a shifting sand bar must be crossed, and this makes a local pilot necessary. The best water in the channel over the bar is generally 12 to 14 feet. When over the bar the depth varies from 4 to 10 fathoms throughout an almost unobstructed channel from 175 yards to ⅝ mile in width. The shore on both sides is subject to great changes, and its shape and extent as delineated upon the charts must not be relied upon.

Rockaway Beach, the western end of which forms the eastern point at the entrance to the inlet, is a long, narrow, sandy island. It is a popular summer resort.

Barren Island, on the northern side of the inlet, is composed of alternate marsh and sand, and is of irregular shape. It is bold-to on its southern and eastern sides—4 fathoms being found within 100 yards of the former and 5 fathoms within 30 yards of the latter. There are a number of large hotels and other buildings on the island, which has communication by ferry with Canarsie Landing.

Jamaica Bay, into which the inlet leads, is a large but shallow bay 5¼ miles long with a greatest width of 3½ miles, but so full of marsh islets and islands as to render its navigation utterly impossible except to very light draft vessels with local pilots on board. No intelligible description can be given of the islets and the numerous channels among them. None but vessels whose masters are fully acquainted with the dangers enter the inlet at present.

The current of flood and ebb in the inlet sets nearly in the direction of the axis of the channel, the former having a velocity of a little over 1 mile and the latter a little over 2 miles per hour.

Canarsie Landing is a village about 2½ miles to the northward of Barren Island; 6 feet at low water can be taken up to this landing through a dredged channel 50 feet wide. During the summer steamboats run between Canarsie and Rockaway Beach, connecting at the former place by rail with Brooklyn.

To the westward of Barren Island, at a distance of ⅝ mile, begin **Plumb Island** and **Manhattan Beach,** and just to the westward of them begins **Coney Island,** which extends in a **W.** by **N.** direction for about 3½ miles, its western end, **Norton Point,** forming the northern point at the entrance to New York Bay. The south shore of **Coney Island** has many houses and large summer hotels; the high "Centennial Tower" is a very prominent object.

Tides.—The mean rise and fall of tides at Rockaway Inlet is 4 feet; high water occurs 12 m. and low water 14 m. later than high and low water, respectively, at Sandy Hook. At Canarsie Landing the mean rise and fall of tides is 4.2 feet, and high water occurs 52 m. later than at Rockaway Inlet.

GENERAL REMARKS, ROCKAWAY INLET.

In approaching Rockaway Inlet care must be taken to avoid *Rockaway Shoals*, which extend off the entrance to a distance of nearly 1¾ miles and are very abrupt, the depth diminishing in some places from 5 fathoms to 6 feet within 200 yards. The channel leading in through these shoals is marked by buoys, which are changed from time to time as necessary.

Strangers should not attempt to enter without a pilot, as the channel is continually shifting. Permanent sailing directions can not be given.

A large bell buoy (black and white perpendicular stripes) is placed in 6½ fathoms of water off the southern end of Rockaway Shoals, both as guide to the channel into the inlet and as a warning to passing vessels to keep outside the shoals. From this buoy Sandy Hook Light-vessel bears **SE.** ¾ **S.,** distant 5 miles; Scotland Light-vessel **S.** by **W.** ⅛ **W.,** distant 5 miles. This buoy is taken up during the winter.

NEW YORK BAY AND HARBOR.*

New York Bay affords the principal access by water to New York City and surrounding ports. It is of irregular shape and is divided by a passage 1 mile wide, known as **The Narrows,** into an **Upper** and **Lower Bay.**

LOWER BAY.

The entrance to the bay is between **Sandy Hook** to the southward and **Coney Island** to the northward, and is about 6 miles wide. An extensive bar, through which several channels lead, extends across the entrance. By the best of these channels (see channels) the deepest draft vessels can go up to the city.

* Shown on Coast and Geodetic Survey charts **120**, scale $\frac{1}{80,000}$, price $0.50; **369**, scale $\frac{1}{40,000}$, price $0.75; and in part on charts **369**[4], **369**[4a] scale $\frac{1}{10,000}$, price of each $0.50.

The Lower Bay extends from the entrance to The Narrows. It is triangular in shape, and portions of it have special names.

Sandy Hook Bay is the southern part of the Lower Bay, lying to the westward of Sandy Hook and to the eastward of **Point Comfort,** about 6 miles westward of the Hook beacon. The bay is an excellent anchorage for vessels of less than 24 feet draft, the depth of water ranging from 5 fathoms, just inside Hook, to 15 feet near its southern part; the shoaling is gradual and the bottom good holding ground. Vessels of over 24 feet draft can not find good anchorage out of the channel before arriving at Quarantine. Extensive shoals make off to the northward and eastward from Point Comfort, but as the depth of water decreases gradually, the lead will give sufficient warning of too close an approach to the shore. The best anchorage is in the eastern part of the bay, giving the shore of Sandy Hook a berth of about ½ mile.

Navesink River and **Shrewsbury River,** through one common entrance, empty into the southern extremity of Sandy Hook Bay to the eastward of the Highlands of Navesink. These two rivers are shallow, but are being improved under the supervision of the U. S. Engineers, the object being to obtain a channel with a depth of 6 feet at low water from the deep water of Sandy Hook Bay to **Branchport** on the Shrewsbury River and **Red Bank** on the Navesink River. In 1899 the channel from Sandy Hook Bay into the rivers has a depth of about 7 feet, and is only used by small steamers and sailing vessels of 5 feet or less draft. One drawbridge crosses the main entrance to the eastward of Navesink Lighthouses, and another about 2 miles farther up, near the mouth of the Shrewsbury River. Strangers should not attempt to enter these rivers without a pilot.

Raritan Bay is the name given to the body of water lying between Point Comfort and the southern shore of Staten Island; its depth varies from 7 to 18 feet, but a buoyed channel, with a depth of 21 feet (said to be shoaling), leads from the deep waters of the bay along the southern shore of Staten Island to **Princess Bay** and into the **Arthur Kill** and **Raritan River** at the western end of the bay. Arthur Kill is a deep, narrow body of water which makes from Raritan Bay in a northerly direction, dividing Staten Island from New Jersey, and leading into **Newark Bay,** and uniting by the **Kill Van Kull** with the waters of the Upper Bay.

Gravesend Bay is a small bay which makes into the Long Island shore between The Narrows and the western end of Coney Island. In the northern part of the bay good anchorage, in 11 to 16 feet of water, will be found, but the southern part is very shoal, having only a depth of 1 to 6 feet. On the eastern shore of the bay are several wharves used by steamers running to Bath Beach, which is a summer resort.

The northwestern part of the Lower Bay is covered by extensive flats with 1 to 16 feet over them, known as **Staten Island Flats,** making off to the southeastward from Staten Island. Parts of these flats are known as **Old Orchard Shoal** and **West Bank,** which border on the main channel up the bay. Near the southeastern extremity is Old Orchard Shoal Lighthouse, and near the eastern edge of West Bank are Swinburn and Hoffmann islands, artificial islands on the shoalest part of the bank. **Swinburn Island,** the southernmost one, will appear as a number of long, low, white houses, in front of which will be seen a two-story dwelling house. **Hoffmann Island** is about ¾ mile to the northward of Swinburn Island and 1¼ miles to the southward of Fort Tompkins Lighthouse. On approaching it from the southward it will appear as a mass of stone, brick, and other débris, apparently loosely thrown together and supporting two long brick houses two stories high.

Sandy Hook, the southern, and **Norton Point,** the northern point at the entrance, are both low and sandy. On Sandy Hook is the **North Hook Beacon,** with fog-signal (siren) but near it, and about 700 yards west of the beacon is a fog-signal (bell) tower (see page 16). These buildings and a dwelling house are near the point of the hook; to the southward of these are an unfinished granite fortification, some low houses, Sandy Hook Lighthouse, South Hook beacon, a life-saving station (see page 16), and a wind-signal display station. There is also a signal station from which vessels are reported to the Maritime Exchange in New York City. **Norton Point,** the western end of Coney Island, is marked by Coney Island Lighthouse (see table, page 16). Several hotels and other buildings are on the point, and thence eastward the beach of Coney Island presents an almost continuous line of hotels and summer houses. *Iron piers,* the landing place of steamboats to Coney Island, make out from the south shore of Coney Island, 1½ miles to the eastward of Coney Island Lighthouse, and are quite prominent.

Prominent objects.—The most prominent landmark to the southward of the entrance, in approaching from seaward, is the high wooded ridge forming the **Highlands of Navesink,** on the side of which, in a cleared space, are two conspicuous lighthouses. The flashing white light shown here is visible 22 miles in clear weather (see "Table of Lights," page 16). North of the entrance the **Centennial Tower** on Coney Island is a prominent object.

The principal guides to the immediate entrance are Sandy Hook Light-vessel (see page 14) off Gedney Channel and Scotland Light-vessel (see page 14) off South Channel.

Staten Island, which forms the northwestern shore of New York Lower Bay, is a large island, somewhat triangular in shape, with its base to the northeastward, and a length of 11½ miles. It lies **NE.** and **SW.**, and its backbone, which is composed of high wooded hills with ornamental grounds and villas, is one of the most conspicuous features of the immediate approaches to New York.

Channels.—Several buoyed channels lead across the bar which extends from Sandy Hook to Coney Island. Three of these—False Hook, South, and Gedney channels—approach each other in their courses toward the bay until they meet, still on the bar, in a basin from which two other channels, the Main and Swash, lead into the lower bay. To the northward of these are East and Fourteen Feet channels. Light draft vessels can cross the bar close to the Coney Island shore by what is locally known as the Coney Island Channel.

The principal channel, and the one having the greatest depth (30 feet at mean low water), is **Gedney Channel.** A red first-class nun buoy and four red buoys (spars, each showing red electric light at night) mark its northern edge, and two black first-class can buoys and four black buoys (spars, each showing white electric light at night) mark its southern edge and lead up to the range which serves as a guide through Main Channel; Gedney Channel also leads into Swash Channel. Gedney Channel whistling buoy (nun-shaped, black and white perpendicular stripes) lies off the entrance to Gedney Channel, and directly on a line between the entrance and Sandy Hook Light-vessel, bearing from the latter **WNW.** ¼ **W.**, distant nearly 3¼ miles.

South Channel is the next channel of importance, and has a least depth of 21 feet. A straight course leads from its entrance through it and Swash Channel into the bay.

Main Channel leads from the inner end of Gedney Channel, in a **W.** by **S.** direction between the shoal making out from the point of the Hook, on its southern side, and Flynns Knoll on its northern side; the least depth in the middle of the channel is 31 feet at mean low water. The northern side of the channel is marked by red buoys, the last of these, No. 12 (with perch and ball), marks the turning point into the main channel up the bay; 50 feet **NNE**, from this buoy there is a red spar buoy showing red electric light at night. On the shoal making out to the northeastward from Hook Beacon there is a black bell buoy.

The *main channel up the bay* runs along to the westward of Southwest Spit, Flynns Knoll, and East Knolls, and is marked by four red buoys (nuns, Nos. C 2, C 4, C 6, and C 8) on its eastern side and a black electric-lighted buoy and three black buoys (can, Nos. C 1, C 3, and C 5) on its western side. These buoys are replaced by spar buoys in winter. According to the report of the Chief of Engineers, U. S. Army, the channel from buoy No. 12 to the deep water of The Narrows has a general width of 1,000 feet, with a least depth of 30 feet for that width.

The **Swash Channel** leads from the junction of the Gedney and South channels in a northwesterly direction between Romer Shoal and East Knolls, and its course follows close to the southern edge of Romer Shoal. It is a narrow channel through which 23 feet can be carried, but in which are several lumps, over which there is a depth of only 22 feet. At the junction of the Gedney and Swash channels are two red buoys, one a nun with perch and square, the other electric-lighted, showing a fixed white light.

False Hook Channel leads along and close to the eastern shore of Sandy Hook and joins the main channel to eastward of the point of the Hook. It is buoyed and has a depth of 19 feet, but is not safe for strangers.

East Channel, to the northward of Gedney and Swash channels, has a depth of 19 feet and is buoyed. Near its eastern entrance there are spots with from 14 to 18 feet over them.

Fourteen Feet Channel runs across East Bank to the northward of East Channel and has a depth of 14 feet, but it is not buoyed, is seldom used, and should not be attempted by strangers.

Ranges.—*At night* the use of the range lights enables vessels to enter readily in clear weather. *By day* it is often difficult, if not impossible, to pick up the ranges. The electric-lighted buoys of Gedney Channel make its entrance easy. The **Point Comfort beacons** (Point Comfort and Waackaack) form the range for the main channel until Sandy Hook Lighthouse and South beacon (in range) become the guides. When inside, **Conover and Chapel Hill beacons** form the range (astern) for going up the bay. For South and Swash channels **Elm Tree** and **New Dorp beacons** form the range.

THE NARROWS

is that part of New York Bay which lies between the extreme western point of Long Island and the eastern point of Staten Island, and connects the Lower and Upper bays. It is 1 mile wide, is deep (having 8 to 16 fathoms of water), and unobstructed if the eastern shore be given a berth of ¼ mile. On its western side is **Fort Tompkins** and on its eastern side **Fort Hamilton** and **Fort Lafayette.** The latter is about ¼ mile from the Long Island shore on the edge of the flats, and is a circular brickwork. There is a fog-signal station, but no light here. To the southward of Fort Tompkins there is a lighthouse (see page 16) as a guide to The Narrows. Above this fort on Staten Island are the towns of **Clifton, Stapleton, Tompkinsville,** and **New Brighton,** which have communication with Manhattan Island by ferry.

At Southfield, just above Fort Wadsworth, are the **Quarantine Headquarters** and **Boarding Station**; vessels subject to visitation by the Health Officer are boarded when abreast of Fort Wadsworth. On the eastern side of The Narrows, just above Fort Hamilton, there is a village of the same name, and 1 mile farther to the northward is the village of **Bay Ridge**. This is all a part of Greater New York.

UPPER BAY AND HARBOR

extends from The Narrows to the **Battery** (the southern point of Manhattan Island) at the confluence of the **Hudson** and **East** rivers. It is about 4 miles long north and south and from 2 to 3¼ miles wide east and west.

The whole of the western part of the bay is covered by extensive flats, with 1 to 6 feet over them, known as **Jersey Flats**. For a description of these flats see dangers under section 5, Sailing Directions, New York Bay.

The **Kill Van Kull**, with 4 to 7 fathoms of water, connects the bay with Newark Bay and the Arthur Kill, and separates the northern shore of Staten Island from **Bergen Neck**.

Gowanus Bay is the name of the bight in the Long Island shore about 2 miles above The Narrows. It is important and much frequented on account of its dry docks and facilities for repairing vessels. It is shallow, and an extensive shoal, Gowanus Flats, lies off it. Two dredged channels lead into Gowanus Bay; the one from the southward, known as **Bay Ridge Channel**, has a depth of 26 feet; the channel from the northward, known as **Red Hook Channel**, has a depth of 26 feet and follows the wharves from Red Hook into Gowanus Bay. **Erie Basin** is on the north side of the entrance to the bay and is usually entered from the Red Hook Channel. The channel depth in **Gowanus Creek** is 26 feet.

The *main channel up the bay*, from The Narrows to the city, leads between Jersey Flats and Gowanus Flats, and has a depth of 5 to 15 fathoms and a width of about ½ mile.

Governors Island, lying in the northeastern part of the bay, at the mouth of the East River, is occupied by **Fort Columbus**. On the northwestern point of the island are **Castle William** and a light and fog-signal station (see page 16). The main channel into East River leads north of the island; for the depth in this channel and range for passing through, see page 123.

Between Governors Island and Brooklyn, **Buttermilk Channel** leads from the bay into East River and forms the access to **Atlantic Docks**. The least depth in the channel is 24 feet. The channel is broad and unobstructed, and about 300 yards wide at its narrowest part between Governors Island and the Atlantic Docks. A black bell buoy at the southern entrance and a black spar buoy abreast of Governors Island mark the northern edge of the channel, and a red spar buoy marks its southern limit at the northern point of Red Hook Flats.

Anchorage.—The anchorage limits and harbor regulations are given in Appendix I.

Pilotage is compulsory for foreign vessels, vessels from a foreign port, and all vessels sailing under register. Pilots generally board vessels bound to New York between Fire Island and Barnegat Inlet. Pilot boats are also always found near Sandy Hook. The pilot laws and regulations will be found in Appendix I.

The **buoyage** of New York Bay and the adjacent waters accords with the uniform system adopted in United States waters (see introductory, page 5). Many of the can, nun, and bell buoys are replaced by spar buoys during the winter.

Quarantine regulations for the port are changed from time to time as is found necessary by the local authorities (see Appendix I, and Quarantine Headquarters above). The National Quarantine laws and regulations will be found in Appendix III.

A time ball is dropped daily, except Sunday, in New York City, from the Western Union telegraph building, 195 Broadway, exactly at noon of the 75th meridian; that is, at 5 h. 0 min. 0 sec. Greenwich mean time. The instant of noon is marked by the beginning of the fall of the ball. A notice is furnished for publication in the New York daily papers stating whether the ball has fallen at the correct time, and giving the amount of error if there has been any. This time signal is maintained and operated by the Western Union Telegraph Company. The ball is dropped by electric signal from the U. S. Naval Observatory, in accordance with arrangements made under the authority of the Navy Department.

A **Branch of the United States Hydrographic Office**, subordinate to the Navy Department, is established at the Maritime Exchange, Produce Exchange Building. Bulletins are posted here giving information of value to seamen, who are also enabled to avail themselves of publications pertaining to navigation, as well as to get chronometer comparisons, and to correct their charts from standards. No charge is made for this service.

Wind signals of the U. S. Weather Bureau are displayed in New York City from the American Surety Building, No. 100 Broadway; they are also displayed at Sandy Hook (see Appendix II).

Ice.—The large number of ferryboats, towboats, and steamers navigating the waters of this harbor usually keep the channels open, but in severe winters ice seriously interferes with navigation for short periods of time.

For variation of the compass see page 24.

For tides see page 22. A tidal indicator, maintained by the Coast and Geodetic Survey, is erected on the wharf at Fort Hamilton so as to be seen by vessels passing through The Narrows. On this indicator is shown the exact stage of the tide and whether the tide is rising or falling. The arrowhead in the middle of the semicircle when pointing upward indicates a rising tide, and when pointing downward a falling tide. The pointer near the arrowhead points to the height of the tide (in feet), which is indicated by figures on the semicircle, the zero agreeing with mean low water.

CURRENTS—NEW YORK BAY AND HARBOR.

In approaching New York Bar from seaward the flood current, when between Rockaway and Navesink, rarely reaches 1 knot per hour, and runs fair for the entrance, except that it is disposed to press upon the outside shores of Sandy Hook and Coney Island.

The ebb current issuing from the harbor is stronger than the flood, even in the low-river season, the excess being never less than 10 per cent, except near Coney Island and the outside shore of Sandy Hook, where the flood exceeds the ebb usually.

Observations made under directions of the Coast and Geodetic Survey office have enabled it to deduce the following general rules with regard to currents in New York Bay and Harbor:

The Ebb Current.—In the East Channel and in The Narrows the current reaches its strength at about the southing of the moon, while in the Swash, Main, and Gedney channels it is about 40m. earlier.

The Flood Current.—In the Swash, Main, and Gedney channels the strength of the current occurs about 5h., in the East Channel about 6h., and in The Narrows about 7h., after the southing of the moon.

In the Gedney, Main, and Swash channels, high-water slack occurs about 22m. after high water at Sandy Hook, as given in U. S. Coast and Geodetic Survey Tide Tables; it lasts about 25m., when the current begins to run ebb, and 3h. 40m. after high water at Sandy Hook it reaches its maximum velocity of 2.2 knots per hour.

Low-water slack occurs about 51m. after low water at Sandy Hook; it lasts about 25m., when the current begins to run flood, and at 3h. 23m. after low water at Sandy Hook it reaches its maximum velocity of 1.8 knots per hour.

In the Main and Swash channels the flood current starts in on the north side of the channel 30m. earlier than on the south side, and the ebb current starts out on the south side of the channel 30m. earlier than on the north side.

The currents at half ebb in the Swash Channel set to the eastward strongly.

In The East Channel, high-water slack occurs about 49m. after high water at Sandy Hook; it lasts about 25m., when the current begins to run ebb, and at 4h. 23m. after high water at Sandy Hook it reaches its maximum velocity of 2.2 knots per hour.

Low-water slack occurs at 1h. 10m. after low water at Sandy Hook; it lasts about 25m., when the current begins to run flood, and at 4h. 26m. after low water at Sandy Hook it reaches its maximum velocity of 1.9 knots per hour.

In The Narrows, high-water slack occurs about 2h. 0m. after high water at Sandy Hook (or 1h. 30m. after high water at Governors Island); it lasts from 15m. to 30m., when the current begins to run ebb, reaching a maximum velocity of 1.5 knots per hour at 4h. 30m. after high water at Sandy Hook.

Low-water slack occurs about 2h. 30m. after low water at Sandy Hook (or 1h. 40m. after low water at Governors Island); it lasts from 15m. to 30m., when the current begins to run flood, reaching a maximum of 1.2 knots per hour at 5h. 12m. after low water at Sandy Hook (or 4h. 18m. after low water at Governors Island).

Both ebb and flood currents appear first on the east side of the channel.

In Hudson River, off Thirty-ninth street, high-water slack occurs about 3h. 8m. after high water at Governors Island; it lasts from 40m. to 55m., when the current begins to run ebb, reaching a maximum velocity of 3.1 knots per hour at 6h. 17m. after high water at Governors Island.

Low-water slack occurs about 3h. 3m. after low water at Governors Island; it lasts about 35m., when the current begins to run flood, reaching a maximum velocity of 2.2 knots per hour at 5h. 43m. after low water at Governors Island.

See also current tables following.

NEW YORK BAY AND HUDSON RIVER.

	Locality of Station.					
	Hudson River, New York, off Thirty-ninth street.		The Narrows, New York Harbor.		Lower Bay, near West Side of East Bank.	
	Compass direction.	Velocity.	Compass direction.	Velocity.	Compass direction.	Velocity.
		Knots.		*Knots.*		*Knots.*
Hours before H. W. at Governors Island 2	NE. ½ N.	0.7	NNW.	1.1	N. ¾ W.	1.2
Hours before H. W. at Governors Island 1	NE. ½ N.	1.7	NNW.	1.2	N. ¾ W.	1.1
Hours before H. W. at Governors Island 0	NE. ½ N.	2.2	NNW.	0.7	N. by W.	0.8
Hours after H. W. at Governors Island 1	NE. ½ N.	1.9	NNW.	0.2	NNW.	0.2
Hours after H. W. at Governors Island 2	NE. ½ N.	1.1	S. by E.	0.6	SE. by E. ¼ E.	0.4
Hours after H. W. at Governors Island 3	NE. ½ N.	0.0	S. by E.	1.2	S. by E. ¼ E.	1.1
Hours before L. W. at Governors Island 2	SW. by S.	1.5	S. by E.	1.7	S.	1.9
Hours before L. W. at Governors Island 1	SW. by S.	2.5	S. by E.	1.5	S. ½ E.	2.2
Hours before L. W. at Governors Island 0	SW. by S.	3.1	S. by E.	1.1	S. ½ E.	1.9
Hours after L. W. at Governors Island 1	SW. by S.	2.7	S. by E.	0.6	S. ¼ W.	1.1
Hours after L. W. at Governors Island 2	SW. by S.	1.8	S. by E.	0.2	NNW. ¼ W.	0.2
Hours after L. W. at Governors Island 3	SW. by S.	0.5	NNW.	0.6	N. by W. ¾ W.	0.8

Off Thirty-ninth street.—In the path of the Hudson, from The Narrows to the Tappan Sea, it is running flood 15 feet below the surface fully an hour before the turning from ebb to flood at the surface.

Slack before ebb lasts from forty to fifty-five minutes.

Slack before flood lasts about thirty-five minutes.

The Narrows.—Slack water lasts from fifteen to thirty minutes. Both the ebb and flood currents appear first on the east side.

Near West Side of East Bank.—There is usually a slack before the flood current lasting about ten minutes.

	Locality of Station.					
	Lower Bay, Fourteen Feet Channel.		Lower Bay, East Channel.		Swash, Main, and Gedney Channels.	
	Compass direction.	Velocity.	Compass direction.	Velocity.	Compass direction.	Velocity.
		Knots.		*Knots.*		*Knots.*
Hours before H. W. at Sandy Hook 2	W.	1.6	NW.	1.9	W.	1.8
Hours before H. W. at Sandy Hook 1	W.	1.3	NW.	1.5	W.	1.5
Hours before H. W. at Sandy Hook 0	W.	0.8	NW.	1.0	W.	0.5
Hours after H. W. at Sandy Hook 1	W.	0.2	SE.	0.2	E.	0.7
Hours after H. W. at Sandy Hook 2	E.	0.6	SE.	1.0	E.	1.7
Hours after H. W. at Sandy Hook 3	E.	1.5	SE.	1.7	E.	2.1
Hours before L. W. at Sandy Hook 2	E.	1.9	SE.	2.2	E.	2.1
Hours before L. W. at Sandy Hook 1	E.	1.7	SE.	2.1	E.	1.7
Hours before L. W. at Sandy Hook 0	E.	1.2	SE.	1.5	E.	1.0
Hours after L. W. at Sandy Hook 1	E.	0.0	SE.	0.2	W.	0.0
Hours after L. W. at Sandy Hook 2	W.	0.9	NW.	1.0	W.	1.1
Hours after L. W. at Sandy Hook 3	W.	1.4	NW.	1.7	W.	1.7

Fourteen Feet Channel.—Both the ebb and flood currents set obliquely across the channel.

East Channel.—Slack water lasts about twenty-five minutes.

Swash, Main, and Gedney Channels.—Slack water lasts about twenty-five minutes.

The half-ebb currents in the Swash Channel set to the eastward strongly.

In the Main and Swash the flood current starts in on the north side of the channel thirty minutes earlier than on the south side, and the ebb current starts out on the south side of the channel thirty minutes earlier than on the north side.

GENERAL REMARKS.

ON THE APPROACHES TO NEW YORK BAY AND HARBOR FROM SEA.

The Gulf Stream first warns vessels approaching New York from the southeastward by its high temperature—say from 70° to 75° F., between the Latitudes of 36° and 39° N.—the water outside of the stream being about 51° F. in the summer time. The distance from Sandy Hook in a southeasterly direction to the outer edge of the Gulf Stream is about 430 miles and to its inner edge 240 miles. On striking soundings after crossing the stream—say in from 75 to 100 fathoms—a slight diminution of temperature will be perceived, and the water will change in color from a dark to a light blue. Depth is a better indication of position off this part of the coast than the character of the bottom, as the same characteristics may be found in widely different positions; the judicious use of the lead will always give sufficient warning of danger.

To the above means of ascertaining the vessel's position with reference to the coast are to be added several peculiarities in the character of the approaches.

IRREGULARITIES OF DEPTH.

Five Fathom Bank, off Delaware Bay Entrance, with a least depth of 15 feet, lies **ESE. ½ E.,** 15½ miles from Cape May Lighthouse. In several places this bank has only 3½ fathoms, but 10 to 15 fathoms will be found just to the eastward of it.

Two buoys mark the shoaler spots of the bank, and two light-vessels (Five Fathom Bank Light-vessel and Northeast End Light-vessel) are moored to the eastward of it as guides to clear it.

Mud Gorge.—The surveys of the sea approaches to New York have developed a continuous channel or ancient river course cut in the sea bed from off Sandy Hook bar out nearly to the ocean basin. The sea bed, for a distance of nearly 100 miles off Sandy Hook, until a depth of 40 to 60 fathoms is reached, is composed of *sand.* In some places the sandy bottom has black specks, in others yellow specks, and again pebbles and broken shells are found in it. The continuous gully cutting to the southeastward through this bed of sand has a bottom of *mud or clay.* Near its outer or seaward end this is a green ooze mixed with sand. Farther in it becomes a blue clay mixed with some sand; but whatever the character of the bottom in particular parts of the gully, its general features are so different from those of the sand bed through which it cuts that there is no room for mistake. It must be borne in mind, however, that the deep channel in which a bottom of mud is found is narrow in places, requiring quick work with the lead to pick it up.

The first indications of this remarkable channel are found about 5 miles to the southeastward of Sandy Hook Light-vessel, where the depth of water is about 19 fathoms. For about 10 miles from this point the channel or gully follows a southerly course, with a width of from ¾ to 1 mile, and a depth increasing gradually from 19 to 33 fathoms between banks over which the depth is the same as that of the adjacent sea bed—about 15 to 18 fathoms. The gully turns more to the eastward in the next 5 miles, after which it has a general direction about **SE. ⅝ E.** for nearly 60 miles to a sand bar extending across it. Throughout the second 10 miles the depth remains nearly constant at about 35 fathoms; the banks sink to 22 fathoms below the surface. In the next 15 miles the depth of the gully increases to 42 fathoms, the banks conforming to the change. Thence to the bar, a distance of about 40 miles, the depth in the channel remains about the same—41 to 43 fathoms—while the banks gradually sink to the same level. The bar, over which the depth is also about 43 fathoms, is near the outer limit of the sand bed already mentioned.

Outside the bar, which is 10 miles wide, the channel is found again as a deep ravine extending to the eastward about 25 miles farther, with a depth of from 200 to about 475 fathoms between banks over which the depth, increasing offshore, is from 45 to 200 fathoms. The average width of this ravine is about 3 miles. Specimens of bottom from it are the same as from its banks and the adjacent flats—a green sandy mud. A narrow ridge, over which the depth is about 200 fathoms, separates the outer end of the ravine from the ocean basin.

Cholera Bank.—This bank, although a comparatively short distance from Sandy Hook Light-vessel and but little elevated above the surrounding bottom, serves by the characteristic soundings (which show rocky bottom) to indicate the navigator's position. It extends in an easterly and westerly direction for several miles, with a depth from 10 to 11 fathoms and an average width **N.** and **S.** of about 1 mile. It bears from Sandy Hook Light-vessel about **SE.** by **E.** ½ **E.**, distant about 10 to 12 miles.

The 20-fathom line off the Jersey coast also serves as a guide to vessels approaching from the southward in thick weather. If a vessel from the southward, striking 20 fathoms to the northward of Barnegat, steers about **N.** by **W.** ¾ **W.**, she would be apt to keep in not less than 20 fathoms and can thus work up toward the light-vessel. Such course will be apt, also, to strike the mud gorge already described, which, with the aid of the chart of the approaches to New York, may be followed up for the light-vessel. Inasmuch as the wind current—owing to the prevailing northeasterly winds—sets to the westward toward the Jersey coast, it will be well, should less than 20 fathoms be obtained before the soundings in mud gorge indicate a near approach to the light-vessel, to haul to the eastward until the water deepens, and then proceed again to the northward. Should the weather continue thick, the ship's head should be put offshore, keeping outside of 20 fathoms until the weather clears.

Soundings on the Long Island and New Jersey Coasts.—Among the irregularities of bottom which serve as indications of a vessel's position when approaching New York Entrance may be mentioned the soundings off the coasts of Long Island and New Jersey. The water shoals very gradually going to the westward toward the latter coast; and very rapidly if standing to the northward toward Long Island. From the peculiar position, also, of the two shores relatively to each other and to the waters of New York Bay, it follows that the course which will deepen the water, if the vessel is on the Long Island side of the approach, will shoal it if she is on the New Jersey coast. This is very important in thick weather. The following rule, based upon the above fact, is safe and reliable: Striking 15 fathoms and in doubt as to position, steer **SW.** by **S.** If the water deepens, the vessel is on the Long Island shore; if it shoals gradually, she is on the Jersey coast. In the former case you may stand off and on, taking care *not* to go inside of 12 fathoms, and so work up toward the light-vessel. In the latter case the ship's head should at once be put offshore (as nearly **E.** by **S.** as possible), and you should stand off in that direction until the soundings give 20 fathoms, which is at a safe distance from land. A stranger finding himself on the Jersey coast in thick weather should not attempt to run in toward the light-vessel, but should keep offshore until the weather clears.

Pilot boats cruise offshore between Fire Island and Barnegat. For information relative to pilots see Appendix I.

CURRENTS.

In approaching from the eastward from the vicinity of Nantucket Shoals Light-vessel a slight allowance should be made for the southwesterly set of the wind current—caused by the prevailing northeasterly winds. Should the wind be to the northward of **E.** it has been customary to allow, in order to make the course good, a set of the current to the southwestward of at least 12 miles in every twenty-four hours. It may be said that the failure to use the lead has caused many vessels to make the Jersey coast to the southward of Sandy Hook instead of making the light-vessel or the southern coast of Long Island. The lead should be used at regular intervals, and when nearing the entrance (say in longitude 73° 15′ **W.**) soundings should be taken at intervals of 2 miles, the depth from this point until the Sandy Hook Light-vessel is reached being in no place greater than 15 fathoms and ranging as low as 12. Should the weather be thick and soundings be obtained as low as 10 fathoms, the ship's head should be immediately put offshore. Striking soundings in 15 fathoms and in doubt as to position, **SW.** by **S.** should be steered. If the soundings increase, you are on the Long Island shore; if they gradually diminish, you have fallen to the southward of the true course and overrun your distance and are on the Jersey coast. In the former case the ship may stand off and on, taking care not to go inside of 12 fathoms, and so gradually work up toward the light-vessel. In the latter case her head must at once be put offshore (as nearly **E.** by **S.** as possible) until 20 fathoms is reached, as before described.

Observations made between Nantucket and Cape May have developed the existence of weak tidal currents veering around the compass, accompanied by a general drift of the sea to the southwestward amounting to about 7 miles in twenty-four hours.

Tidal currents on south coast of Long Island.—Under ordinary circumstances the set of the flood is directly along the beach; off Montauk the ebb sets to the southward, and the flood to the northward. Between Shinnecock and Fire Island the ebb set sometimes to the eastward and sometimes to the northeastward, in the latter case obliquely on to the beach. Between Fire Island and Sandy Hook the current of ebb sets generally to the southeastward; while the flood (especially in the neighborhood of the inlets) has a tendency to set to the northwestward and is quite strong, running from 1½ miles to 2½ miles an hour. The current in the vicinity of Montauk is quite strong, the flood running from 1½ miles to 2 miles an hour, and the ebb being even stronger. Between Shinnecock and Fire Island, however, it rarely reaches the velocity of 1 mile.

In thick weather and during strong winds from the southward—especially southeast snowstorms—we would recommend strangers on this coast under no circumstances to go inside of 15 fathoms, sounding frequently.

Tidal currents on the coast of New Jersey, when uninfluenced by the winds, as a general rule, follow the trend of the shore except close in near the entrance of the several inlets, where the current of flood sets inshore and that of ebb offshore.

In thick or foggy weather, when the ship's reckoning indicates that she is near the Jersey coast, great care should be taken to make frequent and accurate soundings with an armed lead. The soundings are not sufficiently characteristic along this part of the coast to make it possible to give precise rules for determining the ship's position by the depth of water or character of the bottom. There is, however, one rule which, if strictly adhered to, will keep the vessel out of danger until the weather clears and her position can be accurately determined, viz: Should at any time a sounding of 10 fathoms or less be obtained, the course should be immediately changed to the eastward until the water deepens to 14 fathoms; after which care should be taken to keep outside of that depth.

In beating to windward in thick weather, vessels on the inshore tack, to the southward of Barnegat, should go about as soon as they strike 10 fathoms; and when to the northward of Barnegat as soon as they strike 11 fathoms. A stranger overtaken by thick weather when, from his reckoning and the character of the soundings, he has reason to believe he is too near the coast, should put the ship's head offshore and stand off and on under easy sail, taking frequent soundings.

SAILING DIRECTIONS, NEW YORK BAY AND HARBOR.

General remarks on approaches, etc., to New York Harbor are given on pages 135–137.

The channels leading across the bar at the entrance to New York Lower Bay are described on page 131. The sailing directions for these channels are given in sections in the order of their importance. No directions for the Fourteen-Feet Channel are given as it is not buoyed and can only be used by light-draft vessels whose masters are well acquainted with it.

In following the sailing directions reference should be made to the table of lights on pages 14–16 for description of them and the location of the ranges.

Strangers should not attempt to enter the harbor in thick weather.

It should be remembered that in this harbor and vicinity the bell, nun, and can buoys are generally replaced during the winter season by spar buoys.

1. ***Entering through Gedney and Main Channels.***—Steer **WNW. ¼ W.** from Sandy Hook Light-vessel and pass close to Gedney Channel whistling buoy.

Continue the **WNW. ¼ W.** course, passing between the buoys (lighted by electricity at night) marking Gedney Channel, until abreast of buoy No. E 7, when the vessel should be on the Main Channel range (Point Comfort beacon in range with Waackaack beacon). Now change the course to **W.** by **S.** and stand in through the Main Channel, keeping on the range.

Remarks.—On the **WNW. ¼ W.** course the high Centennial Tower on Coney Island will be seen to the northwestward, Romer Shoal Lighthouse (see table, page 16) will be a little on the starboard bow, Staten Island ahead, and North Hook beacon, South beacon, and Sandy Hook Lighthouse will be on the port bow. Gedney Channel whistling buoy (black and white perpendicular stripes) will be passed close-to and the buoys marking Gedney Channel will be made ahead; on the north side of the channel are a red first-class nun buoy (No. 2 G E) and four red spar buoys, Nos. E 2, E 4, E 6, and E 8, having red electric lights at night, and on the south side are two black first-class can buoys (No. 1 G E and No. G) and four black spar buoys, E 1, E 3, E 5, and E 7, with white electric lights at night.

On the **W.** by **S.** course a number of buoys will be passed, the color and number indicating on which side they are to be left. If the range can not be seen and followed, give the two red buoys, one with perch and square, on the starboard hand, a berth of 300 yards. The course leads about ¼ mile to the northward of the black bell buoy on the shoal, making out ⅝ mile in a northeasterly direction from North Hook beacon.

For a description of the lighthouses and ranges, see table, page 16.

Dangers.—*North of the red buoys* of Gedney Channel there is a shoal, with 14 to 23 feet of water, extending northward to the East Channel, and westward connecting with Romer Shoal. (See description, page 140.)

South of the line of black buoys of Gedney Channel, between it and South Channel, there is 20 to 27 feet of water.

Flynns Knoll, lying north of the Main Channel, is a sand shoal 1 mile long **WNW.** and **ESE.** and has from 10½ to 17 feet of water over it. At its western end it sends off a spur known as **Southwest Spit**, ½ mile long, with from 13½ to 17 feet over it.

2. ***Around Southwest Spit.***—Standing in on the **W.** by **S.** course, as directed in section 1, preceding, after the North Hook beacon is passed, South Hook beacon and Sandy Hook Lighthouse will gradually come in range. As soon as they are in range, bearing **SE.** by **E. ¼ E.**, steer **NW.** by **W. ¼ W.** and keep the range for a little over ½ mile; the vessel should then be near Southwest Spit buoys (nun, red, with perch and ball, and a red spar buoy near it which has a red electric light at night) and nearly on the Chapel Hill Range (see page 16), a black spar buoy showing a white electric light should be ahead, distant about 300 yards. As soon as Conover beacon and Chapel Hill beacon are in range, bearing **S.** by **W. ¼ W.**, bring them over the stern and steer **N.** by **E. ¼ E.**, keeping the range and following the directions under section 3 following.

In beating, do not go north of the line of buoys south of Flynns Knoll and Southwest Spit.

Remarks.—The North Hook beacon is at the northern extremity of Sandy Hook, and will be about 2 points on the port quarter when South Hook beacon and Sandy Hook Lighthouse come in range, and Conover and Chapel Hill beacons (often difficult to pick up) will then bear about **SSW. ¼ W.**

The lighthouses and beacons are described in the table on page 16.

Several red buoys will be seen to the northward, which should be given a berth of ¼ mile, and the western one, surmounted by a perch and ball, marks the turning point into Chapel Hill Cut, and should be left about 200 yards on the starboard hand.

There is 25 feet of water about 500 yards to the westward of red buoy No. 12 (with perch and ball) and just to the westward of Chapel Hill Range a black buoy showing a white electric light is placed on the western edge of the channel at this place and should be left on the port hand.

Dangers.—**Flynns Knoll** and **Southwest Spit** are described under section 1 preceding.

3. ***Up the Bay.***—When Conover and Chapel Hill beacons are in range, bearing **S.** by **W. ¼ W.**, steer **N.** by **E. ¼ E.** until above Hoffman Island, following the buoyed channel on this course, and keeping the range while visible, until Coney Island Lighthouse (on western end of Coney Island, see page 16,) bears **SE.** by **E. ¼ E.**, then follow the directions under section 4 following.

In beating, be guided by the chart and the buoys.

Remarks.—A number of buoys will be passed, the color and number indicating on which hand they are to be left.

A white buoy lying about ⅜ mile to the northwestward of buoy No. C 5 is not to be considered.

After passing black can buoy No. 7, the Junction buoy (nun, red and black horizontal stripes, surmounted by a perch and square) at the western end of Swash Channel, will be left about 300 yards on the starboard hand.

Romer Shoal Lighthouse will be left about 1⅜ miles on the starboard hand.

Swinburn Island and Hoffmann Island, to the westward of the course, are low artificial islands on the shoalest part of West Bank, with several buildings upon them.

Coney Island Lighthouse (see page 16) will be left 1 mile on the starboard hand, and farther to the eastward the high tower on Coney Island is prominent.

Following the course up the bay, Fort Tompkins and the lighthouse named from it will be seen on the hills on the western shore of The Narrows. On the opposite shore is Fort Hamilton, off which is Fort Lafayette, low and circular in shape (here there is a fog signal, but no light. See page 16). The tidal indicator is at Fort Hamilton wharf, see page 133.

Dangers.—**Flynns Knoll** is described on page 138.

East Knolls separating the Main and Swash channels, has from 10½ to 16 feet of water over it, and is about 1½ miles long **NNW.** and **SSE.** and ¾ mile wide.

West Knolls, to the westward of the channel, nearly abreast East Knolls, is about ⅛ mile long **NNE.** ½ **E.** and **SSW.** ½ **W.**, with 15 feet over it, and over 3 fathoms on all sides.

Romer Shoal is described on page 140.

Staten Island Flats make off from the eastern shore of that island from 1¾ to 2⅝ miles, with depths over them from 1 to 16 feet. Round Shoal, Old Orchard Shoal, and West Bank are parts of these flats.

West Bank, which limits the western side of the Main Channel, forms the northeastern part of Staten Island Flats and makes off in a **S.** ¼ **W.** direction from Fort Tompkins for a little over 3 miles. It has from 1 to 10 feet over it. Its eastern side is bold-to, but is well marked by black buoys and by Swinburn and Hoffmann islands, neither of which should be approached closer than ⅜ mile.

East Bank, an extensive sand shoal, extends to the southward from Coney Island and has from 3 to 18 feet of water over it. The shoal lumps are scattered all over the bank, and care is necessary when near it. In passing it, to keep clear, do not bring Fort Lafayette on any bearing to the westward of **N.** ½ **W.**

4. ***Through The Narrows.***—When Coney Island Lighthouse bears **SE.** by **E.** ¼ **E.** (Fort Tompkins Lighthouse bearing **NW.** by **N.**), steer **N.** by **W.** through The Narrows to abreast of Tompkinsville and then follow the directions in section 5 following:

If beating do not go to the westward of the black buoys marking West Bank, or to the eastward of a straight line from Fort Lafayette to Coney Island Lighthouse.

Remarks.—On the **N.** by **W.** course Robbins Reef Lighthouse will be a little on the starboard bow and may be steered for.

The towns of Clifton and Stapleton, on Staten Island, will be passed, and the course leads up to abreast Tompkinsville. When past Fort Lafayette do not go to the eastward of a line joining it and Robbins Reef Lighthouse, until within 1 mile of the latter, in order to keep clear of the point of the shoal making to the southwestward from Gowanus Bay.

Dangers.—**Craven Shoal** will be left on the port hand; this is a detached lump with 18 feet over it, lying about 1 mile **SSE.** from Fort Tompkins Lighthouse. On its eastern side is a buoy painted red and black in horizontal stripes.

There are no dangers in The Narrows if the eastern shore be given a berth of ¼ mile.

5. ***From Tompkinsville to New York.***—The course from off Tompkinsville is about **NE.** by **N.**, carrying not less than 5 fathoms of water. If intending to anchor, conform to the limits prescribed in Appendix I.

Remarks.—Directly ahead is the borough of Manhattan (New York City), at the extreme lower end of which is the Battery. The **Brooklyn Bridge** and **Governors Island** are prominent on the starboard bow. On the port bow are Bedloe Island and Ellis Island. The highest point of the colossal statue "**Liberty Enlightening the World,**" on Bedloe Island, is more than 300 feet above the water and has an electric light visible about 24 miles.

A little to the southward of Bedloe Island there is a dredged channel, with a depth of 25½ feet, leading in to Clearmont wharves. This channel is narrow and is marked by buoys. On the western side of the channel between Stapleton and the Battery are a number of white buoys which mark the anchorage limits.

Dangers.—The channel is unobstructed; the dangers limiting it are **Gowanus Flats** and **Governors Island Shoal** on the starboard hand and on the port hand the **Jersey** (or **Bergen**) **Flats.** Several buoys will be passed—red ones on the starboard hand, black ones on the port hand.

Gowanus Flats with from 7 to 18 feet of water over them make off in a southwesterly direction for 2½ miles from Red Hook (the northern point at the entrance to Gowanus Bay). Gowanus Flats southwest end buoy (bell, red) lies a little over 1 mile **SE.** by **S.** from Robbins Reef Lighthouse, and to the eastward of the course up the bay and to the westward of the entrance to Gowanus Bay. Bay Ridge Channel with a depth of 26 feet and Red Hook Channel with a depth of 26 feet make in along the eastern side of the flats. The **NW.** corner of Governors Island (low circular fort with light, see page 16) bearing to the eastward of **NE.** by **N.** gives these flats a good berth.

Jersey Flats are very shoal, being bare in places, with a ruling depth of 3 to 6 feet. **Robbins Reef** and **Oyster Island Flats** form parts of this shoal ground. The eastern edge of the flats is marked by Robbins Reef Lighthouse, Bedloe Island, Ellis Island, and a number of black buoys. There is a bell buoy and a gas-lighted buoy near the southeastern point of the flats and to the southward of Robbins Reef Lighthouse.

Governors Island shoal bell buoy (black) is left on the starboard hand going up the main channel; it is at the lower end of the shoal making off to the southwestward from the island. The depth just inside the buoy is 17 feet, decreasing toward the island; and for a distance of ¼ mile to the southwestward of the buoy the shoal has a depth of 23 feet and less.

Governors Island is occupied by Fort Columbus, and here are the headquarters of the military division of the Atlantic, commanded by a general officer of the Army.

6. ***To enter the East River on the Range north of Governors Island.***—When Brooklyn bridge shows to the northward of Castle William, look for St. Margaret's Hotel (Brooklyn), and when the hotel is nearly in range with Castle William the central elevator will be seen to the left of it. Commence turning with a port helm so as to be pointed on the range (see remarks following) before Red Hook chimney is shut in by Castle William. Keep close on the range until the vessel has pier 8 (New York) in line looking up the pier; then follow a mid-channel course up the river.

Remarks.—The range is the northwest corner (marked by a white post and square white target with black center) of the upper structure of the central elevator (yellow structure on pier 9, Brooklyn) in line with the center of the northwest tower of St. Margaret's Hotel (most prominent brick building with 3 towers, to the right of Brooklyn Bridge); it leads through the deepest water between Governors Island and the Battery and is good at mean low water, if closely followed, for vessels of 26 feet or less draft. At high water the range leads about in the middle of a channel 870 feet wide with a depth of over 26 feet (see page 123).

Dangers.—**Dimond Reef** lies about 150 feet to the southward of the range and has a least depth of about 26 feet over it.

Shoals with a depth of less than 26 feet extend to the southward from the Battery to within 300 feet of the range.

Coenties Reef, with a depth of about 26 feet over it, lies 275 yards from the end of pier 7 (New York) and about 320 feet to the northward of the range.

1 A. ***Entering through Gedney and Swash channels.***—Follow the directions in section 1, page 137, until red buoy No. B 2, with perch and square, is on the starboard beam, then haul to the northward and bring Elm Tree and New Dorp beacons (see page 16) in range bearing **NW. ½ N.** Keep this range (passing about 400 yards to the southward of Romer Shoal Lighthouse) until past the red bell buoy at the western end of Swash Channel. Now change course to **N.** by **E. ¼ E.** (Conover and Chapel Hill beacons in range astern) and when Coney Island Lighthouse bears **SE.** by **E. ¼ E.** follow the directions in section 4, page 139.

Remarks.—On **NW. ½ N.** course Scotland Light-vessel will be directly astern, Romer Shoal buoys (nuns, Nos. S 2 and S 4) and Romer Shoal Lighthouse will be left on the starboard hand, and black buoys (Nos. S 1 and S 3), also a red and black horizontally striped buoy, will be left well on the port hand.

At the western end of the Swash Channel, besides the red bell buoy (on the northern side), there is a junction buoy (red and black horizontal stripes surmounted by a perch and square) on the southern side of the channel at its junction with the main channel up the bay.

The currents of half ebb in the Swash Channel set to the eastward strong, and care must be taken not to be set on to Romer Shoal.

Dangers.—The dangers to the southward of Swash Channel are described on page 138.

Romer Shoal, with 3 to 18 feet over it, extends about 3¼ miles in a northwesterly and southeasterly direction, and lies between Swash Channel and East Channel. It is well marked by buoys and by Romer Shoal Lighthouse, which is near the center, on the Swash Channel side.

1 B. ***Entering through South and Swash channels.***—From Scotland Light-vessel steer **NW. ½ N.**, passing close to the two mid-channel buoys (black and white perpendicular stripes) and keeping Elm Tree and New Dorp beacons in range until between the bell buoy (red) and the junction buoy (red and black horizontal stripes with perch and square) at the western end of Swash Channel. Now change the course to **N.** by **E. ¼ E.** and stand up the bay, following the directions in section 4, page 139.

Remarks.—In crossing the Main Channel, from South to Swash channel, black buoy No. B 1 and red buoy No. B 2 will be left on the starboard hand and Palestine Shoal buoy (red and black horizontal stripes) on the port.

See Remarks and Dangers under section 1 A preceding. See also currents, on pages 133, 134.

1 C. ***Entering through East Channel.***—This channel is not much used; it is not safe for vessels drawing over 17 feet, even with a smooth sea, and should not be attempted by strangers. Keep the Centennial Tower on Coney Island bearing to the westward of **N.** by **W.** ½ **W.** until Romer Shoal Lighthouse bears **W.** ¾ **N.** Steer for this lighthouse on this bearing until Sandy Hook Lighthouse bears **SSW.** ⅛ **W.** and then change the course to **NW.**, leaving the black buoys on the port and the red buoys on the starboard hand. When red buoy (No. 6) bears about **N.** haul to the northward, pass to the westward of it, and steer **N.** ½ **W.** until Coney Island Lighthouse bears **SE.** by **E.** ¼ **E.**, then follow the directions under section 4, page 139.

Remarks.—Although this channel is buoyed, strangers should not use it.

Allowance must be made for the currents; the flood sets toward Romer Shoal, the ebb toward East Bank.

The **W.** ¾ **N.** course leads about ¼ mile north of black buoy No. 1 and nearly directly for black buoy No. 3; the course is changed to **NW.** when about midway between these buoys. The three red buoys (Nos. 2, 4, and 6) marking the northern edge of the channel are gas-lighted, and each shows a fixed red light at night.

Dangers.—**Romer Shoal**, described above, forms the southern limit of the channel, and a part of **East Bank** rises abruptly on the northern side of the channel.

1 D. ***Entering through False Hook Channel.***—This channel has a least depth of 19 feet, but it should not be attempted by vessels drawing over 16 feet or by strangers. With Navesink Lighthouses bearing to the westward of **WSW.** bring Sandy Hook Lighthouse to bear **NNW.** ¾ **W.** and steer for it. This course will lead about 400 yards to the westward of Outer Middle Ground buoy (spar, red, No. 2) near the entrance. When this buoy bears **E.**, distance about 400 yards, steer **N.** by **W.** ½ **W.** and pass 200 to 300 yards to the westward of **The Oil Spot** buoy (spar, red, No. 4). Continue the **N.** by **W.** ½ **W.** course nearly parallel to the beach until North Hook beacon bears **W.** by **N.**, then change course to **NNE.** ½ **E.** passing to the northward of False Hook Shoal buoy (nun, red and black horizontal stripes) and close to the westward of Bayside Range Cut buoy (can, black, No. B 3) and out into the Main Channel. Now turn to the westward and enter through the Main Channel (see directions, section 1, page 137) or continue **NNE.** ½ **E.** until on the Swash Channel Range and enter as directed, section 1 B, page 140.

Remarks.—On the **N.** by **W.** ½ **W.** course the eastern shore of Sandy Hook will be given a berth of about ¼ mile, but it may be approached with safety to within ⅛ mile.

Dangers.—**Outer Middle Ground**, with 18 to 21 feet over it; **Oil Spot**, with 10 to 19 feet over it, and **False Hook Shoal**, with 16 to 18 feet over it, lie to the eastward of the channel (between it and South Channel) in a **NNW.** and **SSE.** direction, and are inclosed by five buoys, two red buoys on the western side, two black buoys on the eastern side, and a buoy (red and black horizontal stripes) at the northern end of False Hook Shoal, about **E.** ¾ **S.** from North Hook beacon.

A **shoal** with 11 to 17 feet over it makes out for about ⅝ of a mile in a northeasterly direction from North Hook beacon. Its northeastern extremity is marked by a black bell buoy, which should be given a berth of at least 450 yards while to the southward of it.

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APPENDIX 1.

PILOTS AND PILOTAGE, HARBOR CONTROL, QUARANTINE, ETC.

CONNECTICUT.

Extracts from Revision of 1887, General Statutes of the State of Connecticut.

TITLE LVII, CHAPTER CXCVII.

1875. Harbor masters, how appointed, and tenure of office.

Section 3223. The Governor shall appoint a harbor master, and may appoint a deputy harbor master, for each of the harbors of New Haven, Norwich, Bridgeport, Stamford, Norwalk, Stonington, and New London, who shall severally hold office for three years from the time of their appointment, and until others shall be appointed in their places.

Branford Harbor, harbor masters for.

Sec. 3224. The Governor shall appoint a harbor master and a deputy harbor master for the harbor of Branford. * * * The jurisdiction of said harbor masters shall include the harbor of Branford and Branford River as far up said river as to Hobart's bridge, so called, and the harbor of Stony Creek and the adjacent islands, known as the Thimble Islands.

Sec. 3225. The Governor may appoint a suitable number of harbor masters and deputy harbor masters in any town of this State which has navigable waters within its limits. * * *

Powers.

Sec. 3227. Each harbor master may station all vessels riding at anchor in the channel of the harbor under his care, and remove, from time to time, such vessels within said channels as are not employed in receiving or discharging their cargoes, to make room for the passage of other vessels up or down said channels, and shall be the sole judge of the fact, whether any vessel so at anchor shall be so in the channel as to obstruct or hinder the passage of any other vessel; and may determine how far within such harbor, and in what instances, masters or others having charge of vessels at anchor within said channel, shall remove the same; and upon the application of the owner or lessee of any wharf, dock, or pier in such harbor, shall station any vessel lying at or adjacent to such wharf, dock, or pier, or remove it therefrom to make room for the dockage or passage of any other vessel, when in the judgment of said harbor master the interest and convenience of commerce or navigation shall require, and may exercise all the powers and duties with reference to vessels at anchor in said harbor. * * *

Jurisdiction of harbor master of New Haven.

Sec. 3229. The harbor master of New Haven harbor shall have, in relation to all vessels lying at any of the wharves, docks, or piers between Tomlinson's bridge and Heaton's wharf, the same powers and duties as in relation to vessels lying in the channel of said harbor.

Mooring near basin-wharf in New Haven harbor.

Sec. 3232. If any vessel shall be unnecessarily moored in the channel in New Haven harbor, which extends from the sluice in and through the wharf of the New Haven and Northampton Company to the main channel, so as to obstruct the free passage of vessels through said channel, the master, or person in command of such vessel at the time she is so moored shall be fined ten dollars, and also one dollar an hour for each hour above twelve that said vessel shall be so moored. * * *

Vessels subject to payment of pilotage.

Sec. 3235. All inward and outward bound vessels of foreign bottom entering any port in this State, for the purpose of loading or unloading, and drawing nine feet of water or over, shall be subject to the payment of pilotage, if spoken by a pilot before entering such port; but vessels engaged in the coasting trade, and coming by the way of New York, fishing-smacks, vessels engaged in the oyster trade, canal boats, barges, and tugboats shall not be so subject. * * *

Vessels exempt.

Vessels arriving at Hartford to pay tolls to the port wardens.

Sec. 3236. The person in charge of every vessel of a draft of more than six feet, and of over fifty tons burden, carrying cargoes to the city of Hartford from any port or place beyond the mouth of Connecticut River, and of every steamer engaged in towing on said river, shall report to the port warden of the city of Hartford within twenty-four hours after every arrival at said city, stating the name and registered tonnage of the same, and pay to him for every vessel carrying cargoes, and for every steamer engaged in towing, a toll of two cents a ton upon its registered tonnage, except that where the actual weight of cargo can be determined by its bills of lading, said toll shall be imposed on said actual tonnage, at the rate of one cent a ton; and the Hartford and New York Transportation Company shall, on the first day of June in each year, pay to said port warden one thousand dollars, in lieu of all tolls imposed by this section.

Refuse not to be deposited in the waters of this State.

Sec. 3242. Every proprietor or charterer of any steamboat or vessel from the furnace of which any refuse shall be thrown into the waters of any harbor, or river, in this State, shall forfeit for the first offense one hundred dollars, and for every subsequent offense two hundred dollars. * * *

Dumping in New Haven or Bridgeport harbors.

Sec. 3246. Every person who shall deposit or assist in depositing any substance except oyster shells in New Haven harbor, or off its mouth within two miles of Southwest Ledge Lighthouse, or in Bridgeport harbor, or off its mouth within three hundred feet outside of the outer bar, so called, or in the waters adjacent to said harbor below Yellow and Old Mill bridges, or in Stamford harbor, or off its mouth inside of a direct line drawn from Captain Island Light, off Greenwich, to the buoy on Old Cow Reef off Shippan Point, shall be fined not less than fifty or more than five hundred dollars, or imprisoned not more than six months, or both. * * *

In Stamford harbor.

Dumping in Norwalk harbor prohibited.

Sec. 3248. Every person who shall deposit or assist in depositing any mud or other substance, except oyster shells or other material necessary for making oyster beds, in Norwalk harbor, or at any place off the town of Norwalk inside of a line running due east and west from a point due south a distance of one mile from Greens Reef Government buoy, or who shall deposit any substance in any of said waters during the night season, shall be fined not less than fifty nor more than five hundred dollars, or imprisoned not more than six months, or both.

Harbor masters' action for fees.

Sec. 3736. Harbor masters shall receive three dollars per day for the time actually employed in the duties of their office, and such fees may be recovered of the owners of the vessels over which they exercise or perform any of the duties of their office, in an action founded upon this statute.

Extracts from Revision of 1887, General Statutes of the State of Connecticut, as amended 1895.

TITLE XLIII, CHAPTER CLV.

PUBLIC HEALTH AND SAFETY.

Town board of health, how constituted.

Sec. 2588. The justices of the peace and selectmen in each town and such reputable physicians resident in said town as shall be chosen for that purpose by said justices and selectmen shall constitute a board of health. * * *

Notices.

Sec. 2593. It shall be sufficient notice to all persons of any regulation of such board, if it be published in a newspaper published in the town, or posted for three days on each sign post in said town. * * *

Quarantine, what vessels are subject to, and how enforced.

Sec. 2594. The board of health in any town, contiguous to navigable waters, may assign within the town, or the waters contiguous thereto, the port or place in any harbor, road, river, or bay, where vessels coming into the limits of such town or into such contiguous waters, shall, if need be, perform quarantine; and every vessel which shall come from any foreign port or place, or, between the first day of June and the first day of November, come from any port or place in the United States south of the capes of Delaware Bay, or in the British provinces, and come to anchor in any such harbor, road, bay, river, or contiguous waters, if any place for quarantine shall have been assigned as aforesaid, shall come to anchor and lie at such place so assigned, and at no other place, until discharged in manner as is hereinafter provided; and the master of every vessel coming to anchor as aforesaid shall forthwith make signal for a health officer by hoisting colors

in the shrouds or, if need be, may send a person on shore, who shall notify immediately the health officer of the port, or, if there be no health officer, a member of the board of health, of the arrival of such vessel, and forthwith return on board; but the provisions of this section shall not apply to any such vessel which shall have entered any port or place north of said capes, where there are quarantine regulations, and been visited by a health officer, received a clean bill of health, and been permitted to go, and has actually gone to the wharves and unloaded thereat; and such clean bill of health or a certified copy thereof shall be left or filed at the office of the board of health of the town or city having jurisdiction over said port within twenty-four hours after the arrival of such vessel.

What vessels are not subject to quarantine.

Sec. 2595. When the board of health in any town shall deem it expedient that vessels arriving in its town or in the waters contiguous thereto, from any port or place in the United States, north of the capes of the Delaware Bay, should perform quarantine, such board may by an order, published or posted as aforesaid, subject such vessels to quarantine in the same manner as if they arrived from any foreign port or place.

Vessels from northern home ports.

Sec. 2596. Any vessel subject to quarantine, arriving in the harbor of New Haven, on board of which there shall be no sickness at the time of such arrival, or on board of which, during the passage, there shall have been no case of malignant or contagious disease, may come to and make fast at the end of any public wharf in said harbor, without incurring any penalty for violation of the quarantine laws; but no person shall be allowed to leave said vessel except to make fast to the wharf, until said vessel shall have been visited by a health officer, and by him discharged from quarantine; and if the health officer, on visiting any such vessel, shall find any such sickness on board as, in his opinion, shall make it proper for him to cause such vessel to continue subject to quarantine, he shall order it to be removed to such place as shall be assigned as a place of quarantine. But this section shall not apply to any vessels coming from any foreign port or ports, except a port in Canada and the British provinces.

Vessels arriving at New Haven.

When health officer may order such vessel removed.

Any vessel from any port or place having sickness of any kind on board shall be subject to inspection and quarantine before making fast to any wharf.

Sec. 2597. * * * and every vessel so subjected to quarantine shall perform quarantine under the regulations of such board of health.

Sec. 2598. The board of health may establish the fees, not exceeding five dollars, which the health officer shall be entitled to receive for visiting a vessel as aforesaid, and the master or owner of such vessel shall pay the same to such health officer.

Fees of health officers.

Sec. 2599. No master of any vessel, liable to perform quarantine as aforesaid, shall fraudulently attempt to elude a quarantine by false declarations of the port or place from whence he came, or land, or suffer to be landed from his vessel any person or thing, except in the manner hereinbefore provided, nor permit any person to board such vessel, before it shall have been visited as aforesaid.

Penalty for attempting to elude quarantine.

Sec. 2600. When a health officer or member of the board of health shall, on visiting any vessel as aforesaid, think it necessary that it should be cleansed or purified, he shall direct its master to hoist a white flag on the head of the mainmast, there to be kept during the daytime; and shall apply without delay to the board of health to direct the time and manner in which the cargo on board such vessel shall be in part or in whole cleansed or purified; and such vessel, or such part thereof as may be infected, shall be cleansed in such method as such board shall direct. And when such vessel shall contain any person ill of a contagious or infectious disease, he shall be removed on shore to such place as said board may direct, and nursed and provided for, in the manner prescribed by law. And such board may also cause any passenger on board, and such of the mariners as the master shall not require to continue on board, to be removed on shore and secluded for fourteen days, in such place as the board shall direct; and if any person shall, without such permission, visit any person so confined, he shall be deemed to be contaminated with infection, and be liable to the same confinement and penalty as are imposed upon the person visited.

Health officers may order vessels to be cleansed, etc.

Persons diseased to be removed and secluded.

Penalty for escaping, or associating with those who escape.

Sec. 2601. If the board of health shall find that any certificate of health granted by them was obtained by fraud or false representation, or be of opinion that any vessel, person, or cargo, should perform further quarantine for the purpose of being cleansed or purified, on notice thereof being given by the board to such person, or the owner, master, supercargo or consignee

Certificates obtained by fraud or mistake, void.

of such vessel or cargo, as the case may be, the same shall in all respects be liable to be proceeded with in the same manner as if no certificate of health had been given.

Board may interdict communication with infected places.

Sec. 2602. The board of health of any town may interdict communication between it and any other town or place in which any contagious or malignant disease is prevalent.

Sec. 2609. Every person who shall violate any provision of the preceding sections of this chapter or legal order of a board of health for which no other penalty is provided, shall be fined not more than five hundred dollars or imprisoned not more than six months, or both.

NEW YORK.

PILOT LAWS IN REFERENCE TO EAST RIVER.*

(In effect November, 1899.)

Extracts from the New York City Consolidation Act of 1882.

Pilotage fees, etc.

Sec. 6. It shall be lawful for any [of the duly authorized Hell Gate pilots] to demand and receive from any person who shall employ any of them to pilot any vessel of the burden of ninety-five tons and upward, or from the consignee or owner of said vessel, from the eastward of Sands Point or Execution Rocks, or to take charge of any such vessel at or to the eastward of Sands Point or Execution Rocks, and pilot her to the port of New York, or to pilot her from the port of New York to Sands Point or Execution Rocks,—for every vessel, one dollar and fifty cents for each and every foot of water such vessel may draw; and from the eastward of Hell Gate to the port of New York, one dollar for each and every foot of water such vessel may draw; and for pilotage from the port of New York to the eastward of either of the before-mentioned points and places, they shall be entitled to receive the same compensation as is above provided when the said vessel is bound to the port of New York. And every pilot shall, for such services, be entitled, in addition to the above-mentioned rates of compensation, to demand and receive the further sum of twenty-five cents for each and every foot of water which any square-rigged vessel may draw, which they shall pilot to or from the port of New York; and every such pilot who shall have piloted any ship or vessel into the port of New York by the way of Hell Gate shall be entitled to a preference in piloting the said ship or vessel out of the said port on the next outward voyage of the said ship or vessel, if the said voyage be by the way of Hell Gate. And further, from the first day of November to the first day of April in every year, every such Hell Gate pilot shall be entitled to demand and receive for every ship, bark, or brig the sum of two dollars, and for every schooner or sloop the sum of one dollar, in addition to the rates of compensation for pilotage hereby established. But no pilotage shall be charged to any vessel under a coastwise license unless such vessel actually employs a pilot. And every master or commander of any vessel who shall give to such Hell Gate pilot an untrue account of the draft of water or tonnage of his vessel, shall forfeit and pay the sum of twenty-five dollars, to be sued for and recovered by the Board of Wardens [of the port of New York].

Pilots first tendering services to be taken, etc.

Sec. 8. Any of said Hell Gate pilots, who shall first tender his services, may demand and receive from the master, owner, or consignee of any vessel of the burden of one hundred tons and upwards, navigating the said channel of Hell Gate, to whom he shall have tendered his services as a pilot, and by whom the same shall have been refused, whether outward or inward bound, one-half pilotage for every foot of water such vessel may draw; which half pilotage shall be the one-half of the rates of compensation established by the preceding section. But such half pilotage shall not be chargeable to any vessel under one hundred tons burden sailing under coastwise license, and shall not be chargeable more than once for the same passage to any vessel; and in case any such vessel under one hundred tons burden,

* Extracts from Pilot Laws, and Rules and Regulations of the Board of Port Wardens, for the government of Hell Gate Pilots, published in pamphlet form in 1883. Hell Gate pilots are under the control of the Board of Port Wardens of the port of New York. This pilot service is entirely distinct from that by way of Sandy Hook, the latter being under the control of the Board of Pilot Commissioners.

navigating the said channel to or from the port of New York, shall make the usual signal for a pilot, and shall refuse to receive on board or employ such pilot when he shall have tendered his services, then the master, owner, or consignee of such vessel shall pay to such Hell Gate pilot such pilotage from the place at which such pilot shall have so offered his services. Any pilot who shall pilot any government vessel through the said channel shall be entitled to receive the same compensation therefor as is provided by law for like services in piloting such vessel to or from the port of New York by the way of Sandy Hook.

N. B.—Any provision authorizing extra compensation for piloting a government vessel conflicts with and is therefore annulled by section 4237 of the Revised Statutes of the United States, which is as follows:

No regulations or provisions shall be adopted by any State which shall make any discrimination in the rate of pilotage or half pilotage between vessels sailing between the ports of one State and vessels sailing between the ports of different States, or any discrimination against vessels propelled in whole or in part by steam, *or against national vessels of the United States;* and all existing regulations or provisions making any such discrimination are annulled and abrogated.

Allowance for extra services.

Sec. 9. The master, owner, or consignee of any ship of vessel, to whom any Hell Gate pilot shall have rendered, upon the request of the master of said ship or vessel, any extra service for the preservation of said ship or vessel while in distress, shall pay to said pilot, in addition to the compensation set forth in the last section but one [6?], such amount for extra services as the Board of Wardens shall determine to be a reasonable reward; and for every day which any Hell Gate pilot shall be detained on board any ship or vessel over and above twenty-four hours, he may demand and receive from the master, owner, or consignee of said vessel, two dollars a day for each and every day he shall be so detained.

Sec. 10. This act shall not be construed to apply to the passenger steamboats plying on regular passenger routes this side or to the westward of Cape Cod. And all foreign vessels, and vessels under register navigating the channel of Hell Gate, who shall be spoken, shall be subject to the pilotage fees, as provided in section twenty-one hundred and thirty [6 ?], to the first pilot who tenders his services.

Sec. 16. The said Board of Wardens shall furnish every pilot aforesaid with printed instructions, to be shown by such pilot to the master or commander of every vessel as soon as he shall go on board to take charge of such vessel to pilot her into the said port, under the penalty of ten dollars for each and every neglect or refusal.

RULES AND REGULATIONS OF THE HELL GATE PILOTS.

The Board of Port Wardens of the Port of New York have adopted the following regulations for the government of Hell Gate pilots, October, 1874; amended Nov. 13, 1877, Sept. 20, 1878, and Sept. 23, 1878.

ARTICLE 1. The pilot who shall first board any vessel on the North River, coming from above Spuytendevil Creek, after leaving her place of loading, shall be entitled to the fees of pilotage, provided said vessel takes a pilot.

ART. 2. All vessels from Elizabethport, Newark, Amboy, Port Johnson, Jersey City, Weehawken, and Manhattanville to be governed by the same regulations as in Articles 1 and 5.

ART. 3. The pilot first speaking any vessel coming into port, and tendering his services as pilot, shall be entitled to the fees of pilotage; provided such pilot shall not at the time have another vessel actually in charge.

ART. 4. In no case shall any one pilot take charge of or pilot more than one vessel at the same time; and in all cases shall remain on board the vessel under his charge.

ART. 5. Any pilot having a vessel in charge, and speaking one down the North River, shall give one of the two to the next pilot speaking her, provided both vessels go the same tide.

ART. 8. Any pilot having a vessel engaged, and not reporting on board of her, or to the captain or mate of said vessel, within twenty-four hours, and not less than six hours before the time of sailing, shall forfeit all claims to said vessel.

ART. 9. No pilot shall leave an incoming vessel under his charge until her arrival off the Battery, or place of her destination; nor an outgoing vessel until she arrives at the place designated by law, without the consent of the master.

ART. 10. No pilot shall by any unfair means, or by a reduced price, take any vessel from another pilot; and in case of his so doing, shall forfeit to the pilot displaced the full amount of the pilotage.

ART. 11. Pilots are required to board the nearest vessel having a signal flying for a pilot, except in case there should be a vessel in sight with a signal of distress flying.

ART. 14. A pilot in charge of a vessel must remain on board until notified by the master that his services are no longer wanted, under a penalty of forfeiting the pilotage. The omission of the master to inform the pilot that his services are no longer wanted will entitle him to detention money, unless such detention is momentary for the landing of passengers.

ART. 16. The pilot first speaking any vessel that loads cargoes of any kind, shall be entitled to said vessel, provided he is on board when the vessel leaves the wharf in the State of New Jersey.

ART. 25. Any pilot violating any of the foregoing rules shall be liable to fine or suspension, or both, at the discretion of the Board of Port Wardens.

DRAFT.	SLOOPS AND SCHOONERS, FORE AND AFT.		VESSELS WITH YARDS, AND STEAMERS.	
	Rikers Island at $1.00.	Sands Point at $1.50.	Rikers Island at $1.25.	Sands Point at $1.75.
5 feet	$5 00	$7 50	$6 25	$8 75
6 "	6 00	9 00	7 50	10 50
7 "	7 00	10 50	8 75	12 25
8 "	8 00	12 00	10 00	14 00
9 "	9 00	13 50	11 25	15 75
10 "	10 00	15 00	12 50	17 50
11 "	11 00	16 50	13 75	19 25
12 "	12 00	18 00	15 00	21 00
13 "	13 00	19 50	16 25	22 75
14 "	14 00	21 00	17 50	24 50
15 "	15 00	22 50	18 75	26 25

It shall be lawful to demand from every ship, bark or brig, the sum of two dollars, and for every schooner and sloop one dollar from the first day of November to the first day of April in every year, in addition to the rates of pilotage established as winter pilotage.

PILOT LAWS IN REFERENCE TO VESSELS ENTERING BY WAY OF SANDY HOOK.

Extracts from the New York City Consolidation Act of 1882.

Section 2100. * * * Any pilot bringing in a vessel from sea shall, by himself or one of his boat's company, be entitled to pilot her to sea when she next leaves the port, unless, in the meantime, a complaint for misconduct or incapacity shall have been made against such pilot or one of his boat's company, and proved before the Board of Commissioners of Pilots; provided, however, that if the owner of any vessel shall desire to change such pilot, then the said commissioners may assign any other pilot on the same pilot boat to pilot said vessel to sea.

[***Secs. 2101-2102*** of this act, fixing the fees for pilotage, were repealed by an act of the State legislature, passed April 3, 1884, and the latter act as amended in 1889, established the fees now authorized, as follows:]

SEC. 1. The fees for piloting for the port of New York, by the way of Sandy Hook, are hereby established as follows:

For every vessel inward bound, and not exempted from pilotage by any law of this State or any regulation thereunder, and drawing less than fourteen feet of water, two dollars and seventy-eight cents per foot.

For every vessel drawing fourteen feet, and less than eighteen feet, of water, three dollars and thirty-eight cents per foot.

For every vessel drawing eighteen feet, and under twenty-one feet, of water, four dollars and thirteen cents per foot.

For every vessel drawing twenty-one feet of water and upward, four dollars and eighty-eight cents per foot.

If the master or owners of any vessel shall request the pilot to moor said vessel to any place within Sandy Hook, and not to be taken to the wharf or harbor of New York, or the vessel be detained at quarantine, the same pilotage shall be allowed, and the pilot entitled to his discharge.

When any ship or vessel bound for the port of New York, and boarded by any pilot appointed by the Board of Commissioners of Pilots of the City of New York, at such distance to the southward or eastward of Sandy Hook Lighthouse, as that said lighthouse could not be seen from the deck of such ship or vessel in the daytime, and in fair weather, the addition of one-fourth to the rates of pilotage hereinbefore mentioned shall be allowed to such pilot, provided the commander of such vessel shall have agreed to pay such addition. But such additional rate may be waived by the pilot boarding or offering his services to any vessel, and if waived he shall be taken on board and shall be entitled to pilot such vessel, and to be paid at the ordinary rates established by law. In case of the refusal of the commander of any vessel to take such pilot after such waiver, he and the owner or consignee of the

vessel shall be liable to pay such pilot at the ordinary rate, the same as if he had piloted the vessel to the port of New York. In case the same additional rate of pilotage is not waived by the pilot so boarding or speaking any vessel, the commander, owner, or consignee shall not be liable to pay any pilotage, except that in case of failing to take a licensed pilot before such vessel reaches the port of New York, the pilotage shall be paid at the ordinary rate to the pilot who first offers his services. Whenever the services of a pilot by way of Sandy Hook shall be required to pilot any vessel sailing from any other port in the United States to the port of New York, application must first be made in writing by the master, owner, or consignee of such vessel to the board of commissioners of pilots for such pilot, and the said board shall thereupon designate the pilot so to be employed. * * *

SEC. 2. The pilotage on vessels outward bound not exempt from pilotage shall be as follows:

For every vessel drawing less than fourteen feet of water, two dollars and two cents per foot.

For every vessel drawing fourteen feet, and less than eighteen feet of water, two dollars and thirty-three cents per foot.

For every vessel drawing eighteen feet, and less than twenty-one feet of water, three dollars and eight cents per foot.

For every vessel drawing twenty-one feet of water and upward, three dollars and fifty-six cents per foot.

Sec. 2103. The rates of pilotage for any intermediate distance shall be determined by the Board of Commissioners, and promulgated in their rules and regulations for the government of pilots.

Sec. 2104. Between the first day of November and the first day of April, inclusive, four dollars shall be added to the full pilotage of every vessel coming into or going out of the port of New York.

Sec. 2105. For every day of detention in the harbor of an outward bound vessel, after the services of a pilot have been required and given, except detention shall be caused by such adverse winds and weather that the vessel can not get to sea; and for every day of detention of an inward bound vessel by ice longer than two days for passage from sea to wharf, three dollars shall be added to the pilotage. If any pilot shall be detained at quarantine or elsewhere, by the health officer, for being or having been on board a sickly vessel as pilot, the master, owner or agent, or consignee of such vessel shall pay to such pilot all necessary expenses of living and three dollars per day for each and every day of such detention. This section shall not apply to vessels propelled wholly or in part by steam, owned or belonging to citizens of the United States, and licensed and engaged in the coasting trade.

Sec. 2106. For every day of detention at the wharf, or in the harbor, beyond the time notified to the pilot for him to attend the vessel, or beyond the usual time of getting vessels from sea to the wharf, and from the wharf to sea; and for every day of detention of an inward bound vessel by ice, longer than two days for the passage from sea to wharf, three dollars shall be added to the pilotage. If any pilot shall be detained at quarantine by the health officer, for having been on board a sickly vessel as pilot, the master, owner, agent, or consignee of such vessel shall pay to such pilot all necessary expenses of living and three dollars per day for each and every day of such detention. This section shall not apply to vessels embraced in the preceding section.

Sec. 2107. For services rendered by pilots in moving or transporting vessels in the harbor of New York, the following shall be the fees: For moving from North to East river, or vice versa, * * * a merchant vessel, five dollars, except such vessel shall have arrived from sea, or is ready for and bound to sea on the day such services for transportation are rendered; but if the services are rendered thereafter such payment shall be made. For moving any vessel from the quarantine to the city of New York, one-quarter of the sum that would be due for the inward pilotage of such vessel. For hauling any vessel from the river to a wharf, or from a wharf into the river, three dollars, except on the day of arrival of or departure of such vessel. The provisions of this section shall not apply to vessels propelled wholly or in part by steam, owned or belonging to citizens of the United States, and licensed and engaged in the coasting trade.

Sec. 2108. For services rendered by pilots in moving or transporting vessels in the harbor of New York other than those embraced in the preceding section, the following shall be the fees:

For moving from North to East river, or vice versa, a merchant vessel, five dollars.

For moving any vessel from quarantine to the city of New York, one-quarter of the sum that would be due for the inward pilotage of such vessel.

For hauling any vessel from the river to a wharf, or from a wharf into the river, three dollars.

Sec. 2109. The pilotage shall be payable by the master, owner, consignee, or agent entering or clearing the vessel at the port of New York, who shall be jointly and severally liable therefor.

Sec. 2110. A pilot who is carried to sea when a boat is attending to receive him shall receive at the rate of one hundred dollars per month during his necessary absence.

Sec. 2111. Masters of vessels shall give an account to the pilot when boarding of the draft of such vessels; and in case the draft given is less than the actual draft, the master shall forfeit the sum of twenty-five dollars, which may be sued for and recovered by the commissioners, as is provided in section twenty-one hundred and twenty-three, in respect to other fines and penalties.

Sec. 2119. No master of any vessel navigated under a coasting license and employed in the coasting trade, by the way of Sandy Hook, shall be required to employ a licensed pilot when entering or departing from the harbor of New York; but this provision shall not be construed to alter the legal rate of compensation of any pilot who may be so employed; but in case the services of a pilot shall have been given, the pilot shall be entitled to the rates established by this title. If the master of any vessel above one hundred and fifty and not exceeding three hundred tons burden, and owned by a citizen of the United States, and sailing under a coasting license to or from the port of New York, by the way of Sandy Hook, shall be desirous of piloting his own vessel, he shall first obtain a license for such purpose from the Commissioners of Pilots, who are hereby authorized and required to grant the same, if such master shall, after an examination had by said commissioners, be deemed competent; which said license shall be and continue in force one year from the date thereof, or until the determination of any voyage during which the license may expire. For such license the master to whom it shall be granted shall pay to the said commissioners four cents per ton. All masters of foreign vessels and vessels from a foreign port, and all vessels sailing under register, bound to or from the port of New York by the way of Sandy Hook, shall take a licensed pilot; or in case of refusal to take such pilot, shall himself, owners, or consignees pay the said pilotage as if one had been employed; and such pilotage shall be paid to the pilot first speaking or offering his services as pilot to such vessel. Any person not holding a license as pilot under this title, or under the laws of the State of New Jersey, who shall pilot, or offer to pilot, any ship or vessel to or from the port of New York by the way of Sandy Hook, except such as are exempt by virtue of this title, or any master, or person on board a steam tug or towboat, who shall tow such vessel or vessels, shall be deemed guilty of a misdemeanor, and, on conviction, shall be punished by a fine not exceeding one hundred dollars, or imprisonment not exceeding sixty days; and all persons employing a person to act as a pilot, not holding a license under this title, or under the laws of the State of New Jersey, shall forfeit and pay to the Board of Commissioners of Pilots the sum of one hundred dollars. This section shall not apply to vessels propelled wholly or in part by steam, owned or belonging to citizens of the United States, and licensed and engaged in the coasting trade.

Sec. 2120. Any person not holding a license as pilot under this title, or under the laws of the State of New Jersey, who shall pilot or offer to pilot any ship or vessel, not embraced in the preceding section, to or from the port of New York by the way of Sandy Hook, shall be deemed guilty of a misdemeanor, and on conviction shall be punished by a fine not exceeding one hundred dollars, or imprisonment not exceeding sixty days; and all persons employing a person to act as pilot not holding a license under this title, or under the laws of the State of New Jersey, shall forfeit and pay to the Board of Commissioners of Pilots the sum of one hundred dollars.

Sec. 2121. It shall be the duty of each branch and deputy pilot belonging to the port to use his utmost endeavors to hail every vessel he shall discover entering the port, and to interrogate the master of such vessel in reference to all matters necessary to enable such pilot to determine whether such vessel be subject to quarantine.

Sec. 2122. If from the answers obtained from such inquiries it shall appear that such vessel came from a port where any quarantinable disease existed at the time of her departure, or that any case of such disease shall have occurred on board of her during the passage, the pilot shall immediately direct the master of the vessel to proceed and anchor such vessel at the quarantine anchorage in the lower bay. In other cases of vessels liable to quarantine he shall direct the masters thereof to proceed and anchor such vessels at such point as shall be assigned by the quarantine commissioners as an anchorage for such vessels.

BY-LAWS OF THE BOARD OF COMMISSIONERS OF PILOTS.

(*Extracts.*)

9th. All boats shall have conspicuous numbers in their sails. * * *

11th. No boat shall put a boy or other person than an adequately licensed pilot on board a vessel for the purpose of piloting said vessel. * * * This shall not apply to vessels in distress, providing the masters of such vessels are willing to employ the services of such boy, person, or pilot; such boy, person, or pilot shall keep the signal for a pilot flying until the lighthouse on Sandy Hook bears south, and in case a regular pilot takes charge of the vessel, the person who first took charge shall be entitled to half the inward pilotage.

15th. Pilots are required to board the nearest vessel having a signal flying for a pilot, except in case there should be a vessel in sight with a signal of distress, under a penalty of fifty dollars.

17th. Pilots are required to transport a vessel to any part of the port of New York, when applied to, under a penalty of twenty-five dollars.

21st. Pilotage for taking vessels from [Upper to Lower] Quarantine:

For vessels having had death or sickness on board, double outward pilotage.

For vessels from sickly ports, but having no sickness on board, single outward pilotage.

Pilotage of vessels from Quarantine to New York, quarter pilotage.

Pilotage of vessels from New York to Perth Amboy, or from Perth Amboy to New York, except on the voyage to or from sea, shall be one dollar and a half per foot of the vessel's draft.

Pilotage of vessels from the North River or the East River to Bayonne, or *vice versa*, ten dollars each way.

In case of vessels bound over Sandy Hook Bar to or from points in Newark Bay, Staten Island Sound, the Passaic, Hackensack, or Raritan rivers, only one full pilotage shall be paid; of which two-thirds shall be paid to the pilot piloting the vessel over Sandy Hook Bar and one-third to the local pilot.

Provided, however, that if the Bar pilot is competent to pilot the vessel the whole way he shall be entitled to do so, and to receive the full pilotage, the same as if the vessel was piloted to or from New York, Jersey City, or Brooklyn.

22d. Vessels boarded north or west of a line drawn from the lights on the Highlands of Navesink to the Black Buoy No. 1 of the Bar, thence to the Red Buoy No. 2, of Gedney Channel, shall pay half pilotage only. If boarded above The Narrows, quarter pilotage.

This by-law has no reference to section [21].

24th. No pilotage, except the regular inward pilotage, shall be allowed when vessels are detained from the *nonvisiting* of the health officer.

25th. Vessels returning from sea in consequence of head winds or stress of weather, shall pay full pilotage.

34th. A pilot boat when in sight of a vessel wanting a pilot shall, if there are no pilots on board, signalize the fact by running her flag or signal up and down twice in the daytime; and at night, by making a like signal with her masthead light.

36th. A pilot in charge of a vessel is required to stay on board until notified by the master that his services are no longer wanted, under penalty of forfeiting the pilotage. The omission of the master to inform the pilot that his services are not wanted, will entitle the pilot to detention money, unless the detention is temporary, to take out *passengers*.

42d. The master of every vessel bound to or from New York, when in the act of receiving or discharging a New York pilot, shall bring his vessel to a stop, and shall give all necessary assistance to the pilot, consistant with the safety of his vessel, to enable said pilot to board or leave the vessel safely; under a penalty, payable by the vessel and recoverable by this Board, of twenty-five dollars for every omission to comply with this regulation.

Any pilot who willfully or through negligence causes unnecessary delay to a vessel, in the act of boarding or leaving her, shall be subject to a like penalty of twenty-five dollars, recoverable by this Board, for each offense.

43d. Pilots are required to anchor vessels of which they have charge, in accordance with the regulations promulgated by the United States anchorage officer.

RATES OF PILOTAGE FROM APRIL 1 TO NOVEMBER 1.

DRAFT.	INWARD.				OUTWARD.	
	RATE.	PILOTAGE.	OFFSHORE.	TOTAL.	RATE.	PILOTAGE.
6 feet 0 inches	$2 78	$16 68	$4 17	$20 85	$2 02	$12 12
6 " 6 "	2 78	18 07	4 52	22 59	2 02	13 13
7 " 0 "	2 78	19 46	4 86	24 32	2 02	14 14
7 " 6 "	2 78	20 85	5 21	26 06	2 02	15 15
8 " 0 "	2 78	22 24	5 56	27 80	2 02	16 16
8 " 6 "	2 78	23 63	5 91	29 54	2 02	17 17
9 " 0 "	2 78	25 02	6 25	31 27	2 02	18 18
9 " 6 "	2 78	26 41	6 60	33 01	2 02	19 19
10 " 0 "	2 78	27 80	6 95	34 75	2 02	20 20
10 " 6 "	2 78	29 19	7 30	36 49	2 02	21 21
11 " 0 "	2 78	30 58	7 64	38 22	2 02	22 22
11 " 6 "	2 78	31 97	7 99	39 96	2 02	23 23
12 " 0 "	2 78	33 36	8 34	41 70	2 02	24 24
12 " 6 "	2 78	34 75	8 69	43 44	2 02	25 25
13 " 0 "	2 78	36 14	9 03	45 17	2 02	26 26
13 " 6 "	2 78	37 54	9 38	46 92	2 02	27 27
14 " 0 "	3 38	47 32	11 83	59 15	2 33	32 62
14 " 6 "	3 38	49 01	12 25	61 26	2 33	33 78
15 " 0 "	3 38	50 70	12 67	63 37	2 33	34 95
15 " 6 "	3 38	52 39	13 10	65 49	2 33	36 11
16 " 0 "	3 38	54 08	13 52	67 60	2 33	37 28
16 " 6 "	3 38	55 77	13 94	69 71	2 33	38 44
17 " 0 "	3 38	57 46	14 36	71 82	2 33	39 61
17 " 6 "	3 38	59 15	14 79	73 94	2 33	40 77
18 " 0 "	4 13	74 34	18 58	92 92	3 08	55 44
18 " 6 "	4 13	76 40	19 10	95 50	3 08	56 98
19 " 0 "	4 13	78 47	19 62	98 09	3 08	58 52
19 " 6 "	4 13	80 53	20 13	100 66	3 08	60 06
20 " 0 "	4 13	82 60	20 65	103 25	3 08	61 60
20 " 6 "	4 13	84 66	21 16	105 82	3 08	63 14
21 " 0 "	4 88	102 48	25 62	128 10	3 56	74 76
21 " 6 "	4 88	104 92	26 23	131 15	3 56	76 54
22 " 0 "	4 88	107 36	26 84	134 20	3 56	78 32
22 " 6 "	4 88	109 80	27 45	137 25	3 56	80 10
23 " 0 "	4 88	112 24	28 06	140 30	3 56	81 88
23 " 6 "	4 88	114 68	28 67	143 35	3 56	83 66
24 " 0 "	4 88	117 12	29 28	146 40	3 56	85 44
24 " 6 "	4 88	119 56	29 89	149 45	3 56	87 22
25 " 0 "	4 88	122 00	30 50	152 50	3 56	89 00
25 " 6 "	4 88	124 44	31 11	155 55	3 56	90 78
26 " 0 "	4 88	126 88	31 72	158 60	3 56	92 56
26 " 6 "	4 88	129 32	32 33	161 65	3 56	94 34
27 " 0 "	4 88	131 76	32 94	164 70	3 56	96 12
27 " 6 "	4 88	134 20	33 55	167 75	3 56	97 90
28 " 0 "	4 88	136 64	34 16	170 80	3 56	99 68

From November 1 to April 1.—A vessel entering the port of New York by the way of Sandy Hook during this season adds four dollars to the amount set opposite her draft, in column marked "Pilotage," in the foregoing table. If subject to offshore pilotage, by agreement, four dollars is added to the amount set opposite her draft, in the column marked "Total." Outward bound—add four dollars to the amount set opposite draft of vessel, in the column marked "Outward Pilotage."

HARBOR CONTROL, ETC., PORT OF NEW YORK.

Act passed by the Congress of the United States.

AN ACT to prevent obstructive and injurious deposits within the harbor and adjacent waters of New York City, by dumping or otherwise, and to punish and prevent such offenses.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the placing, discharging, or depositing, by any process or in any manner, of refuse, dirt, ashes, cinders, mud, sand, dredgings, sludge, acid, or any other matter of any kind other than that flowing from streets, sewers, and passing therefrom in a liquid state, in the tidal waters of the harbor of New York, or its adjacent or tributary waters, or in those of Long Island Sound, within the limits which shall be prescribed by the

supervisor of the harbor, is hereby strictly forbidden, and every such act is made a misdemeanor, and every person engaged in or who shall aid, abet, authorize, or instigate a violation of this section, shall, upon conviction, be punishable by fine or imprisonment, or both, such fine to be not less than two hundred and fifty dollars nor more than two thousand five hundred dollars, and the imprisonment to be not less than thirty days, nor more than one year, either or both united, as the judge before whom conviction is obtained shall decide, one half of said fine to be paid to the person or persons giving information which shall lead to conviction of this misdemeanor.

Sec. 4. That all mud, dirt, sand, dredgings, and material of every kind and description whatever, taken, dredged, or excavated from any slip, basin, or shoal in the harbor of New York, or the waters adjacent or tributary thereto, and placed on any boat, scow, or vessel for the purpuse of being taken or towed upon the waters of the harbor of New York to a place of deposit, shall be deposited and discharged at such place or within such limits as shall be defined and specified by the supervisor of the harbor. * * *

*Extract from an act passed April 14, 1857.**

Board of Port Wardens.—Sec. 5. It shall be the duty of said Board, or some one of the members thereof, to attend personally all sales of vessels when condemned, vessels' materials, and goods in a damaged state, which shall be sold at public auction in the port of New York, by reason of such damage, for the benefit of owners or underwriters, or for account of whom it may concern; and it shall be the duty of auctioneers making such sales to give due notice thereof to said Board before the sale, and all such sales shall be made by auctioneers under the direction and by order of the wardens, for which service they shall be entitled to receive a commission of one-half of one per cent on the gross amount of sales thereof, to be paid to said Board of Wardens on demand, by the auctioneer making such sales, and such property shall be exempt from the payment of auction duty to the State; and it shall be the duty of auctioneers to make monthly statements to said Board, specifying the total amount of each day's sales made by them under this act, which statement shall be filed in said wardens' office, and the wardens, when required by the owner or consignee thereof, shall certify the cause of such damage, the amount of such sales, and the charges on the same, all of which shall be recorded in the books of said office, and the said Board of Wardens shall be allowed for each and every survey held on board of any vessel, on hatches, stowage of cargo, or damaged goods, or at any warehouse, store, or dwelling, or in the public street, or on the wharf, within the limits of the port of New York, on goods said to be damaged, the sum of two dollars, and for each and every certificate given in consequence thereof, the sum of one dollar, and for each and every survey on the hull, sails, spars, or rigging of any vessel damaged, or arriving at said port in distress, the sum of five dollars, and for each and every certificate given in consequence thereof, the sum of two dollars and fifty cents, and for each valuation or measurement of any vessel the sum of ten dollars, and the compensation and emoluments of said office shall be divided equally between the said nine wardens composing the Board under this act.

RULES AND REGULATIONS OF THE DEPARTMENT OF DOCKS AND FERRIES, PUBLISHED 1899.

(Extracts.)

Rule 3.—No cargo shall be discharged from any vessel upon any pier, bulkhead or wharf structure, at which such vessel is being unladen, after notice signed and served by the Dock Master of the District or other representative of the Department, upon the owner, consignee, master or other officer or stevedore of such vessel, that such pier, bulkhead or structure will be endangered by the placing of additional cargo thereon, under a penalty of one hundred dollars for every such offense, and a further penalty equal in amount to the damages of every description which shall be caused by the further discharging of cargo upon such pier, bulkhead or structure, after the service of said notice, * * *.

Rule 4.—No manure, ashes, cellar dirt, garbage, offal, dead animals or refuse of any kind shall be received or delivered at any pier, bulkhead or reclaimed land, or placed thereon, without a special permit, to be applied for in writing, having first been obtained from the Department; and the party or parties receiving or discharging said manure, ashes, cellar dirt, garbage, offal, dead animals or refuse of any kind, or placing the same on any pier, bulkhead or reclaimed land, without a permit obtained therefor as specified, shall be subject to a penalty of twenty-five dollars for each offense, and a further penalty of twenty-five dollars a day for each and every day after the placing of the same on any pier, bulkhead or reclaimed land, until the removal thereof, * * *.

* Extract from pamphlet published 1875 and in force 1899.

Rule 5.—All goods, merchandise and materials of every kind, landed or placed on any pier, bulkhead or other wharf structure, or upon reclaimed land, must be removed therefrom without unnecessary delay, and within twenty-four hours after the Dock Master of the District, or other representative of the Department, shall have served upon the owner, shipper, or consignee of such cargo a notice * * * to remove the same, under penalty of twenty dollars per day for each and every day during which any part of said goods, merchandise or material shall remain upon such pier, bulkhead, structure or reclaimed land, after the expiration of said twenty-four hours, * * *.

Rule 8.—No vessel of any kind shall be loaded or discharged by horse-power on the North River, between Pier "A" and West Eleventh street, and on the East River, from the Battery to Grand street. No vessel of any kind shall be loaded or discharged elsewhere by horse-power, or shall stones or similar cargo be discharged from any vessel upon any other pier, bulkhead or wharf structure, unless proper planking be provided to protect the surface of such pier, bulkhead or wharf structure from injury consequent upon the travel of the horse, or the unloading of stones or similar cargo thereupon, under a penalty of ten dollars a day for each horse so employed, and of twenty-five dollars for each offense of discharging such stones or like cargo upon such pier, bulkhead or wharf structure, * * *.

Rule 9.—No brick, sand, gravel, or similar material shall be unloaded on any wharf property unless a permit therefor shall be issued by the Secretary, and no such material shall be unloaded on unleased city property unless an application shall be submitted to the Secretary of the Board, accompanied by a receipt from the Dockmaster for ten dollars, specifying the name of the vessel from which the cargo is to be unloaded, * * *. No vessel carrying such material or cargo shall be allowed to occupy a berth for a period longer than three days when said berth is required by another vessel.

Rule 10.—No sand shall be discharged from any vessel unless canvas or similar material be extended from the vessel's side to the bulkhead or wharf structure at which such vessel is being unladened, to prevent the falling of the sand into the water; and if the surface of any such wharf structure is not sufficiently tight to prevent the sand dumped thereon from going through into the water, then no sand shall be discharged thereon from any vessel, unless canvas or similar material be first laid thereon to receive the sand, under a penalty of twenty-five dollars for each offense, * * *.

Rule 13.—No ashes, refuse, offal, fruit, vegetables or any other substance shall be thrown into the water surrounding or adjacent to any pier or bulkhead, or any other part of the water-front of the city under a penalty of twenty-five dollars for every such offense, * * *.

Rule 15.—All lumber, brick, or other material in bulk, discharged on any pier or bulkhead not shedded, shall be at once removed, or, if not so removed, shall be placed at least twenty feet from the edge of the bulkhead, pending removal, under a penalty of twenty-five dollars per day for each and every day such lumber, brick or other material shall remain on the bulkhead, * * *.

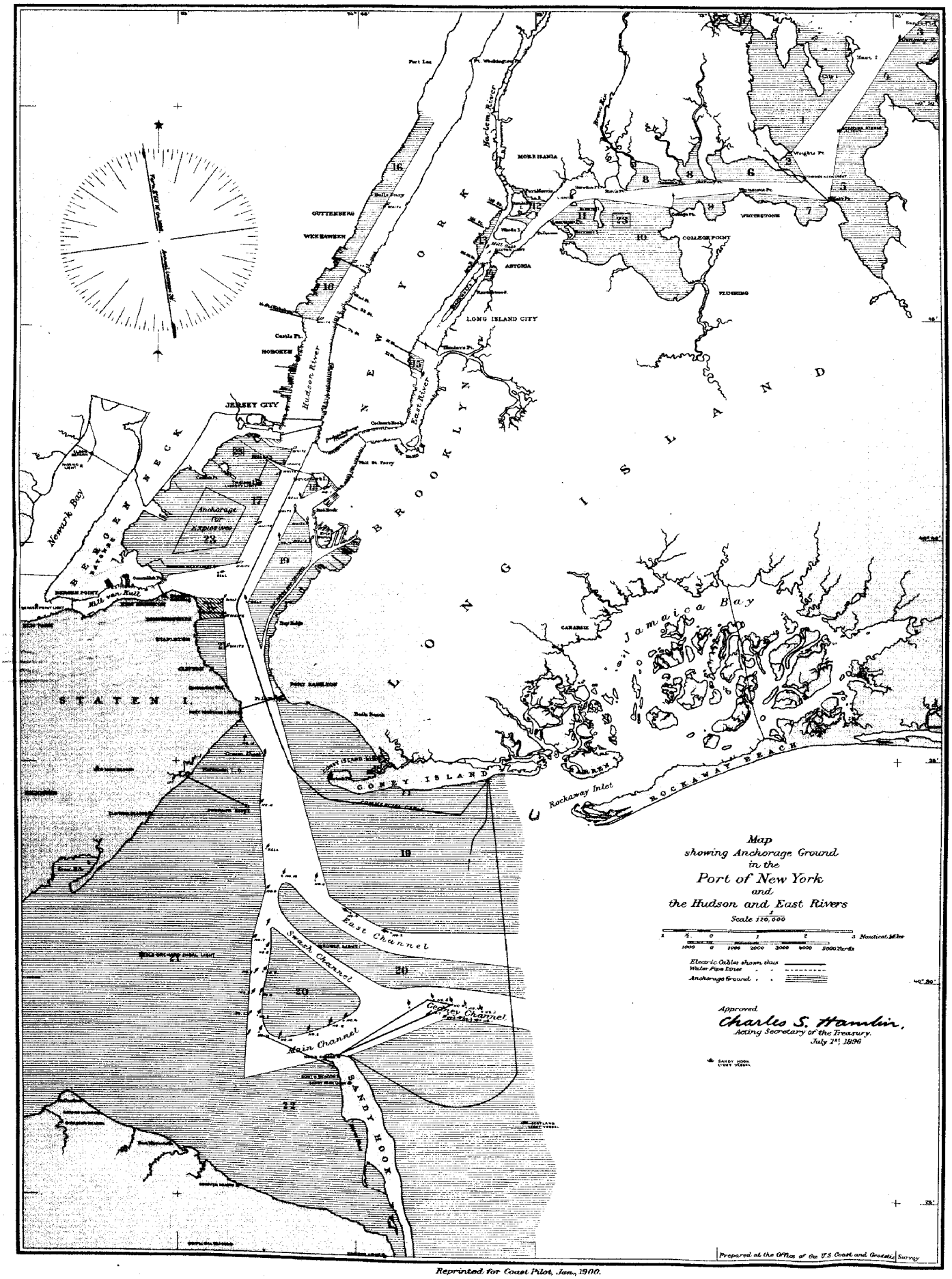
Rule 18.—No person shall load, discharge or keep on any wharf, pier or bulkhead, or allow to remain on any lighter, barge or other craft moored to the wharves, piers or bulkheads of the city, any cotton, turpentine, rosin, hay, straw or other inflammable merchandise, unless the same is covered with tarpaulins, or other more permanent or substantial material, under penalty of not exceeding fifty dollars for each day or fraction of a day that such cotton, turpentine, rosin, hay, straw, or other inflammable merchandise shall be permitted to remain uncovered as provided in this rule; * * *.

RATES OF WHARFAGE FOR THE CITY OF NEW YORK.

(In force January 1, 1898.)

Sections 859, 860, and 861 of The Greater New York Charter (Laws of 1897).

Sec. 859. It shall be lawful to charge and receive within The City of New York wharfage and dockage at the following rates, namely: From every vessel that uses or makes fast to any pier, wharf or bulkhead within said city, or makes fast to any vessel lying at such pier, wharf or bulkhead, or to any other vessel lying outside of such vessel, for every day or part of a day, except as hereinafter provided, as follows: From every vessel of two hundred tons burden and under, two cents per ton, and for every vessel over two hundred tons burden, two cents per ton for each of the first two hundred tons, and one-half of one cent per ton for every additional ton, except that, save as hereinafter provided, vessels known as North River barges, market boats and barges, sloops employed upon the rivers and waters of this State, and schooners, exclusively employed upon the rivers and waters of this State, shall pay for every such vessel under the burden of fifty tons, at the rate of fifty cents per day; for every such vessel of the burden of fifty tons and under the burden of one hundred tons, at the rate of sixty-two and a half cents per day; for every such vessel of the burden of one hundred tons, and under the burden of one hundred and fifty tons at the rate of seventy-five cents per day; for every such vessel of the burden of one hundred and fifty tons and under



Reprinted for Coast Pilot, Jan., 1900.

the burden of two hundred tons, at the rate of eighty-seven and a half cents per day; for every such vessel of the burden of two hundred tons and under the burden of two hundred and fifty tons, at the rate of one hundred cents per day; for every such vessel of the burden of two hundred and fifty tons, and under the burden of three hundred tons, at the rate of one hundred and twelve and a half cents per day; for every such vessel of the burden of three hundred tons and under the burden of three hundred and fifty tons, at the rate of one hundred and twenty-five cents per day, for every such vessel of the burden of three hundred and fifty tons and under the burden of four hundred tons, at the rate of one hundred and thirty-seven and a half cents per day; for every such vessel of the burden of four hundred tons, and under the burden of four hundred and fifty tons, at the rate of one hundred and fifty cents per day; for every such vessel of the burden of four hundred and fifty tons, and under the burden of five hundred tons, at the rate of one hundred and sixty-two and a half cents per day; for every such vessel of the burden of five hundred tons, and under the burden of five hundred and fifty tons, at the rate of one hundred and seventy-five cents per day; for every such vessel of the burden of five hundred and fifty tons, and under the burden of six hundred tons, at the rate of one hundred and eighty-seven and a half cents per day; for every such vessel of the burden of six hundred tons and upwards, to pay twelve and a half cents in addition for every fifty tons in addition to the rate last mentioned, for every day such ship or vessel shall use or be made fast to any of the said wharves; but no boat or vessel over fifty tons burden shall pay less than fifty cents for a day or a part of a day, and the class of sailing vessels now known as lighters shall be at one-half the first above rates. Every other vessel making fast to a vessel at any pier, wharf or bulkhead within said city, or to another vessel outside of such vessel, or at anchor within any slip or basin, when not receiving or discharging cargo or ballast, one-half the first above rates; and from every vessel or floating structure, other than those above named, or used for transportation of freight or passengers, double the first above rates, except that floating grain elevators shall pay one-half the first above rates; and every vessel that shall leave a pier, wharf, bulkhead, slip or basin, without first paying the wharfage or dockage due thereon, after being demanded of the owner, consignee, or person in charge of the vessel, shall be liable to pay double the rates established by this section.

Sec. 860. Vessels of two hundred tons burden and under, which shall be actually engaged in the clam or oyster trade, and which shall make fast to any pier, wharf, or bulkhead within the City of New York, shall pay one and one-half cents per ton per day, and every such vessel which shall make fast to another vessel lying at any such pier, wharf or bulkhead, or to any vessel lying outside of such vessel, or that shall anchor within any slip or basin in said city, shall pay one cent per ton per day; provided, however, that no vessel shall pay less than twenty-five cents, nor less than one day's wharfage, nor shall more than one day's wharfage be charged unless for a continuous use of the pier, wharf, bulkhead, slip, or basin of more than twenty-four hours.

N. B.—Section 861 refers exclusively to the wharfage for canal boats, and vessels engaged in freighting brick on the Hudson River.

ANCHORAGE LIMITS, PORT OF NEW YORK.

Act passed by the Congress of the United States.

AN ACT relating to the anchorage of vessels in the Port of New York.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That the Secretary of the Treasury is authorized, empowered, and directed to define and establish an anchorage ground for vessels in the bay and harbor of New York, and in the Hudson and East Rivers, to adopt suitable rules and regulations in relation thereto, and to take all necessary measures for the proper enforcement of such rules and regulations.

Sec. 2. That in the event of the violation of any such rules or regulations by the owner, master, or person in charge of any vessel, such owner, master, or person in charge of such vessel shall be liable to a penalty of one hundred dollars, and the said vessel may be holden for the payment of such penalty, and may be seized and proceeded against summarily by libel for the recovery of the same in any United States district court for the district within which such vessel may be, and in the name of the officer designated by the Secretary of the Treasury.

Sec. 3. That this act shall take effect immediately.

Approved, May 16, 1888.

TREASURY DEPARTMENT, *July 1, 1896.*

The following-described anchorage grounds for vessels in the bay and harbor of New York, and in the Hudson and East Rivers, respectively, are hereby defined and established, and the following revised Rules and Regulations governing the same are published for the

government of the owner, master, pilot, or other persons having charge of a steam vessel towing or otherwise conducting a vessel to an anchorage in the port of New York, pursuant to the act of Congress approved May 16, 1888, as follows:

Vessels shall anchor only within the following specified limits.

EAST RIVER ANCHORAGES.

1. To the northward of a line from the south point of Hart Island to Wrights Point.
2. To the westward of a line from Wrights Point to Throgs Neck.
3. To the southward of a line from buoy off Sands Point to buoy off Gangway Rock.
4. To the southward of a line from buoy off Gangway Rock to center of Stepping Stones Lighthouse.
5. To the eastward of a line from the center of Stepping Stones Lighthouse to Willets Point.
6. On Hammond Flats, to the northward of a line from Throgs Neck to Old Ferry Point.
7. To the southward of a line from Willets Point to Whitestone Point.
8. On the north side of the channel, north of a line between Old Ferry Point and Hunts Point.
9. On the south side of the channel, south of a line between Whitestone Point and buoy (No. 1) off College Point, and to the eastward of a line running from said buoy to College Point.
10. In Flushing Bay, to the southward of a line from College Point to the north end of Rikers Island.
11. To the southward of a line from the north end of Rikers Island to the north end of South Brother Island, thence to Lawrences Point.
12. To the westward of a line from Stony Point to northeast end of Wards Island; and between Wards Island and Randalls Island, and between Randalls Island and Port Morris.
13. To the westward of a line from the foot of One hundred and sixteenth street, New York, to the north end of Avenue B, New York; but no vessel shall anchor on this anchorage within 150 feet of any wharf or pier, or so as to impede the movements of a ferry, or so as to prevent ready access to or from the piers.
14. To the eastward of a line from Hatters Dock to Gibbs Point (Hallets Cove, Astoria).
15. To the southward of Thirty-first street and northward of Twenty-first street piers, and to the westward of a line passing through buoy No. 1, off Thirty-fourth street, and danger buoy, off Twentieth street. Small vessels of the United States Government and vessels carrying a distinctive signal prescribed by the Secretary of the Navy may anchor anywhere within these limits, provided they do not obstruct the approach to any pier or impede the movements of any ferryboat; and the officer in charge of anchorage grounds may, whenever he deems it advisable, move or cause to move any vessel not, in his opinion, complying with this proviso.

HUDSON RIVER ANCHORAGES.

16. Vessels may anchor in the Hudson River to the westward of the center line of said river running NE. $\frac{5}{8}$ N. (correct magnetic) from Castle Point, and above Fourteenth street, Hoboken Ferry Landing; provided that in no case shall a vessel anchor within 200 yards of the shore or in such position as to impede the movements of a ferry or to prevent ready access to or from a pier. A line of three white buoys marks the east limit of this anchorage ground.

WESTERN ANCHORAGE, UPPER BAY.

17. To the southward of the range passing through Wall Street Ferry, Brooklyn, and the white buoy to the north and east of Ellis Island, to the westward of a line running SW. by S. (nearly) from the said white buoy to the white buoy south of Bedloes Island and the white buoy $\frac{1}{2}$ mile east from Robbins Reef Lighthouse, and to the northward of a line from Constables Point, through Robbins Reef Lighthouse, to the last-mentioned white buoy; provided that no vessel anchors in Ellis Island Channel or so as to obstruct the approaches to any pier within these limits.

GOVERNORS ISLAND ANCHORAGE.

18. To the southward of Governors Island, within the triangular space included in lines running from Castle William to buoy No. 1, thence to buoy No. 3 in Buttermilk Channel.

EASTERN ANCHORAGES, UPPER AND LOWER BAYS.

19. To the southward of a line passing through the Statue of Liberty on Bedloes Island, the two white buoys marking north limit of anchorage ground and the southern point of the north entrance to the Erie Basin; to the eastward of a range passing through Produce

Exchange Tower, the east edge of Castle William, the white buoy marking north limit of anchorage ground, and buoys No. 14 and bell buoy off Owls Head; and to the eastward of a range, passing through bell buoy off Owls Head, the western edge of Long Island in the Narrows, and eastern side of Fort Lafayette as far south as the East Channel, between buoys Nos. 4 and 6; provided that no vessel shall anchor within 300 yards of the Erie Basin, and that no vessel shall anchor so as to impede the movements of a ferry or so as to prevent ready access to or from the piers.

20. Vessels may anchor on Dry Romer Shoal and Flynns Knoll.

STATEN ISLAND ANCHORAGE.

21. To the southward of a line from St. Georges Ferry Landing, Staten Island, to the white buoy off St. Georges Landing and the railroad terminal docks at Bay Ridge, Long Island, and to the westward of a line running S. ⅝ W. (nearly) from the white buoy off St. Georges Landing, through the white buoys off Tompkinsville and Stapleton, Staten Island. To the westward of a line running SSE. ¼ S. (nearly) from Fort Tompkins to the buoy on Cravens Shoal, thence to buoys Nos. 11, 9, and 7, thence to Conovers Beacon; but in no case shall a vessel anchor so as to impede the movements of any ferry or prevent ready access to or from any pier.

The part of anchorage 21 lying between its northern boundary and the white buoy 800 yards south of said boundary is reserved for ships of war of all nations and vessels of the United States Government.

[NOTE.—Vessels detained at upper quarantine may anchor between Fort Tompkins Light and Quarantine Wharf at Clifton, Staten Island.]

SANDY HOOK BAY ANCHORAGE.

22. To the southward of a line extending from East Beacon to Bayside Beacon (Point Comfort), provided they do not impede the movements of vessels in getting to and from the piers. In order to prevent injury to the submarine cables, vessels are forbidden to anchor when the East Beacon Lighthouse bears anywhere between the compass bearings of WSW. ½ W. and SW. by W. ¾ W. from the vessel, unless the said vessel is to the northward of the northern line of buoys of Gedneys Channel. No vessel shall anchor in any of the following channels: Gedneys Channel, Main Channel, Swash Channel, and East Channel, excepting in cases of great emergency, and then outside of the channels as marked by the buoys, and only until such time as they can procure assistance.

23. Vessels carrying gunpowder or other explosives may anchor only as follows:

First.—On the shoal ground to the eastward of Rickers Island, East River, from ¼ to ⅝ of a mile from this island.

Second.—On Jersey Flats, to the westward of a line running NE. by N. from the outer end of the pier, east of Black Tom Island; provided that such vessels do not anchor within 800 yards of Ellis Island or within 500 yards of any pier.

Third.—On the flats to the south of a line drawn from Bedloes Island to Cavens Point, New Jersey, and the westward of a line from Bedloes Island to Robbins Reef; provided that they do not anchor within 1,000 yards of either Bedloes Island or Robbins Reef Light or within 500 yards of any pier. Vessels (carrying explosives) of too great draft to use this anchorage may anchor only in Gravesend Bay, but not within 1,000 yards of the shore.

All vessels laden with explosives while within the port will display at all times a red flag of at least 16 square feet surface at the masthead. Vessels so laden and without masts will display the flag at least 10 feet above the uppermost deck. Points where cables and water pipes cross are clearly marked in red on the accompanying map, and all vessels are cautioned not to anchor so as to interfere with them.

Ash scows, the property of the municipalities bordering on the waters of the port, may be anchored in such places as the supervisor of anchorages may designate.

The white mooring buoys off the upper Quarantine Station, in the Narrows, are exclusively for the use of vessels awaiting the first visit of the health officer, and are not to be occupied at any other time.

All officers of revenue vessels at the port of New York are charged with the enforcement of these rules and regulations, and are empowered to remove from her anchorage any vessel not anchored within the prescribed limits.

QUARANTINE LAWS OF THE PORT OF NEW YORK.

Extracts from Article VI, Chapter XXV, of the Laws of New York, 1895, as amended 1896.

ANCHORAGE.

Sec. 86. The anchorage for vessels under quarantine shall be in the Lower Bay, not less than two miles from the nearest shore, and within an area to be designated by buoys by the

Health Officer. The quarantine ship shall be anchored in the Lower Bay whenever in the judgment of the Health Officer it is necessary for the protection of the public health. At other times it may be moored at such place as he may direct.

BOARDING STATION.

Sec. 87. The boarding station for vessels from any place where disease subject to quarantine existed at the time of their departure, or which shall have stopped at any such place during their voyage, or on board of which during the voyage any case of such disease shall have occurred, arriving between the first day of April and the first day of November, shall be at such place as the Health Officer and Quarantine Commissioners may designate. And all such vessels immediately on their arrival shall anchor near such boarding station and there remain with all persons arriving thereon until discharged by the Health Officer.

BOARDING VESSELS.

Sec. 104. The Health Officer shall board every quarantinable vessel as soon after her arrival as practicable, between sunrise and sunset * * * . *See also section 130 of this act.*

BILLS OF HEALTH.

Sec. 105. The health officer shall require the masters of all merchant ships and vessels arriving at such port from any foreign port to present a bill of health, duly executed * * * at such port of departure.[1] * * * Vessels touching at other ports on the passage shall also bring a bill of health from each port, or shall have endorsed on the original bill of health by one of such United States officers thereat. * * *

QUARANTINABLE DISEASES.

Sec. 109. The quarantinable diseases are yellow fever, cholera, typhus or ship fever, smallpox, scarlet fever, diphtheria, measles and relapsing fever, and any other disease of a contagious, infectious or pestilential nature, which has been or may be determined to be quarantinable by the Health Officer. Persons with insufficient evidence of effective vaccination and known to have been recently exposed to smallpox, shall be vaccinated as soon as practicable and detained until the vaccination shall have taken effect. * * *

QUARANTINABLE VESSELS AND PERIOD OF QUARANTINE.

Sec. 110. Every vessel arriving at the port of New York from any place where a quarantinable disease existed at the time of departure, or which shall have arrived at any such place and proceeded therefrom to New York, or on board of which during the voyage any cases of any such disease shall have occurred, shall remain at quarantine until the Health Officer grant a permit for the discharge of such vessel or cargo or both. Every vessel arriving at the Port of New York from any foreign port, and every vessel from a domestic port (in the ordinary passage from which they pass south of Cape Henlopen, arriving between the first day of May and the first day of November), shall, on their arrival at the quarantine grounds, be subject to visitation by the Health Officer, but shall not be detained beyond the time requisite for due examination and observation, unless they have had on board, during the voyage, some case of quarantinable disease, in which case they shall be subject to such regulations as the Health Officer may prescribe. No vessel shall be put in quarantine without a written decision of the Health Officer, of which the captain or master shall be immediately informed. No quarantinable vessel shall depart from quarantine without the written permission of the Health Officer, which shall be delivered by the master of the vessel to the board of health of the city of New York, or the health commissioner of the city of Brooklyn, according to the destination of the vessel, within twenty-four hours after the permit is received by him.

Sec. 112. If a vessel which has not had, during the voyage, a case of quarantinable disease, is found in a condition which the Health Officer deems dangerous to the public health, the vessel and its cargo shall be detained until the case can be considered, but the decision of the Health Officer shall be rendered within twenty-four hours. Any vessel in an unhealthy state, whether it has sickness on board or not, shall not be allowed pratique until it shall have been broken out, duly cleansed and ventilated.

Sec. 115. The Health Officer shall cause all vessels * * * in quarantine to be designated by a yellow flag, and shall prohibit communication with or passage within range of the same, except under such restrictions as he may designate compatible with the public safety.

[1] Under heading "National Quarantines" see sections 2 and 5 of "An Act granting additional quarantine powers, etc." Approved February 15, 1893.

WHEN VESSEL MAY RETURN TO SEA WITHOUT QUARANTINE.

Sec. 111. A vessel may, before breaking bulk, put to sea in preference to being quarantined, if the Health Officer is satisfied that its sick will be taken care of for the remainder of the voyage, and its bill of health shall be returned if it has not arrived at its port of destination. The Health Officer shall state on such bill of health the length and circumstance of its detention and its condition on reputting to sea and shall take care of such of its sick as prefer to remain.

WHEN MASTER OF VESSEL MUST PROVIDE FOR PASSENGERS.

Sec. 124. All passengers on board any vessel under quarantine shall be provided for by the master of the vessel on which they arrive. If the master neglects or refuses to provide for them, or if they have been sent on shore by the Health Officer, they shall be maintained by the quarantine commissioners at the expense of the vessel. * * *

FEES AND COMPENSATION OF HEALTH OFFICERS.

Sec. 130. The Health Officer shall receive fees for his services at not exceeding the following rates namely: For inspection of any vessel from a foreign port five dollars. For inspection of every vessel from a domestic port, south of Cape Henlopen, between May first and November first, in each year, steamers three dollars, other vessels one dollar. For medical inspection of every one hundred or fraction of one hundred steerage passengers upon transatlantic steamers two dollars. For each special permit issued for the discharge of cargo, portion of cargo or baggage brought as freight, twenty-five cents. For sanitary inspection of every vessel after the discharge of cargo or ballast ten dollars. For fumigation and disinfection of every vessel from an infected port, or of such vessel as in the judgment of the Health Officer shall require fumigation and disinfection by reason of exposure to infection or contagion, fifty dollars, or such sum not more than fifty dollars or less than five dollars, as may in the judgment of the Health Officer be deemed reasonable, during a single quarantine. For boarding every vessel and giving a permit between sunset and sunrise, at the request of the owner, consignee or master of the vessel, when such pratique can be given without danger to the public health, five dollars. For vaccination of persons on vessels * * * each twenty-five cents. But no charge shall be made for the vaccination of any person who shall have been successfully vaccinated by the medical officer of the ship.

LIEN FOR SERVICES AND EXPENSES.

Sec. 123. All such expenses, services, and charges shall be a lien on the vessels, merchandise or other property in relation to which they shall have been made, incurred or rendered, and if such master, owner, or consignee shall omit to pay the same within three days after the presentation of such account, the commissioners may proceed to enforce such lien in the manner provided in the lien law for the enforcement of liens upon vessels; * * *.

SANITARY CODE OF THE BOARD OF HEALTH.

Extracts from pamphlet edition of the code, issued January 1, 1899.

REPORTS AS TO CONTAGIOUS AND INFECTIOUS DISEASES.

Sec. 148. That the master, chief officer, and consignee, or one of them, of every vessel not being in quarantine, or within quarantine limits, but being within one-fourth of a mile of any dock, wharf, pier, or building of said city, shall daily report to the Sanitary Bureau, or cause to be reported, in writing, the particulars, and shall therein state the name, disease, and condition of any person being in or on such vessel, and sick of any contagious disease.

Sec. 151. That every master and chief officer of any vessel, and every physician of, or who practiced on, any vessel which shall arrive in the port of New York from any other port, shall at once report to this Department any facts connected with any person or thing on said vessel, or that came thereon, which he has reason to think may endanger the public health of this city; and he shall report the facts as to any person being or having been sick thereon, of a contagious disease, and as to there being or having been, during the voyage or since her arrival, any infected persons or articles thereon.

Sec. 152. That every master, charterer, owner, part owner, and consignee of any vessel or of the cargo thereof which shall be in the water of said city, unless detained in quarantine, shall at once give, or cause to be given, to the Sanitary Superintendent, written notice of any infected article or person, and every person sick of a contagious disease, being or having within ten days been on board said vessel; and also of each and every fact and thing relative to said vessel, sick person or cargo, or to the crew of such vessel, which any of the first-

mentioned persons shall have reason to think may be useful for this Department to know, or be or become dangerous or prejudicial to life or health in said city.

REMOVALS FROM AND UNLOADING OF VESSELS.

Sec. 159. That every master, owner, charterer, part owner, or consignee of any vessel, that shall bring any cotton into the port of New York and within the limits of the City of New York between the first day of May and the first day of November of each year, shall at once report to this Department, or cause to be made, in writing, a report to this Department of the fact of any such cotton being in a dangerous, infected, or unsound condition, or having been exposed to any infection.

Sec. 160. That no master, charterer, owner, part owner or consignee of any vessel, or any other person, shall bring to any dock, pier, wharf, or building within one thousand feet thereof, in said city, or unload at any dock, building, or pier therein, or have on storage in the built-up portions of said city, any skins, hides, rags, or similar articles or materials, having been brought from any foreign country or any infected place, or from any points south of Norfolk, Virginia, without or otherwise than according to written permit so to do from this Department; and no person shall sell, exchange, remove, or in any way make exposure of any straw, bedding or other articles used by immigrants upon any vessel bringing immigrants to this port, until it has been adequately and properly cleansed or disinfected; and all straw, bedding or other articles that have been exposed on any vessel to contagion or infection of any contagious disease, or have been or are liable to communicate such disease, shall be destroyed by fire on said vessel.

Sec. 161. That no owner, agent, or consignee of any vessel, or cargo, and no officer of any vessel (in respect of either of which vessel or cargo a permit, according to any law, ordinance, or regulation shall or should have been obtained to pass quarantine, or to come up to the water front of the city of New York) shall unlade, or land, or cause to be unladen or landed, such cargo, or any part thereof, in said city, without having first received the written permit of this Department so to do.

Sec. 162. That no captain, officer, consignee, owner, or other person in charge of any vessel (or having right and authority to prevent the same) shall remove or aid in removing from any vessel to the shore (save as legally authorized by the Health Officer of the port of New York, and into quarantine grounds and buildings only) any person sick of, or person that has been exposed to, and is liable very soon to develop any contagious disease, nor so remove or aid in removing any articles that may have been exposed to the contagion of any such disease, except in accordance with a permit from the Department of Health, or with its special regulations.

Sec. 163. That no master, charterer, consignee, or other person shall order, bring or allow (having power and authority to prevent) any vessel or person, or article therefrom, from any infected port, nor any vessel or person or article therefrom, liable to quarantine, according to the ninth section of the three hundred and fifty-eighth chapter of the laws of 1863 (or under any other laws, and whether such quarantine has been made or suffered or not), to come or be brought to any point nearer than three hundred yards of any dock or pier, or to any building in said city without or otherwise than according to a permit from the Department of Health. Nor shall any vessel, or person or thing therein or therefrom, having been in quarantine, come or be brought within the last-named distance of any last-named place, without the permit or assent of this Department.

Sec. 164. That no person shall bring into this city from any infected place, or land, or take therein, from any vessel lately from an infected port, or from any vessel or building in which had lately been any person sick of a contagious disease, any article or person whatsover, nor shall any such person land or come into such city without a permit from the Department of Health; and it shall be no excuse that such person or article so offending, or the occasion of offense, has passed through quarantine, or has a permit from any other source than this Department.

Sec. 165. That no owner, part owner, charterer, agent, or consignee of any vessel, nor any officer or person having charge or control of the same, shall allow to be cast therefrom, and no person shall cast therefrom, into any public waters of the city of New York, any straw, bedding, clothing, or other substance, from any incoming vessel, from any foreign port, or port south of Cape Henlopen, without a permit from this board, except as allowed by the quarantine authorities.

REMOVALS OF SICK PERSONS.

Sec. 167. That no person shall within this city, without a permit from this Department, carry, remove, or cause or permit to be carried or removed, any person sick with any infectious or contagious disease, or remove or cause to be removed, any such person from any building or vessel to any other building or vessel or to the shore, * * * *

APPENDIX II.

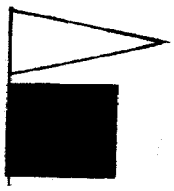
WIND SIGNALS OF THE U. S. WEATHER BUREAU.

STORM AND INFORMATION SIGNALS ALONG THE SEACOAST.

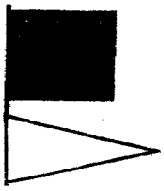
A red flag with a black center indicates that the storm is expected to be of marked violence.

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 quadrant; below, from the southerly quadrant.

STORM SIGNALS.

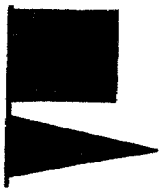


Northwesterly winds.



Southwesterly winds.

Northeasterly winds.



Southeasterly winds.

By night a red light will indicate easterly winds and a white light above a red light will indicate westerly winds.

The "**Information Signal**" consists of a red pennant of the same dimensions as the red and the white pennants (direction signals) and when displayed indicates that the local observer has received information from the central office of a storm covering a limited area, dangerous only for vessels about to sail to certain points. The signal will serve as a notification to shipmasters that the necessary information will be given them upon application to the local observer.

Hurricane.

The "**Hurricane Signal**" denotes the expected approach of a hurricane or of one of the severe and dangerous storms that occasionally moves across the Gulf of Mexico and along the Atlantic Coast.

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APPENDIX III.

REGULATIONS U. S. MARINE-HOSPITAL SERVICE.

APPROVED NOVEMBER 27, 1897.

(*Extracts.*)

GENERAL DUTIES OF COMMISSIONED OFFICERS.

PROFESSIONAL DUTIES.

111. 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. Professional duties defined.

112. 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 (Form 1928) 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 $1 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 Light-House 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. To examine seamen, cadets, enlisted men, etc., as to their physical condition.

113. 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. To examine applicants for pilot's license.

114. No fee will be charged by any officer of the Marine-Hospital Service for the medical examination of seamen of the United States merchant marine or for making a certificate as to their physical condition. No fee to be charged.

SANITARY DUTIES.

117. It shall be the duty of commissioned officers to enforce the national quarantine rules 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. To enforce national quarantine rules and regulations. Apr. 29, 1878, s. 3; Feb. 15, 1893.

121. Upon the outbreak of smallpox at or near a relief station, commissioned officers will vaccinate such seamen as may come to the marine-hospital officer for the purpose; and officers are authorized, at all times, to visit vessels to examine and vaccinate crews. To vaccinate seamen.

RELIEF STATIONS.

353. A relief station of the Marine-Hospital Service is a port situated on any navigable water of the United States where an officer of the Marine-Hospital Service is on duty to extend relief to seamen or where an officer of the customs service is specifically authorized to extend said relief. Definition.

Classes.

354. 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.

Provisions for relief.

355. At all relief stations where the number of patients warrants, an officer of the Marine-Hospital 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. At places where Congress has made no provision for the erection of a marine hospital, buildings or rooms suitable for hospital purposes, or separate wards in State, municipal, or private hospitals, may be leased or rented, for the exclusive benefit of the patients of the Service, or contracts may be made for the care and treatment of patients with local hospitals, subject to the approval of the Secretary of the Treasury.

Supervision of relief.

356. The medical and surgical treatment of the patients of the Marine-Hospital Service will be under the supervision of the commissioned and non-commissioned officers of the Service, at all relief stations where such officers are on duty, and they will be required to take direct professional charge of the patients.

Provision for marine-hospital dispensaries.

357. 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 Marine-Hospital 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.

Location of offices and dispensaries.

358. The marine-hospital office shall be located at the custom-house whenever practicable, and suitable office room for that purpose shall be set apart by the custodian of the custom-house building, subject to the approval of the Secretary of the Treasury.

Districts.

359. The relief stations of the Marine-Hospital Service are grouped into eight districts, as follows:

The district of the North Atlantic; the district of the Middle Atlantic; the district of the South Atlantic; the district of the Gulf; the district of the Ohio; the district of the Mississippi; the district of the Great Lakes, and the district of the Pacific.

Middle Atlantic.

361. The district of the Middle Atlantic embraces the following-named relief stations, viz: Albany, N. Y.; Bridgeport, Conn.; Delaware Breakwater, Del.; Hartford, Conn.; New Haven, Conn.; New London, Conn.; New York, N. Y.; Perth Amboy, N. J.; Philadelphia, Pa.; Sag Harbor, N. Y.; Somers Point, N. J., and Wilmington, Del.

BENEFICIARIES.

Persons entitled to relief.

368. The persons entitled to the benefits of the 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 Light House Establishment, officers and crews of the Revenue-Cutter Service, seamen employed on the vessels of the Mississippi River Commission, seamen employed on 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. Officers and seamen employed on vessels of the Coast and Geodetic Survey who are not enlisted men from the Navy, are entitled to the benefits of the Marine-Hospital Service.

Yachtsmen entitled.

369. Seamen employed on yachts are entitled to treatment, provided the said yachts are enrolled, licensed, or registered as vessels of the United States.

Exceptions, R. S., s. 4804.

370. 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 marine-hospital fund.

Wrecked seamen entitled.

372. Seamen taken from wrecked vessels of the United States are entitled to the benefits of the Marine-Hospital Service if sick or disabled, and will be furnished care and treatment without reference to the length of time they have been employed.

Seamen sent by consular officers entitled. U. S. Rev. Stat., s. 4577.

373. 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 Marine-Hospital Service without reference to length of service.

374. A sick or disabled seaman, in order to obtain the benefits of the Marine-Hospital Service, must apply in person, or by proxy if too sick or disabled so to do, at the office of the Marine-Hospital Service, to an officer of that Service, or to the proper customs officer acting as the agent of the Marine-Hospital Service at stations where no Marine-Hospital officer is on duty, and must furnish satisfactory evidence that he is entitled to relief under the regulations. Seamen must make application for relief.

375. Masters 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. Evidence to be presented by applicant. U. S. Rev. Stat., 4803.

376. 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. Certificates from owners or agents as evidence.

377. Masters of documented vessels of the United States shall, on demand, furnish any seaman who has been employed on such vessel a certificate (Form 1914) 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, whether the relief is furnished or the claim rejected. Masters must furnish certificate of service.

378. In case the master of any vessel shall fail or refuse to furnish a master's certificate to any seaman who may have been employed on board said vessel within sixty days, the collector of customs shall cause said master, if he be in port, to appear at the marine-hospital office and produce the ship's books. Masters refusing to give certificate. Secs. 5438 and 5440, R. S.

379. 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. False certificates.

380. 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. Exceptions.

381. 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 375, which must show that the applicants were employed within sixty days immediately preceding the said closure of navigation, and it must be satisfactorily shown that the disease or injury was also acquired during the time of their service. Closure of navigation.

382. The time during which a seaman has been under treatment in hospital as a patient of the Marine-Hospital Service shall not be reckoned as absence from vessel in respect to debarring him from further relief. Period of treatment not to be reckoned as absence from vessel.

383. Whenever an applicant for relief presents himself at the marine-hospital office or the custom-house without a master's certificate or shipping commissioner's discharge and it is impracticable to obtain such certificate on account of the absence of the vessel or its master from the port, 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 Marine-Hospital Service. Affidavits may be accepted as evidence.

384. 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 if supported by satisfactory evidence. Brief service on last vessel not a bar to relief.

387. 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 to the Supervising Surgeon-General for decision. Applications for relief after sixty days' absence from vessel.

388. 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. * * * Seamen to sign certificates.

Out-patients to furnish new service certificates.

390. 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.

Expenses for sickness during voyage.

391. The expenses of caring for sick and disabled seamen incurred during a voyage will not be paid by the Marine-Hospital Service.

Seamen admitted to local quarantine hospitals.

392. The expenses for the care and treatment of seamen suffering from contagious diseases entitled to the benefits of the Marine-Hospital Service, 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 from the Marine-Hospital fund unless such seamen were admitted at the time by the request of an officer of the Service.

Money not to be paid to seamen for expenses of sickness.

393. In no case shall money be paid to a seaman or to his family or friends by the Marine-Hospital Service as reimbursement for expenses incurred during sickness or disability.

Seamen injured in brawls not to receive treatment.

395. Seamen who may be injured during 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 Marine-Hospital fund.

Seamen taken ill on vessel entitled.

396. Seamen taken seriously 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.

Certificates of discharge.

397. 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.

Only temporary relief contemplated.

398. 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.

RELIEF.

OUT-PATIENT RELIEF.

Cases to be treated as out-patients.

399. Sick and disabled seamen entitled under these regulations to the benefits of the Marine-Hospital 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.

No relief furnished at homes of patients.

400. Seamen will not be furnished relief at their own homes, except by special authority from the Supervising Surgeon-General, and then only an allowance for medical attendance and medicines will be made at the rates fixed by the Treasury Department.

HOSPITAL RELIEF.

Cases for hospital treatment.

413. A sick or disabled seaman entitled to the benefits of the Marine-Hospital 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.

To be valid only for day of issue.

416. A bed ticket (Form 1917) 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.

To be valid only for day of issue.

424. A bed ticket (Form 1917) 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.

432. 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 require hospital treatment. The period for which treatment is authorized by the permit should be based upon the certificate of the acting assistant surgeon or attending physician, as given in the relief certificates, but should in no case exceed twenty days.

Permits for hospital relief. Form 1916.

STATIONS OF THE FOURTH CLASS.

445. 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 require hospital treatment. The period for which treatment is authorized by the permit should be based upon the certificate of the acting assistant surgeon or attending physician, as given in the relief certificates, but should in no case exceed twenty days.

Permits for hospital relief. Form 1916.

448. 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.

Permits valid only on day of issue.

410. Out-patient relief will not be furnished except in cases of emergency, such as acute illness or injury, requiring not more than one or two visits.

Not more than two visits allowed.

412. Foreign seamen or employees of the various Government services, not beneficiaries, shall not be treated.

Foreign seamen et al. not treated.

INSANE SEAMEN.

462. Insane seamen entitled to the benefits of the Marine-Hospital Service may be admitted to the Government Hospital for the Insane, Washington, D. C., upon the order of the Secretary of the Treasury.

Relief for insane seamen. Mar. 3, 1875.

DECEASED SEAMEN.

468. On the death of a patient while under the charge of the Marine-Hospital Service, notice to receive his effects shall be given by letter, or otherwise, to his nearest known relative. * * *

Relatives to be notified.

469. 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.

Burial expenses

SEAMEN OF THE GOVERNMENT SERVICES AND FOREIGN SEAMEN.

UNITED STATES NAVY AND COAST SURVEY.

470. Officers and seamen employed on vessels of the United States Navy and the Coast Survey may be admitted for care and treatment as patients of the Marine-Hospital Service only upon the written request of their respective commanding officers. Every such admission shall be immediately reported to the Supervising Surgeon-General by the officer in charge of the station, on a daily report (Form 1942) or relief certificate (Form 1915), accompanied by a copy of the request upon which such officer or seaman was admitted. They shall 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 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." The above class of patients are not subject to the provisions requiring transportation to marine hospitals.

Officers and seamen of various Government services may be admitted.

FOREIGN SEAMEN.

471. The accommodations provided for the care and treatment of the patients of the Marine-Hospital Service are also available to foreign seamen at relief stations of the first, second, and third class upon the application of

Foreign seamen may be treated. Sec. 6, act Mar. 3, 1875; 18 Stat. L., 485.

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 Secretary of the Treasury. When treatment is furnished a foreign seaman, the fact will be immediately reported to the Supervising Surgeon-General, on a daily report (Form 1942) or relief certificate (Form 1915), accompanied by a copy of the application upon which he was admitted.

Bills for care and treatment, Form 1926.

472. A bill (Form 1926) in duplicate must be rendered by the officer of the Marine-Hospital Service in command for the care of each foreign seaman or other seaman admitted (not entitled to treatment free), said bill to be rendered upon the termination of treatment in each case. One copy of this bill shall be delivered to the collector of customs, who shall at once collect the amount; the other copy shall be forwarded by the officer rendering the bill to the Supervising Surgeon-General.

Monthly accounts to be rendered.

473. Customs officers acting as agents of the Marine-Hospital Service shall collect all bills for the care and treatment of seamen of the classes enumerated in paragraphs 470 and 471 when rendered by the proper Marine-Hospital officer, and will render monthly accounts for all moneys collected on account of the care and treatment of such seamen; said accounts to be accompanied by abstracts giving the name and nationality of the patient, date of admission and date of discharge, period of treatment, and amount collected in each case.

Notification of amount of bill.

474. Collectors of customs will notify the commanding officer of the vessel of the class enumerated in paragraphs 470 and 471, upon whose request the seaman was admitted, of the amount of the bill, and when paid will give a receipt therefor. The money will be deposited as a repayment to the Marine-Hospital fund in the manner provided for moneys received for the care of foreign seamen.

Charges for care and treatment.

475. 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 426 and 434 requiring transportation to marine hospitals.

THE REVENUE-CUTTER SERVICE.

Admitted without regard to length of service.

476. 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.

Admitted to stations of class 1 and to contract hospitals.

477. Any such officer or seaman whose condition absolutely requires treatment in hospital will be admitted to hospitals at stations of the first class and to all contract hospitals enumerated in the annual circular entitled "Contracts for care of seamen," subject to the provisions of the said circular with regard to the transfer of patients from a contract to the nearest marine hospital. No admission to hospital will be granted at any port not mentioned in said circular. At all ports mentioned in the circular, where no specific arrangements for treatment in hospital are made, the regulations governing admission at fourth-class (emergency) stations will be enforced.

Out-patient treatment—where and how furnished.

478. Out-patient treatment will be furnished at all stations where an officer of the Marine-Hospital Service is on duty. At all other stations out-patient relief will be granted only in case of emergency and under the provisions of the regulations relative to fourth-class (emergency) stations. No out-patient relief will be granted at any station not mentioned in the annual circular entitled "Contracts for care of seamen," and in all other respects the regulations of the Marine-Hospital Service must be complied with.

THE LIGHT-HOUSE SERVICE.

Officers and crews of the Light-House Establishment entitled.

487. Officers and crews of the several vessels belonging to the Lighthouse Establishment may be admitted to the benefits of the Marine-Hospital Service upon the application of their respective commanding officers. No charge will be made for care and treatment.

THE ENGINEER CORPS, UNITED STATES ARMY.

480. 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.

Seamen employed on vessels of the Engineer Corps, U. S. A., entitled.

NATIONAL QUARANTINES.

AN ACT granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service.

(*Extracts.*)

[Approved February 15, 1893.]

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 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.

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 shall 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 certificates 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 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 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.

QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE FRONTIERS OF THE UNITED STATES.

(*Extracts.*)

ARTICLE I.—INSPECTION.

1. Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine office prior to entry.

A. Any vessel with sickness on board.

B. All vessels from foreign ports.

C. Vessels from domestic ports where cholera or yellow fever prevails or where smallpox or typhus fever prevails in epidemic form.

EXCEPTIONS.—Vessels not carrying passengers on inland waters of the United States. Vessels from the Pacific and Atlantic coast of British America, provided they do not carry persons or effects of persons nonresident in America for the sixty days next preceding arrival, and provided always that the port of departure be free from quarantinable disease. Vessels from other foreign ports via these excepted ports shall be inspected.

D. Vessels from foreign ports carrying passengers having entered a port of the United States without complete discharge of passengers and cargo. Such vessels shall be subject to a second inspection before entering any other port. 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 port south of said latitude during the quarantine season of such port.

2. The inspections of vessels required by these regulations shall be made by daylight, except in case of vessels in distress.

3. In making the inspection of a vessel, the bill of health and clinical record of all cases treated during the voyage, crew and passengers' list 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.

4. No person except the quarantine officer, his employés, United States customs officers, or agents of the vessel, shall be permitted to board any vessel subject to quarantine inspection, until after the vessel has been inspected by the quarantine officer and given its discharge.

5. Tugboats or any other vessels having had communication with vessels subject to inspection, shall be themselves subject to inspection.

ARTICLE II.—QUARANTINE.

1. For the purpose of these regulations, the quarantinable diseases are cholera (cholerine), yellow fever, smallpox, typhus fever, and leprosy.

2. Vessels arriving under the following conditions shall be placed in quarantine:

A. With quarantinable disease on board.

B. Having had such on board during the voyage or within thirty days next preceding arrival; or, if arriving in the quarantine season, having had yellow fever on board after March 1 of the current year, unless satisfactorily disinfected thereafter.

C. From ports infected with cholera, or where typhus fever prevails in epidemic form, coming directly or via another foreign port, or via United States ports, unless they have complied with the United States quarantine regulations for foreign ports, also vessels from noninfected ports but bringing persons or cargo from places infected with cholera, yellow fever, or where typhus fever prevails in epidemic form, except as subsequently noted.

D. From ports where yellow fever prevails, unless disinfected in accordance with these regulations, and not less than five days have elapsed since such disinfection.

E. Tugboats and other vessels having had communication with vessels subject to quarantine, shall be quarantined if they have been exposed to infection.

EXCEPTIONS.—The following exceptions may be made to Rules C and D with regard to vessels from ports quarantined against on account of yellow fever:

(1) Vessels arriving during certain seasons of the year, to wit, from November 15 to April 1, may be admitted to entry.

(2) Vessels bound for ports in the United States north of the southern boundary of Maryland, with good sanitary condition and history, having had no sickness on board at ports of departure en route or on arrival, provided they have been five days from last infected or suspected port, may be allowed entry at port of destination. But if said vessels carry passengers destined for places south of this latitude the baggage of said passengers shall be disinfected.

* * * * * * *

ARTICLE III.—GENERAL REQUIREMENTS AT QUARANTINES.

1. Pilots bringing infected vessels will be detained in quarantine a sufficient time to cover the period of incubation of the disease for which the vessel is quarantined, if, in the opinion of the quarantine officer, such pilots have been exposed to infection. The dunnage of pilots shall be disinfected when necessary.

2. No direct communication shall be allowed between quarantine, or any vessel in quarantine, and any person or place outside, and no communication except under the supervision of the quarantine officer.

3. No ballast shall be allowed to leave the quarantine station, unless disinfected.

4. Where it is impossible to disinfect cargo *in situ*, it shall be removed and disinfected in the manner provided for articles of their class in these regulations; such articles to be unpacked and so arranged as to allow the disinfectant used to reach every part of all surfaces of said articles.

5. Vessels arriving at any port of the United States, having cholera or yellow fever aboard during the quarantine season, shall be remanded to an anchorage set apart for infected vessels, and there to remain until after the discharge of the passengers and purification of the vessel.

6. All passenger baggage disinfected under the requirements of these regulations shall be labeled.

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APPENDIX IV.

RULES TO PREVENT COLLISIONS OF VESSELS.

Compiled for insertion in volumes of the U. S. Coast Pilot, Atlantic Coast.

AN ACT in regard to collision 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 names 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 Nov. 18, 1890, to take effect Dec. 15, 1890.

INTERNATIONAL RULES.

I.—ENACTING CLAUSE, AND SCOPE.

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 word "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 sail, 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.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. [*Article 9, act of August 19, 1890, was repealed by act of May 28, 1894, and article 10, act of March 3, 1885, was reenacted in part by act of August 13, 1894, and is reproduced here in part as article 9. It will be the object of further consideration by the maritime powers:*]

Fishing-vessels of less than twenty tons net registered tonnage, 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 the 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.

The following portion of this article applies only to fishing-vessels and boats when in the sea off the coast of Europe lying north of Cape Finisterre:

(*a*) All fishing-vessels and fishing-boats of twenty tons net registered tonnage 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.

(*b*) All vessels when engaged in fishing with drift nets shall exhibit two white lights from any part of the vessel where they can be best seen. Such lights shall be placed so that the vertical distance between them shall be not less than six feet and not more than ten feet, and so that the horizontal distance between them, measured in a line with the keel of the vessel, shall be not less than five feet and not more than ten feet. The lower of these two lights shall be the more forward, and both of them shall be of such a character and contained in lanterns of such construction as to show all around the horizon, on a dark night, with a clear atmosphere, for a distance of not less than three miles.

(*c*) All vessels when trawling, dredging, or fishing with any kind of drag-nets 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, on a dark night, with a clear atmosphere, the white light to a distance of not less than three miles and the red light of not less than two miles.

(*d*) A vessel employed in line-fishing, with her lines out, shall carry the same lights as a vessel when engaged in fishing with drift nets.

(*e*) If a vessel, when fishing with a trawl, dredge, or any kind of drag-net, becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall show the light and make the fog signal for a vessel at anchor.

(*f*) Fishing-vessels may at any time use a flare-up in addition to the lights which they are by this article required to carry and show. All flare-up lights exhibited by a vessel when trawling, dredging, or fishing with any kind of drag-net shall be shown at the after-part of the vessel, excepting that if the vessel is hanging by the stern to her trawl, dredge, or drag-net they shall be exhibited from the bow.

(*g*) Every fishing-vessel when at anchor between sunset and sunrise shall exhibit a white light, visible all around the horizon at a distance of at least one mile.

(*h*) In a fog a drift-net vessel attached to her nets, and a vessel when trawling, dredging, or fishing with any kind of drag-net, and a vessel employed in line-fishing with her lines out, shall, at intervals of not more than two minutes, make a blast with her fog horn and ring her bell alternately.

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 light 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 IN FOG, ETC.

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, ETC.

(*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 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 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. 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-away 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 AND 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 fair-way or mid-channel which lies on the starboard side of such vessel.

RIGHTS 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 fair-way 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. [See p. 173.]

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 AND SCOPE.

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:

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.

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 word "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, 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 sea-going 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 sea-going vessels and ferry-boats) 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 head-light shall be so constructed as to show an unbroken light through twenty points of the compass, namely, from right head 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-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.

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 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.

LIGHTS FOR ROWING BOATS.

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.

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 drag-nets 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.*

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 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.

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* *Resolved*, That all coal boats, trading boats, produce boats, canal boats, oyster boats, fishing boats, and other water craft navigating any bay, harbor, or river, propelled by hand power, horse power, sail, or by the current of the river, or which shall be moored in or near the channel or fairway of any bay, harbor, or river, shall carry one bright white light forward, not less than six feet above the rail or deck.

Rafts of one crib and not more than two in length shall carry one bright white light on a pole not less than twelve feet high; three or more cribs in length, shall carry one white light at each end of the raft at the same height. Boom rafts with cross binders towed ahead of steamers on the Mississippi and Ohio rivers, and other waters flowing into the Gulf of Mexico, and on the Red River of the North, shall carry a white light *twelve feet high* at the forward end of the raft, and one such light at each side midway between the forward and after end.

Rafts of more than one crib abreast shall carry one white light on each outside corner of the raft, making four lights in all. Bag or boom rafts navigating or anchored in the fairway of any bay, harbor, or river shall carry a white light at least twelve feet high at each end of the raft, and one of such lights on each side midway between the forward and after end.

Rowboats shall carry one white light two feet above the stern.

JAS. A. DUMONT,
Supervising Inspector General,
President Board of Supervising Inspectors.

Approved, February 16, 1891.

A. B. NETTLETON,
Acting Secretary.

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, may carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III.—SOUND SIGNALS IN FOG, ETC.

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 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 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, ETC.

(*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 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 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 rain-storms, when vessels can not so see each other, fog-signals only must be given.

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 the two vessels is to keep out of the way, the other shall keep her course and speed.

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 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 fair-way or mid-channel which lies on the starboard side of such vessel.

RIGHTS 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 fair-way 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 VESSELS IN SIGHT OF ONE ANOTHER.

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.

ART. 30. [See page 180.]

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.

ADDITIONAL RULES.

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 ferry-boats 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 the Treasury, 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 ferry-boats and steam-vessels, which rules shall be kept posted up in conspicuous places in such vessels.

PENALTY.

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.

EXTRACTS FROM TREASURY DEPARTMENT CIRCULAR No. 88 OF 1897.

LINES ESTABLISHING HARBORS, RIVERS, AND INLAND WATERS OF THE UNITED STATES, WITHIN WHICH THE INLAND RULES APPLY.

Pursuant to section 2 of the act approved February 19, 1895, the following lines dividing the high seas from rivers, harbors, and inland waters are hereby designated and defined:

(*Bearings are Magnetic and Given Approximately.*)

CUTLER (LITTLE RIVER) HARBOR, MAINE.—A line drawn from Long Point SW. by W. ¾ W. to Little River Head.

LITTLE MACHIAS BAY, MACHIAS BAY, ENGLISH BAY, CHANDLER BAY, MOOSABEC REACH, PLEASANT BAY, NARRAGUAGUS BAY, AND PIGEON HILL BAY, MAINE.—A line drawn from Little River Head WSW. ¼ W. to the outer side of Old Man; thence WSW. ⅝ W. to the outer side of Double Shot Islands; thence W. ¾ S. to Libby Islands Light-House; thence WSW. ¼ W. to Moose Peak Light-House; thence WSW. ¼ W. to Little Pond Head; from Pond Point, Great Wass Island, W. by S. to outer side of Crumple Island; thence W. ⅝ S. to Petit Manan Light-House.

ALL HARBORS ON THE COASTS OF MAINE, NEW HAMPSHIRE, AND MASSACHUSETTS, BETWEEN PETIT MANAN LIGHT-HOUSE, MAINE, AND CAPE ANN LIGHT-HOUSES, MASSACHUSETTS.—A line drawn from Petit Manan Light-House SW. $\frac{3}{8}$ S., 26$\frac{1}{2}$ miles, to Mount Desert Light-House; thence W. $\frac{3}{8}$ S., 33$\frac{1}{2}$ miles, to Matinicus Rock Light-Houses; thence WNW. $\frac{7}{8}$ W., 20 miles, to Monhegan Island Light-House; thence W., 21 miles, to Seguin Island Whistling Buoy; thence W. $\frac{3}{4}$ S., 19 miles, to Old Anthony Whistling Buoy, off Cape Elizabeth; thence SW., 28 miles, to Boon Island Light-House; thence SW. $\frac{1}{8}$ W., 12 miles, to Anderson Ledge Spindle, off Isles of Shoals Light-House; thence S. by W. $\frac{1}{4}$ W., 19$\frac{1}{2}$ miles, to Cape Ann Light-Houses, Massachusetts. (Lines heretofore established for Portland Harbor, and Kittery Harbor, Maine, Portsmouth Harbor, New Hampshire, Newburyport, Ipswich, and Annisquam harbors, Massachusetts, are hereby canceled.)

BOSTON HARBOR.—From Point Allerton NNE. $\frac{1}{4}$ E., easterly, through Point Allerton Beacon to Northeast Grave Whistling Buoy; thence NNE. $\frac{1}{4}$ E. to Outer Breaker (Great Pig Rocks) Bell Buoy; thence NE. by E. $\frac{3}{8}$ E. to Halfway Rock Beacon; thence NE. by E. $\frac{1}{4}$ E. to Eastern Point Light-House.

ALL HARBORS IN CAPE COD BAY, MASSACHUSETTS.—A line drawn from Plymouth (Gurnet) Light-Houses E., 16$\frac{1}{4}$ miles, to Race Point Light-House.

NANTUCKET SOUND, VINEYARD SOUND, BUZZARDS BAY, NARRAGANSETT BAY, BLOCK ISLAND SOUND, AND EASTERLY ENTRANCE TO LONG ISLAND SOUND.—A line drawn from Chatham Light-Houses, Massachusetts, S. by E. $\frac{3}{8}$ E., about 6 miles, to Northeast Slue Channel Whistling Buoy (Pollock Rip); thence S. by W. $\frac{5}{8}$ W., about 11 miles, to Great Round Shoal Light-Vessel; thence SSW. $\frac{5}{8}$ W., 7$\frac{5}{8}$ miles, to Sankaty Head Light-House; from the westerly end of Tuckernuck Island NW. by W. $\frac{1}{2}$ W., about 5$\frac{1}{2}$ miles, to Wasque Point, Chappaquiddick Island; from Gay Head Light-House W. $\frac{3}{4}$ S., 35 miles, to Block Island (SE.) Light-House; thence W. $\frac{3}{4}$ S., 15 miles, to Montauk Point Light-House, on the easterly end of Long Island, N. Y.

NEW YORK HARBOR.—From Navesink (southerly) Light-House NE. $\frac{5}{8}$ E., easterly, to Scotland Light-Vessel; thence NNE. $\frac{1}{2}$ E., through Gedney Channel Whistling Buoy (proposed position) to Rockaway Point Life-Saving Station.

PHILADELPHIA HARBOR AND DELAWARE BAY.—From Cape Henlopen Light NE. by E. to South Shoal Whistling Buoy, thence NNE. $\frac{1}{4}$ E. to Cape May Light.

BALTIMORE HARBOR AND CHESAPEAKE BAY.—From Cape Henry Light-House NE. by E. $\frac{3}{4}$ E., easterly, to Outer Entrance Whistling Buoy, thence N. by E. $\frac{3}{8}$ E. to Cape Charles Light-House.

CHARLESTON HARBOR.—From Charleston Light-Vessel NW. $\frac{1}{2}$ W. (toward Sullivans Island Range Rear Light) to the North Jetty, and from Charleston Light-Vessel SW. $\frac{1}{8}$ W. to Charleston Whistling Buoy, thence SW. $\frac{7}{8}$ W. to Charleston Main Channel Entrance Bell Buoy, thence W. to Folly Island.

SAVANNAH HARBOR AND CALIBOGUE SOUND.—From Tybee Whistling Buoy NNW. $\frac{15}{16}$ W. through North Slue Channel Outer Buoy to Braddock Point, Hilton Head Island, and from Tybee Whistling Buoy W. to Tybee Island.

ST. SIMON SOUND (BRUNSWICK HARBOR) AND ST. ANDREW SOUND.—From hotel on beach of St. Simon Island $\frac{15}{16}$ mile NE. by E. $\frac{1}{4}$ E. from St. Simon Light-House, SE. $\frac{7}{8}$ E. to St. Simon Sea Buoy, thence S. $\frac{1}{4}$ E. to St. Andrew's Sound Sea Buoy, thence W. to the Shore of Little Cumberland Island.

ST. JOHNS RIVER, FLORIDA.—A straight line from the outer end of the northerly jetty to the outer end of the southerly jetty.

PENSACOLA HARBOR.—From Pensacola Entrance Whistling Buoy N. $\frac{7}{8}$ W., a tangent to the E. side of Fort Pickens, to the shore of Santa Rosa Island, and from the Whistling Buoy NW. $\frac{3}{16}$ W. to Fort McRee Range Front Light.

MOBILE HARBOR AND BAY.—From Mobile Bay Outer or Deep Sea Whistling Buoy (or its watch buoy in summer) NE. by N. to the shore of Mobile Point, and from the Whistling Buoy NW. by W. to the shore of Dauphin Island.

NEW ORLEANS HARBOR AND THE DELTA OF THE MISSISSIPPI.—From South Pass East Jetty Light N. by E. $\frac{1}{2}$ E. to Pass a Loutre Light, thence N. to Errol Island and from South Pass East Jetty Light W. $\frac{7}{8}$ S. to Southwest Pass Light, thence N. to shore.

GALVESTON HARBOR.—From Galveston Bar Whistling Buoy N. by W. $\frac{3}{4}$ W. through the beacon marking the outer extremity of the N. jetty, and SW. by W. $\frac{1}{2}$ W., westerly, through North Breaker Beacon.

SAN DIEGO HARBOR.—From Point Loma Light S. $\frac{7}{8}$ E. to San Diego Bay Outside Bar Whistling Buoy, thence NNE. $\frac{7}{8}$ E. to tower of Coronado Hotel.

SAN FRANCISCO HARBOR.—From Point Bonita Light House SE. $\frac{7}{8}$ S. to Point Lobos.

COLUMBIA RIVER ENTRANCE.—From Cape Disappointment Light SE. $\frac{7}{8}$ E. to Point Adams Light.

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