U. S. DEPARTMENT OF COMMERCE
HARRY L. HOPKINS, Secretary
COAST AND GEODETIC SURVEY
LEO OTIS COLBERT, Director

Serial No. 627

UNITED STATES COAST PILOT

ATLANTIC COAST

SECTION B

CAPE COD TO SANDY HOOK

Fourth (1940) Edition

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PREFACE

This volume is the fourth edition of the Coast Pilot covering the Atlantic coast from Race Point, Cape Cod, to Sandy Hook, including Nantucket, Vineyard, and Long Island Sounds, New York Harbor, Hudson River, and tributaries. It is based mainly upon the work of the United States Coast and Geodetic Survey, including the results of a special examination in 1939.

Navigators are requested to notify the Director, United States Coast and Geodetic Survey, of any errors or omissions that they may find in this publication, or of any additional matter which should be inserted for the information of mariners.

Corrections and additions affecting all Coast Pilot volumes are included in Notice to Mariners, published weekly by the United States Coast Guard. The aids to navigation mentioned in this pilot are those in existence according to the latest available information.

A supplement, giving the more important changes to the text, is issued as often as warranted by the number and importance of the accumulated corrections until a revised edition appears. Each supplement is complete in itself and cancels all previous issues. The date of the latest supplement to each Coast Pilot is given in the List of Coast Pilots published each month in Notice to Mariners.

In using this volume reference should be made to the latest supplement and to Notices to Mariners issued subsequent to the volume or supplement, and due regard should be given to the possibility of changes having occurred since the date of the latest of these publications. The supplement may be obtained free of charge upon application to the United States Coast and Geodetic Survey, Washington, D. C., or to any of its district offices.

LEO OTIS COLBERT, *Director.*

AUGUST 1, 1940.

IMPORTANT

The courses and bearings given in degrees are true, reading clockwise from 0° at north to 359°.

Distances are in nautical miles. Multiply nautical miles by 1.15 to obtain the approximate statute miles.

Currents are expressed in knots, which are nautical miles per hour.

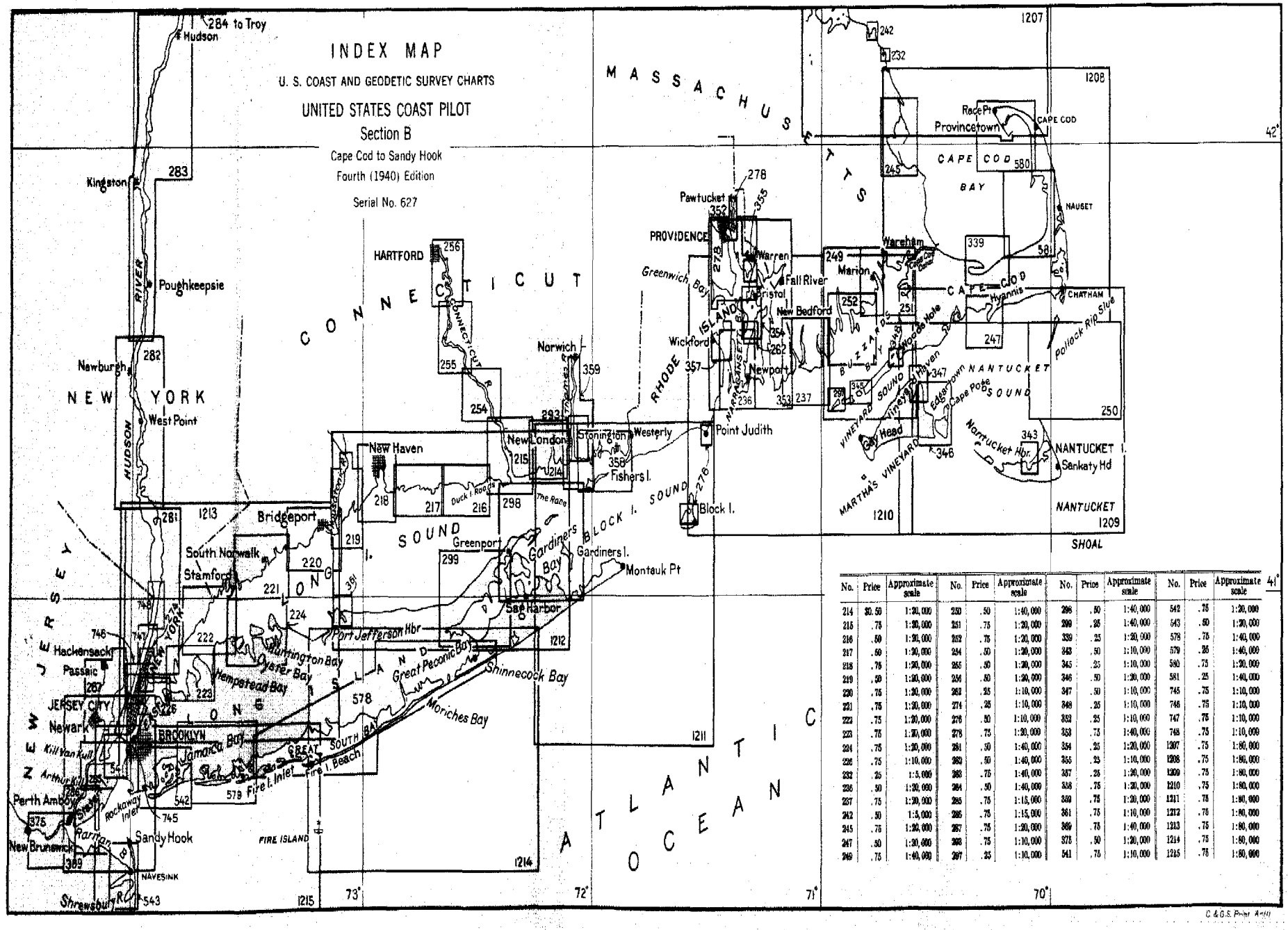
Figures in brackets, given after those denoting feet or fathoms, are their equivalent in meters.

At frequent intervals a name is marked by an asterisk. The approximate latitude and longitude of the points so marked, together with the numbers of the large scale Coast and Geodetic Survey charts on which that point is shown, are given at the bottom of the page.

The addresses of various offices furnishing service to the mariner, located within the area covered by this Pilot, are tabulated in the Appendix, together with other material of value to the navigator.

Chart numbers are given in the Index in addition to page numbers. The number given is that of the largest scale Coast and Geodetic Survey chart on which the feature appears.

With this Coast Pilot the latest Supplement and all Notices to Mariners issued after the date of the Supplement should be used.



No.	Price	Approximate scale	No.	Price	Approximate scale	No.	Price	Approximate scale	No.	Price	Approximate scale
214	$0.50	1:20,000	250	.50	1:40,000	296	.50	1:40,000	542	.75	1:20,000
215	.75	1:20,000	251	.75	1:20,000	299	.25	1:40,000	543	.50	1:20,000
216	.50	1:20,000	252	.75	1:20,000	339	.25	1:20,000	578	.75	1:40,000
217	.50	1:20,000	254	.50	1:20,000	343	.50	1:10,000	579	.25	1:40,000
218	.75	1:20,000	255	.50	1:20,000	345	.25	1:10,000	580	.75	1:20,000
219	.50	1:20,000	256	.50	1:20,000	346	.50	1:20,000	581	.25	1:40,000
220	.75	1:20,000	262	.25	1:10,000	347	.50	1:10,000	745	.75	1:10,000
221	.75	1:20,000	274	.25	1:10,000	348	.25	1:10,000	746	.75	1:10,000
222	.75	1:20,000	276	.50	1:10,000	352	.25	1:10,000	747	.75	1:10,000
223	.75	1:20,000	278	.75	1:20,000	353	.75	1:40,000	748	.75	1:10,000
224	.75	1:20,000	281	.50	1:40,000	354	.25	1:20,000	1207	.75	1:80,000
226	.75	1:10,000	282	.50	1:40,000	355	.25	1:10,000	1208	.75	1:80,000
232	.25	1:5,000	283	.75	1:40,000	357	.25	1:20,000	1209	.75	1:80,000
236	.50	1:20,000	284	.50	1:40,000	358	.75	1:20,000	1210	.75	1:80,000
237	.75	1:20,000	285	.75	1:15,000	359	.75	1:20,000	1211	.75	1:80,000
242	.50	1:5,000	286	.75	1:15,000	361	.75	1:10,000	1212	.75	1:80,000
245	.75	1:20,000	287	.75	1:20,000	369	.75	1:40,000	1213	.75	1:80,000
247	.50	1:20,000	303	.75	1:10,000	375	.50	1:20,000	1214	.75	1:80,000
249	.75	1:40,000	397	.25	1:10,000	541	.75	1:10,000	1215	.75	1:80,000

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UNITED STATES COAST PILOT

ATLANTIC COAST

SECTION B

CAPE COD TO SANDY HOOK

Chapter 1.—GOVERNMENT SERVICES TO THE NAVIGATOR

U. S. COAST AND GEODETIC SURVEY

This Bureau is charged with (1) the survey of the coasts of the United States and its possessions, to insure the safe navigation of coastal and intracoastal waters; (2) the determination of geographical positions and elevations in the interior of the country, to coordinate the coastal survey and provide a framework for mapping and other engineering work; (3) the study of tides and currents to furnish datum planes to engineers and tide and current tables to mariners; (4) the compilation of aeronautical charts, to meet the needs of the pilots of aircraft; (5) observations of the earth's magnetism in all parts of the country, to furnish magnetic information essential to the mariner, aviator, land surveyor, radio engineer and others; and (6) seismological observations and investigations to supply data required in designing structures to reduce the earthquake hazard.

The results of these surveys and studies are analyzed in the Washington office and published as **nautical** and **aeronautical charts**; annual tables of **predicted tides** and **currents; coast pilots;** charts showing magnetic declination; annual lists of United States earthquakes; publications of geographic positions and elevations; and other publications.

Field stations are located at some of the principal ports as listed in the Appendix. Files of charts, coast pilots, and other publications are maintained at these Field Stations for the use of mariners, who are invited to avail themselves of the facilities afforded. Charts, coast pilots, current tables, and tide tables are kept for sale. Mariners observing any changes affecting charts or coast pilots are requested to notify the inspector in charge of the field station.

Reporting of dangers, shoals, changes in channel depths, etc.—Mariners are especially requested to immediately inform the Coast and Geodetic Survey of all important facts relating to changes in

the coast pilots and charts that may come to their attention. Reports of an urgent character should be sent by radio.

The Coast and Geodetic Survey must depend in a great measure upon outside sources of information pending a complete revision of a coast pilot volume. Mariners and others will therefore realize the importance and great desirability of cooperation in this work and are urgently requested to forward to the Director, United States Coast and Geodetic Survey, Washington, D. C., directly or through a field station, any information affecting the coast pilots or charts that may come to their notice, as well as any suggestions that they may have for increasing the value of these publications.

Agencies for the sale of the Charts, Coast Pilots, Tide Tables, and Current Tables of the Coast and Geodetic Survey are established in many ports of the United States and in some foreign ports. The charts and publications can also be purchased at the office of the Coast and Geodetic Survey, Washington, D. C., or any of the Field Stations. If ordered by mail, prepayment is obligatory. Remittances should be made by money order, express order, or check, payable to the U. S. Coast and Geodetic Survey. Postage stamps cannot be accepted. The sending of money is unsafe except by registered letter. Only the numbers of charts need be mentioned. The catalog of charts and other publications of the Survey may be obtained free of charge on application at any of the sales agencies or to the Coast and Geodetic Survey, Washington, D. C. A list of the sales agencies of the Coast and Geodetic Survey is in the catalog and is repeated quarterly in the Notice to Mariners.

The sales agents located within the area covered by this Coast Pilot are listed in the Appendix.

CHARTS

Accuracy of charts.—Each sounding represents an actual measure of depth and location at the time the survey was made. Shores and shoals where sand and mud prevail, and especially bar harbors and the entrances of bays and rivers exposed to strong tidal current and a heavy sea, are subject to continual change of a greater or less extent, and important ones may have taken place since the date of the last survey. In localities which are noted for frequent and radical changes, such as the entrance to a number of estuaries on the Atlantic, Gulf, and Pacific coasts, notes are printed on the charts calling attention to the fact.

It should also be remembered that in coral regions and where rocks and boulders abound it is always possible that a survey with lead and line, however detailed, may have failed to find every small obstruction. For these reasons, when navigating such waters, the customary sailing lines and channels should be followed and those areas avoided where the irregular and sudden changes in depth indicate conditions which are associated with pinnacle rocks, coral heads, or boulders.

Dredged channels.—These are generally shown upon the chart by two broken lines to represent the side limits of the improvement together with the depth and date. The depth is the controlling depth through the channel on the date charted and does not mean that this depth obtains over the full width of the channel, nor that the depth has not subsequently changed due to either shoaling or dredging.

Buoys.—Too much reliance should not be placed on buoys always maintaining their exact position, especially when in exposed positions. It is safer, when possible, to navigate by bearings or angles to fixed objects on shore and by the use of soundings.

Plane of reference for soundings on charts.—For the Atlantic coast of the United States and Puerto Rico the plane of reference for soundings is the mean of all low waters; for the Pacific coast of the United States and Alaska, with the one exception noted below, and for the Hawaiian and Philippine Islands, it is the mean of the lower low waters. For the Atlantic coast of the Canal Zone, Panama, the plane of reference for soundings is mean low water, and for the Pacific coast of the same it is low-water springs. For foreign charts many different planes of reference are in use, but that most frequently adopted is low-water springs.

Nautical charts bear three dates, which are important to persons using them: (1) The **edition date** (month and year) of the publication note, *printed* on most charts, centrally in the lower margin; (2) the **print date** (year, month, and day), the latest date *printed* in the lower left-hand corner below the border, which is the date of correction to the printing plate; (3) the **date of issue, stamped in the right lower margin** and just to the left of the subtitle. Charts contain all necessary corrections for aids to navigation, dredged channels, and dangers, which have been received **to the date of issue, being corrected by hand** for data received after the latest print date.

Scales of charts.—The charts are various in character, and are constructed on different scales, to adapt them to varied navigational purposes. The most important distinctions are the following:

1. Sailing charts, on scales from 1:600,000 to 1:4,500,000, which exhibit the approaches to a large extent of coast, contain the offshore soundings, and enable the navigator to fix his position as he approaches the coast from the open ocean, or when sailing between distant coast ports.
2. General charts of the coast, on scales from 1:180,000 to 1:400,000, intended especially for coastwise navigation, when a vessel's course is offshore but mostly within the sight of land or aids to navigation.
3. Coast charts, on scales from 1:80,000 to 1:100,000, intended for coastwise navigation, close to shore; and for entering and navigating the larger bays and harbors.
4. Harbor charts, on scales from 1:5,000 to 1:40,000, intended for navigation of harbors and constricted waterways.

Caution in using small-scale charts.—It is obvious that dangers to navigation cannot be shown with the same amount of detail on small-scale charts as on those of larger scale; therefore in approaching the land or dangerous banks regard should be had to the scale of the chart, and the largest scale chart available should be used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amounts of displacement means large fractions of a mile. For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

Determination of Compass Error by the Use of Navigational Ranges.—The azimuths of channel ranges, which have been determined with sufficient accuracy for compass error determination, are

indicated in degrees and minutes in the Light Lists and in the Notice to Mariners. Azimuths given only in degrees should not be used for this purpose.

TIDES AND CURRENTS

Tide Tables for the Atlantic Ocean and for the Pacific Ocean (two volumes) are published in advance annually by the United States Coast and Geodetic Survey, price 25 cents each. The first volume supplies full tidal data for the east Coast of North and South America, the west and north coasts of Africa, and all of Europe. The Pacific Ocean Tide Table gives data for the Pacific and Indian Oceans.

They contain tables of full daily predictions of the times and heights of high and low waters for certain reference stations along the coasts, with full explanations for the use of this table. The use of Table 2 of the Tide Tables should be known to every navigator. By means of this table the predictions given for the reference ports are extended so as to enable one to obtain the predictions for each day for a large number of other stations. Table 3 enables the height of tide at any time to be computed. Table 4 gives the time of the rising and setting of the sun. Table 6 gives the time of the rising and setting of the moon at certain places.

The effect of strong winds, in combination with the regular tidal action, may at times cause the water to fall below the plane of reference of the chart, mean low water. The water may also rise about the same amount above mean high water due to similar causes.

Caution.—In using the Tide Tables, slack water should not be confounded with high or low water. For ocean stations there is usually but little difference between the time of high or low water and the beginning of ebb or flood current; but for places in narrow channels, land-locked harbors, or on tidal rivers, the time of slack current may differ by several hours from the time of high- or low-water stand. The relation of the times of high and low water to the turning of the current depends upon a number of factors, so that no simple or general rule can be given. To obtain the times of slack water, reference should be made either to figures given for various places in this volume of the Coast Pilot or to the Current Tables.

Current Tables for the **Atlantic Coast** and for the **Pacific Coast** (two volumes) of the United States are published in advance annually by the United States Coast and Geodetic Survey. Each volume includes the daily predicted times of slack water and the times and velocities of strength of flood and ebb for certain reference stations and a table of current differences and constants by means of which corresponding daily predictions may be readily obtained for numerous other places. Tables for the velocity of current at any time, duration of slack, and rotary tidal currents at certain offshore locations, together with data on the Gulf Stream and wind currents are included. There are also current diagrams for six bodies of water along the coast, which show in a graphical form the velocities of the flood and ebb currents and the times of slack and strength over a considerable stretch of the channel of these waterways. These tables are for sale by the Coast and Geodetic Survey, Washington, D. C., and by authorized sales agencies.

Tidal Current Charts are published by the United States Coast and Geodetic Survey for various localities, see List of Publications in Appendix. These current charts are good for any year and show the direction and velocity of the tidal current for each hour of the current. They present a comprehensive view of the tidal current movement of the area as a whole and also supply a means of readily determining the direction and velocity of the current at various localities throughout the area.

WIND CURRENTS

There are given below the results of recent investigations on the currents caused by local winds. These investigations are based on observations made on a number of the lightships along the Atlantic coast from Nantucket Shoals Lightship to Brunswick Lightship. The results, therefore, apply more directly along the route between lightships but are applicable also to the coastal sailing routes farther offshore.

Direction of current due to wind.—It is evident that a wind continuing for some time will give rise to a current, the velocity of which increases with an increase in the velocity of the wind; and the mariner has taken it for granted that this current brought about by the wind sets in the same direction as the wind. But the results of careful observations show that this is not the case. Instead of setting with the wind, the current on the Atlantic coast of North America produced by local winds sets on the average about 20° to the right of the wind.

For example, a wind blowing from north will, on the North Atlantic coast, bring about a current that sets not south but about 20° to the right of south, or 200°. Similarly a wind from south will produce a current setting 20° to the right of north, or 20°. It is to be noted that while the current due to the wind will, on the North Atlantic coast, set 20° to the right of the wind direction, the current which a vessel experiences at any time is the resultant of the combined action of the tidal current, the wind current, and any other currents, such as the Gulf Stream or currents due to river discharge.

Velocity of current due to wind.—The velocity of the current brought about by winds of different velocities is given in the table below. It will be seen that on the Atlantic coast of the United States the velocity of the wind current is about 1½ percent of the velocity of the wind.

Table of current velocity due to wind—North Atlantic coast

Wind velocity.....miles per hour..	10	20	30	40	50	60
Current velocity.....knots..	0. 2	0. 3	0. 4	0. 6	0. 8	1. 0

An easily remembered working rule to get the velocity of the current due to wind along the **Atlantic coast** is to multiply the velocity of the wind (in miles per hour) by 1½ and point off two places. This will give the velocity of the current in knots. For example, to

determine the current due to a 40-mile wind we have $40 \times 1\frac{1}{2} = 60$, and pointing off two decimal places gives 0.60, or six-tenths of a knot.

Pacific Coast.—This subject is very complex. In general it may be said that along the Pacific coast of the United States at a distance of from 5 to 10 miles offshore, the wind brings about a current having a velocity about 2 percent that of the wind. The direction of this wind-driven current, however, is not with the wind. With winds from the northeast, southeast, and northwest quadrants, the current sets about 20° to the right of the wind, while with winds from the southwest quadrant the current sets about 20° to the left of the wind. It is evident, however, that these are but average values, for strong currents are sometimes experienced when the local winds are light.

Above values are approximate and may be much affected by local conditions.

DISTANCES BETWEEN PORTS

The Coast and Geodetic publication, Distances Between United States Ports, (Serial No. 444) is a compilation of numerous tables of distances giving, in a condensed and convenient form, distances between ports of the United States and its off-lying territories. The ports include all the important harbors and a sufficient number of minor ports so that distances can be given between points at short and fairly regular intervals along the various coasts. Each distance between two ports is along the shortest route marked by aids to navigation and affording a safe depth for the maximum draft that can enter both ports.

For ready reference and for use in combining these tables with those issued by other nations, a number of distances from United States to foreign ports are included.

This publication may be obtained from the Coast and Geodetic Survey, Washington, D. C., or from the sales agencies of the bureau at the various ports.

The table of distances given in the Appendix is typical of the tables given in the above publication; it is an abridgement of tables in the publication listing numerous additional ports. Distances in this table are given in nautical miles which may be converted approximately to statute miles by adding 15 percent to the distances given, and more precisely by multiplying the distance in nautical miles by 1.15155.

The Hydrographic Office publication No. 117, Table of Distances Between Ports, gives distances (in nautical miles), via the shortest navigable routes, between the principal world ports, including the principal United States ports. This publication may be obtained from the Hydrographic Office, Washington, D. C., or from authorized sales agencies in the various ports.

A more complete tabulation of distances between ports on the Great Lakes will be found in the bulletin Survey of the Northern and Northwestern Lakes, issued annually by the United States Lake Survey Office, Detroit, Mich.

See List of Publications in Appendix.

PLANIMETRIC MAPS

Planimetric maps (without contours) compiled from air photographs covering extensive sections of the coastal areas of the United

States are published by the United States Coast and Geodetic Survey. These maps give detailed topographic features but no elevations, contours, or depths. The nautical chart gives the depths in the water areas, the shore line, important land features, and all other information essential to the navigator; the maps simply give additional detail of land-areas. The maps vary considerably in size, being laid out to conform with the coast line as conveniently as possible. The average size is about 44 inches by 24 inches or a nearby equivalent area. The scale of the maps varies, the majority being on a scale of 1:20,000 but a 1:10,000 scale and at times a 1:5,000 scale is used. On these scales, the approximate area covered by an average sheet is 80 square miles (nautical), 20 square miles, and 5 square miles, respectively.

Index sheets showing the geographical layout of these maps may be secured from the Coast and Geodetic Survey, Washington, D. C. The maps are sold to the public at 75 cents per copy.

The areas for which these maps are available within the limits of this pilot are given in the Appendix.

ARMY ENGINEERS

The improvement of the rivers and harbors of the United States and miscellaneous civil works are under the charge of the **Corps of Engineers, United States Army.**

The miscellaneous civil works under the corps of Engineers include the administration of the Federal laws enacted for the protection and preservation of navigable waters of the United States, the establishment of regulations for the use, administration, and navigation of navigable waters, the approval of plans of bridges, the alteration of obstructive bridges, the establishment of anchorage grounds and harbor lines, the removal of sunken vessels obstructing or endangering navigation, the granting of permits for structures or operations in navigable waters, etc.

The attention of navigators is called to the various publications of the United States Engineers relative to matters of nautical interest, which are listed under "Publications" in the appendix of this volume.

Information concerning the various ports, improvements, channel depths, navigable waters, and the condition of the intracoastal waterway in the areas under their jurisdiction may be obtained direct from the District Engineer Offices.

Anchorage Areas in some places are defined and limited by the United States Engineers. They also publish **regulations** controlling the use of these anchorage areas. These are enforced by the United States Coast Guard. The areas are shown on the **large scale charts** of the Coast and Geodetic Survey. Copies of the regulations may be obtained at the offices of the United States Engineers. A list of the district offices and their locations in the area covered by this pilot is given in the Appendix.

The Port Series, publications of the United States Army, Corps of Engineers, are complete reports covering the principal seaports of the United States; they are primarily of interest to commercial and industrial concerns. The volumes of the series are wide in their scope and treat the subjects of particular interest to the shipping world, such as the physical features of each port (includes list of

piers, wharves, and docks, with data), its organization and practices, regulations regarding the movement of ships and goods, port dues and charges, water and rail connections, and character and commerce of the hinterland.

The information in all these reports is generally prepared along similar lines; the general subjects covered include the following:

Port and harbor conditions.	Port and harbor facilities.
Port customs and regulations.	Communications.
Port services and charges.	The freight-rate situation.
Fuel and supplies.	Commerce reports.

Those volumes of the Port Series concerning ports within the area covered by this Coast Pilot are listed in the Appendix.

The publication, **Port and Terminal Charges at United States Ports,** Miscellaneous Series, No. 1, also prepared by the United States Army Corps of Engineers and sold by the Superintendent of Documents, gives detailed information regarding all port services and charges (including dockage, wharfage, storage, handling charges, etc.) at practically all ports of the United States. This publication includes the more important governmental regulations affecting the movement of vessels, freight, and passengers. This information includes a digest of the more important regulations of the United States Public Health Service (quarantine and hospital services), the Customs Service, and the Immigration Service; it also includes a list of Federal documents which vessels are required to have.

HYDROGRAPHIC OFFICE

The Hydrographic Office of the United States Navy exists for the improvement of the means for navigating safely the vessels of the United States Navy and of the mercantile marine by providing accurate nautical charts, light lists, and sailing directions (pilots) of foreign navigable waters, navigators, and manuals of instruction for the use of all vessels of the United States, and for the benefit and use of navigators generally.

The charts and coast pilots pertaining to the territorial waters of the United States and its possessions are published by the **United States Coast and Geodetic Survey.**

Among the publications of the Hydrographic Office are monthly pilot charts for the various oceans, a weekly notice to mariners (domestic and foreign waters), a weekly hydrographic bulletin and a daily memorandum of information of interest to navigators. These publications can be secured by mariners who cooperate with the bureau by furnishing certain desired marine data. It also publishes numerous special charts, books, manuals, and tables of interest to navigators and aviators. Navigational warnings for the Hydrographic radio broadcasts are prepared.

Branch Hydrographic Offices within the area covered by this volume are listed in the Appendix. In these offices, bulletins are posted giving information of value to mariners who can also avail themselves of publications pertaining to navigation and facilities for correcting their charts from standards. No charge is made for this service.

WEATHER BUREAU

This Bureau has charge of weather forecasting, including the issuance and display of weather forecasts, and storm, hurricane, cold-wave, frost, forest-fire, and flood warnings. It collects and transmits marine meteorological information for the benefit of commerce and navigation, records and reports rainfall and temperature conditions, etc. Meteorological tables issued by this Bureau for various ports are given in the Appendix.

For additional information regarding weather broadcasts see Radio Services.

COAST GUARD

The **United States Coast Guard,** in addition to its other duties, is charged with the establishment and maintenance of aids to navigation. This organization publishes the **Light Lists, Radiobeacon Charts,** and **Notices to Mariners,** which give the changes in lights, buoys, etc.

Light Lists.—All aids to navigation, such as radio beacons, lights, fog signals, buoys, and day marks, maintained by the United States Coast Guard are described in these publications, which are for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., or by numerous sale agencies. The various lists published are given under Publications in the Appendix of this volume. Each of these publications also lists the radiobeacons operated by the United States Coast Guard and the radio direction-finder stations operated by the United States Navy.

Mariners are referred to the above publications for detailed information regarding the characteristics, power, visibility, etc., of lights, as well as a description of light structures and day marks, buoys, fog signals, etc. Such information is not given in this Coast Pilot volume.

The **Notice to Mariners** will be mailed free to mariners who apply to the Commandant, United States Coast Guard, or single copies may be obtained or consulted at the offices of the District Commanders of Coast Guard, or the Coast and Geodetic Survey field stations, or other agencies, distributing marine information.

Coast Guard stations are maintained at the places named in the Appendix. The active stations are fully manned throughout the year and are supplied with boats, wreck guns, beach apparatus, and all other appliances for affording assistance in case of shipwreck. Instructions to enable mariners to avail themselves fully of the assistance thus afforded will be found on page 13.

AIDS TO NAVIGATION

The lighthouses and lightships, radiobeacons, radio direction-finder (Navy) and distance-finding stations, and other aids to navigation are the principal guides and mark the approaches and channels to the principal ports. The buoyage is in accordance with the system adopted by the United States and is described below. The lightships and principal coast lights are described in the text of this volume.

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Some of the light stations are equipped with radiobeacons and distance-finding apparatus.

Private aids to navigation, such as stakes and small floats, are not supervised by the Government, and are therefore not listed or indicated on the charts. When private aids are established similar to those maintained by the Government, they must be authorized by the United States Coast Guard.

System of buoyage, colors, shapes, and numbers.—On the *right or starboard* side of the channel for the entering vessels are placed *conical or nun buoys*, painted *red*, and with *even numbers*, and on the *left or port side*, *cylindrical or can buoys*, painted *black*, and with *odd numbers;* the numbers for each side increase from seaward.

Obstructions, with channel ways on either side, are marked with buoys painted with *red and black horizontal bands*, which may be left on either side, with due regard as to the position of the buoy with relation to the obstruction, as shown on the chart. In general, obstruction buoys have no distinctive shape, but in the case of buoys with horizontal bands marking obstructions or bifurcations of channels, when it is desired to indicate the main channel, a can buoy with black band at the top is used when the important channel is to the right, for the entering vessel, and a nun buoy with red band at the top when the important channel is to the left.

Fairways are indicated, where necessary, by buoys painted with *black and white vertical stripes;* such buoys are placed in good water in midchannel or approaches, and may be passed close-to on either side. Midchannel buoys have no distinctive shape at present.

Offshore Buoys along the Atlantic Coast are colored and numbered from north to south, and along the Pacific coast from south to north, conforming to the order of Light Lists; this does not apply to outside buoys which have a definite approach signification, and which are colored and numbered to conform to the approach. In channels not having a definite approach character, buoys are colored and numbered from north to south or from east to west on the Atlantic coast and from south to north or west to east on the Pacific coast.

Bell buoys have a flat-topped float with skeleton superstructure supporting a bell. **Gong buoys** have a flat top with skeleton framework supporting a series of four gongs of varied tone. **Whistle buoys** are conical, with whistle at top. **Spar buoys** are long slender buoys of wood or iron. These classes of buoys, as well as lighted buoys, have not at present a shape distinction to indicate the side of channel or entrance, although a shape distinction is being introduced for wood spar buoys.

Anchorage Buoys are painted white.

Quarantine Anchorage Buoys are painted yellow.

Certain Other Special Buoys are in use locally, such as white with green top for dredging buoys.

Coast and Geodetic Survey *sono-radio buoys*, used in radio acoustic ranging, may be found anchored on the continental shelf in areas being surveyed. Some of these buoys are fitted with mechanism to show a white light upon the approach of a vessel. When within about a mile of the buoy the sound of a ship's propeller, or other

ship noises, produce the audio mechanical effect resulting in a fluctuating illumination.

Station Buoys, colored the same as the regular aids, are placed alongside of lightships and important buoy stations to mark them in case the regular aid is carried away. Lightship station buoys bear the letters "LS" above the initials of the station.

Colors of Lights for Buoys and Beacons.—*Red or white lights* are placed on the *right or starboard* side of a channel for the entering vessel, and *white or green lights* on the *left or port side.* White lights may be on either or both sides of the channel, but colored lights are only on the sides indicated respectively. The same rules apply to lights on fixed structures serving a purpose similar to that of buoys. Coast lights and lightships near channels or entrances may not conform to this system.

Lighted buoys are not at present uniformly differentiated as to shape, with respect to the side of the channel; they have bodies which contain the gas tanks or gas, and are usually surmounted by skeleton superstructures with lanterns; combination buoys have both light and bell, or light and whistle.

Significance of light characteristics

(FLASHING CHARACTERISTICS ARE USED ON LIGHTED BUOYS TO DISTINGUISH THEIR PRINCIPAL PURPOSES CORRESPONDING IN PART TO THE COLOR DISTINCTIONS THAT ARE MADE ON UNLIGHTED BUOYS)

Characteristic of flashing	Purpose indicated	Color of light	Color of buoy
1. **Flashing:** Less than 30 light periods per minute.	Channel sides and coasts.	White Green Red	Red or black. Black. Red.
2. **Quick flashing:** Not less than 60 flashes per minute.	Sudden constriction or sharp turns in channel; also wrecks when marked by solid color buoys. *A distinctly cautionary significance is indicated.*	White Green Red	Black or red. Black. Red.
3. **Interrupted quick flashing (group):** Quick flashing as above but interrupted by eclipse periods of 4 seconds at regular intervals about 8 times per minute.	Obstructions, middle grounds, junctions, or wrecks. *A distinctly cautionary significance is indicated.*	White Green Red	Horizontally striped buoy. Top band of buoy either red or black. Top band of buoy black only. Top band of buoy red only.
4. **Short-long flashes:** Groups of a short and a long flash. Groups are repeated about 8 times per minute.	Mid-channels and fairways.	White	Black and white vertical stripes.

NOTE.—While a thorough understanding of the significance of these features will be of material assistance to the navigator, it is not contemplated that they shall be implicitly relied upon without reference to the charts which should always be consulted for guidance. Many conditions do not permit of proper understanding in any other way.

Caution Regarding Buoys.—Buoys are liable to be carried away, shifted, capsized, sunk, etc., lighted buoys may be extinguished, or whistling or bell buoys may not sound, as the result of storm, the accumulation of ice, running ice, or other natural causes, or collision, or other accidents. Buoys marking channels subject to frequent changes are moved as may be necessary and should be used only with local knowledge. Such buoys may not be charted.

Day Beacons are constructed and distinguished with special reference to each locality, and particularly with regard to the background upon which they are projected. Beacons on the sides of channels are, when practicable, colored to conform to the coloring of buoys, subject to the above conditions as to background.

Reflectors (red or white) are placed on some buoys or day beacons to enable the navigator, using a searchlight, to readily locate such aids.

Radiobeacons.—For information regarding operating schedules, transmitting range, station identification, etc., see "Light List."

Lighthouse tenders, when working on buoys in channels or other frequented waters, may display a red flag (international signal code flag B) and a black ball at the fore as a warning to other vessels to slow down in passing. Passing vessels will facilitate the work of the U. S. Coast Guard by a proper observance of the signals.

Suggestions as to aids to navigation.—Mariners are also invited to send suggestions as to improvements or changes in aids to navigation directly to the District Commander of the district concerned, or to confer with them, or address Commandant, United States Coast Guard, Washington, D. C.

Defects in aids to navigation.—Aids to navigation are protected by law, and mariners in their own interest should use every precaution to avoid collisions with them. Mariners are requested to report defects in the aids to navigation *using official designation identification in the Light Lists* direct to the District Commander, United States Coast Guard of the district concerned by commercial radio, by radio communication with lightships, or other prompt means.

Messages may be sent by telegraph collect. Radio reports should be sent using the registered address **COGUARD** with the name of the city in which the district office is located. Example, "Coguard, Boston"; "Coguard, New York."

Lightships under way, or off station, will fly the International Code signal letters "PC" (signifying "lightship is not at anchor on her station").

All lightships on station and all vessels relieving station ships will display the International Code signal of the station whenever a vessel is approaching or in the vicinity and there are indications that such vessel is in strange waters or fails to recognize the station, or when the vessel asks for the information.

Lightships, where so stated, carry riding lights for the purpose of showing in which direction the ship is riding.

Casualties and near casualties to lightships imposes upon the Coast Guard the obligation to CAUTION all shipmasters that courses should invariably be set to pass lightships with sufficient clearance to avoid possibility of collision from any cause. Errors of observation, current and wind effects, other vessels in the vicinity,

and defects in steering-gear may and have been the causes of actual collisions, or imminent danger thereof, needlessly jeopardizing the safety of lightships and their crews, and that of all navigation dependent on these important aids to navigation. Experience shows that lightships cannot be safely used as leading marks to be passed close aboard, but should invariably be left broad off the course, wherever sea-room permits.

Caution must be used in approaching radiobeacons on radio bearings, and care must be taken to set courses to pass safely clear. The risk of collision will be avoided by insuring that the radio bearing does not remain constant. This caution is applicable to those lightships and stations on submarine sites which are passed close to.

INSTRUCTIONS TO MARINERS IN CASE OF SHIPWRECK

(INSTRUCTIONS FOR USE OF GUN APPARATUS MUST BE POSTED BY LAW)

General information.—Coast Guard (lifesaving) stations and houses of refuge are located upon the Atlantic and Pacific seaboards of the United States, the Gulf of Mexico, and the Lake coasts.

The stations are manned throughout the year by crews of experienced surfmen.

All lifesaving stations, except inactive stations, are fully supplied with boats, wreck guns, beach apparatus, and restoratives.

The lifesaving stations are provided with the International Code of Signals, and other means of visual signaling, and vessels can, by opening communication, be reported; or obtain the latitude or longitude of the station, where determined; or information as to the weather probabilities in most cases; or, where facilities for the transmission of messages by telephone or telegraph are available, request for a tug or Coast Guard cutter will be received and promptly forwarded.

All services are performed by the lifesaving crews without other compensation than their pay from the Government.

Destitute seafarers are provided with food and lodging at the nearest station by the Government as long as necessarily detained by the circumstances of shipwreck.

The station crews patrol the beach from 2 to 4 miles each side of their stations between sunset and sunrise, and if the weather is foggy the patrol is continued through the day. A continuous lookout is also maintained at every station night and day.

Each patrolman carries warning signals. Upon discovering a vessel standing into danger he ignites one of these, which emits a brilliant red flame of about 2 minutes' duration, to warn her off, or, should the vessel be ashore, to let her crew know that they are discovered and assistance is at hand.

If the vessel is not discovered by the patrol immediately after striking, rockets, flare-up lights, or other recognized signals of distress should be used. If the weather be foggy, some recognized sound signal should be made to attract attention, as the patrolman may be some distance away at the other end of his beat.

Masters are particularly cautioned, if they should be driven ashore anywhere in the neighborhood of the stations, to remain on board until assistance arrives and under no circumstances should they attempt to land through the surf in their own boats until the last hope of assistance from the shore has vanished. Often when comparatively smooth at sea a dangerous surf is running which is not perceptible 400 yards offshore, and the surf when viewed from a vessel never appears as dangerous as it is. Many lives have been lost unnecessarily by the crews of stranded vessels being thus deceived and attempting to land in the ship's boats.

The difficulties of rescue by operations from the shore are greatly increased in cases where the anchors are let go *after entering the breakers*, as is frequently done, and the chances of saving life correspondingly lessened.

Rescue with the lifeboat or surfboat.—The patrolman after discovering your vessel ashore and burning a warning signal, hastens to his station or the telephone for assistance. If the use of a boat is practicable, either the large life-

boat is launched from its ways in the station and proceeds to the wreck by water, or the lighter surfboat is hauled overland to a point opposite the wreck and launched, as circumstances may require.

Upon the boat reaching your vessel the directions and orders of the officer in charge (who always commands and steers the boat) should be implicitly obeyed. Any headlong rushing and crowding should be prevented, and the captain of the vessel should remain on board, to preserve order, until every other person has left.

Women, children, helpless persons, and passengers should be passed into the boat first.

Goods or baggage will positively not be taken into the boat until all are landed. If any be passed in against the remonstrance of the officer in charge, he is fully authorized to throw the same overboard.

Rescue with the breeches buoy or life car.—Should it be inexpedient to use either the lifeboat or surfboat, recourse will be had to the wreck gun and beach apparatus for the rescue by the breeches buoy or the life car.

A shot with a small line attached will be fired across your vessel. Get hold of the line as soon as possible and haul on board until you get a tailblock with a whip or endless line rove through it. The tailblock should be hauled on board as quickly as possible to prevent the whip drifting off with the set or fouling with wreckage, etc. Therefore if you have been driven into the rigging, where but one or two men can work to advantage, cut the shot line, and run it through some available block, such as the throat or peak-halyards block, or any block which will afford a clear lead, or even between the ratlines, that as many as possible may assist in hauling.

Attached to the tailblock will be a tally board with the following directions in English on one side and French on the other:

"Make the tail of the block fast to the lower mast, well up. If the masts are gone, then to the best place you can find. *Cast off shot line, see that the rope in the block runs free*, and show signal to the shore."

As soon as your signal is seen a 3-inch hawser will be bent onto the whip and hauled off to your ship by the lifesaving crew.

If circumstances permit, you can assist the lifesaving crew by manning that part of the whip to which the hawser is bent and hauling with them.

When the end of the hawser is got on board, a tally board will be found attached, bearing the following directions in English on one side and French on the other:

"Make this hawser fast about 2 feet above the tailblock, see all clear and that the rope in the block runs free and show signal to the shore."

Take particular care that there are no turns of the whip line around the hawser. To prevent this, take the end of the hawser up between the parts of the whip before making it fast.

When the hawser is made fast, the whip cast off from the hawser, and your signal seen by the lifesaving crew, they will haul the hawser taut and by means of the whip will haul off to your vessel a breeches buoy suspended from a traveler block, or a life car, from rings running on the hawser.

If the breeches buoy be sent, let one man immediately get into it, thrusting his legs through the breeches. If the life car, remove the hatch, place as many persons therein as it will hold (four to six) and secure the hatch on the outside by the hatch bar and hook, signal as before, and the buoy or car will be hauled ashore. This will be repeated until all are landed. On the last trip of the life car the hatch must be secured by the inside hatch bar.

In many instances two men can be landed in the breeches buoy at the same time by each putting a leg through a leg of the breeches and holding onto the lifts of the buoy.

Children when brought ashore by the buoy should be in the arms of older persons or securely lashed to the buoy. Women and children should be landed first.

In signalling as directed in the foregoing instructions, if in the daytime, let one man separate himself from the rest and swing his hat, a handkerchief, or his hand; if at night, the showing of a light and concealing it once or twice will be understood; and like signals will be made from the shore. (See also Wreck Signals, below.)

Circumstances may arise, owing to the strength of the current or set or the danger of the wreck breaking up immediately, when it would be impossible to send off the hawser. In such a case a breeches buoy or life car will be hauled

off instead by the whip or sent off to you by the shot line, and you will be hauled ashore through the surf.

If your vessel is stranded during the night and discovered by the patrolman—which you will know by his burning a brilliant red light—keep a sharp lookout for signs of the arrival of the lifesaving crew abreast of your vessel.

Some time may intervene between the burning of the light and their arrival, as the patrolman may have to return to his station, perhaps 3 or 4 miles distant, and the lifesaving crew draw the apparatus or surfboat through the sand or over bad roads to where your vessel is stranded.

Lights on the beach will indicate their arrival, and the sound of cannon firing from the shore may be taken as evidence that a line has been fired across your vessel. Therefore upon hearing the cannon, make strict search aloft, fore, and aft, for the shot line, for it is almost certain to be there. Though the movement of the lifesaving crew may not be perceptible to you, owing to the darkness, your vessel will be a good mark for the men experienced in the use of the wreck gun, and the first shot seldom fails.

Important.—Remain by the wreck until assistance arrives from the shore, or as long as possible. If driven aloft, the inshore mast is the safest.

If not discovered immediately by the patrol, burn rockets, flare-up, or other lights, or if the weather be foggy, fire guns or make other sound signals.

Make the shot line fast on deck or to the rigging to prevent its being washed into the sea and possibly fouling the gear.

Take particular care that there are no turns of the whip line around the hawser before making the hawser fast.

Send the women, children, helpless persons, and passengers ashore first.

Make yourself thoroughly familiar with these instructions, and remember that on your coolness and strict attention to them will greatly depend the chances of success in bringing you and your people safely to land.

Wreck signals.—The following signals have been adopted by the Coast Guard and will be used and recognized by the officers and employees as occasion may require:

"Upon the discovery of a wreck by night, the lifesaving force will burn a red pyrotechnic light or a red rocket to signify, '*You are seen; assistance will be given as soon as possible.*'

"A red flag waved on shore by day, or a red light, red rocket, or red roman candle displayed by night, will signify, '*Haul away.*'

"A white flag waved on shore by day, or a white light slowly swung back and forth, or a white rocket, or white roman candle fired by night, will signify, '*Slack away.*'

"Two flags, a white and red, waved at the same time on shore by day, or two lights, a white and a red, slowly swung at the same time, or a blue pyrotechnic light burned by night, will signify, '*Do not attempt to land in your own boats; it is impossible.*'

"A man on shore beckoning by day, or two torches burning near together by night, will signify, '*This is the best place to land.*'

"Any of these signals may be answered from the vessel as follows: In the daytime, by waving a flag, a handkerchief, a hat, or even the hand; at night, by firing a rocket, a blue light, or a gun, or by showing a light over the ship's gunwale for a short time, and then concealing it."

CUSTOMS

Collection districts and **Ports of Entry** located within the area covered by this volume are tabulated in the Appendix.

MARINE INSPECTION AND NAVIGATION

The Bureau of Marine Inspection and Navigation under the Department of Commerce is charged with general superintendence of the commercial marine and merchant seamen of the United States, except so far as supervision is lodged with other offices of the Government.

In addition to various other duties the Bureau is especially charged with the decision of all questions relating to the issuing of registers,

enrollments, and licenses of vessels; investigates the operation of the laws relative to navigation; is charged with the enforcement and investigation of violations of the navigation and marine inspection laws; and is charged with the duty of inspecting vessels, the licensing of the officers of vessels, and the administration of the laws relating to such vessels and their officers for the protection of life and property. The Bureau certificates the able seamen who form the crew of merchant vessels, and the inspectors of the Service, also certificate the lifeboat men.

The licensed officer in command of any vessel shall report in writing and in person to the board of local inspectors nearest the port of first arrival any accident to said vessel involving loss of life, or damage to property, and shall also report in like manner any casualty or loss of life from whatever cause of any person on board such vessel and any stranding or grounding, whether or not any damage has been sustained by the vessel.

For administrative purpose the Supervising Inspectors of the Service maintain 7 district offices, and Local Inspectors have offices in the more important cities having maritime interests.

Offices of Local Inspectors of the Bureau, within the area covered by this volume, are listed in the Appendix.

SHIPPING COMMISSIONERS

Offices of **U. S. Shipping Commissioners** are maintained in various ports. These officials administer the laws for the protection of seamen, the maintenance of discipline on shipboard, maintain an employment agency for securing seafaring personnel for all ships of American registry and promote Americanization of crews.

The offices of the Shipping Commissioners within the area covered by this Coast Pilot are listed in the Appendix.

QUARANTINE AND HEALTH

The United States Public Health Service is the governmental guardian of the public health, working to prevent the spread of human contagious and infectious diseases.

In addition to its other duties, this Bureau administers hospitalization and out-patient treatment at marine hospitals and many other relief stations to legal beneficiaries of the Government; it administers the foreign and domestic quarantine laws, supervising the medical examination of immigrants and enforcing interstate quarantine laws.

American merchant seamen are entitled to medical relief obtainable through the United States Public Health Service at its established relief stations.

An American seaman is one engaged on board in 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.

Relief stations of the Public Health Service are located at the addresses given, in the Appendix.

Free medical advice is furnished to seamen by radio, see page 22.

Quarantine regulations are given in the text under the names of the ports.

In general, where State quarantine is in force, the minimum requirements of quarantine are in accordance with the regulations of the United States Public Health Service. National quarantine regulations will be found at the stations of the service and at American consulates, and will be furnished to vessels upon application, either by officers of the service or by the bureau in Washington. D. C.

RADIO

LEGAL RESPONSIBILITY

Radio Supervision.—The radio communications in the United States and its possesions, except the Philippine Islands and the Panama Canal Zone, are controlled by the Federal Communications Commission, Washington, D. C.

Responsibility of Shipmasters.—Shipmasters have the responsibility of seeing that the general radio regulations are carried out by the radio operators.

Radio Inspectors.—Inspectors of the Federal Communications Commission have authority to board ships at United States ports for the inspection of the radio station to determine whether it complies with international treaties, Federal laws, and such rules and regulations of the Federal Communications Commission which may apply. In general, these inspectors operate at the following ports where field offices of the Comimssion are located and where information concerning radio regulations and communications may be obtained.

Boston, Mass.	San Juan, P. R.	San Francisco, Calif.
New York, N. Y.	Tampa, Fla.	Portland, Oreg.
Philadelphia, Pa.	New Orleans, La.	Seattle, Wash.
Baltimore, Md.	Port Arthur, Tex.	Juneau, Alaska.
Norfolk, Va.	Galveston, Tex.	Honolulu, T. H.
Savannah, Ga.	San Diego, Calif.	
Miami, Fla.	Los Angeles, Calif.	

Service Documents.—The rules and regulations of the International Telecommunication Convention require that when a radio-transmitting installation is compulsory equipment on board a ship, the latter must be provided with the following service documents:

1. The radio license.
2. The operators' certificates.
3. Register (radio service log) in which shall be noted, at the time they occur, service incidents of all kinds, as well as the communications exchanged with land stations or mobile stations and relating to reports of disaster. If the regulations on board permit, the position of the ship shall be indicated once a day in the said register.
4. Alphabetical list of call letters.
5. List of coast and ship stations.
6. List of stations performing special services.
7. The general radio regulations and the additional radio regulations as well as the provisions of the convention necessary for the operations of radio-communication service on board ships.
8. The telegraph rates of the countries for which the station (ship) most frequently accepts radio-telegrams.

The rules and regulations of the United States Federal Communications Commission require certain vessels to have additional service documents, a complete list of which may be obtained from the Federal

Communications Commission, Washington, D. C., or from its sub-offices.

For further details concerning the above rules and regulations consult the following publications:

Ship Radiotelegraph Safety Rules.
The Communications Act of 1934, with amendments.
Radio Aids to Navigation, H. O. 205.

WEATHER REPORTS

1. The **Major Weather bulletins,** issued daily via United States Naval Radio Stations (NAA/NSS), Washington, D. C., and (NPG) San Francisco, Calif., includes observations from ships at sea; surface weather observations from selected land stations; forecasts, storm warnings, and a summary of general atmospheric pressure distribution. The information contained in these bulletins is suitable for preparing weather maps at sea.

The forecasts included in the Washington, D. C. bulletins are for coastal and contiguous ocean areas of the western North Atlantic Ocean from Eastport to the Florida Straits, the Gulf of Mexico, and the Caribbean Sea west of longitude 75° W. A rebroadcast of parts of these bulletins is made via (NBA) Balboa (Summit), Panama Canal Zone, except that forecasts and warnings for the areas Eastport, Maine, to Jacksonville, Florida, inclusive, are omitted.

The broadcasts from **San Francisco** are for the North Pacific. Rebroadcasts of the San Francisco bulletins and of the bulletins issued by **Cavite, P. I.,** are made daily by **Oahu, T. H.,** with some omissions. Weather reports from stations in the South Pacific are included in the Oahu broadcasts.

2. **Local Weather Bulletins** containing forecasts, storm warnings when issued, and the weather summaries for specified areas are broadcast on schedule every day by certain Government and commercial radio stations.

During the **West Indies hurricane** season, July 1 to November 15, inclusive (NAU) San Juan, P. R., transmits daily and on schedule a weather bulletin issued for the eastern Caribbean Sea. This bulletin is rebroadcast by the United States Coast Guard vessel patrolling the waters of the United States West Indies when it is in the vicinity of Puerto Rico and the Virgin Islands.

3. **Storm warnings,** whenever they are issued by the United States Weather Bureau, are the subject of special broadcasts by various Government and commercial radio stations of the mobile service.

United States Naval shore radio stations concerned with the broadcasting of weather information transmit storm warnings in accordance with the urgency. Warnings of a **very urgent nature,** such as tidal waves, hurricanes, typhoons, cyclones, etc., when the danger is so imminent as to warrant its prompt divulgence, are broadcast as follows:

1. One transmission immediately upon receiving the message from the United States Weather Bureau.

2. One transmission at the end of the first silent period which follows the preceding transmission.

3. One transmission during the first ensuing **"ON watch"** period for ships with only one radio operator in case the two previous transmissions were both made during the **"OFF watch"** period.

Storm warnings of less urgency than the above and other than those normally included in the scheduled major and the local weather bulletins are broadcast as follows:

1. One transmission at the end of the first silent period which follows the reception of the message from the United States Weather Bureau.

2. One transmission during the first ensuing "ON watch" period in case the previous transmission occurred during an "OFF watch" period.

The broadcasting of storm warnings by other than United States Naval Radio Stations is made according to varying procedures. Broadcasts from commercial stations are generally made at hourly intervals on the hour or half-hour.

During the West Indies hurricane season, July 1 to November 15 (NAU), San Juan, Puerto Rico, broadcasts storm and hurricane warnings whenever they are issued by the United States Weather Bureau and in their absence the words "weather normal over Eastern Caribbean" are transmitted. These storm warnings are also broadcast and repeated hourly generally on the hour or half-hour by (WPR) Ensenada, Puerto Rico. This last station also transmits the warnings upon request.

Storm warnings are broadcast in plain language and on the frequencies assigned to the service (maritime or aeronautical) for which they are intended.

Scheduled radiotelegraphic broadcasts of weather information affecting the coasts of the United States, Canada, and Alaska, are also made by Mexican and Canadian radio stations. Most Canadian coastal stations of the mobile service supply weather information on request only and without charge.

Radiotelephonic broadcasts of **Weather** information (United States).—Transmission by voice of weather information from the United States Weather Bureau is made through certain radio stations of the United States Coast Guard. These broadcasts are followed immediately by reports of dangers, obstructions, and changes in aids to navigation.

This service gives to yachts, fishing vessels, tugboats, and any vessel within range, equipped with an ordinary radio receiving set, having a band covering the frequency range of 2 to 3 megacycles, direct official weather information from the Weather Bureau, in plain language, and on regular schedules, such as is available to ships equipped with radiotelegraph apparatus and operator. This service should also prove of value to dock terminals, pilots, yacht clubs, etc.

These radiophone broadcasts are made twice daily at definite times and consist of the transmission of weather bulletins issued by the United States Weather Bureau. The bulletins contain forecasts (and storm warnings whenever they are issued) for specified regions and adjacent coastal waters.

North of the United States, radiophone weather as well as navigational information, is furnished on request and on schedule, without charge, by certain Canadian radio stations.

West Indies.—Radiotelephonic broadcasts of storm and hurricane warnings are made by various stations in the West Indies.

Complete details relative to the broadcasting of weather information are published in **"Distribution of Weather Information by Radio** (Radio Circular No. 1)."

This circular, together with a card descriptive of storm warnings, may be obtained upon application to any United States Weather Bureau office. Details are also given in Radio Aids to Navigation (H. O. 205). These publications give the schedules with times and frequencies of weather broadcasts, together with tables for decoding as needed.

Storm warnings are also broadcast 6 times at 2-hour intervals, whenever they are issued by the United States Weather Bureau. The first of these special broadcasts begins exactly 2 or 4 or 6 or 8 or 10 or 12 hours after the scheduled time of the regular broadcast, depending upon the time the message containing the warnings is received at the radio station. If the warnings are superseded by another message from the United States Weather Bureau before the completion of the 6 broadcasts, the later information is used and broadcast 6 times unless superseded again.

Reports from ships (Weather and Hydrographic).—The master of every ship of the United States equipped with radio transmitting apparatus, on meeting with a tropical storm, dangerous ice, derelict, or any other direct danger to navigation, is required to cause to be transmitted a report of these dangers to ships in the vicinity and to the appropriate Government agencies.

Weather reports (United States).—Weather reports should not be sent regularly except from ships with which specific arrangements have been made by the United States Weather Bureau, but masters of all ships encountering tropical or other severe storms should send special observations by radio.

These reports should be sent in the international meteorological code, preceded by the ship's name, unsigned, and checked collect.

If a copy of the international meteorological code is not on shipboard, the code will be found in Radio Aids to Navigation (H. O. 205), or a copy may be obtained on application to the United States Weather Bureau, Washington, D. C. If code is impracticable, the message may be sent in plain language.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Carribean Sea, and southern North Atlantic Ocean are urged to cooperate with the United States Weather Bureau in order that more complete information may be supplied to ships and for the purpose of warning the inhabitants of coastal areas.

Ice reports.—When in the vicinity of the Grand Banks during the whole of the ice season (generally from March to July), mariners are requested to report to the United States Coast Guard cutter (call letters NIDK) of the International North Atlantic Ice Patrol, any field ice, icebergs, or obstructions sighted or reported sighted, giving the date, time, latitude and longitude, water temperature, set, and drift. If ice is sighted when the ice patrol is not in operation, the report should be addressed to the Hydrographic Office, United States Navy Department.

Reporting derelicts.—Reports regarding derelicts should be addressed to the Hydrographic Office, United States Navy Department, Washington, D. C., and prefixed **Hydro.**

TIME SIGNALS

The **United States system** of broadcasting time signals, as indicated in the table below, consists of the transmission of dashes (—) and the omission of dashes (0) for the seconds of the 5 minutes preceding the final time signal which is on the hour. The final time signal is the beginning of a much longer dash (——) than the others, being of about 1.3 seconds duration. The number of dashes sounded in the group immediately preceding the four omissions at the end of the first four minutes of the signal, indicates the number of minutes of the signal yet to be sent. There are nine omissions before the final time signal. In all cases, the beginning of a second is on the beginning of a corresponding dash.

Minute intervals preceding hour	Seconds of minute intervals												
	1 to 28	29	30 to 50	51	52	53	54	55	56	57	58	59	60
55 to 56	Dash (—) every second 1 to 28 incl.	0	Dash (—) every second 30 to 50 incl.	0	—	—	—	—	0	0	0	0	—
56 to 57		0		—	0	—	—	—	0	0	0	0	—
57 to 58		0		—	—	0	—	—	0	0	0	0	—
58 to 59		0		—	—	—	0	—	0	0	0	0	—
59 to hour		0		0	0	0	0	0	0	0	0	0	—

NAVIGATIONAL WARNINGS

Radiotelegraphic navigational warnings affecting the waters of the United States and possessions are compiled by the United States Hydrographic Office, Navy Department; the United States Coast Guard; and the North Atlantic International Ice Patrol (U. S. Coast Guard vessel). These warnings contain information of importance to the safety of navigation, such as the position of ice, derelicts; also defects and changes in aids to navigation, mine field, etc., which are later published in the Notice to Mariners. Navigational warnings are also available via radiotelephone.

Radiotelephone.—Transmission by voice of radio navigational warnings is made immediately after the regular "radiotelephonic broadcast of weather information" by the same stations, following the same schedule and method of procedure.

These radiophone warnings contain the latest reports of local changes in aids to navigation such as are later published in the Notice to Mariners and the late and more important reports of obstructions to navigation in nearby waters as received from the Hydrographic Office of the United States Navy and local sources.

Complete details relative to radio telephonic or telegraphic navigational warnings are given in Radio Aids to Navigation (H. O. 205).

SHIPS IN DISTRESS

Radio-equipped vessels requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency 500 kilocycles to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to

"Coguard." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and number of vessels required to render adequate aid; thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance.

1. Name, type, and nationality of vessel.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea, and wind.
4. Number of persons on board.
5. State whether or not Coast Guard assistance is required.

Small craft in distress.—Under the provision of the international regulations, which permit the use of any means available to a vessel or aircraft in distress to draw attention and obtain help, small commercial and private craft equipped with radiotelegraph or radiotelephone apparatus that cannot be operated on the international distress frequency of 500 kc (600 m.) may usually obtain United States Coast Guard assistance by transmitting the distress signal or call and the message on the 2670 kc. (112 m.) frequency. Practically all Coast Guard units maintain a continuous watch on 2670 kc. (112 m.) and will answer emergency calls thereon, if heard.

Medical advice by radio.—Arrangements are made in various countries whereby mariners of all nationalities may obtain medical advice by radio. In the United States and its possessions free medical advice is obtainable through Government and commercial radio stations of the mobile service. The advice is given in language intelligible to the layman.

RADIO BEARINGS

Accuracy of radiobeacon bearings.—No exact data can be given as to the accuracy to be expected in radio bearings taken by a ship, since the accuracy depends to a large extent upon the skill of the ship's operator, the condition of the ship's equipment, and the accuracy of the ship's calibration curve. Mariners are urged to obtain this information for themselves by taking frequent radio bearings when their ship's position is accurately known, and by recording the results. United States radiobeacons are operated on hourly schedules regardless of weather conditions and at other times upon request (see special operation of radiobeacon stations given in Light Lists), giving mariners opportunity to make such frequent observations, and often to check the results directly with visual bearings.

Skill in the operation of the radio direction-finder can be obtained only by practice and by observing the technical instructions for the set in question. For these reasons the operator should study carefully the instructions issued with the set and should practice taking bearings frequently so that when bearings are needed he can obtain them rapidly and accurately.

As the operator obtains bearings by revolving the direction-finder coil until the signal disappears or becomes a minimum, the operator can tell by the size of the arc of silence or of minimum strength ap-

proximately how accurately he has taken the bearing. For instance, if the minimum is broad and the residual signal covers about 10° with equal strength, it is doubtful if the bearing can be accurately estimated within 3° or 4°. Where direction-finder bearings are not taken by the navigating officer, it will frequently be advantageous for the mariner to have his ship's operator report the probable operator's error of the bearing taken.

Radio bearings from other vessels.—Any vessel with a radio direction-finder can give a bearing to a vessel equipped with a radio transmitter. Such service will generally be furnished when requested, particularly by Government vessels. These bearings, however, should be used only as a check, as comparatively large errors may be introduced by local conditions surrounding the radio direction-finder unless known and accounted for. Any radio station, the position of the transmitter of which is definitely known, may serve as a radiobeacon for vessels equipped with a radio direction-finder. However, mariners are cautioned that stations established especially for maritime service are more reliable and safer for use by the mariner, for numerous reasons.

Many navigators are using the ship's radio direction-finder as a help in avoiding collision in fog, detecting with it the presence and observing the direction of approaching vessels.

Caution, when taking radio bearings from a ship one should be careful to take the bearing when the vessel is on an even keel. Large errors may be introduced if the vessel is listed when the bearing is taken.

Conversion of radio bearings to Mercator Bearings.—The increasing use of radio directional bearings for locations of ships' positions at sea, especially during foggy weather, has made it particularly desirable to be able to apply these radio bearings (taken on shipboard or sent out by the shore stations) directly to the nautical chart. These radio bearings are the bearings of the great circles passing through the radio stations and the ship, and, unless in the plane of the Equator or of a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is, the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

On page 24 a table of corrections is given for the conversion of a radio bearing into a Mercator bearing. It is sufficiently accurate for practical purposes for distances up to 1,000 miles.

The only data required are the latitudes and longitudes of the radiobeacons or radio direction-finder station receiver or transmitter, and of the ship by dead reckoning. The latter is scaled from the chart, and the former either scaled from the chart or taken from the list of radiobeacon and radio direction-finder stations found in Hydrographic Office publication No. 205.

The table is entered with the differences of longitude in degrees between the ship and station (the nearest tabulated value being used), and opposite the middle latitude between the ship and station, the correction to be applied is read.

When bearings are taken from the ship, the sign of the correction (bearings read clockwise from the north) will be as follows: In north latitude, the minus sign is used when the ship is east of the radiobeacon and the plus sign used when the ship is west of the radiobeacon. In south latitude, the plus sign is used when the ship is east of the radiobeacon, and the minus sign is used when the ship is west of the radiobeacon.

To facilitate plotting, 180 degrees should be added to the corrected bearing, and the result plotted from the radiobeacon.

Should the position by dead reckoning differ greatly from the true position of the ship as determined by plotting the corrected bearings, a retrial should be made, using the new value as the position of the ship.

When the bearing is from a radio direction-finder shore station, the sign of the correction will be reversed to that given when the bearing is taken from the ship, and the position of the radio direction-finder station receiver is used in plotting the bearing.

Example.—A ship in latitude 39°51′ N., longitude 67°35′ W., by dead reckoning, obtains a radio bearing of 299° true on the radiobeacon located in latitude 40°37′ N., and longitude 69°37′ W.

Radiobeacon station	Latitude	40°37′ N
Dead reckoning position of ship	Latitude	39°51′
Middle latitude		40°14′
Radio station	Longitude	69°37′ W
Dead reckoning position of ship	Longitude	67°35′
Longitude difference		2°02′

Entering the table with difference of longitude equals 2°, which is the nearest tabulated value, and opposite 40° middle latitude, the correction of 39′ is read.

The ship being east of the radiobeacon, the correction is minus. The Mercator bearing will then be 299°—0°39′=298°21′. To facilitate plotting, add 180° and plot from the position of the radiobeacon, the bearing (298°21′+180°) or 478°21′ or 118°21′ (Mercator bearing reckoned clockwise from north true).

Table of corrections, in minutes

[DIFFERENCE OF LONGITUDE IN DEGREES]

Mid. L.	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
15°	4	8	12	16	19	23	27	31	35	40	43	47	50	54	58	62	66	70	74	78
16°	4	8	12	17	21	25	29	33	37	41	45	50	54	58	62	66	70	74	79	83
17°	4	9	13	18	22	26	31	35	39	44	48	53	57	61	66	70	75	79	83	88
18°	5	9	13	19	23	28	32	37	42	46	51	56	60	65	70	74	79	83	88	93
19°	5	10	15	20	24	29	34	39	44	49	54	59	63	68	73	78	83	88	93	98
20°	5	10	15	21	26	31	36	41	46	51	56	62	67	72	77	82	87	92	98	103
21°	5	11	16	21	27	32	38	43	48	54	59	64	70	75	81	86	91	97	102	108
22°	6	11	17	22	28	34	39	45	51	56	62	67	73	79	84	90	96	101	107	112
23°	6	12	18	23	29	35	41	47	53	59	64	70	76	82	88	94	100	105	111	117
24°	6	12	18	24	31	37	43	49	55	61	67	73	79	85	92	98	104	110	116	122
25°	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95	101	108	114	120	127
26°	7	13	20	26	33	39	46	53	59	66	72	79	85	92	99	105	112	118	125	131
27°	7	14	20	27	34	41	48	54	61	68	75	82	89	95	102	109	116	123	129	136
28°	7	14	21	28	35	42	49	56	63	70	77	84	92	99	106	113	120	127	134	141
29°	7	15	21	29	36	44	51	58	65	73	80	87	95	102	109	116	124	131	138	145
30°	7	15	22	30	38	45	53	60	68	75	83	90	98	105	113	120	127	135	143	150
31°	8	15	23	31	39	46	54	62	70	77	85	93	100	108	116	124	131	139	147	155
32°	8	16	24	32	40	48	56	64	72	79	87	95	103	111	119	127	135	143	151	159
33°	8	16	25	33	41	49	57	65	74	82	90	98	106	114	123	131	139	147	155	163
34°	8	17	25	34	42	50	59	67	75	84	92	101	109	117	126	134	143	151	159	168

Table of corrections, in minutes—Continued

[DIFFERENCE OF LONGITUDE IN DEGREES]

Mid. L.	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
35°	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129	138	146	155	163	172
36°	9	18	26	35	44	53	62	71	79	88	97	106	115	123	132	141	150	159	168	176
37°	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	163	172	181
38°	9	18	28	37	46	55	65	74	83	92	102	111	120	129	139	148	157	166	175	185
39°	9	19	28	38	47	57	66	75	85	94	104	113	123	132	142	151	160	170	179	189
40°	10	19	29	39	48	58	68	77	87	96	106	116	125	135	145	154	164	174	183	193
41°	10	20	30	39	49	59	69	79	89	98	108	118	128	138	148	157	167	177	187	197
42°	10	20	30	40	50	60	70	80	90	100	110	120	130	140	151	161	171	181	191	201
43°	10	20	31	41	51	61	72	82	92	102	113	123	133	143	153	164	174	184	194	205
44°	10	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167	177	188	198	208
45°	11	21	32	42	53	64	74	85	95	106	117	127	138	149	159	170	180	191	201	212
46°	11	22	32	43	54	65	76	86	97	108	119	129	140	151	162	173	183	194	205	216
47°	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	186	197	208	219
48°	11	22	33	45	56	67	78	89	100	111	123	134	145	156	167	178	190	201	212	223
49°	11	23	34	45	57	68	79	91	102	113	125	136	147	158	170	181	192	204	215	226
50°	11	23	34	46	57	69	80	92	103	115	126	138	149	161	172	184	195	207	218	230
51°	12	23	35	47	58	70	82	93	105	117	128	140	152	163	175	186	198	210	221	233
52°	12	24	35	47	59	71	83	95	106	118	130	142	154	165	177	189	201	213	225	236
53°	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
54°	12	24	36	49	61	73	85	97	109	121	133	146	158	170	182	194	206	218	231	243
55°	12	25	37	49	61	74	86	98	111	123	135	147	160	172	184	197	209	221	233	246
56°	12	25	37	50	62	75	87	100	112	124	137	149	162	174	187	199	211	224	236	249
57°	13	25	38	50	63	75	88	101	113	126	138	151	164	176	189	201	214	226	239	252
58°	13	25	38	51	64	76	89	102	115	127	140	153	165	178	191	204	216	229	242	254
59°	13	26	39	51	64	77	90	103	116	129	141	154	167	180	193	206	219	231	244	257
60°	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260

PUBLICATIONS

The following résumé of the United States Government publications of navigational value is included for the ready reference of the mariner:

The Catalog of United States Coast and Geodetic Survey Nautical Charts, Coast Pilots, Tide Tables, Current Tables, Tidal Current Charts, and Aeronautical Charts is distributed free by the United States Coast and Geodetic Survey and its authorized agents.

The List of Publications of the Department of Commerce lists the publications of the United States Coast and Geodetic Survey and may be secured free on application from the offices of the Department of Commerce and its field agencies, or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Certain libraries have been designated by the Congress of the United States to receive prints, as issued, of all publications printed by the Government for public distribution. These publications may be consulted by anyone during business hours.

NAUTICAL CHARTS

Coasts of the United States, Territories, and Possessions:

Issued by the United States Coast and Geodetic Survey.

For sale by the United States Coast and Geodetic Survey, Washington, D. C., field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various ports.

Mississippi River from the Head of Passes to Cairo:

Issued and for sale by the Mississippi River Commission, Vicksburg, Mississippi.

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Illinois Waterway System:
Issued and for sale by the United States Engineers, Chicago, Illinois.
Ohio River:
Issued and for sale by the United States Engineers, Cincinnati, Ohio.
Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River, St. Regis to Cornwall, Canada:
Issued and for sale by the United States Lake Survey, Detroit, Michigan.
New York State Canal System:
Issued and for sale by the Superintendent of Public Works, Albany, New York.
Foreign countries:
Issued by the Hydrographic Office, United States Navy Department.
For sale by the Hydrographic Office, Washington, D. C., and authorized sales agents in the various ports.

COAST PILOTS

Coasts of the United States, Territories, and Possessions:
Published by the United States Coast and Geodetic Survey.
For sale by the United States Coast and Geodetic Survey, Washington, D. C., field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various ports.
Foreign countries:
Published by the Hydrographic Office, United States Navy Department.
For sale by the Hydrographic Office, Washington, D. C., and authorized sales agents in the various ports.

TIDE TABLES

Atlantic Ocean, and Pacific and Indian Oceans—Two volumes:
Published by the United States Coast and Geodetic Survey.
For sale by the United States Coast and Geodetic Survey, Washington, D. C., field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various ports.

CURRENT TABLES

Atlantic Coast, North America, and Pacific Coast, North America, and Philippine Islands—Two volumes:
Published by the United States Coast and Geodetic Survey.
For sale by the United States Coast and Geodetic Survey, Washington, D. C., field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various ports.

TIDAL CURRENT CHARTS

Boston Harbor, New York Harbor, San Francisco Bay—Three volumes:
Published by the United States Coast and Geodetic Survey.
For sale by the United States Coast and Geodetic Survey, Washington, D. C., field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various ports.

NOTICE TO MARINERS

Issued by the United States Coast Guard and by the Hydrographic Office, United States Navy Department.
Notices to Mariners are published weekly and may be secured free of charge from the United States Coast Guard and from the Hydrographic Office.
Notice to Mariners, Philippine Islands, is compiled quarterly by the United States Coast and Geodetic Survey and may be secured free of charge from the United States Coast and Geodetic Survey, Washington, D. C., or Manila, P. I. Pacific Coast field stations of the United States Coast and Geodetic Survey, and authorized sales agents in the various Philippine ports.

LIGHT LISTS

North Atlantic Coast, South Atlantic Coast, Intracoastal Waterway, Pacific Coast:
Published by the United States Coast Guard.
For sale by the Superintendent of Documents, Washington, D. C., and by authorized sales agents in the various ports.

Philippine Islands:
Published by the Department of Finance, Bureau of Customs, Manila, Philippine Islands.
Copies of the List of Lights, Buoys, Beacons, and Daymarks of the Philippine Islands may be secured free on application to the Insular Collector of Customs, Manila, P. I.
A limited number of Philippine Notice to Mariners and List of Lights, etc., are available for free distribution at the Coast and Geodetic Survey field stations at Seattle, Wash., San Francisco, Calif., and Honolulu, T. H.
Foreign Countries:
Published by the Hydrographic Office, United States Navy Department.
For sale by the Hydrographic Office, Washington, D. C., and authorized sales agents in the various ports.

RADIO

Charts of Radiobeacon System, Atlantic and Gulf Coasts, Pacific Coast, and Great Lakes:
Free on application to the United States Coast Guard.
Radio Circular No. 1, Distribution of Weather Information by Radio.
Free on application to the Weather Bureau, United States Department of Commerce, Washington, D. C.
Radio Aids to Navigation (H. O. Publ. No. 205):
Published by the Hydrographic Office, United States Navy Department.
For sale by the Hydrographic Office, Washington, D. C.
Radiobeacons and Radiobeacon Navigation:
Published by the United States Coast Guard.
For sale by the Superintendent of Documents, Washington, D. C.
List of radiobeacons:
See Light Lists published by the United States Coast Guard.
Hydrographic Bulletin:
Issued weekly by the U. S. Hydrographic Office.
International Code of Signals (American Edition) Vol. II (Radio):
For sale by U. S. Hydrographic Office.
International Convention for the Safety of Life at Sea, London, 1929 (affecting radio), Extracts From:
May be obtained from Federal Communications Commission, Washington, D. C.
Communications Act of 1934:
For sale by Superintendent of Documents, Washington, D. C.
Ship Radio Telegraph Safety Rules:
From the Commission or the Superintendent of Documents.
The International Bureau of Telecommunication Union, Berne, Switzerland:
Publishes and sells the following:
1. List of Frequencies.
2. List of Coast Stations and Ship Stations.
3. List of Aircraft and Aeronautical Stations.
4. List of Broadcasting Stations.
5. List of Stations Performing Special Services.
6. List of Call Letters of Fixed Land and Mobile Stations.
7. List of Fixed Stations.
8. The Telegraph Rates.
Radio Service Bulletin:
Issued by U. S. Radio Communications Commission.

MISCELLANEOUS

American Practical Navigator (Bowditch):
Published by the Hydrographic Office, United States Navy Department.
For sale by the Superintendent of Documents, Washington, D. C.
Annual Report of the Chief of Engineers, United States Army:
Part 1.—Report upon river and harbor improvement work, including flood-control operations.
Part 2.—Commercial Statistics, Water-borne Commerce of the United States.
These volumes may be consulted at the libraries which are public depositories.

General Rules and Regulations Prescribed by the Board of Supervising Inspectors—four volumes:
Published by and issued free on application to the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce, Washington, D. C.
Laws Governing Steamboat Inspection:
Published by and free on application to the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce, Washington, D. C.
List of Bridges Over the Navigable Waters of the United States:
Published by the United States Engineers.
For sale by the Superintendent of Documents, Washington, D. C.
Navigation Laws of the United States:
Published by the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce.
For sale by the Superintendent of Documents, Washington, D. C.
Pilot Rules for Certain Inland Waters of Atlantic and Pacific Coasts and Coast of Gulf of Mexico:
Published by and free on application to the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce, Washington, D. C.
Pilot Rules for Rivers whose Waters Flow into the Gulf of Mexico and Their Tributaries and Red River of North:
Published by and free on application to the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce, Washington, D. C.
Pilot Rules for Great Lakes and Their Connecting and Tributary Waters:
Published by and free on application to the Bureau of Navigation and Steamboat Inspection, United States Department of Commerce, Washington, D. C.
Port and Terminal Charges at United States Ports:
Prepared by the Board of Engineers for Rivers and Harbors, War Department, in cooperation with the United States Shipping Board.
For sale by the Superintendent of Documents, Washington, D. C.
Port Series—of the United States—25 volumes:
Prepared by the Board of Engineers for Rivers and Harbors, War Department, in cooperation with the United States Shipping Board.
For sale by the Superintendent of Documents, Washington, D. C.
Rules and Regulations; The Navigable Waters of the United States:
Prepared by the United States Engineers.
Shipping Charges at United States and Foreign Ports; Consular Services and Charges:
Prepared by the Board of Engineers for Rivers and Harbors, War Department, in cooperation with the United States Shipping Board.
For sale by the Superintendent of Documents, Washington, D. C.
The American Ephemeris and Nautical Almanac:
Published by the United States Naval Observatory.
For sale by the Superintendent of Documents, Washington, D. C.

PROTECTION OF NAVIGABLE WATERS

Protection of Navigable Waters.—There are given below extracts from the laws of the United States for the protection and preservation of the navigable waters of the United States.

That it shall not be lawful to throw, discharge, or deposit, or cause, suffer, or procure to be thrown, discharged, or deposited either from or out of any ship, barge, or other floating craft of any kind, or from the shore, wharf, manufacturing establishment, or mill of any kind, any refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state, into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water; and it shall not be lawful to deposit, or cause, suffer, or procure to be deposited material of any kind in any place on the bank of any navigable water, or on the bank of any tributary of any navigable water, where the same shall be liable to be washed into such navigable water, either by ordinary or high tides, or by storms or floods, or otherwise, whereby navigation shall or may be impeded or obstructed.

That it shall not be lawful to tie up or anchor vessels or other craft in navigable channels in such a manner as to prevent or obstruct the passage of other vessels or craft; or to voluntarily or carelessly sink, or permit or cause to be sunk, vessels or other craft in navigable channels; or to float loose timber and logs, or to float what is known as sack rafts of timber and logs in streams or channels actually navigated by steamboats in such manner as to obstruct, impede, or endanger navigation. And whenever a vessel, raft, or other craft is wrecked and sunk in a navigable channel, accidentally or otherwise, it shall be the duty of the owner of such sunken craft to immediately mark it with a buoy or beacon during the day and a lighted lantern at night, and to maintain such marks until the sunken craft is removed or abandoned, and the neglect or failure of the said owner so to do shall be unlawful; and it shall be the duty of the owner of such sunken craft to commence the immediate removal of the same, and prosecute such removal diligently, and failure to do so shall be considered as an abandonment of such craft, and subject the same to removal by the United States as hereinafter provided for.

That, except in case of emergency imperiling life or property, or unavoidable accident, collision, or stranding, and except as otherwise permitted by regulations prescribed by the Secretary as hereinafter authorized, it shall be unlawful for any person to discharge, or suffer, or permit the discharge of oil by any method, means, or manner into or upon the coastal navigable waters of the United States from any vessel using oil as fuel for the generation of propulsion power, or any vessel carrying or having oil thereon in excess of that necessary for its lubricating requirements and such as may be required under the laws of the United States and the rules and regulations prescribed thereunder. The Secretary is authorized and empowered to prescribe regulations permitting the discharge of oil from vessels in such quantities, under such conditions, and at such times and places as in his opinion will not be deleterious to health or sea food, or a menace to navigation, or dangerous to persons or property engaged in commerce on such waters, and for the loading, handling, and unloading of oil.

Chapter 2.—LOCAL INFORMATION

LOCAL SERVICES

Pilots and Pilotage—Pilots.—In the area covered by this volume pilotage, with a few unimportant exceptions, which seldom occur, is compulsory for all vessels, both domestic and foreign, engaged in the foreign trade, but not for vessels in the domestic trade. Information for the more important ports is given in the description of the localities.

Pilots cruise off the entrance of the more important ports. Local pilots can be obtained on inquiry at most of the larger ports covered by this volume. The masters of towboats are usually licensed pilots. Refer to name of port in text.

Towboats are available at the more important ports. For further information refer to the description of the port.

Harbor masters are appointed for the principal ports, and they have charge of the anchorage and berthing of vessels in their respective harbors. Harbor and anchorage regulations are published in the Port Series of publications which give full information regarding port regulations. Federal laws prohibit the dumping of refuse material of any kind and of oil into the navigable waters of the United States. Restricted anchorage areas are shown on large scale charts.

Repairs to vessels.—The principal places where extensive repairs to hulls and machinery of large vessels can be made are tabulated in the Appendix. Small vessels and motorboats can be hauled out, and minor repairs to machinery can be made at many other places as mentioned under the descriptions of the different ports.

Miscellaneous.—For information of any particular kind about a definite locality refer to that locality in the text.

In the Appendix are tables giving meteorological data, etc., as well as the addresses of local offices in which the ship's master is interested.

WEATHER

Winds.—On Nantucket Shoals and over Nantucket and Vineyard Sounds the prevailing winds in the average are westerly and northwesterly from late fall through the winter and southwesterly through the warmer months, but northeasterly winds are also somewhat frequent in August and September. From Vineyard Sound westward the prevailing winds are southwesterly to northerly during the colder months and southwesterly during the warmer months. The directions are subject to many variations at all seasons. (*See also* the Meteorological Tables in the Appendix.)

Fogs are liable to occur at any season, but in the average are most prevalent during May, June, and July. They come most frequently with easterly and southeasterly winds, often with southerly

winds, and occasionally with the wind westward of south. Off Montauk Point and Point Judith, winds between south and southwest are nearly as apt to bring fog as those from southeastward. Westerly and northerly winds clear away fog, this holding good for all parts of the Atlantic coast. (For fog conditions in Long Island Sound, see p. 195.)

Ice.—During the winter season, when there is ice in Long Island Sound, the section between Hunts Point and Execution Rocks Light Station is subject to pack ice to a great degree. The bottle neck appears to be at Throgs Neck. On an east wind, the scattered ice drifts in between Throgs Neck and Execution Rocks and freezes together. Also, the ice from the shallow waters of Flushing Bay, Rikers Island Flats and sections of the East River works down to Throgs Neck to meet the Long Island Sound ice, so that there is a considerable ice jam throughout this entire stretch.

No more ice forms in this area than in any other in this vicinity, and in this section the ice is kept broken up by the heavy traffic, but during the periods when it packs, and the pack freezes, trouble is experienced in navigation. Throughout this entire area, there are a great many shoal-water bays and areas, over which ice forms readily.

In connection with the maintenance of buoys over this area, and elsewhere along Long Island Sound, much more trouble is encountered with ice on the south side than on the north side, for when the ice is broken up, the prevailing winter winds, being from the northwest quadrant, have a tendency to hold the ice over into the south shore, where it packs and the packs keep freezing together until they form very heavy masses of ice.

STORM WARNINGS

Storm warnings are displayed by the United States Weather Bureau at numerous places on the coasts of the United States and the Great Lakes.

They are also displayed by the United States Coast Guard cutters and patrol boats operating in harbors and offshore areas from New London, Conn., to Cape May, N. J.

Small-craft warning.—A red pennant indicates that moderately strong winds that will interfere with the safe operation of small craft are expected. Small-craft warnings are flown at night (as well as during the day) to insure a visual display at dawn.

Northeast storm warning.—A red pennant above a square red flag with black center displayed by day, or two red lanterns, one above the other, displayed by night, indicate the approach of a storm of marked violence with winds beginning from the northeast.

Southeast storm warning.—A red pennant below a square red flag with black center displayed by day, or one red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the southeast.

Southwest storm warning.—A white pennant below a square red flag with black center displayed by day, or a white lantern below a red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the southwest.

Northwest storm warning.—A white pennant above a square red flag with black center displayed by day, or a white lantern above a red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the northwest.

Hurricane, or whole gale warning.—Two square flags, red with black centers, one above the other, displayed by day, or two red lanterns, with a white lantern

between, displayed by night, indicate the approach of a tropical hurricane, or one of the extremely severe and dangerous storms which occasionally move across the Great Lakes and Atlantic coast.

HURRICANES

Tropical cyclones of the North Atlantic Ocean are usually designated as West Indian hurricanes, but actually many of these storms originate and die out far from the mainland and hundreds of miles from the West Indies. The storm area varies from 100 miles to 500 or more miles in width, with a comparatively calm center some 10 or 20 miles in diameter. This center is an area of lowest atmospheric pressure around which the wind blows in a more or less circular course (spirally) in a direction contrary to the hands of a watch. In some respects the center, or "eye" is the most dangerous part of the hurricane and is therefore a region especially to be avoided; for although the air movement within it, if any, is usually light and fitful, the seas in this area in most cases are very heavy and confused, rendered so by the shifting violent winds surrounding it. The storm field advances in a straight or curved track, sometimes with considerable speed, at other times at a very slow rate. The highest rates of progression usually occur when the storm moves northward or northeastward over the United States, or in middle or higher latitudes over the ocean. The average speed is about 12 or 15 miles an hour.

Hurricanes form over a wide range of the ocean between the Cape Verde and the Windward Islands, over the western part of the Caribbean Sea, and in the Gulf of Mexico. While some move northward in the beginning, especially those that originate southeast of Bermuda, the majority take a westerly to northwesterly course. Of these some curve gradually northward, either to the eastward of or above the larger islands of the West Indies, then turn northeasterly or easterly near to or at considerable distance from the Atlantic coast of the United States. Others pass over or south of the greater islands and enter the Gulf of Mexico; thence curve northward or northeastward and strike some part of the east Gulf coast or continue to the westward and strike the west Gulf coast. Tracks of hurricanes are shown on the pilot charts of the North Atlantic Ocean and Central American waters, published monthly by the United States Hydrographic Office.

The hurricane season is likely to begin in June and close with November. The months of greatest frequency are August, September, and October. Hurricanes are most likely to be severe during August and the early half of September. During all the months of the season, however, the possibilities of encountering an intense storm are sufficiently great to warrant the mariner in keeping careful watch of the weather elements while in these waters. (See p. 18.)

Signs of approach.—One of the earliest signs of a hurricane is the appearance of high cirrus clouds which converge toward a point on the horizon that indicates the direction of the center of the storm. The snow-white fibrous mares' tails appear when the center is about 300 or 400 miles distant. Another usual early indication is a long, heavy swell propagated to a considerable distance, sometimes 2 or 3 days in advance, when there is no intervening land to interrupt it. This swell comes from the general direction in which the storm is approaching. There is usually a slight rise of the barometer at the

outset, followed by a continuous fall. If front of the storm, if it is advancing in some westerly direction toward the observer, the winds blow from a northerly point (northeast, north, or northwest); if in some northerly direction toward the observer, they will blow from an easterly point (southeast, east, or northeast). A further indication is a rough, increasing sea. If one or more of these signs be wanting, there is little cause for anticipating a hurricane.

As the storm center approaches the barometer continues to fall; the velocity of the wind increases and blows in heavy squalls, and the changes in its direction become more rapid. Rain in showers accompanies the squalls, and when closer to the center the rain is continuous and attended by furious gusts of wind; the air is frequently thick with rain and spume drift, making objects invisible at a short distance. A vessel on a line of the hurricane's advance will experience the above disturbances, except that as the center approaches the wind will remain from the same direction, or nearly so, until the vessel is close to or in the center.

Distance from center.—The distance from the center of a hurricane can only be estimated from a consideration of the height of the barometer and the rapidity of its fall, and the velocity of the wind and rapidity of its change in direction. If the barometer falls slowly and the wind increases gradually it may be reasonably supposed that the center is distant; with a rapidly falling barometer and increasing winds the center may be supposed to be approaching dangerously near.

Practical rules.—When there are indications of a hurricane, vessels should remain in port or seek one if possible, carefully observing and recording the changes in barometer and wind and taking every precaution to avert damage by striking light spars, strengthening moorings, and if a steamer, preparing steam to assist the moorings. In the ports of the Southern States hurricanes are generally accompanied by very high tides, and vessels may be endangered by overriding the wharf where moored if the position is at all exposed.

Vessels in the straits of Florida may not have the sea room to maneuver so as to avoid the storm track and should use every endeavor to make a harbor or stand out of the straits to obtain sea room. Vessels unable to reach port and having sea room to maneuver should observe the following rules:

When there are indications of the near approach of a hurricane, sailing vessels should heave to on the starboard tack and steamers remain stationary and carefully observe and record the changes in wind and barometer so as to find the bearing of the center and ascertain by the shift of wind in which semicircle the vessel is situated. The safety of the vessel often depends on heaving to in time.

Bearings of center.—Facing the wind, the storm center will be 8 to 12 points to the right; when the storm is distant it will be from 10 to 12 points, and when the barometer has fallen five- or six-tenths it will be about 8 points.

A line drawn through the center of a hurricane in the direction in which it is moving is called the axis or line of progression, and facing in the direction of its path the semicircle on either side of the axis is called, respectively, the right hand or dangerous semicircle and the left hand or navigable semicircle.

To find in which semicircle the vessel is situated:

If the wind shifts to the right, the vessel will be in the right hand or dangerous semicircle with regard to the direction in which the storm is traveling, in which case the vessel should be kept on the starboard tack and increase her distance from the center.

If the wind shifts to the left, the vessel will be in the left or navigable semicircle. The helm should be put up and the vessel run with the wind on the starboard quarter, preserving the compass course, if possible, until the barometer rises, when the vessel may be hove to on the port tack, or if there is not sea room to run, the vessel can be put on the port tack at once.

Should the wind remain steady and the barometer continue to fall, the vessel is in the path of the storm and should run with the wind on the starboard quarter into the navigable semicircle.

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing.

In receding from the center of a hurricane the barometer will rise and the wind and sea subside.

FISH WEIRS

Fish weirs are numerous along the outside coast. The stakes often become broken off and form a danger to navigation, especially at night. Regulations limiting the areas within which fish weirs may be established have been prescribed by the Secretary of War (see *Rules and Regulations relating to Navigable Waters*) and the supervision of the fishing structures is controlled by the Chief of Engineers, United States Army. Strangers should proceed with caution when crossing areas of possible fish weirs, and should avoid crossing shell areas at night, whenever possible. In general, the limits of the fish trap areas are shown on the charts.

Regulations prescribe that fishing structures and appliances in navigable waters of the United States shall be lighted for the safety of navigation, as follows:

The lights shall be displayed between sunset and sunrise. They shall be placed at each end of the structure excepting where the inner end terminates in such situation that there is no practicable navigation between it and the high-water line of the adjacent coast, in which case no inner light shall be displayed. The outer light shall be white and the inner light shall be red. The size, capacity, and manner of maintenance of the lights shall be such as may be specified in the War Department permit authorizing the erection of the structure or appliance.

When several structures or appliances are placed on one line with no navigable passage between them, they will be considered, for lighting purposes, as one structure.

WIRE DRAG SURVEYS

In all areas mentioned above as rocky or regions of bowlders, the ordinary survey with the lead line can not be relied upon to locate all dangers. In such areas a wire drag survey, in which a horizontal wire is suspended below the surface and dragged across the area, is the only means of locating all dangers. *Until such surveys are made and the dangers thus located have been charted, vessels should proceed with caution when crossing such areas where the charted depth does not considerably exceed the draft.*

Wire drag.—At the end of 1939 the areas examined by means of a wire drag were as follows: The main part of Buzzards Bay to the entrance of Cape Cod Canal, excluding tributaries; the broken ground in the approaches to Buzzards and Narragansett Bays outside of the inshore dangers; the eastern passage of Narragansett Bay between the Dumplings and the south end of Prudence Island, including Newport Outer and Inner Harbor; parts of the western passage of Narragansett Bay; an area about 5 miles wide between Endeavor Shoal and Block Island, including the western part of Southwest Ledge; an area between Constellation Rock and Cerebus Shoal; an area about 3 miles wide northward and westward of Shagwong Reef nearly to Gardiners Island; the main part of Gardiners Bay, including Plum Gut; the western approach to the Race; the western approach and the greater part of Fishers Island Sound; the approach to Port Jefferson Harbor, outside of Mount Misery Shoal; the approaches to Duck Islands Roads; parts of Sixmile Reef; the western end of Long Island Sound, west of South Norwalk; and the East River between Whitestone and Lawrence Points, northward of Rikers Island. These limits are general, and are given more in detail under the descriptions of the various bodies of water. The dangers bordering the shores are not ordinarily dragged.

INLAND WATERWAYS

INTRACOASTAL WATERWAY

The Intracoastal Waterway affords a protected route, with the exception of various sections, for vessels between Boston, Mass., and the Rio Grande, a distance of approximately 3,100 miles. No toll is charged for passage as the waterway is under Federal jurisdiction. Navigation is restricted, however, by the limiting depths, and horizontal and vertical clearances in the various sections of the waterway.

Boston to New York Harbor.—Information regarding the waterways between the Cape Cod Canal and New York Harbor is given in detail in the text of this volume.

New York Harbor to Delaware Bay.—An outside run between New York Bay and Delaware Bay is now necessary. Vessels whose draft permits use of the New Jersey Inland Waterway may shorten the run outside.

The Intracoastal Waterway formerly extended from New York Bay through the Raritan River, the Delaware and Raritan Canal, and the Delaware River to Delaware Bay. This route is discontinued due to the permanent closing of the Delaware and Raritan Canal.

Inside Route Pilot.—The Intracoastal Waterway from New York to Key West is described in the Inside Route Pilot published by the United States Coast and Geodetic Survey.

Intracoastal Waterways.—For the benefit of commercial navigation, yachting interests and others, an annual pamphlet giving prevailing conditions in the Intracoastal Waterways from Boston, Mass., to the Rio Grade, Tex., is published by the Chief of Engineers, War Department, Washington, D. C.

Monthly Bulletins giving existing conditions in the Cape Cod Canal, Chesapeake and Delaware Canal, the various sections of the

Intracoastal Waterway southward of Norfolk, Okeechobee Cross-Florida Waterway, and sections of the Intracoastal Waterway along the Gulf coast, are published by the various District Engineers having the supervision and charge of maintenance and improvement of these waterways. These bulletins may be had upon application, from the United States District Engineer offices located at Boston, Philadelphia, Norfolk, Wilmington (N. C.), Charleston, Savannah, Jacksonville, Mobile, New Orleans, and Galveston.

NEW YORK STATE CANAL SYSTEM

The New York State Barge Canal, known as the Erie Canal, affords an all-water route from the Hudson River on the east to Lake Erie. The canal is free for the use of both commercial and pleasure vessels. The canal was constructed for a depth of 12 feet throughout. Barges loaded to about 11 feet (3.4 m.) use the canal with safety.

There are 35 locks, the usable dimensions being 300 feet in length, 44½ feet in width, and 12 feet (3.6 m.) over the sills. The controlling clearance under fixed bridges is about 14½ feet (4.7 m.).

If bound to Lake Ontario, the Erie Canal is followed to Three Rivers Point where the canalized Oswego River is entered and followed to Oswego on Lake Ontario. There are seven locks in the Oswego Canal, which is 24 miles in length. The locks are the same dimensions as those in the Erie Canal.

Troy to St. Lawrence River.—The Champlain Canal, Lake Champlain, and the Richelieu River afford an all-water route from Troy to the St. Lawrence River. The size of vessels using this route is limited by the locks in the Chambly Canal (Canadian), which have usable dimensions of 118 feet in length, 22 feet in width, and 6½ feet (2.0 m.) of water over the sills. The locks of the Champlain Canal are the same design as those in the Erie Canal. The distance from Albany to Montreal via this route is 309 statute miles. The Canadian Government requires permits or let-passes from pleasure boats entering Canadian waterways, which may be obtained at their canal statistical offices at St. Johns and Prescot. American vessels when leaving Canada should report at the customs office.

Charts of the Erie Canal, Champlain Canal, Lake Champlain, and Great Lakes are published by the United States Lake Survey Office, Detroit, Mich., and sections of the New York State canals by the Superintendent of Public Works, Albany, N. Y.

Ice.—Navigation in the upper Hudson River and the New York State Canal System is usually obstructed by ice from the middle of December to the latter part of March.

LAKES TO GULF WATERWAY

The Lakes to Gulf Waterway by way of the Illinois Waterway System and the Mississippi River affords passage for vessels from Chicago on Lake Michigan to the Gulf of Mexico, a distance of 1,630 statute miles.

Charts of the Mississippi River may be obtained from the office of the Mississippi River Commission, Box 665, Vicksburg, Miss.

Ice.—Navigation of the Illinois Waterway System is stopped by ice from about December 1 to March 1, and in the section of the

Mississippi River between Grafton and Cairo usually between December 15 and February 15.

CURRENTS, CAPE COD TO NEW YORK

The currents between Race Point and Monomoy Island and through Nantucket and Vineyard Sounds and approaches, including Pollock Rip Slue and Great Round Shoal Channel, are described, beginning on page 61.

Nantucket Shoals.—The tidal current over the shoals is rotary, turning clockwise. The average velocity at strength is from 1½ to 2 knots, setting northeastward about 2 hours after low water at Boston on the northern part of the shoals, and about 3½ hours after low water at Boston on the southern portion. The strength of the southwestward current is from 1½ to 2 knots and occurs about 2 hours after high water at Boston on the northern part of the shoals, and about 3½ hours after high water at Boston on the southern part. A velocity at strength of 2½ knots or more is common in places on the shoals. Considerable change in velocity may be experienced with but a small change in position relative to the shoals.

Since the **current is rotary,** there is no true slack. The minimum current is about ½ to 1 knot, setting southeastward about 1 hour before high water at Boston over the northern portion of the shoals, and about ½ hour after high water at Boston over the southern portion. Over the northern part of the shoals the northwestward minimum current of ½ to 1 knot occurs about 1 hour before low water at Boston, while over the southern portion it occurs about ½ hour after low water at Boston.

Nantucket Shoals Lightship.—The tidal current here is rotary, turning clockwise. The maximum northeastward current occurs about 2 hours before high water at Boston and has a velocity of about 1 knot. The maximum southwestward current occurs about 2 hours before low water at Boston and has a velocity of about 1 knot. The minimum currents set northwestward with a velocity of about ½ knot about 1 hour after low water at Boston and southeastward with a velocity of about ½ knot about 1 hour after high water at Boston. The tidal current, however, is affected by winds, which, when blowing with the current accelerate it and when against the current retard it.

Approaching New York from the vicinity of Nantucket Shoals Lightship, a slight allowance should be made for a southwesterly set of the current. Should the wind be easterly, it is customary to allow, in order to make the course good, a set of the current with it of at least 12 miles in every 24 hours.

The effect of the winds on the currents should always be considered. On the Atlantic Coast of North America currents produced by winds set on the average about 20° to the right of the direction of the wind. With strong gales, currents with velocities up to 2½ knots may be encountered at Nantucket Shoals Lightship, and 1½ knots at Fire Island, Ambrose Channel, and in the vicinity of Five Fathom Bank. Alongshore winds produce the highest velocities at Fire Island and in the vicinity of Five Fathom Bank.

At Fire Island Lightship the tidal current is slightly rotary, with a mean velocity at strength of ¼ knot in a westward and east-

ward direction on the flood and ebb, respectively. The minimum currents before flood and ebb are less than one-tenth of a knot.

The important currents affecting navigation are those due to winds, the maximum velocities of current ranging from 1 to 1½ knots. A sudden reversal in the direction of the wind produces a corresponding change in the current and augmented velocity. Sustained winds do not maintain the currents at the maximum velocities.

At Ambrose Channel Lightship the tidal currents have a mean velocity of about ¼ knot at strength of flood or ebb, the flood setting in a westerly and the ebb in an easterly direction. The strength of flood occurs about 1 hour before time of high water at Sandy Hook, and the strength of ebb about 1 hour before time of low water at Sandy Hook. Wind velocities of 10 to 25 miles produce currents of about 0.5 to 1 knot, setting about 20° to the right of the wind. The greatest observed velocity of the current was about 1.4 knots during a gale.

Chapter 3.—ROUTES AND SAILING DIRECTIONS

GENERAL ROUTES

Navigation along the coast between Cape Cod and New York, either coasting or approaching from sea, presents to the mariner a problem of unusual difficulty from three causes, the off-lying shoals, which are generally shifting in character, strong and variable currents, and large amount of fog.

A discussion of fog and a table of the hours of operation of fog signals is given on page 410. An inspection of the table shows that the area of greatest frequency of fog is southeastward and eastward of Cape Cod and Nantucket Island, where the other two conditions, of strong and variable currents and dangerous shoals, also prevail.

Monomoy and Nantucket Shoals and Georges Bank comprise the extensive shoals, many of them shifting in character and with little depth, extending southeastward and eastward from Nantucket Island and Cape Cod to a total distance of 150 miles from shore. Monomoy and Nantucket Shoals and the channels between them are described on page 54. Nantucket Shoals Lightship, the leading mark for vessels passing southward of Nantucket Shoals, or passing between Nantucket Shoals and Georges Bank, is moored in a depth of 30 fathoms (55 m.) off the south side of Nantucket Shoals.

When crossing the banks or approaching the coast, navigators should not neglect to take soundings at frequent intervals. Due to the irregular bottom, the soundings are of little value for locating the position, but are essential for safety in preventing too close an approach to danger. Vessels equipped with radio transmitter or radio compass should make frequent use of radio direction-finder bearings and raidobeacon signals.

The passage across Georges Bank between the easternmost of the Nantucket Shoals and the westernmost shoal spots of Georges Bank, about 30 miles wide, has been called Great South Channel. It is generally used by vessels over 24-foot (7.3 m.) draft.

Georges Bank (chart 1107), for a distance of 75 miles in a west-southwesterly direction and a width of about 40 miles, has depths of less than 20 fathoms (37 m.) and numerous scattered unmarked spots with depths ranging from 2 to 10 fathoms (4 to 18 m.), among which is **Georges Shoal. Cultivator Shoal,** also in this area, is marked by a whistling buoy located 1 mile north of a 3-fathom spot. This part of Georges Bank, lying between latitude 41°05′ N. and 42°00′ N. and longitude 67°17′ W. and 68°35′ W., should be avoided; in heavy weather the sea breaks on the spots with 10 fathoms (18 m.) or less, and strong tide rips are encountered, the latter, however, not always indicating shoal water. The tidal currents are rotary with no period of slack water. The velocity at strength is about 2 knots and the velocity of the minimum current which occurs about midway between the times of strength is about 1 knot. The flood sets north-

ward and ebb southward. The hourly velocities and directions of the tidal current are shown by means of current roses on Coast and Geodetic Survey Chart Nos. 70, 1107, 3075, 3076.

In the vicinity of the 100-fathom (183 m.) curve on the south side of Georges Bank there are several prominent subaqueous canyons. The most important of these are the **Hydrographer Canyon** in latitude 40°10′ N., and longitude 69°04′ W.; the **Oceanographer Canyon** in latitude 40°25′ N., and longitude 60°08′ W.; the **Lydonia Canyon** in latitude 40°30′ E., and longitude 67°42′ W. These are of value in checking position if the vessel be equipped with an echo sounding machine.

From southward.—Large vessels approaching the Gulf of Maine from southward sometimes endeavor to make the 50-fathom (91 m.) curve on the southern edge of Georges Bank in latitude 40°20′ N. and longitude 68°50′ W.; then stand 0° true on soundings of over 30 and less than 50 fathoms (55 to 91 m.) for about 50 miles; and then shape a 323° true course, taking care to keep in a greater depth than 20 fathoms (37 m.), until the course is laid to sight Cape Cod Lighthouse.

A tall, slender radio mast at Chatham, Nauset Beach Lighthouse, Cape Cod Lighthouse and the Pilgrim Monument at Provincetown are the most prominent landmarks on the east side of Cape Cod.

Vessels of over 24-foot (7.3 m.) draft, bound from Cape Hatteras, Chesapeake Bay, Delaware Bay, or New York, usually make Nantucket Shoals Lightship.

Coasting vessels of 24-foot (7.3 m.) or less draft, bound to points north of Cape Cod, usually go inside of Nantucket Shoals, either through Vineyard and Nantucket Sounds, or through Cape Cod Canal. The latter route is available for vessels of 28-foot (8.5 m.) or less draft.

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

In thick weather the greatest caution is necessary, as soundings cannot be depended on for locating the vessel's position, but inside a depth of 30 fathoms (55 m.) the lead must be constantly used to prevent too close an approach to danger. Vessels equipped with radio should obtain bearings from nearby radio direction-finder stations but should not neglect to take frequent soundings also. Coming from the vicinity of Nantucket Shoals Lightship, the depth should not be shoaled to less than 15 fathoms (27 m.), and it is advisable to remain offshore in a depth of over 20 fathoms (37 m.).

Coming from southward or southwestward, to insure clearing the shoals off Montauk Point and Block Island, stand in for the south shore of Long Island anywhere between Montauk Point and Shinnecock Bay Light, sounding frequently until in a depth of 17 fathoms (31 m.),

when the vessel will be about 5.5 miles from the beach. A 65° true course made good, and keeping the lead in use so as not to shoal the water to less than 17 fathoms (31 m.), will then lead along the beach at a distance of about 5½ miles and about 6 miles southward of Montauk Point Lighthouse. Continuing on the 65° true course, the water will gradually deepen to 24 and 26 fathoms (44 and 48 m.), and then begin to shoal again until a depth of 10 to 12 fathoms (18 to 22 m.) is struck on the bank which extends about 5 miles southeastward from Block Island. The distance the vessel should have made in a greater depth than 20 fathoms (37 m.) should be about 9 miles. When the water deepens to more than 15 fathoms (27 m.), after crossing the bank, and does not again shoal, the vessel will have cleared Block Island.

Approaching Block Island from southward is dangerous in thick weather if the position is uncertain.

The **tidal currents** have a velocity of about 1¾ knots between Montauk Point and Block Island and about 1 knot between Block Island and Gay Head. Their greatest velocity is close to Montauk Point, where it is about 2 knots. The flood has a general northwesterly set and the ebb a southeasterly set of about equal duration.

Small coasting vessels and tows, bound into Block Island Sound or Vineyard Sound from southward, usually follow the coast until Barnegat Lighthouse or Barnegat Lightship is made, then haul across for Shinnecock Bay Light, and follow the south shore of Long Island to the entrance.

Many vessels have grounded in fog on the south side of Long Island and on Block Island. Probably many of these could have been avoided if frequent soundings had been taken in approaching the coast and if use had been made of radio direction-finder bearings.

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

Passing 1.6 miles southward of Montauk Point Lighthouse, steer 55° true for 3 miles to a position 1 mile east of Great Eastern Rock Buoy. Then make good a 43° true course for 21 miles to a position southwest of Point Judith lighted whistle buoy, passing 1.3 miles northwestward of Block Island North Lighthouse and about 0.1 mile northwestward of Block Island North Reef lighted bell buoy. After passing south of Point Judith lighted whistle buoy make good a 72° true course for 22 miles, passing north of Hen and Chickens Lightship, and then shape the courses to pass through Quicks Hole On these courses the currents have their greatest velocity between Montauk Point and Block Island, where they set northwestward on the flood and southeastward on the ebb.

CAPE COD TO NEW YORK

General remarks.—The routes followed by vessels along this part of the coast vary greatly according to the draft and the state of the

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weather. Nantucket and Vineyard Sounds and Block Island and Long Island Sounds form a somewhat sheltered route along the coast, which is used extensively by coasting vessels. Deep-draft vessels pass outside of Nantucket Shoals, between them and Georges Bank; vessels of less than 28-foot (8.5 m.) draft, with good local knowledge, can pass through Nantucket and Vineyard Sounds, thereby avoiding Nantucket Shoals, but 24 feet (7.3 m.) is ordinarily the deepest draft using this route. Cape Cod Canal is available to enable vessels up to 28-foot (8.5 m.) draft, to avoid rounding Cape Cod.

The route through Long Island Sound and East River is used by vessels up to 20-foot (6.1 m.) draft, although barges drawing 23 feet (7 m.) are towed through East River, which is the most difficult part of the route.

There are numerous anchorages where a vessel with good ground tackle can ride out any gale. Of these Provincetown Harbor is the harbor of refuge most frequently used by vessels approaching Massachusetts Bay from seaward. Newport Harbor and Dutch Island Harbor are the best anchorages for vessels approaching the coast from seaward between Gay Head and Block Island. Menemsha Bight and the anchorage in Buzzards Bay eastward of Penikese Island are also used to some extent, the former in southerly and easterly winds and the latter in southerly and westerly winds.

Gardiners Bay and Great Salt Pond, in Block Island Sound, are excellent anchorages. In Long Island Sound there are anchorages at frequent intervals. Along the south shore of Long Island there are no harbors, except for small craft.

Deep-draft vessels should not attempt to cross Nantucket Shoals. The courses in Table No. 1, if made good, lead between Nantucket Shoals and Georges Bank, in a depth of not less than 18 fathoms (33 m.).

In general, on the courses across Nantucket Shoals, the greatest easterly set (away from the shoals) may be expected from about three hours before high water to high water at Boston, and the greatest westerly set (toward the shoals) from about three hours before low water to low water at Boston. (See also p. 37).

The soundings on the sailing lines are very irregular and are of little use in determining the position. Since the courses lead outside the range of visibility of Sankaty Head Lighthouse, radio direction-finder bearings and soundings are the only method of insuring safety when rounding Nantucket Shoals. In thick weather use should also be made of the radio fog signals from Nantucket Shoals Lightship. Vessels depending on soundings only should haul offshore whenever a sounding less than 25 fathoms (46 m.) is obtained; this, however, will take a vessel a little farther offshore than the directions given above. When bound north in thick weather, keeping in a greater depth than 20 fathoms (37 m.) will insure giving the eastern side of Cape Cod a berth of 2.5 miles.

Cape Cod, Nauset Beach, and Chatham Lighthouses, the lightship at Pollock Rip, and Great Round Shoal entrance lighted whistle buoy may be seen in clear weather. Steamers, unless sure of their position by making some of these aids or Nantucket Shoals Lightship, and sailing vessels at all times, should pass outside the shoals.

on account of the strong tidal currents, variable both in direction and velocity, for which it is impracticable to make proper allowance.

The following tables, give the directions for the outside and inside passages.

Courses and Distances

Table 1.—NEW YORK TO BOSTON VIA NANTUCKET LIGHTSHIP

CHARTS 1107, 1108, 1207, 1208, 1215

Directions (*Reverse directions in italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
1. **Gedney Channel Lighted Whistle Buoy,** bearing 180° true, distant 0.25 mile:		
Courses pass 2.0 miles northward of Ambrose Channel Lightship and 1.75 mile northward of Fire Island Lightship:		
Direct	88	196
Reverse	*268*	*196*
2. **Nantucket Shoals Lightship,** bearing 0° true, distant 1.0 mile:		
Direct	70	21.8
Reverse	*250*	*21.8*
3. 49 miles, 133° true from **Sankaty Head Lighthouse:**		
Direct	346	41.5
Reverse	*166*	*41.5*
4. 26.6 miles, 76° true from **Sankaty Head Lighthouse:**		
Direct	327	50.2
Reverse	*147*	*50.2*
5. 4 miles, 35° true from **Cape Cod Lighthouse** (Table 2—position No. 13 gives courses via Nantucket Sound):		
Courses pass 0.5 mile northwest of Peaked Hill Bar Lighted Whistle Buoy:		
Direct	292	36.5
Reverse	*112*	*36.5*
6. **Boston Lightship,** bearing 22° true, distant 1.0 mile.		

Courses and Distances

Table 2.—NEW YORK TO BOSTON VIA NANTUCKET AND VINEYARD SOUNDS

CHARTS 250, 1108, 1209, 1210, 1214, 1215

Directions (*Reverse directions in italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
1. **Gedney Channel Lighted Whistle Buoy,** bearing 180° true, distant 0.25 mile:		
Direct	88	32.1
Reverse	*268*	*32.1*
2. **Fire Island Lightship,** abeam bearing 178° true, distant 1.75 miles:		
Course passes south-southeastward of Bridgehampton Lighted Bell Buoy, bearing 336½° true, distant 2.8 miles.		
Passes 0.75 mile southward of southeast limit of restricted area 5 miles south-southeastward of Montauk Point. Passes 0.5 mile south of 55-foot (16.8 m.) shoal 5 miles south of Block Island.		
Direct	66	85.1
Reverse	*246*	*85.1*

Table 2—NEW YORK TO BOSTON VIA NANTUCKET AND VINEYARD SOUNDS—Continued

CHARTS 250, 1108, 1209, 1210, 1214, 1215

Directions (*Reverse directions in italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
3. **Block Island Southeast Lighted Whistle Buoy,** bearing 336° true, distant 1.5 miles (Table 7—position No. 1 gives courses to Buzzards Bay):		
Course passes northwest of Vineyard Sound Whistle Buoy, bearing 146° true, distant 1.6 miles:		
Direct	56	34.7
Reverse	*236*	*34.7*
4. **Nashawena Lighted Whistle Buoy,** bearing 328° true, distant 0.25 mile (if westbound, Table 6—position No. 3 gives courses to Long Island Sound via Point Judith.):		
Direct	58	11.1
Reverse	*238*	*11.1*
5. **Nobska Point Lighthouse,** bearing 328° true, distant 1.1 miles (Table 8 and 8A gives courses via North Shore Nantucket Sound for draft of 14 feet (4.3 m.):		
Direct	106½	7.3
Reverse	*286½*	*7.3*
6. **Hedge Fence Lighted Gong and Trumpet Buoy No. 16,** bearing 16½° true, distant 0.5 mile:		
Direct	95	11.3
Reverse	*275*	*11.3*
7. **Halfmoon Shoal Lighted Bell Buoy No. 12,** bearing 5° true, distant 0.2 mile (Table 3—position No. 1 gives courses via Pollock Rip Channel):		
Direct	95	11.5
Reverse	*275*	*11.5*
8. **Point Rip Lighted Bell Buoy,** bearing 30° true, distant 0.25 mile:		
Direct	119	3.2
Reverse	*299*	*3.2*
9. **Great Round Shoal Lighted Whistle Buoy,** bearing 166° true, distant 740 yards:		
Direct	79	9.3
Reverse	*259*	*9.3*
10. **Great Round Shoal Channel Entrance Lighted Whistle Buoy "GRS,"** bearing 300° true, distant 800 yards:		
Direct	341½	16.2
Reverse	*161½*	*16.2*
11. **Chatham Lighted Whistle Buoy No. 6,** bearing 270° true, distant 0.2 mile. (Table 3—position No. 5 gives courses via Pollock Rip Channel):		
Direct	348½	14.6
Reverse	*168½*	*14.6*
12. **Nauset Lighted Whistle Buoy No. 4,** bearing 270° true, distant 0.25 mile:		
Direct	331	11.0
Reverse	*151*	*11.0*
13. **4 miles, 35° true from Cape Cod Lighthouse.** (Table 1—position No. 5 gives courses to and from Boston Lightship.)		

Courses and Distances

Table 3.—NANTUCKET SOUND AND POLLOCK RIP CHANNEL

CHARTS 250, 1209

Directions (*Reverse directions in italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
1. **Halfmoon Shoal Lighted Bell Buoy No. 12,** bearing 5° true, distant 0.2 mile (Table 2-position No. 7 gives courses via Vineyard Sound):		
Direct	75	7. 9
Reverse	*255*	*7. 9*
2. **Handkerchief Lightship,** bearing 345° true, distant 0.25 mile (Table 8 and 8A gives courses via North Shore Nantucket Sound for limited draft of 14 feet (4.3 m.)):		
Direct	45	5. 1
Reverse	*225*	*5. 1*
3. **Stonehorse Shoal Lightship,** bearing 0°, distant 300 yards:		
Direct	68	*4. 4*
Reverse	*248*	*4. 4*
4. **Pollock Rip Channel Lighted Whistle Buoy,** bearing 0° true, distant 700 yards:		
Direct	22	8. 0
Reverse	*202*	*8. 0*
5. **Chatham Lighted Whistle Buoy No. 6,** bearing 270° true, distant 0.2 mile (Table 2—position 11 gives courses to and from Boston Lightship).		

Courses and Distances

Table 4.—THROGS NECK (EAST RIVER) TO CAPE COD CANAL ENTRANCE

CHARTS 221, 222, 223, 224, 237, 249, 298, 1210, 1211, 1212, 1213

Directions (Eastbound)	True course	Distance
	Degrees	*Nautical miles*
1. **Throgs Neck Lighthouse,** bearing 270° true, distant 700 yards:		
Course	6	1. 2
2. **Stepping Stones Lighthouse,** bearing 96° true, distant 0.25 mile:		
Pass about 350 yards off Hart Island Light and Gangway Rock Light:		
Course	34	3. 4
3. **Execution Rocks Lighthouse,** bearing 0° true, distant 660 yards:		
Course	51	3. 4
4. **Matinicock Point Shoal Lighted Bell Buoy No. 21,** bearing 90° true, distant 1.9 miles:		
Pass about 0.15 mile northward of shoal marked by wreck:		
Course	67	14. 0
5. **Eatons Neck Lighted Bell Buoy No. 11-B,** bearing 180° true, distant 0.2 mile:		
Course	83	13. 6
6. **Stratford Shoal (Middle Ground) Lighthouse,** bearing 353° true, distant 1.8 miles:		
Course	74	34. 8
7. **Cornfield Point Lightship** bearing 344° true, distant 1.4 miles:		
Cornfield Lighted Whistle Buoy, distant 0.25 mile nearly in range with Lightship:		
Course	81	8. 7

Courses and Distances

Table 4.—THROGS NECK (EAST RIVER) TO CAPE COD CANAL ENTRANCE—Continued

CHARTS 221, 222, 223, 224, 237, 249, 298, 1210, 1211, 1212, 1213

Directions (Eastbound)	True course	Distance
	Degrees	*Nautical miles*
8. **Plum Island Lighted Bell Buoy No. 1-A,** bearing 171° true, distant 0.3 mile: Pass about 0.6 mile northward of Little Gull Island Light: Course	90	7. 4
9. **Race Rock Lighthouse,** bearing 315° true, distant 2.3 miles: Course	75	25. 4
10. **Point Judith Eastbound Lighted Gong Buoy No. 1,** bearing 165° true, distant 0.2 mile (Table 6—position No. 1 gives courses to Vineyard Sound.): Point Judith Lighted Whistle Buoy No. 2 nearly in range with Point Judith Lighthouse. Course	75½	18. 9
11. 5.3 miles 266° true from **Cuttyhunk Lighthouse:** Pass southeastward of Hen and Chickens Lightship, distant 0.55 mile. Course	50	6. 6
12. **Mishaum Ledge Lighted Gong Buoy,** bearing 0° true, distant 0.3 mile: Course	70	7. 2
13. **Traffic Lighted Gong Buoy No. 6,** bearing 180° true, distant 0.4 mile: Course	41	6. 1
14. **Buzzards Bay Lighted Bell Buoy No. 7,** bearing 326° true, distant 1.7 mile: Course	18	5. 2
15. Midway between **Hog Island Channel Lighted Buoys No. 1 and No. 2.**		

Courses and Distances

Table 5.—CAPE COD CANAL ENTRANCE TO THROGS NECK (EAST RIVER)

CHARTS 221, 222, 223, 224, 237, 249, 298, 1210, 1211, 1212, 1213

Directions (Westbound)	True course	Distance
	Degrees	*Nautical miles*
1. Midway between **Hog Island Channel Lighted Buoys No. 1 and No. 2:** Course	198	5. 2
2. **Buzzards Bay Lighted Bell Buoy No. 7,** bearing 326° true, distant 1.7 miles: Course	221	6. 1
3. **Traffic Lighted Gong Buoy No. 6,** bearing 180° true, distant 0.4 mile: Course	250	7. 2
4. **Mishaum Ledge Lighted Gong Buoy,** bearing 0° true, distant 0. 3 mile: Course	230	6. 6
5. **5.3 miles, 266°** true from Cuttyhunk Lighthouse Pass southeastward of Hen and Chickens Lightship, distant 0.55 mile (Table 7—position No. 2 gives courses via south of Block Island): Course	257	18. 9

Table 5—(CAPE COD CANAL ENTRANCE TO THROGS NECK (EAST RIVER)—Continued

CHARTS 221, 222, 223, 224, 237, 249, 298, 1210, 1211, 1212, 1213

Directions (Westbound)	True course	Distance
	Degrees	*Nautical miles*
6. **Point Judith Lighted Whistle Buoy No. 2,** bearing 346° true, distant 0.25 mile:		
Point Judith Lighthouse in range with Buoy No. 2:		
Course	256	25.9
7. **Race Rock Lighthouse,** bearing 301° true, distant 1.0 mile:		
Pass 0.5 mile southward of lighthouse:		
Course	272	3.5
8. **Little Gull Island,** bearing 182° true, distant 1.8 miles:		
Course	261½	12.1
9. **Cornfield Point Lightship,** bearing 351½° true, distant 0.5 mile:		
Course	251	5.8
10. **Sixmile Reef Lighted Whistle Buoy,** bearing 341° true, distant 0.25 mile:		
Course	254½	28.7
11. **Stratford Shoal (Middle Ground) Lighthouse,** bearing 344½° true, distant 0.8 mile:		
Course	261	13.7
12. **Eatons Point Lighted Bell Buoy No. 11–B,** bearing 180° true, distant 0.6 mile:		
Course	247	12.8
13. **Great Captain Island Lighthouse,** bearing 22° true, distant 3.75 miles:		
Course	231	4.9
14. **Execution Rocks Lighthouse,** bearing 0° true, distant 660 yards:		
Pass about 350 yards of Gangway Rock Light and Hart Island Light.		
Course	214	3.4
15. **Stepping Stones Lighthouse,** bearing 96° true, distant 0.25 mile:		
Course	186	1.2
16. **Throgs Neck Lighthouse,** bearing 270° true, distant 700 yards.		

Courses and Distances

Table 6.—POINT JUDITH TO VINEYARD SOUND

CHART 1210

Directions (*Reverse directions in italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
1. **Point Judith Eastbound Lighted Gong Buoy No. 1,** bearing 165° true, distant 0.2 mile:		
Eastbound Course	83	21.4
1A. **Point Judith Lighted Whistle Buoy No. 2,** bearing 346° true, distant 0.25 mile (Table 5—position No. 6 gives courses via Long Island Sound):		
Westbound Course	265	21.6
2. **Vineyard Sound (Sow and Pigs) Lightship,** bearing 0° true, distant 0.5 mile:		
Direct	75	7.0
Reverse	*255*	*7.0*
3. **Nashawena Light Whistle Buoy,** bearing 328° true, distant 0.25 mile (Table 2—position No. 4 gives courses via Nantucket Sound). (Table 3—position No. 1 gives courses via Pollock Rip Channel.)		

Courses and Distances

Table 7.—SOUTH OF BLOCK ISLAND TO BUZZARDS BAY

CHARTS 1210, 1211

Directions (*Reverse directions in italics*—read upward)	True course	Distance
1. **Block Island Southeast Light Whistle Buoy,** bearing 336° true, distant 1.5 miles (Table 2—position No. 3, gives courses via Fire Island Lightship):	*Degrees*	*Nautical miles*
Direct	44	27.3
Reverse	*224*	*27.3*
2. 5.3 miles, 266° true from **Cuttyhunk Lighthouse** (Table 4—position No. 11 gives courses to Buzzards Bay).		

Courses and Distances

Table 8.—NORTH SHORE OF NANTUCKET SOUND

CHARTS 247, 1209. (FOR DRAFT UP TO 14 FEET [4.3 M.])

Directions (*Reverse directions in italics*—read upward)	True course	Distance
To Pass Southward of Bishop and Clerks	*Degrees*	*Nautical miles*
1. **Nobska Point Lighthouse,** bearing 328° true, distant 1.1 miles (Table 2—position No. 5 gives courses via Vineyard Sound):		
Direct	49½	2.5
Reverse	*229½*	*2.5*
2. 3.8 miles, 0° true from **West Chop Lighthouse:**		
Direct	87	7.2
Reverse	*267*	*7.2*
3. **Wreck Shoal West Buoy No. 18,** bearing 0°, distant 50 yards (Table 8A—position No. 1 gives courses north of Bishop and Clerks):		
Direct	77	8.3
Reverse	*257*	*8.3*
4. **Bishop and Clerks Lighthouse,** bearing 40° true, distant 0.65 mile:		
Courses pass close southwestward of Handkerchief Shoal Buoy No. 16:		
Direct	119	9.9
Reverse	*299*	*9.9*
5. **Handkerchief Shoal Lightship,** bearing 345° true, distant 0.25 mile (Table 3—position No. 2 gives courses via Pollock Rip Channel).		

Courses and Distances

Table 8A.—NORTH SHORE OF NANTUCKET SOUND

CHARTS: 247, 1209 (FOR DRAFT UP TO 14 FEET [4.3 M.])

Directions (*Reverse directions in italics*—read upward)	True course	Distance
To Pass Northward of Bishop and Clerks	*Degrees*	*Nautical miles*
1. **Wreck Shoal West Buoy No. 18,** bearing 0° true, distant 50 yards (Table 8-position No. 3 gives courses to Vineyard Sound):		
Direct	77	1.9
Reverse	*257*	*1.9*
2. **Wreck Shoal Buoy No. 16,** bearing 329° true, distant 0.2 mile:		
Direct	59	4.9
Reverse	*239*	*4.9*
3. **West Southwest Ledge Lighted Bell Buoy No. 14,** bearing 358° true, distant 0.4 mile:		
Direct	88	3.9
Reverse	*268*	*3.9*
4. **Bishop and Clerks Lighthouse,** bearing 218½° true, distant 0.85 mile:		
Direct	128½	9.9
Reverse	*308½*	*9.9*
5. **Handkerchief Shoal Buoy No. 16,** bearing 38½° true, distant 50 yards:		
Direct	119	0.7
Reverse	*299*	*0.7*
6. **Handkerchief Shoal Lightship bearing 345°** true, distant 0.25 mile (Table 3-position No. 2 gives courses via Pollock Rip Channel).		

Chapter 4.—COAST OF CAPE COD, FROM PROVINCETOWN TO MONOMOY POINT

GENERAL DESCRIPTION

Cape Cod Bay and the coast northward are described in Atlantic Coast Pilot, Section A, St. Croix River to Cape Cod.

Prominent objects.—In making the northern part of Cape Cod in clear weather the most prominent feature is Pilglrim Monument,* a stone structure about 350 feet (107 m.) high above the sea; a tall standpipe and several high church spires in Provincetown will also be seen. It is frequently difficult to recognize natural landmarks on Cape Cod when approaching from seaward owing to a lack of distinctive features. The Coast Guard stations and the lighthouses are about the only well-defined marks in places; of the latter, Cape Cod Lighthouse is the most important, being the chief guide for this part of the coast. Nauset Beach Lighthouse is the most prominent daymark southward of Pilgrim Monument.

Cape Cod is a long peninsula, forming the easterly extremity of Massachusetts. It makes out from the mainland, first in an easterly direction for 31 miles, and then northward for a little over 20 miles—this latter portion, forming what is sometimes termed the Hook of the Cape, is more usually known locally as the Lower Cape. It is composed almost entirely of sandy lands, with high, bare sand hills, and low, nearly level plains, and is well settled. Cape Cod Bay is on its northern and western side; Nantucket Sound is on the southern side. The portion of Cape Cod between Chatham and the Cape Cod Canal is known locally as the Upper Cape. The region is wooded and is well settled by numerous towns and villages. Along the south shore there are many private summer residences and estates

PROVINCETOWN HARBOR TO RACE POINT

Provincetown Harbor is formed by a turn in the northern end of the Hook of Cape Cod, and has a diameter of about 2 miles. It is one of the best harbors on the Atlantic coast, being of sufficient capacity for large fleets and having anchorage in 3 to 10 fathoms (5.5 to 18.3 m.), with excellent holding ground. Coasters and fishermen seek shelter here from gales from any direction.

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

* Lat. 42°03′.1, Long. 70°11′.4; charts 580, 1208, 1107.

Herring Cove, about 0.8 mile southward of Race Point Lighthouse, affords a temporary lee from easterly winds; small vessels sometimes anchor well inshore in from 10 feet to 4 fathoms (3 to 7.3 m.), according to draft. The **Naval Trial Course** (1 nautical mile long) is between Race Point and Wood End Lighthouses and is marked by range beacons (skeleton towers with mast) on shore and by white buoys which lie 0.6 to 1 mile from shore.

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

The depth of water at the entrance and in Provincetown Harbor is ample for vessels of deep draft, and there are no outlying dangers. There is a depth of 7½ feet (2.2 m.) at the steamer wharf which is the most easterly wharf along the waterfront. This wharf is owned by the town and there is a wharfage charge for small craft. Water and gasoline are obtainable and a float landing is available.

Storm-warning displays are made at Provincetown from a skeleton tower on the hill near the Pilgrim Monument, and are visible from all directions in approaching the coast. They are also shown at Race Point and Cape Cod Lighthouse.

Communication.—Provincetown is on a railroad, and there is a good highway to Plymouth and Boston. During the summer season there is a daily steamer service with Boston.

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

Tides.—The mean rise and fall of the tide is about 9 feet (2.7 m.).

Currents.—Off Race Point the tidal currents have a velocity of about 2 knots at strength. The flood sets southward and the ebb in the opposite direction, and tide rips occur during heavy weather when the wind is against the current. Westward of the stretch of coast between Wood End and Race Point, the velocity at strength is about 1 knot. In this locality the ebb current sets northwesterly and the flood sets in the opposite direction.

At the entrance and in the harbor, the tidal currents have little velocity.

A submarine trial course is located between Wood End and Long Point Lighthouses. The course is 1 nautical mile in length and is marked at each end and at the half-mile point by shore ranges. Each end of the course is marked by a white buoy. Vessels navigating in this area should be on the lookout for submarines.

Long Point Lighthouse, at the eastern end of the sand spit, is a white square tower 36 feet (11 m.) high.

Wood End Lighthouse, on the south side of the sand spit forming the southwest side of Provincetown Harbor, is a white pyramidal tower 45 feet (13.7 m.) high. There is a Coast Guard station near the light.

Race Point Lighthouse, at the extreme northwest end of Cape Cod, is a white tower. The light is 41 feet (12.5 m.) above the water, and visible 12 miles. The fog signal is an air whistle.

Race Point Coast Guard station is about 1.4 miles eastward from the light.

Shank Painter Bar, extending to a greatest distance of 0.6 mile off the shore between Race Point and Wood End Lighthouses, rises abruptly from deep water. It is marked by a buoy 1.2 miles southward from Race Point Lighthouse and a bell buoy off Wood End Lighthouse.

RACE POINT TO MONOMOY POINT

From Race Point the shore curves northeastward, eastward, and then southeastward to the Highlands, a total distance of about 9 miles, and is composed of bare, sand hillocks of various heights. On approaching the Highlands the sand hills begin to be covered with a brownish-looking growth of grass, and the land is higher. The pitch of the cape at this point shows a high bluff, on which stands Cape Cod Lighthouse and three radio masts. In coasting, several Coast Guard stations are seen. At the Highlands the shore may be safely approached as close as 0.5 mile, but the water shoals somewhat abruptly, and care must be taken not to go inside of 5 fathoms (9.1 m.). From Cape Cod Lighthouse to near Chatham entrance the coast should not be approached closer than 0.5 mile.

Peaked Hill Bar commences about 3 miles northwestward of Cape Cod Lighthouse and extends westward along the shore several miles, its distance from the beach being about 0.6 mile. The depth over the shoal ranges from 14 to 18 feet (4.3 to 5.5 m.) and in heavy weather it is marked by breakers. A lighted whistle buoy is placed about 2 miles off Peaked Hill Bar and 5.2 miles 337° true from Cape Cod Lighthouse.

Many vessels bound westward into Cape Cod Bay or Boston Harbor in a fog have grounded on Peaked Hill Bar through a failure to take soundings. Keeping in a depth of 20 fathoms (37 m.) will insure passing 2 to 2.5 miles off the eastern side of Cape Cod, and will lead to Peaked Hill Bar lighted whistle buoy. Vessels equipped with radio transmitters can fix their position by a sounding taken on a bearing from North Truro radio direction-finder station, or by simultaneous bearings from two or more stations.

Cape Cod Lighthouse is a white tower. The light is 183 feet (56 m.) above the water, and visible 20 miles. The fog signal is an air oscillator. If the oscillator is disabled, the reed horn will be sounded. A radiobeacon is operated at the light. Just northward of the lighthouse is a reporting station with which vessels may communicate with Boston by using the International Code signals. Close to southward of the lighthouse is **North Truro radio direction finder station.** A stone tower on the summit of the ridge about 0.5 mile south of the light is a prominent landmark.

From the Highlands to Nauset Beach Lighthouse, about 12 miles southward, the shore has a slight curve and consists of steep sand bluffs of various heights, with narrow valleys at intervals. The two Coast Guard stations, located 3 and 6.8 miles southward from Cape Cod Lighthouse, are fairly prominent. The former (Pamet River)

Used considerably by small boats
shallest depth is about 3 feet
at channel [illegible]

is now an inactive station but a watch is maintained there by the Cahoons Hollow station.

Nauset Beach Lighthouse is a white conical tower with the upper two courses of the structure including bracket work below the balcony level painted red. The light is 114 feet (35 m.) above the water and visible 17 miles. Caution should be used in order not to mistake an old lighthouse tower attached to a private dwelling situated about 0.1 mile southward of the light for Nauset Beach Lighthouse.

There is a lighted whistle buoy 5 miles, 30° true from the lighthouse.

Telegraph cables.—Three submarine cables of the French Telegraph Cable Co. are located along the east shore of Cape Cod as follows: (1) From a landing at Nauset Beach Light trends in a northeasterly direction; (2) from a landing at Nauset Harbor trends in an easterly direction; (3) from a landing at Nauset Beach (East Orleans) trends in a southeasterly direction.

The cable company cautions vessels from anchoring near these cables. It is willing to indemnify any vessel for anchor and gear cut away and lost in order to prevent interruption of cable communication. This will be done on presentation of the proper sworn evidence of the facts with the exact position of the vessel at the time.

Southward of Nauset Beach Lighthouse the coast turns gradually southward to Chatham, a distance of 11 miles. It gradually becomes lower, less steep, slopes gently back from the beach, and is covered with a scanty growth of grass. A few houses appear at long intervals. Nauset, Orleans, and Old Harbor Coast Guard Stations are located 1, 6, and 10 miles, respectively, below Nauset Beach Lighthouse.

About 3.8 miles below Nauset Beach Lighthouse is the entrance to **Nauset Harbor,** which may be recognized by the thickly clustered houses immediately to the south on Nauset Heights which is rising ground somewhat higher than the land northward. The entrance is practically bare at low water and is used only by small local craft at high water. Strangers should never attempt to enter.

From Nauset Harbor to Chatham the coast shows a low, sandy shore covered with small hillocks and backed by higher lands.

A tall slender radio mast and a standpipe are prominent **landmarks** at Chatham Port. The radio mast has 3 red lights exhibited from it from sunset to sunrise. The lights are exhibited at the following heights from the base of the mast which is 80 ft. (24.4 m.) above sea level. The uppermost light at the top of the mast is 360 ft. (110 m.); the middle light 240 ft. (73 m.) and the lower light 120 ft. (36 m.).

Chatham Bar, the northern entrance to Chatham, is about 11 miles southward of Nauset Beach Lighthouse. The channel across the bar is marked by a bell buoy and there is a nun buoy and a lighted whistle buoy outside the bar. This bar is dangerous in thick weather, and when in its vicinity the depth should not be shoaled to less than 8 fathoms (14.6 m.).

The channel over the bar to the town of **Chatham** has a depth of about 3½ feet (1.1 m.) at low water, but is subject to frequent changes, and the buoys at the entrance can not be depended on to lead in the best water. The channel is used only by small local craft with a smooth sea and is not safe for strangers.

The beach extends about 1 mile southward from **Old Harbor** Coast Guard Station. There are no wharves on the eastern side of Chatham, the approach being from Stage Harbor (described on p. 65), and there is no channel from Stage Harbor to Chatham Bar.

In 1925 a 6 foot (1.8 m.) channel was dredged from the entrance in the vicinity of Chatham, northward to the head of navigation at **Meeting House Pond** at **Orleans,** a distance of about 7.5 miles. In 1939 it was reported that the dredged cuts had filled in at numerous places and the controlling depth was about 4 feet (1.2 m.).

Pleasant Bay, the large shoal bay northward of the entrance, is used only by local craft.

Monomoy Beach extends 4.5 miles in a southwesterly direction from Chatham Bar to Monomoy Island. In passing along this beach the town of Chatham and Chatham Lighthouse can be seen over it.

Chatham Lighthouse* is a white, conical tower. The light is 80 feet (24.4 m.) high and visible 15 miles.

Monomoy Island is a low, narrow spit covered with sand hillocks, and forms the northern side of the entrance to Nantucket Sound. Its eastern shore is foul, having many sand shoals off it. Vessels sometimes anchor off this shore in 4 to 6 fathoms (7.3 to 11 m.) and wait for a fair tide to beat through the sounds. As a general rule the shore should not be approached nearer than 1 mile for a distance of 4 miles southward of Chatham Lighthouse. The southern end of Monomoy Island is called **Monomoy Point,** and about 1 mile above its southerly extremity stands Monomoy Point unused lighthouse. Shoals make off nearly 5 miles in a general east-northeast direction from the end of Monomoy Point.

Monomoy Point unused lighthouse is a tower with a covered way to a dwelling. Monomoy and Monomoy Point Coast Guard Stations are located 2 miles north and 0.8 mile southwest, respectively, from the unused lighthouse.

Storm warnings are displayed at Race Point, Cape Cod Light, and Chatham Lighthouse.

Currents.—See "Currents, Nantucket and Vineyard Sounds and approaches," beginning on page 61.

MONOMOY AND NANTUCKET SHOALS

(CHARTS 1107 AND 1209)

Eastward and southeastward of the eastern entrance to Nantucket Sound are Monomoy and Nantucket Shoals. Owing to the great extent and distance of some parts of these shoals from the land, and to the strong and baffling tidal currents which set over them, their navigation in thick or foggy weather is hazardous. In clear weather the lighthouses, light vessels, and buoys render the navigation of the two principal channels comparatively easy. The deeper channel leads through these shoals in an easterly direction from Nantucket (Great Point) Lighthouse, and for the purpose of description will be considered as the dividing line between Nantucket and Monomoy Shoals, which are briefly described under separate headings. (For current information, see "Currents, Cape Cod to New York," p. 37.

*Lat. 41°40'.3, Long. 69°57'.0; charts 1208, 1209.

and "Currents, Nantucket and Vineyard Sounds and approaches," beginning on p. 61.)

Monomoy Shoals consist of numerous detached shoals extending about 5.5 miles in an easterly and 9.5 miles in a southeasterly and south-southeasterly direction from Monomoy Point. Many parts of these shoals, separated from others by narrow slues, have special names and are briefly described below. It should be remembered that the shoals are shifting in character and are subject to change both in location and depth.

Bearse Shoal is the western, and **Pollock Rip** the eastern, part of the shoal extending 3.8 miles eastward of Monomoy Point unused lighthouse. These shoals are a series of sand shoals and ridges, with little water in places for a distance of 2 miles eastward of the unused lighthouse, and 6 to 18 feet (1.8 to 5.5 m.) farther eastward. The channel lying between these two shoals is marked by buoys. (See description of Pollock Rip Channel on p. 59.)

Broken Part of Pollock Rip, with depths of 10 to 18 feet (3 to 5.5 m.) over it, lies eastward of Pollock Rip and is separated from it by Pollock Rip Slue.

Stone Horse, Little Round, and **Great Round Shoals** are portions of a continuous series of sand shoals and ridges, with depths of 5 to 18 feet (1.5 to 5.5 m.) over them, lying directly eastward of the entrance to Nantucket Sound and between the two main channels. Southward and eastward of these shoals there are numerous shoal spots, including Orion Shoal, with depths of 9 to 18 feet (2.7 to 5.5 m.) over them.

Shovelful Shoal is a small shoal lying 580 yards southward from Monomoy Point. It has a least depth of 4 feet (1.2 m.). A narrow channel lies between the shoal and Monomoy Point. A narrow channel lies between this shoal and Handkerchief Shoal. Heavy tide rips are usually encountered in this locality. The bottom here is subject to considerable changes and local knowledge is considered necessary for the safe navigation of these channels.

Handkerchief Shoal extends for 5 miles southwestward from Monomoy Point. It has depths of 2 to 18 feet (0.6 to 5.5 m.) and rises abruptly from the deeper water on its southeast side. On the northwest side the water shoals more gradually, and the lead will indicate an approach to danger. The shoal is uneven and shifting in character, and vessels should not attempt to pass to northward of the buoy which marks its southern end.

Pollock Rip Lightship is moored in 10 fathoms (18.3 m.) about 5.5 miles offshore. It has a red hull with "Pollock" on each side, and two masts with circular gratings at each masthead. The light is 65 feet (19.8 m.) high, and visible 14 miles. A white riding light is exhibited from the forestay to indicate the heading of the vessel. The fog signal is a steam chime whistle. If the whistle is disabled, a bell will be struck by hand.

The radio beacon operated on the lightship is synchronized with the fog signal for distance finding. This is fully explained in the Light List. Radio messages of importance in the maintenance of aids to navigation or other urgent matters will be received during the scheduled time of operation.

Stone Horse Shoal Lightship* is moored in 14 fathoms (25.6 m.) about 0.9 mile 153° true from Monomoy Point unused lighthouse. It has a black hull with "Stone Horse" on each side; one mast.

The light is 60 feet (18.3 m.) high and visible 12 miles. A fixed white light will be shown if the occulting light is inoperative. A white riding light is exhibited from the forestay to indicate heading of the vessel. The fog signal is an air diaphone. A bell will be struck by hand if the whistle is disabled.

Steamship traffic is very heavy to the southward of the Lightship; fishing vessels, etc., should avoid this area during thick or foggy weather.

Day **storm warnings** are displayed. A vessel, showing her distinguishing lights at night, or her number with International Code signals by day, will be reported. The radio station receives and transmits messages.

Handkerchief Lightship is moored in 8¼ fathoms (15.2 m.) about 0.6 mile off the southern end of Hankerchief Shoal. It has a red hull with "Handkerchief" on each side, and a black gallery and lantern at the masthead. The light is 40 feet (12.2 m.) high and visible for 12 miles. If flashing light is extinguished, a fixed white light will be shown. A white riding light is exhibited from the forestay to indicate heading of the vessel. The fog signal is an air horn. A bell will be struck by hand, if whistle is disabled.

The radio beacon is synchronized with the sound signal for distance finding.

Nantucket Shoals is the general name of the numerous different broken shoals which lie southeastward of Nantucket Island and make this one of the most dangerous parts of the coast of the United States for the navigator. These shoals extend 23 miles eastward and 39 miles southeastward from Nantucket Island, are shifting in their nature, and the depths vary from 3 and 4 feet (0.9 and 1.2 m.) on some to 4 and 5 fathoms (7.3 and 9.1 m.) on others, while slues with depths of 10 fathoms (18.3 m.) or more lead between those farthest offshore. The easterly edge of the shoals has depths of 4 and 4½ fathoms (7.3 and 8.2 m.) in places, and trends 166° true from latitude 41°18′ N., longitude 69°29′ W., to latitude 40°57′ N., longitude 69°22′ W.

ASIA RIP, the southeasternmost danger was resurveyed in 1939. The least depth of 5 fathoms 4 ft. (10.4 m.) was found along the ridge on the western edge of the shoal in latitude 40°47.8′, longitude 69°20.5′. Middle Rip was also resurveyed in 1939. The least depth of 4 fathoms (7.3 m.) was found along the ridge on the eastern edge of the shoal in latitude 40°57.1′, longitude 69°22.7′. Deep draft vessels should pass east and south of these shoals.

For a distance of 15 miles eastward and southeastward and 18 miles southward from Nantucket Island, the shoals have depths less than 16 feet (4.9 m.), and this area should be avoided by all vessels. The eastern part of this area is marked by Great Rip lighted buoy No. 2 and fishing buoy No. 2, a red buoy, and the southern part is marked by **Davis South Shoal** west buoy, a red and black horizontally banded buoy. The tidal currents are strong and variable in direction, forming extensive rips and broken water over the shoals.

*Lat. 41°32′.8, Long. 69°59′.1: Charts 250, 1209.

Nantucket Shoals Lightship,* with red station whistle buoy 0.6 mile, 340° true from it, is the leading mark for vessels passing southward of Nantucket Shoals. It is moored in 30 fathoms (55 m.) 43 miles 158½° true from Sankaty Head Lighthouse. It has a red hull with "Nantucket" on each side, and two masts with a red circular grating and radio yard at each masthead. The light is 65 feet (19.8 m.) above water and visible 14 miles. If the light is inoperative a fixed white light will be shown. A white riding light is exhibited from the forestay to indicate heading of vessel.

The fog signal is a two-tone diaphone. A steam whistle is blown if the diaphone becomes inoperative.

The radiobeacon, air signal and submarine oscillator of Nantucket Shoals Lightship are synchronized for distance finding. A short-range warning radiobeacon emits a distinctive warble note for 1 minute following the regular Nantucket radiobeacon and on the same frequency (314 kilocycles). When heard, it will serve in the nature of a warning to vessels that they are in the vicinity of the lightship and must navigate with caution. The range will vary with receiving conditions. This signal is available to vessels with radio receivers to show proximity, and for taking bearings with direction finder from vessels so equipped.

*Lat. 40°37′, Long. 69°37′: Charts 1107, 70.

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Chapter 5.—NANTUCKET AND VINEYARD SOUNDS

CHARTS 1209 AND 1210

GENERAL DESCRIPTION AND CHANNELS

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

The aids are colored and numbered for passing through the sounds from eastward.

The shoals at the eastern entrance are subject to considerable shifting. Those inside are sand shoals, except along the shores, where bowlders occur, but are subject to little change.

Vessels of 24-foot (7.3 m.) draft can pass through Nantucket and Vineyard Sounds, thereby avoiding Nantucket Shoals.

This route is used principally by coasting steamers.

Halfmoon Shoal, near the center of Nantucket Sound, has a least depth of 13 feet (4.0 m.). Its southern end is marked by Halfmoon Shoal Lighted Bell Buoy. There are depths of 22 to 24 feet (6.7 to 7.3 m.) from 1.5 to 2.5 miles southeastward of Halfmoon Shoal. Deep draft vessels should use care to avoid them.

The project for improving the route via Nantucket and Vineyard Sounds provides for a channel 30 feet (9.1 m.) deep at each of the two critical sections, Pollock Rip Channel and **Cross Rip Channel.** The latter improvement is between Halfmoon Shoal and Cross Rip Shoal and in January 1939 the controlling depth was over 31 feet (9.4 m.) through the center of the channel. The axis of this improved channel (4,000 feet project width) is along a course of 98° true from 0.4 mile northward of the station position of Cross Rip Lightship to a position southward of Halfmoon Shoal Lighted Bell Buoy.

Cross Rip Shoal has a least depth of 11 feet (3.4 m.) Its northern edge is marked by a buoy and by Cross Rip Lightship. A shoal with a least depth of 24 feet (7.3 m.) extends for 1¼ miles eastward of the lightship, and deep-draft vessels must exercise caution in passing between this shoal and the shoal making out southwestward from Halfmoon Shoal.

Horseshoe Shoal has a length of about 7.5 miles and bares in places at extreme low water. Its northwest end is marked by a black buoy and its southeast end by a lighted buoy.

Hedge Fence and **L'Hommedieu Shoals,** lying in the western end of Nantucket Sound, have depths of from 2 to 18 feet (0.6 to 5.5 m.). These shoals are marked as follows: the former by a red and black horizontally banded buoy at the west end and a red and black horizontally banded buoy at the east end, and the latter by a black buoy at the east and west ends. The water deepens abruptly off the edges of these shoals, and soundings will give little warning of the approach to danger.

Cross Rip Lightship is moored off the north end of Cross Rip Shoal. It has a black hull with "Cross Rip" on each side and with a black gallery at amidship masthead. The light is 40 feet (12.2 m.) high, and visible 12 miles. If the light is inoperative, a fixed white light will be shown. A fixed white light is exhibited from the forestay to indicate heading of vessel. The fog signal is an air diaphragm horn. If the horn is disabled a bell must be struck by hand. The radio beacon is synchronized for distance finding.

Channels.—For a discussion of navigation of vessels not passing through Nantucket Sound see page 41 and "Directions, Cape Cod to New York," on page 41.

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

Pollock Rip Channel is the most direct channel leading from Nantucket Sound to points northward of Cape Cod. Its eastern approach is marked by **Pollock Rip Lightship.*** In January, 1939 the controlling depth in the 2,000-foot wide cut at the eastern end of the shoals was 32 feet (9.8 m.) except at the enroachment of Bearse Shoal at buoy No. 6 where the minimum depth on the north edge of the channel was 8 feet (2.4 m.) increasing to 30 feet (9.1 m.) at a distance of about 400 feet into the channel.

The channel is subject to shoaling. The axis of the channel follows a course of 68° true from about 300 yards south of Stone Horse Lightship.

On the prolongation of the south channel line at a distance of about 0.5 mile from lighted whistle buoy No. 1 there is a 28-foot (8.5 m.) shoal.

The channel is well marked by lightships, lighted buoys and fog signals, and is generally used in preference to Great Round Shoal Channel. In winter the lighted buoys are removed when in danger of being carried away by ice and their location is marked by spar buoys.

Great Round Shoal Channel is marked by buoys, some of them lighted, but the fog signals are not as numerous as in Pollock Rip Channel. The channel has a depth of about 30 feet (9.1 m.)

Directions for these channels are given on page 64.

Vineyard Sound (Sow and Pigs) Lightship is moored on the north side of the west entrance to the sound in 102 feet (31 m.) of water. It has a red hull with "Vineyard" on each side and two masts with a lantern and gallery on each masthead. The light is 65 feet (19.8 m.) high and visible 14 miles. A fixed light will be shown from the mainmast if the regular light is inoperative. A

*Lat. 41°36'.1, Long. 69°51'.1: Charts 250, 1208, 1209.

fixed white light is exhibited from the forestay to indicate heading of the vessel. The fog signal is an air diaphone. A bell will be struck by hand if the diaphone is disabled. The radio beacon is synchronized for distance finding.

Channels.—Pollock Rip Channel and Great Round Shoal Channel, leading into Nantucket Sound from eastward, are described on pages 59 and 64. Between the numerous shoals in Nantucket Sound there are two well-marked channels leading through Nantucket Sound to the eastern end of Vineyard Sound.

North Channel leads along the north side of Nantucket Sound, on either side of Bishop and Clerks Shoal (marked by a lighthouse), northward of Horseshoe Shoal, between Wreck Shoal and Eldridge Shoal, northward of L'Hommedieu Shoal, and through one of the openings at the western end of this shoal to the main channel of Vineyard Sound. It is used mostly by craft bound to points on the north shore of Nantucket Sound and by vessels bound through Nantucket Sound during northerly winds or in winter, when the prevailing northerly winds keep the north shore of Nantucket Sound free from drift ice. The least depth in this channel is about 16 feet (4.9 m.).

Main Channel leads southward of Halfmoon Shoal; through an opening, marked by Cross Rip Lightship, in the shoals between the south end of Horseshoe Shoal and the shoals southward; through the fairway between Hedge Fence and Squash Meadow; and northward of Middle Ground and Lucas Shoals in Vineyard Sound. This channel is used by most of the vessels bound through Nantucket Sound. With care a least depth of 30 feet (9.1 m.) may be carried through it, but the draft of vessels using it seldom exceeds 24 feet (7.3 m.). See page 43.

Pilots.—State pilotage is not compulsory for vessels passing through the sounds; it is only compulsory for foreign and registered vessels entering or clearing from the ports. Pilots for the sounds or Monomoy and Nantucket Shoals may sometimes be obtained at Boston by vessels coming from northward, or at New York coming from westward.

Towboats.—Vessels towing usually take a towboat from the port of their departure. A towboat may generally be found at New Bedford to assist vessels that may be aground or in trouble.

Anchorages.—Vessels working through the sounds against a head wind usually anchor during the night, or if becalmed and drifting toward the shoals it is best to anchor and wait for a favorable current or change of wind. There are no anchorages for vessels of over 10 feet (3 m.) draft that afford shelter from all winds, except Nantucket Harbor, Hyannis Harbor, the inner harbor of Edgartown, and Woods Hole. Vineyard Haven, the anchorage most used by coasters, is exposed to northeasterly winds. In northerly winds the best anchorages are off Dennisport, Hyannisport, along the north shore, and in Tarpaulin Cove. The anchorage off Falmouth is used in most winds by vessels with good ground tackle. In easterly winds vessels sometimes anchor in smooth water westward of Handkerchief Shoal or inside Great Point. Good shelter is then also found in Chatham Roads and Edgartown outer harbor. In southerly winds Edgartown Harbor and Vineyard Haven are the best anchorages; Menemsha Bight affords shelter and is sometimes used by vessels

in the western end of Vineyard Sound. In westerly winds Edgartown, Vineyard Haven, and Tarpaulin Cove are good anchorages. These harbors can be entered by a stranger assisted by the chart or following the directions under the different headings. Nantucket Harbor had a controlling depth of 15 feet (4.6 m.) in its entrance channel in 1939.

Caution.—Anchorage areas in this locality have been defined by the office of the U. S. Engineer, War Department. Obtain special rules and regulations from that office or from Superintendent of Documents, Washington, D. C. (See Light List of Publications in Chapter 1.) See large scale Coast & Geodetic Survey charts for limits of anchorage areas.

CURRENTS, NANTUCKET AND VINEYARD SOUNDS AND APPROACHES

From Race Point to Chatham Light the tidal currents are comparatively weak, being on the average not more than 0.5 to 1 knot at time of strength, setting approximately parallel to the coast. The time of current changes rapidly.

Off Nauset Beach Light the flood or northward stream attains its strength about 2 hours after low water at Boston and off Chatham Light it reaches its strength at about the time of low water at Boston.

Pollock Rip Channel.—At a point midway between lighted buoys Nos. 1 and 2 at the eastern end of the dredged cut in Pollock Rip Channel the flood current sets about 55° true and the ebb 225° true or at an angle of approximately 20° to the axis of the channel.

At **Stone Horse Shoal Lightship*** at the western end of Pollock Rip Channel predicted times of slack water and times velocities of strengths of flood and ebb for every day of the year are given in the **Current Tables,** Atlantic Coast, published annually in advance by the United States Coast & Geodetic Survey:

Referred to Boston tides the approximate times of slacks and strengths are as follows:

Slack before flood, 2 hours before low water.
Strength of flood, 1¼ hours after low water.
Slack before ebb, 1¾ hours before high water.
Strength of ebb, 1 hour after high water.

The average velocity at strength of flood is about 2 knots and at strength of ebb about 1¾ knots. The greatest observed velocity was 3.6 knots.

The flood current sets 35° true and the ebb 225° true.

South end of Great Round Shoal.—The tidal current is rotary, turning clockwise. The strength of the flood occurs about 2½ hours after low water at Boston and sets 65° true with a velocity of about 1½ knots. The strength of the ebb occurs about 2½ hours after high water at Boston and sets 245° true with a velocity of about 1½ knots. There is no true slack since the current is rotary.

Minimum velocities average about ½ knot and set 315° true about ½ hour before low water at Boston and 160° true about ½ hour before high water at Boston. The greatest observed velocity was 2½ knots, in a southwesterly direction, during a gale with wind velocities of 48 to 65 miles an hour.

*Lat. 40°37′, Long. 69°37′; Charts 1107, 70.

From the eastern entrance of Nantucket Sound to Hedge Fence Lighted Gong Buoy the time of current becomes gradually later; the average velocity at strength varies from about 1 to 2 knots, the flood setting eastward and the ebb westward.

From Hedge Fence westward, through Vineyard Sound to Gay Head, the time of current becomes somewhat earlier. The average velocity at time of strength increases from 1½ knots at Hedge Fence Lighted Gong Buoy to 3 knots off West Chop Light, and then gradually diminishes to 1½ knots off Gay Head Light. See "Current diagram Nantucket and Vineyard Sounds," in the Current Tables, Atlantic Coast.

Handkerchief Lightship.—The current is essentially reversing at this location. Referred to Boston tides the approximate times of slacks and strengths are as follows:

Slack before flood, 1 hour before low water.
Strength of flood, 2 hours after low water.
Slack before ebb, 1 hour before high water.
Strength of ebb, 2 hours after high water.

The flood sets 80° true and the ebb 250° true. The average velocity of 2¼ knots sets 101° true.

Cross Rip Lightship.—Referred to Boston tides the approximate times of slacks and strengths are as follows:

Slack before flood, at low water.
Strength of flood, 3 hours after low water.
Slack before ebb, at high water.
Strength of ebb, 3 hours after high water.

The flood sets 90° true and the ebb 270° true. The average velocity at flood strength is 1¼ knots and at ebb strength 1 knot. The greatest observed velocity was 2½ knots setting southeastward during a northwesterly wind with a velocity of 28 miles an hour.

Muskeget Channel.—The currents through Muskeget Channel are strong, having an average velocity at strength of about 3½ knots at a location east of Wasque Point. Referred to Boston tides the approximate times of slacks and strengths are as follows:

Slack before flood, ½ hour before low water.
Strength of flood, 2 hours after low water.
Slack before ebb, ½ hour before high water.
Strength of ebb, 2 hours after high water.

The flood sets 20° true and the ebb 200° true.

Hedge Fence lighted trumpet and gong buoy.—Referred to Boston tides the approximate times of slacks and strengths are as follows:

Slack before flood, ¾ hour after low water.
Strength of flood, 3¾ hours after low water.
Slack before ebb, ¾ hour after high water.
Strength of ebb, 3¾ hours after high water.

The flood sets 110° true and the ebb 270° true. The average velocity at strength of flood or ebb is about 1¼ knots. The greatest observed velocity was 2½ knots, setting southeastward during a northwesterly wind of 28 miles an hour.

Vineyard Sound Lightship.—The tidal current is rotary, turning clockwise. The velocity is small averaging about ½ knot at strength; the average minimum is about ¼ knot.

The strengths of flood and ebb occur at about the times of Boston low and high waters, respectively. The strength of flood sets about 335° true and the strength of ebb 160° true.

Since the tidal currents are small, winds greatly affect them, and the current will generally set with the wind. Observed velocities seldom exceed 1 knot.

WEATHER

Storm warning displays are made at Chatham, Nantucket, Nobska Point, Tarpaulin Cove, and Cuttyhunk.

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

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

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

For additional information regarding weather see page 30.

DIRECTIONS, NANTUCKET AND VINEYARD SOUNDS

Directions for approaching Vineyard Sound from southward and westward are given on page 41. See also Tables Nos. 2 and 6, Courses and Distances, pages 43 and 47.

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

In clear weather sailing vessels with a favorable current, and with some local knowledge, beat through the sounds against a head wind, and, when they find they are losing ground come to anchor on either side of the prohibited anchorage or under the lee of one of the shoals or in one of the harbors until the wind or current changes. The strongest currents will be encountered in Pollock Rip Channel, between Stone Horse Shoal and Hankerchief Lightships, off East and West Chop, and in Vineyard Sound; in some places the current sets directly on the shoals and in a calm sailing vessels are sometimes obliged to anchor to prevent going aground. Most of the shoals rise abruptly from deep water, and the soundings are very irregular in depth and cannot everywhere be depended on alone for warning of too close an approach to danger.

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

Vessels when in the vicinity of Pollock Rip entrance lighted whistle buoy, and desiring to anchor (wind and sea permitting), should first be sure of their position and then stand northwestward and anchor west of a line joining Bearse Shoal North End buoy No. 2A and Chatham Bar nun buoy No. 2. Or, run 1 mile to southward and anchor in 5 to 7 fathoms (9 to 13 m.) northeastward of Broken Part of Pollock Rip.

When in the vicinity of Stone Horse Shoal Lightship, and desiring to anchor, steer 136° true for 1.5 miles from the lightship and anchor in about 4½ fathoms (8 m.) and about 1.3 miles southward of the sailing line.

Vessels when between Butler Hole and Handkerchief Lightship,* or when in the vicinity of the latter can anchor anywhere southwestward of Stone Horse Shoal in 4¼ to 6½ fathoms (7.7 to 11.9 m.), taking care to keep Stone Horse Shoal lighted bell buoy No. 9 bearing westward of 35° true and to be 1 to 1.5 miles southeastward of the sailing line, so as to keep outside of the prohibited anchorage. Or they may anchor northwestward of Handkerchief Lightship and on the west side of Handkerchief Shoal.

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

See Tables Nos. 2 and 3, pages 43 and 45, for course and distances. The directions are good for a depth of 29 feet (8.8 m.) at low water through Pollock Rip Channel and through Great Round Shoal Channel. These channels are subject to change, and deep draft vessels should wait for a favorable tide.

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

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*Lat. 41°36′.1, Long. 69°51′.1 : Charts 250, 1208, 1209.

Directions along the north shore.—This passage has broken ground with depths of 16 and 17 feet (4.9 and 5.2 m.) in places. Strangers should not attempt it at night.

For directions along the north shore of Nantucket Sound, see tables Nos. 8 and 8A, pages 48 and 49.

MONOMOY POINT TO HYANNIS HARBOR

(CHART 1209)

Monomoy Point and unusued lighthouse are described on page 54. The bight formed by Monomoy Island and the north shore of Nantucket Sound, eastward of Hyannis, has extensive shoals, some of them unmarked, bordering the shores, and scattered throughout the bight. It is frequented only by local fishermen and vessels anchoring in Chatham Roads.

Chatham, a town on the northeastern side of the harbor, is a prominent summer resort. A prominent standpipe and radio mast are prominent landmarks. See page 53.

Chatham Roads is at the northeast end of Nantucket Sound, between the extensive shoals which extend northwestward from the northern end of Monomoy Island and the shoals extending 1.6 miles from the south shore of Cape Cod at Harwich Port, 3 miles westward of Stage Harbor Lighthouse. It is a good anchorage for vessels up to about 18-foot (5.5 m.) draft in 3½ to 5 fathoms (6.4 to 9.1 m.), with good holding ground, but is insecure for small craft in heavy southwesterly gales.

Stage Harbor and Chatham Lighthouses are the guides for entering Chatham Roads and to the entrance of the buoyed channel into Stage Harbor. The western edge of **Common Flat,** the shoal on the eastern side of the roads, is marked by a buoy.

Stage Harbor Lighthouse is a white skeleton tower on **Harding Beach,** on the northeast side of Chatham Roads. The light is 48 feet (14.6 m.) high, visible for 10 miles. The old tower remains standing near the present light.

Chatham Lighthouse and Chatham Bar are described on page 53.

Stage Harbor is a small, well-sheltered anchorage entered from Chatham Roads by a buoyed channel. The channel is crooked but should give no difficulty. Local fishermen will act as pilots if desired.

A draft of 5 feet (1.5 m.) can be carried to the head of the harbor through a drawbridge having an opening 14 feet wide. The harbor is closed by ice for short periods each winter.

The wharves have a depth of about 4½ feet (1.4 m.) alongside at mean low water.

Vessels approaching Chatham Roads from southward should pass westward of Handkerchief Shoal and the extensive Shoals along the eastern shore. From westward they can pass on either side of Bishop and Clerks and southward of **Kill Pond Bar.** When in the the entrance to Chatham Roads, a 64° true course with Stage Harbor and Chatham Lighthouse in range will lead to the perpendicularily striped buoy at the entrance to Stage Harbor; anchorage may be had northward of the buoy in about 4¾ fathoms (8.8 m.) soft bottom.

There is a marine railway for boats 80 feet long, 4½ feet (1.4 m.) draft forward and 6 feet (1.8 m.) aft; hull and gas engine repairs can be made. Gasoline, provisions, and a small quantity of boat supplies can be had.

Bucks Creek, lying 1.8 miles northwestward of Stage Harbor Lighthouse, is used only at high water by boats of local fishermen. Its entrance is 100 feet wide, between two jetties—then is tortuous and difficult. The depths are less than 2 feet (0.6 m.) at low water and there is a shoal outside the jetties.

The Exchange Building at **Harwich Center,** a square building with a cupola, shows up well from seaward.

Witchmere Harbor, 3.6 miles westward of Stage Harbor Lighthouse, has an entrance 100 feet wide between two jetties.

A light is maintained on the end of the west jetty during the summer months. In July 1939 there was a depth of 10 feet (3.0 m.) in the entrance channel in a width of about 60 feet and 7 feet (2.1 m.) in the inner basin and at the landings. The channel is subject to shoaling. A church spire a little west of the entrance is prominent. The outer anchorage basin, locally known as Harwich Port Harbor, has a depth of 11 feet (3.4 m.) with good holding ground. Permission to anchor in the inner basin must be obtained from the harbor master. Repairs can be obtained at a small boat yard which has two railways capable of handling small craft up to 45 feet in length, 7 feet (2.1 m.) draft and 20 tons.

The basins are used primarily by local yachtsmen and fishermen.

Storm warnings are exhibited from a mast located near the jetties.

Gasoline, ship chandlery supplies, ice, and provisions can be obtained at the village of **Harwich Port.**

Allens Harbor, 1 mile westward of Witchmere Harbor, has an entrance between two jetties.

In July 1939 there was 2 feet (0.6 m.) over the bar and 3 feet (0.9 m.) inside. Strangers should wait for high water or obtain local information before entering.

The channel is winding, leads between solid marsh on both sides and is not difficult to follow. It is sometimes marked by stakes. The harbor affords good anchorage for small craft.

There is a prominent elevated water tank just north of the harbor which is a good landmark.

Herring River, 6 miles westward of Stage Harbor Lighthouse, has an entrance between two short jetties and is frequented by yachtsmen and fishermen.

There is a small boatshop here where small craft are repaired and a limited amount of ship chandlery supplies can be obtained.

The channel between the jetties has shoaled considerably and the entrance is practically closed at low water. Fishermen enter the river on high water but strangers should not attempt it without local information. On the west side of the entrance there is a large hotel which is prominent. Supplies in limited quantities can be obtained from the village of **Dennis Port.**

A basin dredged southerly of the Lower County Bridge affords moorings for craft drawing up to 6 feet (1.8 m.)

Bass River has an entrance between two jetties. A channel 60 feet wide and 6 feet (1.8 m.) deep has been dredged to the entrance

and between the jetties to an anchorage basin of the same depth just inside.

The channel has shoaled considerably and in July 1939 there was a controlling depth on the entrance bar of 2 feet (0.6 m.) for a width of about 20 feet. After crossing the bar there are depths varying from 6 to 8 feet (1.8 to 2.4 m.) to the anchorage basin but the channel is subject to shoaling.

On the easterly end of **Dogfish Bar,** southeastward of Bass River entrance, there is a small breakwater which was formerly used as a shelter for small craft. The area around it and to the northward has shoaled up.

It is reported that there is rock in the channel with 3½ feet (1.0 m.) over it about 0.5 mile northward of the light on the end of the west jetty and off the southwest point of the small island. The town of **Yarmouth** maintains buoys for marking the channel from April 1 to October 1 but caution should be used as it is reported that these buoys are not always placed in accordance with the usual sequence of numbering, although the proper colors do appear on the correct side of the channel. There is a spoil bank on the inshore end of the east jetty. There is a small boatshop on the west side of the river with marine railways and facilities for repairing craft up to 40 feet in length and a draft of 6 feet (1.8 m.). Gasoline, water, ship chandlery supplies, and local charts (see Chart Sales agency, p. 2) can be obtained here. **South Yarmouth** and **West Dennis** villages in the town of Yarmouth and Dennis respectively, are on the river about 1¼ miles above the entrance. Supplies of all kinds are obtainable here in limited amounts.

Rocks awash at low water have been reported 0.3 mile northwestward from this breakwater.

Bishop and Clerks is an extensive shoal lying southward of Point Gammon and marked near the center by a lighthouse. There are several rocks awash at low water on an arm of the shoal extending nearly 0.9 mile southward from the lighthouse, marked at its end by a buoy. The remainder of the shoal has depths of 12 to 18 feet (3.7 to 5.5 m.).

A rock with about 4 feet (1.2 m.) over it has been located 1445 yards 147½° true from Bishop and Clerks Lighthouse. Surrounding depths are 13 to 16 feet (4.0 to 4.9 m.). Caution should be used when navigating in this area.

Bishop and Clerks Lighthouse* is a gray granite tower. The light is 56 feet (17.1 m.) high and visible for 12 miles.

Point Gammon, at the eastern entrance to Hyannis Harbor, is a prominent wooded point marked by an unused lighthouse tower. A reef, partly bare at low water, extends 0.5 mile southward from the point, and is marked at the end by a buoy. Extensive flats with rocks bare at low water, extend 1 mile northwestward from Point Gammon.

Hallets Rock, known locally as Middle Ground, has a depth of 12 feet (3.7 m.) over it and is about 1 mile south of Point Gammon. It is marked by a buoy.

*Lat. 41°34'.5, Long. 70°15'.0: Charts 247, 1209.

Great Rock, a bare rock marked by a spindle and cage, is on the western edge of the flats. A buoy lies 400 yards southwestward of Great Rock.

Hyannis Harbor (chart 247).—This harbor is used considerably as a harbor of refuge by coasting vessels of less than 14-foot (4.3 m.) draft, which anchor behind the breakwater, where an area nearly 0.4 mile in diameter has been dredged to a depth of 15½ feet (4.8 m.).

The controlling depths in the protected area behind the breakwaters are from 12 to 20 feet (3.7 to 6.1 m.).

The depth in the channel up to the breakwater is 15 to 16 feet (4.6 to 4.9 m.), but the approach is somewhat obstructed by the flats extending westward from Point Gammon and an extensive shoal with numerous rocks on the west side of the channel. Ice seldom interferes with the movements of vessels, the prevailing northerly winds keeping the harbor clear. Bishop and Clerks Lighthouse, the buoys and the light on the end of the breakwater, are the guides for entering. Pilots for the harbor are located at Vineyard Haven, or local fishermen will come out on signal.

Hyannisport is a village on the northerly side of Hyannis Harbor. The railroad wharf is out of repair and is no longer used. There is a dredged basin 6 feet (1.8 m.) deep leading to the south side of the yacht club landing on the west side of the harbor. Gasoline, fresh water, and some provisions can be obtained here.

A gray stone church with a square tower is a prominent landmark in **West Hyannisport.**

Lewis Bay, large and shallow, extends northeastward from Hyannis Harbor. A channel 9 feet (2.7 m.) deep has been dredged through the bar at the entrance and is marked by buoys. This channel is subject to shoaling. The channel leading from Lewis Bay to Hyannis has also been dredged to 9 feet (2.7 m.). The deepest draft taken to Hyannis is about 8 feet (2.4 m.) at high water. Lewis Bay is closed by ice for about two months each winter.

A bulkhead has been built at the town landing and affords berthing of small craft drawing up to 7 feet (2.1 m.).

There are three boat yards where all major repairs and ship chandlery supplies can be obtained. The largest railway is capable of handling boats up to 70 feet in length, 7 feet (2.1 m.) draft, and 50 tons.

Hyannis has railroad communication and is an important summer resort. Gasoline, ice, provisions, and some yacht supplies can be obtained here.

Directions, Hyannis Harbor—From eastward.—Pass about 0.8 mile northeastward of Bishop and Clerks Lighthouse and 200 yards southward of Hallets Rock buoy, then bring Bishop and Clerks Lighthouse astern on a 318° true course until the breakwater light bears 8° true mag. Then steer 11° true passing 60 or more yards eastward of the end of the breakwater, and anchor about 300 yards northeastward of the eastern end of the breakwater in 15 to 20 feet (4.6 to 6.1 m.), soft bottom. Small craft can anchor farther northward toward the railroad wharf in 6 to 12 feet (1.8 to 3.7 m.), but should stay clear of the wharf, as there are some old piling under water.

From westward.—Pass close southward of Wreck Shoal spar buoy No. 18 and steer 74° true for 2.3 miles, heading for Bishop and Clerks Lighthouse, and pass southward of Wreck Shoal buoy (at eastern end of shoal) and well northward of the buoys marking Eldridge Shoal and the northwest end of Horseshoe Shoal. Then steer 59° true for 4.5 miles to a position about 0.4 mile south-southeastward of a lighted bell buoy.

When the breakwater light bears 10° true, steer 11° true passing eastward of a black buoy, and proceed as in the preceding paragraph.

Vessels going to Lewis Bay or Hyannis must be guided by the buoys marking the dredged channel and by the color of the water, deepest where it is darkest.

HYANNIS HARBOR TO WOODS HOLE

(CHART 1209)

Centerville Harbor (chart 247) is a bight 2 miles wide in the north shore of Nantucket Sound, westward of Hyannis Harbor. The approach to the anchorage is obstructed by rocks and shoals, through which a buoyed channel, with a depth of 10 feet (3 m.) at low water, leads to the anchorage, which has a depth of 15 to 21 feet (4.6 to 6.4 m.) and good holding ground. Vessels seldom anchor here for shelter, as the harbor is exposed to southerly winds; the shoals off the entrance somewhat break the force of the seas from southward, but not sufficiently to make it a safe anchorage. The deepest draft entering is about 12 feet (3.7 m.). Ice closes the harbor in winter.

The shoals in and off the entrance of Centerville Harbor, which are bare at low water, are **Collier Ledge** and **Southwest Rock** (both marked by beacons), **Gannet Rocks** (unmarked), **Spindle Rock** (near the head of the harbor and marked by a red buoy), and numerous rocks southward of Hyannis Point. There are numerous unmarked rocks with 1 to 6 feet (0.3 to 1.8 m.) over them.

Other prominent dangers are: **Hodges Rock** with depths of 6 feet (1.8 m.) marked by a buoy; **Gallatin Rock** with depth of 4 feet (1.2 m.) marked by a buoy; **Bearse Rock** with a depth of 5 feet (1.5 m.) marked by a buoy; **Channel Rock** with depth of 4 feet (1.2 m.) marked by a buoy and **Gannet Ledge** with a depth of 6 feet (1.8 m.) marked by buoy.

Craigville Beach, a public bathing beach on the north side of harbor is extremely popular during the summer.

Centerville is a village inland from the head of the harbor; a church spire in the village is prominent and is used as a guide for entering the harbor.

East Bay, on the west side of Centerville Harbor, has depths of 2 to 4 feet (0.6 to 1.2 m.). Its entrance is 250 feet wide between jetties, through which a channel has been dredged 60 feet wide and 6 feet (1.8 m.) deep, but it is subject to shoaling. With local knowledge a draft of 3 feet (0.9 m.) could be carried to the landing on the southwest side of the bay in 1939. Two private buoys mark the entrance to the channel in summer. This bay is used principally by oyster boats, but local launches often pass through the bay into Centerville River. The river has been dredged to a depth of 5 feet

(1.5 m.) practically to the head of navigation. The width of the channel is 40 feet. Small boats anchor in the river off the village of Centerville, or tie up to private piers.

Strangers should not attempt to enter East Bay without local information.

Directions, Centerville Harbor.—A 330° true course, passing eastward of Gallatin Rock buoy, midway between Bearse and Channel Rock buoys, and westward of Gannet Ledge buoy, leads over a least found depth of 10 feet (3 m.). Anchor about 0.5 mile from shore in 15 to 21 feet (4.6 to 6.4 m.) soft bottom. Strangers should not enter except in the day time with clear weather.

Cotuit Anchorage is an anchorage for small craft between the shoals making off from the shore about 6.5 miles westward of Point Gammon. It is exposed to southerly winds and is seldom used except by local craft. The channel is marked by buoys, and vessels of less than 6 feet (1.8 m.) draft should experience no difficulty in keeping in the best water. Approaching from westward the channel between Succonesset Shoal and Wreck Shoal is frequently used.

West Bay, on the northerly side of Cotuit Anchorage, has an entrance 200 feet wide between jetties, and a depth of about 4 feet (1.2 m.) at low water can be taken through the entrance and the narrow channel leading to the northern half of the bay.

A light is privately maintained from May 15 to October 15 on the shoreward end of the east jetty.

The channel is usually marked by private buoys during the summer. There are numerous oyster stakes in the bay. A depth of about 4 feet (1.2 m.) can be taken through a narrow channel from West Bay to Great Bay. It is crossed by a drawbridge with an opening about 14 feet wide.

Anchorage may be made in northeast part of West Bay near the yacht club landing in depths of 7 feet (2.1 m.) or abreast the boat yard in depths of 6 feet (1.8 m.).

There are several oyster wharves in the vicinity of the bridge. **Ice** closes the bay for about two months each winter.

There is a prominent elevated water tank on (Osterville) **Grand Island.**

Cotuit Bay, northwestward of Cotuit Anchorage, is entered through a dredged channel 100 feet wide and 6 feet (1.8 m.) deep, and there is a greater depth in the bay except at its southern end. The channel is usually marked by bush stakes.

Strangers should not attempt to enter without local information.

A depth of about 6 feet (1.8 m.) can be taken through the narrows from Cotuit Bay to **Great Bay;** the latter has depths of 6 to 18 feet (1.8 to 5.5 m.). Local knowledge is necessary for the navigation of these bays. The bays are closed by ice about two months of each winter.

A channel 6 feet (1.8 m.) deep has been dredged in the **Seapuit River,** affording a connection between Cotuit and West Bays.

A prominent elevated water tank (the most westerly of three in this general vicinity) is located at **Cotuitport.**

A boat yard is situated on the east shore of the bay. There is no marine railway, but there are facilities for making major repairs. The yard is primarily engaged in boat building. Ship-chandlery supplies, gasoline, fresh water, and other supplies can be obtained.

Cotuit is a village on the western side of Great Bay, and **Osterville** is a village on the eastern side of Great Bay. Gasoline, fresh water, and provisions can be obtained at these villages. There is a depth of 4 feet (1.2 m.) at the wharves at Osterville. There are facilities for repairing small boats at Osterville and Cotuit. The nearest marine railways are located at Falmouth and Hyannis.

There is a prominent elevated water tank at Osterville and it is the most easterly of the three water tanks in the general vicinity.

Poponesset Bay is used only by local oyster boats. The entrance is narrow and unmarked, dredged to 60 feet wide and 6 feet (1.8 m.) deep, and extends southwestward from the inner end of the entrance channel of Cotuit Bay. The entrance channel is subject to shoaling, and in 1939 was good for the draft of only 3 feet (0.9 m.). The greater part of the pond has depths of 2 to 4 feet (0.6 to 1.2 m.).

Waquoit Bay has general depths of 2 to 8 feet (0.6 to 2.4 m.) and an entrance about 250 feet wide. There is a stone jetty on each side of the entrance. A channel has been dredged into the bay but it has shoaled and filled in considerably. In July 1939 there was reported to be 4 feet (1.2 m.) on the entrance bar at low water and 7 feet (2.1 m.) in the channel from the entrance to the anchorage.

There is a small marine railway near the north end of the bay capable of hauling out small boats up to 38 feet in length and 5 feet (1.5 m.) draft. Gasoline and ship-chandlery supplies can be obtained in limited amounts.

Menauhant is a summer colony 1 mile westward of the entrance to Waquoit Bay.

Between Waquoit Bay and Falmouth Inner Harbor are several ponds whose outlets are closed and not used. There are several jetties along the beach to protect the shore.

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

Falmouth Inner Harbor, westward of Falmouth Heights, is entered by a dredged channel 100 feet wide and 8 feet (2.4 m.) deep between jetties; the outer end of the west jetty is marked by a flashing light. An anchorage basin 1,300 feet long, 100 to 350 feet wide, and 8 feet (2.4 m.) deep has been dredged inside the entrance. The greater part of the pond has depths of about 8 feet (2.4 m.). There are several small marine railways. The largest can handle a boat 70 feet long, draft 8 feet, and up to 40 tons. Gas engine and hull repairs can be made. The depths at the wharves are from 7 to 10 feet (2.1 to 3.0 m.). Gasoline and provisions can be obtained.

There is a tall standpipe about 1½ miles west of Falmouth which is one of the prominent landmarks in this general vicinity.

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

The **anchorage** in Falmouth Harbor is about 0.8 mile from shore in 4 to 6 fathoms (7 to 11 m.), and small vessels can anchor closer to shor in 15 to 18 feet (4.6 to 5.5 m.); the bottom is generally sticky and good holding ground, shoaling gradually toward the shore. At night, if less than 2 miles eastward of Nobska Point, with West Chop Light bearing eastward of 167° true, vessels should anchor just before Nobska Point Light comes in range with Tarpaulin Cove Light; if farther eastward, vessels should keep well southward of this range. Vessels can enter from southward on a 344° true course, with West Chop Light astern, and pass about 0.2 mile westward of black buoy No. 19. Or, pass 0.4 to 0.5 mile eastward of Nobska Point Light on a north-northeasterly course, and when Tarpaulin Cove Light is nearly in range with Nobska Point Light, stand eastward to an anchorage.

WOODS HOLE*

(CHART 348)

Woods Hole is a narrow passage leading between numerous ledges and shoals from Vineyard Sound to Buzzards Bay, between the mainland and **Nonamesset Island.** It is well marked by buoys and beacons, but the tidal currents are so strong that the passage is dangerous without some local knowledge. The buoys in the narrowest part of the channel are frequently towed under by the currents. A stranger should not attempt to pass through except near slack water. Woods Hole is little used as an anchorage on account of the strong tidal currents and the narrow channel. Great and Little Harbors are on the northern side.

The northerly channel in Woods Hole from Great Harbor to Buzzards Bay has a narrow but straight reach and was dredged 300 feet wide and 13 feet (4 m.) deep, but there are numerous spots with 10 to 12 feet (3 to 3.7 m.) over them. Another channel, Broadway, was dredged 300 feet wide and 11 feet (3.4 m.) deep, but it necessitates a sharp turn; the straight reach should be given the preference on account of the difficulty in making the turn in the strong currents. The deepest draft using the passage are local steamers of 11 feet (3.4 m.) draft.

Nobska Point, on the eastern side of the approach to Woods Hole, is a low bluff marked by a lighthouse. Ledges, partly bare at low water, extend 150 yards southwestward from the point.

Nobska Point Lighthouse is a white tower with a covered way to a dwelling on a bluff at the end of Nobska Point. The light has a red sector from 263° to 289° (from seaward) covering Hedge Fence and L'Hommedieu Shoals, is 87 feet (26.5 m.) high and visible for 15 miles. The fog signal is a reed horn.

A radio beacon operates during fog and low visibility.

Storm warnings are displayed near the lighthouse.

Little Harbor is the easternmost of the two coves in the north shore of the passage. A channel 150 feet wide and 17 feet (5.1 m.) deep has been dredged to the wharf of the lighthouse depot, which is on the western side of the cove, and a turning basin 400 feet wide and 12 to 17 feet (3.7 to 5.2 m.) deep in front of the wharf. Small craft can anchor off or above the wharf, favoring the western side, in

*Lat. 41°31′, Long. 70°40′; charts 348, 249, 1210.

7 to 15 feet (2.1 to 4.6 m.) The dredged channel is marked by buoys, the course into the harbor through it is 351° true. There is a small private wharf north of the lighthouse depot with about 7 feet (2.1 m.) at its end.

Great Ledge is an extensive rocky shoal, awash at extreme low water, between the entrances to Little and Great Harbors. A buoy marks its southwest side.

Nonamesset Shoal has depths of 10 to 13 feet (3 to 4 m.) near its edge, and extends 400 to 500 yards eastward from the island on the western side of the entrance to Great Harbor. The shoal is marked at its southeasterly end by a gong buoy with reflector, and on its easterly side by a buoy.

Great Harbor has an anchorage at the head about 0.2 mile long and nearly 0.2 mile wide; its depth is irregular, ranging from 3½ to 12 fathoms (6 to 22 m.) in the channel, and the holding ground is mostly poor.

Shoals with 5 to 9 feet (1.5 to 2.7 m.) over them extend 400 yards from the northwesterly end of the harbor. There is good anchorage 200 yards northwestward of the Bureau of Fisheries wharf, in 5 to 8 fathoms (9 to 15 m.). A rock with 5 feet (1.5 m.) over it and marked by a buoy lies close to the southern end of this wharf.

Red Ledge (awash at low water) and **Grassy Island** lie on the western side of Great Harbor opposite Parker Flats. The straight channel through Woods Hole leads between these dangers, and is marked by two buoys and on its northerly side by **Grassy Island Ledge Light.** Caution is recommended, as one of these buoys is often towed under. The northeasterly end of the ledges surrounding Grassy Island is marked by a buoy. The channel to the anchorage in Great Harbor leads between this buoy and the end of the Bureau of Fisheries wharf.

Middle Ledge, on the south side of the channel in Woods Hole, is partly bare at low water, and is marked at its easterly end by a black can buoy and at its westerly end by Middle Ledge Light.

Rocks, with little water over them in places, extend about 250 yards off the westerly side of **Long Neck** (known locally as **Penzance Point),** and are marked at the southwest end of a red buoy with reflector, which lies 625 yards northwestward of Middle Ledge Light, **Hadley Rock,** lying about 500 yards west-southwestward of Middle Ledge Light, has a least depth of 5 feet (1.5 m.) over it and is marked by a horizontally banded buoy.

Great Harbor range lights are on white skeleton towers. The front range light is near the shoreward end of the northwest side of the Bureau of Fisheries wharf. The rear range light is on the shore of Great Harbor 260 yards 344½° true from the front light. The range leads into Great Harbor from Vineyard Sound in a depth of over 18 feet (5.5 m.). The course on the range is 344½° true, and should be held until past Parker Flats buoy. Then steer north-northwestward and pass eastward of the buoy lying northeastward of Grassy Island, and pass about 75 yards westward of the Bureau of Fisheries wharf. When entering on the range, attention should be paid to the currents through Woods Hole; the current from Buzzards Bay has a tendency to set vessels eastward. See also the directions for Woods Hole, page 74.

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Pine Island, about 300 yards westward of **Mink Point,** was washed away during the 1938 hurricane. There are boulders remaining which are awash at high water.

Woods Hole, a village situated at the southwest tip of Cape Cod, is a busy commercial center. It is a trans-shipping point for passengers and freight in the general traffic to and from Nantucket and Martha's Vineyard by steamer. There is railroad and bus communication. During the summer it is an active resort and is usually a port of call by yachts passing through Vineyard Sound to and from Buzzards Bay.

On the eastern side of the harbor is the wharf and depot of the New York, New Haven & Hartford Railroad, where the New England Steamship Co. steamers land. Above this are the buildings and wharf of the Woods Hole Institute of Oceanography, the wharves of the Marine Biological Laboratory, and then the wharf, basin, and buildings of the United States Bureau of Fisheries. These buildings are prominent when entering from the southward. About 0.4 mile to the northeastward of the railroad wharf, on the top of a hill, is a very prominent standpipe.

A channel dredged to a depth of 8 feet (2.4 m.), crossed by a drawbridge 31 feet wide, leads from Great Harbor to **Eel Pond.**

Tides.—The mean rise and fall of tides in the passage is about 1½ feet at the south end and 3½ feet at the north end. Strong northwesterly winds may lower the water in the passage as much as 2 feet.

Currents.—In the passage through Woods Hole the current turns eastward about 1½ hours before the time of Boston low water, and westward about ½ hour before the time of Boston high water. In the narrowest part of the passage the velocity at strength is about 4 knots during spring tides and 3 knots during neap tides. Both the velocity of the current and time of slack water are affected by strong winds. At the north entrance to Woods Hole the velocity of the current at strength is about 1 knot while at the south entrance it is about 1½ knots.

In the upper part of Great Harbor, near the Bureau of Fisheries wharf, the currents are barely perceptible and vessels at anchor lie head to the wind.

More detailed information relative to the currents in Woods Hole and the other passages between Buzzards Bay and Vineyard Sound may be obtained from the Current Tables, Atlantic Coast, and from **hourly current charts of Buzzards Bay,** which are included in Coast and Geodetic Survey Special Publication No. 208, which is described briefly on page 120 of this volume.

Ice.—The strong tidal currents usually keep Great Harbor open. Drift ice is brought through from Buzzards Bay, but seldom interferes with navigation, except in unusually severe winters, when it may close the entrance from that bay.

Supplies of all kinds are obtainable at the village of Woods Hole.

A marine railway with a capacity of 30 tons, capable of handling craft up to lengths of 50 feet and drafts of 6 feet (1.8 m.), is situated on the Eel Pond. Light repairs to machinery can be made.

Directions, Woods Hole.—The following directions are good for vessels of not too great draft with slack water in Woods Hole (see p. 73 for Great Harbor):

Approaching from eastward, pass about 0.3 mile southward of Nobska Point and Coffin Rock buoy on a west-southwesterly course;

or, from Nobska Point gas and bell buoys, steer **279°** true until on the Great Harbor range. From westward give the south side of the Elizabeth Islands a berth of about 0.5 mile, and steer for Nobska Point Lighthouse on any bearing **northward of 51°** true until about 0.8 mile from it and on the Great Harbor range.

Steer **344½°** true on the Great Harbor range, and pass about 200 yards eastward of Nonamesset Shoal bell buoy with reflector, about 50 yards westward of the buoy marking Great Ledge, and about 50 yards eastward of the buoy off the eastern side of Nonamesset Shoal.

When nearly up with Parker Flats buoy, a red buoy and a black buoy will be seen close westward, the red buoy lying just southward of Grassy Island Ledge Light.

Caution is recommended as the buoys are sometimes towed under by the strong currents.

Turn sharply westward, pass midway between these buoys on a **257°** true course, and pass about 200 feet northward of a black can buoy and about 50 yards north of Middle Ledge Light.

When past Middle Ledge Light, bring it astern on a **284°** true course, heading for the north end of Uncatena Island, until the buoy with reflector off Long Neck is about 100 yards distant and in range with the western side of Long Neck bearing 14° true. Then steer **330°** true, which will lead into Buzzards Bay about 100 yards eastward of the lighted bell buoy off Timmy Point Shoal.

Vessels of light draft can pass 300 yards southwestward of Nobska Point and steer **290°** true so as to pass about 200 yards southward of Juniper Point, leaving Coffin Rock buoy well to the southward and the red buoy off Juniper Point about 100 yards to the eastward. Then steer **333°** true for the end of the Bureau of Fisheries wharf until nearly up to Parker Flats buoy, and if going through into Buzzards Bay, follow the directions in the preceding paragraph.

Hadley Harbor is at the northwest end of Nonamesset Island, between it and **Uncatena** and **Bulls Neck Islands.** The **inner harbor** owing to its size and narrow, crooked channel, is suitable only for small craft, for which it forms a well sheltered anchorage. There are two marked entrances from the northeastward both marked by private buoys. The deepest entrance is 60 yards off the south shore and leads between ledges on both sides, the southern ledge marked by a private stone beacon and the northern by piled-up rocks. There are private buoys marking the channel between these. The other channel to the northwestward is 210 yards off the southern shore and is also marked by private buoys. There are two wharves on the western side of the harbor, having a depth of about 9 feet (2.7 m.) at the ends.

At the west end of Nonamesset Island, south of **Bulls Neck Island,** is a private beacon composed of an iron pipe cemented in the rock with a white barrel on top of it. There are red reflectors in the barrel. About 100 feet east of the beacon is a private wharf with about 7 feet (2.1 m.) at the end, and there is a private light on it. About 100 yards west of this wharf, across the channel on another island, is a small pier with about 5 feet (1.5 m.) at the end.

WOODS HOLE TO CUTTYHUNK

(CHART 249)

Elizabeth Islands, extending 14 miles west-southwestward from the mainland at Woods Hole, separate Vineyard Sound from Buzzards Bay. They are hilly, partly wooded, and the shores are, in general, low bluffs. Several buoyed channels lead between the islands, but Quicks Hole is the only one fit for a stranger.

Tarpaulin Cove is a bight about 0.5 mile in diameter in the south shore of Naushon Island, about 5 miles west-southwestward of Nobska Point Lighthouse; it affords shelter from northerly and westerly winds and is frequently used. The western point at the entrance is marked by Tarpaulin Cove Lighthouse, and two buoys are placed to guide clear of rocks near the western shore of the cove Good anchorage in 14 to 18 feet (4.3 to 5.5 m.), good holding ground, will be found in the cove, with Tarpaulin Cove Lighthouse bearing between 212° true and 189° true; deep-draft vessels should anchor farther out in 6 fathoms (11 m.) or more. The shore of the cove should be given a berth of 200 yards, and the western end over 300 yards.

Storm-warning displays are made at the cove.

Tarpaulin Cove Lighthouse is a white tower on the southwest side of Tarpaulin Cove. The light is 78 feet (23.8 m.) high and visible 15 miles. The fog signal is a bell.

Robinsons Hole (chart 345) is a narrow passage from Vineyard Sound to Buzzards Bay, leading between Naushon Island and **Pasque Island;** the southern entrance lies 2.5 miles southwestward of Tarpaulin Cove. This passage is buoyed, but is narrow, has a number of rocks and ledges, and has strong tidal currents.

It has been reported that currents sometimes reach a velocity of 5 knots in the passage.

The buoys often tow under with the currents and the passage should never be attempted by a stranger; local fishermen sometimes pass through it.

Quicks Hole* (chart 345) leading between Pasque Island on the east and **Nashawena Island** on the west, is the only passage from Vineyard Sound into Buzzards Bay eastward of Cuttyhunk available for vessels of over 10-foot (3.0 m.) draft. It is much used by tows, especially with westerly or southerly winds, to avoid the very heavy sea in the entrance of Vineyard Sound, and also because a secure anchorage from these winds can be had if necessary on the north side of Nashawena Island. The passage is considered unsafe for a long tow at night, but otherwise it may be used by steamers either night or day.

Quicks Hole lies about 4 miles westward of Tarpaulin Cove and is about 0.6 mile wide, with a clearly defined entrance which bears about 355° true from Gay Head Lighthouse. The channel is nearly straight, has a width of 700 yards, and is marked by buoys. The general depth is over 5 fathoms (9 m.), but there are several spots with 16 to 18 feet (4.9 to 5.5 m.) over them and a number with depths of 21 to 27 feet (6.4 to 8.2 m.). The eastern side is foul from Pasque Island out to the lighted buoy and no attempt should be made

*Lat. 41°27′, Long. 70°51′; Charts 345, 249, 1210.

to pass eastward of the buoy. The passage has been examined by means of a wire drag and the dangers charted, but on account of the broken nature of the bottom the passage is not recommended for a greater draft than 21 feet (6.4 m.) in the absence of local knowledge.

Caution is recommended to avoid **Lone Rock,** which has a depth of 6 feet (1.8 m.) and marked by a buoy. It is situated off the north entrance about ¾ mile northward of the northeast end of Nashawena Island.

The tidal currents have considerable velocity, about 2 to 2½ knots at strength and a sailing vessel should not attempt to pass through unless with a strong favorable wind or a favorable current. Deep-draft vessels should be careful not to be set off their courses. When the current is setting westward through Vineyard Sound it is setting northward through Quicks Hole, and vice versa. The strength of the southward current occurs about 3 hours after low water at Boston and the strength of the northward current about 1½ hours after high water at Boston. Strong winds affect the regularity of the currents.

It is reported the buoys sometimes tow under because of the strong currents.

Directions, Quicks Hole.—Enter Quicks Hole about midway between Pasque and Nashawena Islands, or pass 0.3 mile eastward of the black buoys on the southwest side of the entrance and steer **330°** true with Quicks Hole Ledge lighted buoy a very little on the starboard bow; at night Dumpling Rock Lighthouse should be ahead on this course, showing just westward of the lighted buoy. Continue the course to a position about 200 yards westward of the lighted buoy. Then steer **355°** true with Gay Head Lighthouse astern, which will lead into Buzzards Bay 0.2 mile eastward of Lone Rock buoy. The course can then be shaped up or down Buzzards Bay as desired.

Cuttyhunk Lighthouse is a white conical tower with a covered way to a dwelling, on a bluff at the west end of Cuttyhunk Island. The light is 61 feet (18.6 m.) high and visible for 13 miles.

Sow and Pigs Reef, Cuttyhunk Harbor, and Canapitsit Channel are described with Buzzards Bay. (See p. 89.)

NANTUCKET ISLAND

Nantucket Island on the south side of Nantucket Sound, is about 13 miles long, hilly, highest (about 100 feet (30 m.)) in the eastern part, and partly wooded, with steep sand bluffs on the eastern and southern sides. The northern shore is fringed with shoals to a distance of about 1 mile. There is a prominent standpipe about 1.5 miles westward of Nantucket.

Great Point is the northern extremity of a long sand beach, separated from the main part of the island by Nantucket Harbor and is marked by Nantucket (Great Point) Lighthouse.

Nantucket (Great Point) Lighthouse* is a white tower. The light has a red sector between 84° true and 106° true from seaward. It is 70 feet (21.3 m.) above the water, and visible 14 miles.

Point Rip is a shoal that extends 3.8 miles east-northeastward from Great Point, and has little water over it for a distance of 2 miles

*Lat. 41°23′.5, Long. 70°02′.8; Charts 250, 1209.

from the point. Farther eastward the shoal has depths of 12 to 18 feet (3.7 to 5.5 m.) over it, and is marked on its northerly and easterly side by buoys. A shoal with 19 to 22 feet (5.8 to 6.7 m.) over it extends northward from these buoys, and is marked at its northerly end by Point Rip lighted bell buoy, which lies 3.8 miles 49° true from Nantucket Lighthouse.

Squam Head is a summer resort on the east side of Nantucket Island. There are many large houses which are conspicuous from seaward.

Sankaty Head Lighthouse, the most prominent mark on the easterly side of Nantucket Island, is a white tower with a red band in the middle, on top of a bluff about 90 feet (27 m.) high. The light is 166 feet (51 m.) above the water, and visible 19 miles.

Siasconset is a summer resort on the southeast end of the island, 1.3 miles southward of Sankaty Head Lighthouse; it has bus communication with Nantucket.

The south shore of Nantucket Island has no harbors and is frequented only by local fishermen. The only marks are the Coast Guard stations, radio direction finder station at Surfside, and a few scattered houses.

Surfside (Nantucket) radio direction-finder station is located on the south side of the island. For details see publication H. O. No. 205.

The station also stands watch on the international distress call frequency (500 kc.).

Maddaket Harbor and the thoroughfare between the western end of Nantucket Island and Tuckernuck Island is full of shifting, unmarked shoals, and seldom used, even by local boats.

The Coast Guard Station is about 0.3 mile south of the harbor.

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

Brant Point Lighthouse is a white cylindrical tower on the end of Brant Point. The light is 26 feet (7.9 m.) high and visible for 10 miles. A fog bell is operated during foggy weather.

NANTUCKET HARBOR

(CHART 343)

Nantucket Harbor is near the middle of the northern shore of Nantucket Island. Shoals extend about 1 mile from shore on both sides of the entrance, which is between two jetties extending northward and partially submerged at high water. **Nantucket East Breakwater Light** is on a pile of rocks at the outer end of the jetty. An electric diaphragm horn at the light operates during foggy weather.

Extending northeastward from Nantucket Harbor proper is a shallow lagoon about 5 miles long. A draft of 2 feet (0.6 m.) at low water can be taken to **Wauwinet,** a summer resort at the head of the harbor. A draft of 1½ feet (0.5 m.) can be taken to the wharf at low water, the depth at which is 3 feet (0.9 m.). The shoals extending off Third Point and Five Fingered Point and the crossover at the bar off Bass Point are marked by private buoys and bush stakes. A ferry runs to Nantucket in the summer.

Nantucket is a town on the western shore of the harbor. The principal industry is fishing, and occasionally a cargo of coal is brought in barges. The depths at the wharves are 8 to 12 feet (2.4 to 3.7 m.). The first large wharf is the steamboat wharf. Submerged piers extend off the next two wharves, the ends of which are marked by dolphins, with white painted barrels atop of them. Between these there are several small dolphins. A submerged pier also extends off the fifth (southernmost) wharf. Vessels proceeding to any of the wharves should exercise caution to avoid these submerged piers. There is a wharf with about 9 feet (2.7 m.) at the float stage and several float landings for small boats at the Nantucket Yacht Club, located just north of the steamboat wharf. This area is reported to be shoaling.

There is a relief station of the United States Public Health Service here.

On the point westward of the lighthouse is an unusual tower attached to a dwelling. Close to eastward of the unused tower is the **Nantucket Harbor Range,** consisting of two lights on white skeleton towers. This range is somewhat difficult to pick up in daytime. The bearing of the range is 162° true.

A channel 15 feet (4.6 m.) deep, marked by the lighted range, has been dredged between the jetties. Shoaling is liable to occur on the bar which forms just outside the jetties.

A gilded cupola on top of the clock tower and a large white church are prominent objects in the town.

Pilots can be had by making signal off the entrance. Fishing vessels act as towboats in case of necessity.

Anchorage.—May be selected in 6 to 17 feet (1.8 m. to 5.2 m.) on the south and southwest side of Brant Point and in depths of 12 to 17 feet (3.7 m. to 5.2 m.) off the docks about 500 yards south of Brant Point lighthouse. The bottom is sticky in general but it has been reported that there are spots of hard bottom in the area southwest of the point. Caution should be exercised not to anchor in the fairway and maneuvering area to the steamboat wharf (the largest on the waterfront). Although shelter is afforded to vessels it is advisable for small craft to use heavy ground tackle as the harbor becomes choppy with easterly winds.

Tides.—The mean rise and fall of the tide is about 3.0 feet. High and low water occurring about ¾ hour after the corresponding high and low water at Boston. (See Tide Tables, Atlantic Coast.)

Weather.—Fogs are frequent during the summer months and are apt to shut in almost without warning. For additional detailed information see page 30.

Storm warnings are displayed at Nantucket from the weather bureau vane on Orange Street.

Ice.—Except in severe winters, the harbor is seldom closed by local formations of ice, but is frequently closed by drift ice from the sound, which packs and remains across the entrance during northerly winds.

Directions, Nantucket Harbor.—The following directions are good for a draft of 14 feet (4.3 m.) with smooth water on the bar:

From off Handkerchief Lightship steer about 189° true for a little over 10 miles to the bell buoy at the entrance. Or from a point 0.5 mi. northeast of Cross Rip Lightship steer 120° true for 5.8 miles to a position 0.3 mile northeastward of the lighted bell buoy at the

eastern end of Tuckernuck Shoal, and then steer **149°** true for 6.3 miles to the bell buoy at the entrance. When close to the bell buoy steer **162°** true on the Nantucket Harbor range and follow the buoys until almost abeam the last red buoy and about 300 yards from the beach; then steer **133°** true and round Brant Point at a distance of 75 yards. Then stand southwestward into the harbor and anchor with Brant Point Lighthouse bearing 9° true, or in line with the northern side of the steamboat wharf and with the old tower on Brant Point in range with the rear light of the Nantucket Harbor range.

Supplies.—Coal, gasoline, provisions, and ship chandlery can be obtained here. Water is piped to the principal wharves.

Repairs.—There is a marine railway for boats 56 feet long, 4½-foot (1.4 m.) draft, with a capacity of 15 tons. Hull and gas engine repairs can be made.

Communication.—There is communication with the mainland by cable and by steamer. Air travel is available (by charter of private planes) at Nobadeer Airport. Bus and taxicab transportation is maintained.

MARTHA'S VINEYARD ISLAND

(CHART 346 OR 347)

Martha's Vineyard and Chappaquiddick Islands have a combined length of 18 miles, the islands being separated by Edgartown Harbor, Katama Bay, and the narrow slue connecting them. Marthas Vineyard is well settled, especially along its northern shore, and has cable communication with the mainland. The principal towns are Edgartown, Vineyard Haven, and Oak Bluffs, the last being an important summer resort.

Muskeget Channel is an opening nearly 6 miles wide between Muskeget Island and Chappaquiddick Island. It is full of shifting shoals, the best water being close eastward of Wasque Shoal, and a little eastward of the eastern shore of Chappaquiddick Island. This channel is partly buoyed, but should never be attempted by strangers, as the currents have great velocity (3 to 5 knots) and make the navigation of it dangerous.

See page 62 for currents in Muskeget Channel.

Wasque Shoal lies southward of **Wasque Point** (the southeastern point of Chappaquiddick Island) and rises abruptly on its southern and eastern sides from depths of 3 and 8 fathoms (5.5 to 15 m.) to 2 and 4 feet (0.6 to 1.2 m.); on its eastern edge is a small sand island called **Skiffs Island,** which is awash at low water.

Cape Poge Lighthouse* is a white conical tower on the northeast point of Chappaquiddick Island. The light is 55 feet (16.8 m.) high and visible for 13 miles.

Cape Poge Flats extend 1.5 miles northeastward from Cape Poge and are marked near their end by a buoy.

The southerly edge of the white sector in West Chop Light leads 1 mile northward of the buoy.

*Lat. 41°25′.2, Long. 70°27′.1; Charts 346, 1209.

A shoal, with 18 feet (5.5 m.) at its end, extends 0.4 mile northwestward of Cape Poge, and its edge is marked by a buoy which lies 1 mile west-northwestward of Cape Poge Lighthouse.

Cape Poge Bay, a shallow lagoon in the northern part of Chappaquiddick Island, is entered only by local fishermen in small craft of about 3 feet (0.9 m.) draft.

EDGARTOWN HARBOR

(CHART 346)

Edgartown Harbor is on the eastern side of Martha's Vineyard, just westward of Cape Poge. It is divided into the outer and inner harbors, the former being principally used as a harbor of refuge in southerly and easterly winds and as an anchorage for the night.

Sturgeon Flats, with 3 to 15 feet (0.9 to 4.6 m.) over them, make off about 600 yards from the southeastern shore of the outer harbor southward of the narrow entrance to Cape Poge Bay. The edge of the flats is marked by a black buoy, from which the edge of the flats extends in a general southwesterly direction to the head of the outer harbor. Edgartown Lighthouse, bearing anything southward of 245° true clears the flats.

Outer harbor.—On the western side of the harbor is a shoal which extends 2.8 miles in a north-northeasterly direction from Edgartown Lighthouse. The northern extremity of this shoal is a spot with 11 feet (3.4 m.) over it, lying 2 miles 296° true from Cape Poge Lighthouse, marked by a bell buoy. Vessels entering or leaving the harbor pass eastward of this buoy. The depth on this shoal is very irregular, and there are a number of rocks with from 3 to 5 feet (0.9 to 1.5 m.) over them. The eastern edge of the shoal is marked by buoys.

Strangers should never attempt to pass across the shoal.

Edgartown, on the western shore of the inner harbor, has a little commerce; the chief industry is fishing.

It is becoming increasingly popular as a resort with a large amount of yachting activities during the summer months.

Pilots are stationed at Vineyard Haven and can sometimes be obtained by making signal in the outer harbor; local fishermen are usually available also.

Towboats are seldom used, but can be obtained from New Bedford by telephone.

Edgartown Lighthouse is a white dwelling at the end of a bridge 0.2 mile long, connecting with the shore. The light is white, 45 feet (13.7 m.) high and visible for 12 miles. The fog signal is a bell.

The channel through the outer harbor is free from dangers and has a depth of 4 to 6½ fathoms (7.3 to 11.9 m.) until nearly up to Edgartown Lighthouse; here it narrows and takes a sharp bend westward, with a depth of 16 feet (4.9 m.) leading to the wharves of the town. Abreast the town the channel is narrow and has a depth of 4 to 6 fathoms (7.3 to 11.0 m.); it then curves southward, its eastern edge marked by a black buoy, and a horizontally banded buoy at the southern end of Middle Ground Shoal. About 0.5 mile above the upper wharf in the town the channel widens and has a depth of 3½ to 5 fathoms (6 to 9 m.). This depth continues for nearly 1 mile to Katama Bay, where it shoals.

An examination in November 1939, after dredging, shows that the Middle Ground Shoal and point of shoal just northward for 100 yards east of the black can buoy, have been dredged to a general depth of 12 feet (3.7 m.) or over at mean low water.

Inner Harbor.—At the head of the outer harbor a narrow arm makes southward into Katama Bay, forming what is known as the inner harbor. This affords good anchorage in 3 to 5½ fathoms (5.5 to 10 m.), but it is narrow and the tidal currents have considerable velocity. The bar south of Edgartown Lighthouse, at the entrance to the inner harbor, has only 16 feet (4.9 m.) over it. Strangers in sailing vessels seldom enter the inner harbor, as a fair wind is necessary to keep in the channel.

Katama Bay is a large, shallow body of water used by local fishermen and small pleasure craft. The southern half of the bay is full of shoals. The head of the bay is subject to frequent changes, and a channel is sometimes cut through the beach into the ocean. A sand bar extends across from **Norton Point** to **Wasque Point.**

Anchorages.—In easterly gales good shelter is found westward of Cape Poge, on the eastern side of the outer harbor. In westerly and southerly gales vessels find shelter in the southern end of the outer harbor, about 0.4 mile eastward or east-southeastward from Edgartown Lighthouse. Vessels should not anchor in the channel abreast the town, where the bottom is hard sand, the channel narrow, and tidal current strong. Above the town anchorage is found in the channel, south of Middle Ground Shoal, in 4 to 5 fathoms (7.3 to 9.1 m.), sticky bottom.

In northerly or northeasterly gales vessels usually go to Woods Hole or Tarpaulin Cove for sheltered anchorage.

The **harbor master** has control of the anchoring of vessels in the harbor and he will usually be found at the yacht club wharf.

Harbor regulations have been established and are enforced by him. Copies of these regulations may be obtained from the harbor master or harbor patrolman.

Tides.—The mean rise and fall of the tides is 2 feet, and occurs about ¾ hour after the corresponding tide at Boston.

Currents.—The tidal current in the narrow part of the channel inside Edgartown Lighthouse and off the town has a double flood and a double ebb, and in general follows the direction of the channel. Near the middle of each flood or ebb period there is an approximate slack preceded and followed by maximum of velocity. The slack at the beginning of the double flood occurs about ¼ hour after low water at Boston and the slack at the beginning of the double ebb, ¾ hour after high water at Boston. The average velocity at strength of flood or ebb is about 1 knot. It has been reported, however, that stronger currents (about 3 knots) are now felt since the dredging has been completed in the shoal area southward of the town.

Weather.—Conditions for this general area have been described on page 63. Fogs are prevalent during the summer months and at times appear without warning.

Ice.—Drift ice from the sound, driven into the entrance by the wind, obstructs the entrance of sailing vessels during a part of the winter. The tidal currents keep the inner harbor open except for a few days at a time during severe winters.

Directions, Edgartown Harbor.—The following directions are good for vessels of 18-foot (5.5 m.) draft to the anchorage eastward of Edgartown Lighthouse and for vessels of 15-foot (4.6 m.) draft to the town wharves:

From eastward.—Passing 100 to 500 yards northward of Cross Rip Lightship steer **267°** true for the high stand-pipe (water tower) on Martha's Vineyard southward of Oak Bluffs and pass northward of Cape Poge Flats buoy. When Cape Poge Lighthouse bears about 155° true steer **208°** true for Edgartown Lighthouse.* When Cape Poge Lighthouse bears 87° true steer **197°** true, which should lead approximately 350 yards eastward of the red buoy marking the eastern edge of the shoals on the western side of the harbor and nearly 0.4 mile eastward of Edgartown Lighthouse. Anchor eastward or southeastward of the lighthouse, distant 0.3 to 0.5 mile, in 4 to 5 fathoms (7.3 to 9.1 m.)

From westward.—To pass northward of Squash Meadow, steer for Cape Poge on any bearing southward of 136° true and pass eastward of the bell buoy on the southeast end of Squash Meadow. Then bring Hedge Fence Lighted Trumpet and Gong Buoy astern on a **178°** true course. When Edgartown Lighthouse bears 208° true steer **197°** true and proceed as in the preceding paragraph.

In the daytime, to pass southward of Squash Meadow, pass about 200 yards northeastward of the bell buoy eastward of East Chop Lighthouse, and steer **124°** true for Cape Poge Lighthouse, passing about 200 yards southwestward of the buoy at the northwest end of Squash Meadow and 0.3 mile northward and eastward of the bell buoy No. 17. Then steer **181°** true with Hedge Fence Lighted Trumpet and Gong Buoy astern for 1¾ miles. When about 400 yards eastward of the second red buoy, steer about **197°** true and anchor as directed in the first paragraph.

To go to the wharves.—Pass about 70 yards south of nun buoy off Edgartown Lighthouse and make good a range of a prominent white flagpole (fitted with yardarm) situated near the waterfront, on range with the southeastern corner of the prominent white square church tower, course **278°** true. This range is easily picked up and is good until the wharves are approached, then follow them at a distance of about 50 yards.

The depth at the steamboat wharf is about 18 feet (5.5 m.) and about 11 feet (3.4 m.) at the wharves southward of it except the yacht club wharf where there is a depth of 35 feet (10.7 m.).

Supplies.—Coal, water, gasoline, provisions, and some ship supplies can be had.

Repairs.—There are 3 marine railways, the largest for vessels 50 feet long, 8 feet (2.4 m.) draft, and with a capacity of 15 tons. Gas engine and hull repairs can be made.

Communications.—A ferry operates between Edgartown and Chappaquiddick Island. No schedule is maintained but ferry runs on call. There is bus transportation to Oak Bluffs where connections may be made with the daily steamer to New Bedford. Telephone and telegraph communication is available.

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*Lat. 41°23'.5, Long. 70°30'.2; Charts 346, 1209.

Sengekontacket Pond has two entrances both of which are shoal. The northerly entrance is preferable and this is not navigable by boats with a draft of more than 3 feet (0.9 m.). Both entrances are crossed by highway bridges the vertical clearance of which is about 5 feet (1.5 m.) above mean high water.

Harts Haven is a small pond 1 mile southward of the entrance to Lake Anthony. The entrance to the pond is through a privately dredged channel between two short jetties. It was originally dredged to 5 feet (1.5 m.) but it has shoaled up considerably and the entrance was nearly bare at low water in 1939. The pond has a depth of about 4 feet (1.2 m.).

Lone Rock, with 4 feet (1.2 m.) over it is marked by a buoy. The rock is in surrounding depths of water ranging from 11 to 15 feet (3.4 to 4.6 m.) about 400 yards offshore and 700 yards southeasterly from the steamboat wharf at Oak Bluffs.

Lake Anthony, which is locally known as **Oak Bluffs Harbor,** is 2 miles eastward of Vineyard Haven, has depths of 5 to 8 feet (1.5 to 2.4 m.) except its northern end and near the shores, and affords anchorage for small craft. The entrance which is about 0.8 mile southward of East Chop Lighthouse is between two jetties and is marked by a light at the east end of the north jetty. In July 1939 the controlling depth between the jetties was reported to be 7 feet (2.1 m.).

Caution is necessary to avoid a 9-foot (2.7 m.) shoal 600 yards 100° true from Oak Bluffs North Breakwater light. A buoy is moored about 75 yards southwestward of the shoal.

There are several landings and numerous mooring buoys. Gasoline, provisions, and motorboat supplies can be obtained.

A boat yard with two marine railways can accommodate small craft up to limits of 50 feet in length, 6 feet (1.8 m.) in draft, and a capacity of 15 tons.

Oak Bluffs is a very active summer resort during the summer months.

Communication is by steamer with New Bedford and points on Nantucket Sound. The steamer wharf lies 400 yards south of the entrance to Lake Anthony, and has about 10 feet (3 m.) at the end and 8 feet (2.4 m.) on the sides near the end.

East and West Chop are prominent points on the east and west sides, respectively, of the entrance to Vineyard Haven. Each point terminates in a high wooded bluff which shows prominently from the sounds.

East Chop Lighthouse is a brown tower on the summit of East Chop. The light is 79 feet (24.1 m.) high and visible for 15 miles.

East Chop Flats have 8 to 18 feet (2.4 to 5.5 m.) over them, extend a little over 0.4 mile in a northeasterly direction from East Chop, and are marked off their northeastern end by a bell buoy with a reflector. The bell buoy is removed when endangered by ice.

West Chop Lighthouse is a white conical tower on the summit of West Chop. The light is 84 feet (25.6 m.) high and visible for 15 miles.

The light has a red sector from 281° to 331° true (from seaward) which covers Squash Meadow and Norton Shoal. The fog signal is an air whistle.

VINEYARD HAVEN*

(CHART 347)

Vineyard Haven is a funnel-shaped bight about 1.4 miles long in a southwest direction and about 1.3 miles wide at the entrance; it is on the northern side of Martha's Vineyard between East Chop and West Chop, each marked by a lighthouse. The harbor is easy of access and is the most important and generally used harbor of refuge for coasters between Provincetown and Narragansett Bay; it is exposed to northeasterly winds, but vessels with good ground tackle can ride out most blows. The greatest danger encountered by vessels at anchor in a northeast gale is from vessels with poor ground tackle, which are likely to drift and foul other vessels and then go ashore. The depth is sufficient for the largest vessels passing through Vineyard Sound; it ranges from 35 feet (10.7 m.) or more at the entrance to 15 feet (4.6 m.) near the head of the harbor.

The channel is unobstructed and the lead will be the best guide in selecting an anchorage. When well inside the entrance the water shoals gradually toward the western shore from a red buoy, which is in about 21 feet (6.4 m.); toward the eastern shore the water shoals abruptly to Canal Flats above the black buoy, and the shore should be given a berth of about 300 yards.

Canal Flats, partly bare at low water, make off 300 yards from the eastern shore of the harbor, about 1 mile inside of East Chop Lighthouse; their northwestern edge is marked by a black buoy.

Vineyard Haven is a town on the west shore near the head of the harbor; coal and lumber are brought occasionally in barges and vessels. A breakwater, showing about 2 feet (0.6 m.) above high water, is on the flats on the western side of the harbor near the head. It is marked by a light on the south end.

A privately maintained fog signal is situated near the light.

A dredged channel 17 feet (5.2 m.) deep leads southward of the breakwater to the steamer wharf, which has 19 feet (5.8 m.) at the end. On the south side of the harbor near the head are several wharves with about 10 feet (3.0 m.) at their ends.

Towboats are seldom used, but can be obtained from New Bedford by telephone or local fishing boats can be used.

Hospital.—There is a United States marine hospital at Vineyard Haven to which seamen entitled to hospital treatment are sent.

Anchorage.—Vessels anchor, according to draft, anywhere from the points at the entrance to the head of the harbor, the light-draft vessels favoring the western shore. Small craft can anchor between the breakwater and the steamboat wharf, in 6 to 9 feet (1.8 to 2.7 m.).

Tides.—The mean rise and fall of the tides is about 1¾ feet.

Currents.—The tidal currents have little velocity in the harbor; care should, however, be taken on the ebb, which sets westward, not to approach too closely to West Chop, as the current there sets on the ledges which make eastward and northward from the point.

Directions, Vineyard Haven.—The currents turn about ½ hour earlier inshore across the entrance of the harbor than in the channel through the sound. Vessels entering the harbor, with a head wind or light breeze at the end of a favorable current through the sound,

*Lat. 41°28′, Long. 70°35′: Charts 347, 1209.

should stand on in the channel until the harbor is well opened before standing in for the anchorage, so as to clear the points at the entrance.

From eastward.—Squash Meadow and East Chop Flats will be avoided by keeping in the white sector of West Chop Light. From Hedge Fence Lighted Trumpet and Gong Buoy steer for West Chop Lighthouse on a 275° true course until East Chop Lighthouse bears 163° true. Then steer 220° true into the harbor, giving the eastern shore a berth or about 0.3 mile; the course will lead about 150 yards northwestward of Canal Flats buoy, and the red buoy off the southeast end of the breakwater should be nearly ahead. There is good anchorage northeastward of the latter buoy in 20 to 23 feet (6.1 to 7 m.), taking care, however, to keep clear of the edge of Canal Flats, which rise abruptly.

From westward.—Steer for East Chop Lighthouse on a 133° true course until West Chop Lighthouse bears 262° true. Then steer 189° true into the harbor to a position 150 yards northwestward of Canal Flats buoy; a 220° true course will then lead to the head of the harbor.

Ice.—Both local and drift ice obstruct the movements of vessels in severe winters and at times entirely close the harbor. Strong northerly winds drive drift ice from Vineyard Sound into the harbor and endanger vessels at anchor.

Supplies.—Coal in limited quantity and fresh water can be obtained alongside the wharf. Gasoline, ice, provisions, and some ship chandler's stores can be had at Vineyard Haven.

Repairs.—There is one marine railway at Vineyard Haven for small craft up to 50 feet long, 6 feet (1.8 m.) draft, and 12 tons capacity. New Bedford is the nearest place at which repairs to the machinery of steamers can be made.

Transportation by steamer to New Bedford and points in Nantucket Sound is available.

The entrance to **Lagoon Pond** has depths between the jetties of 7 feet (2.1 m.). It is crossed by a drawbridge which has a vertical clearance of 15 feet (4.6 m.) above mean high water and a horizontal clearance of 30 feet. The depths in the pond average between 7 to 9 feet (2.1 to 2.7 m.) although there are spots where much deeper water will be found. It is used only by local craft.

VINEYARD HAVEN TO GAY HEAD

Shoals extend 0.3 mile northward and eastward from **West Chop,*** and their edges are marked by three buoys. **Alleghany Rock,** with 6 feet (1.8 m.) over it, lies 650 yards northward from West Chop Lighthouse, and is marked on its northern side by a buoy, which is colored and numbered for the channel through Vineyard Sound. Low Point Flats Buoy, a bell buoy with a reflector which is replaced by a spar when endangered by ice, is placed off the edge of the shoals 650 yards northeastward from West Chop Lighthouse. Rocks awash at low water extend nearly 0.3 mile off the eastern side of West Chop, and are marked by Great Rock buoy, which lies 0.5 mile southeastward of the lighthouse.

A narrow, somewhat shifting ridge extends from about ¼ mile northwestward of West Chop, approximately parallel to and 2 miles off the northerly shore of Vineyard Sound, for distance of about 9

*Lat 41°28′.8, Long. 70°36′.0; Charts 247, 249, 1209, 1210.

miles. **Middle Ground** is the easterly half of this ridge and has depths of 4 to 8 feet (1.2 to 2.4 m.) over the greater part; and **Lucas Shoal,** with depths of 12 to 16 feet (3.7 to 4.9 m.) over it, is near the westerly end. The ridge is marked by a buoy at each end and lighted bell buoy on the northerly side. The generally used channel through Vineyard Sound leads northward of the shoal.

Norton Point and **Cape Higgon** are prominent bluffs on the northwest side of Martha's Vineyard, about 3 and 8 miles southwestward of West Chop Lighthouse.

Menemsha Bight, on the northerly side of the westerly end of Martha's Vineyard 2 to 3 miles eastward of Gay Head Lighthouse, affords shelter from southerly and easterly winds for vessels of any size, in 6 to 10 fathoms (11 to 18 m.), sticky bottom. There are no dangers in the bight if the shore be given a berth of 0.3 mile.

Menemsha Inlet, on the southeasterly side of Menemsha Bight, is an opening between two jetties into the northerly end of **Menemsha Pond.** A channel has been dredged through the entrance and a small basin dredged out just inside. The entrance is marked by a light on the end of the east jetty.

A survey in April 1939 indicated that the controlling depth in midchannel between the jetties was 8 feet (2.4 m.). The depth shoals, after passing through the entrance to a controlling depth of 6 feet (1.8 m.). To enter, steer **146°** true, favoring the east jetty, until almost to the inner end, then steer **95°** true for a distance of about 300 feet; continue on a course of **130°** true for about 450 feet and follow a midchannel course of **163°** true, where anchorage may be made in depths of 6 feet (1.8 m.)

The **currents** through the entrance have an estimated velocity of 3 to 5 knots at strength. The slacks occurring about ¾ hour after local high and low water.

There are several wharves inside the small harbor to which the local fishermen tie up. There is a small settlement where gasoline, ice, and some provisions can be obtained.

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

Gay Head Lighthouse is a brown tower; the light is 170 feet (52 m.) above the water, and visible 19 miles. The light is partially obscured by No Mans Land between 342° and 359° true (from seaward), being occasionally visible through the notches in the trees.

Devils Bridge is a reef making out 0.8 mile in a northwest direction from Gay Head; it has 2 feet (0.6 m.) over it about 0.4 mile offshore and 17 feet (5.2 m.) at its end. The reef is marked off its northwest end by a lighted gong buoy and a can buoy.

NO MANS LAND

No Mans Land is a prominent, high, rocky island lying 5 miles southward from Gay Head. Except for a small section on its northern side the shore consists of clay and gravel cliffs 10 to 18 feet (3.0 to 5.5 m.) high with bowlders from the continual erosion of the sea lining the shores. The interior of the island is composed of many hills, the highest being over 100 feet (30.5 m.) with considerable marshy areas among them. There are numerous houses and

finished properties along the northern side westward of the sandy point.

Several sunken ledges lie in the passage between No Mans Land and Martha's Vineyard, through which is a buoyed channel about 0.8 mile wide that may be used by small vessels in the daytime.

Chapter 6.—BUZZARDS BAY

GENERAL INFORMATION

(CHART 249)

Buzzards Bay indents the south shore of Massachusetts in a northeasterly direction north of the Elizabeth Islands, the latter separating the bay from Vineyard Sound. It is the approach to New Bedford Harbor and many smaller towns and villages and to the entrance of Cape Cod Canal.

The shores are irregular, being broken by many bays and rivers, and in general are rocky in character. Large bowlders are a prominent feature and in places extend some distance from shore, rendering close approach to the shore dangerous.

The main part of Buzzards Bay and its approach have been surveyed by means of a wire drag. The bottom in this locality is very broken, with bowlder reefs in places, and vessels should proceed with caution when crossing shoal areas in the tributaries of the bay where the depths are not more than about 6 feet (1.8 m.) greater than the draft. The bay has deep water as far as Wings Neck, above which it is full of shoals.

Channels.—There are three entrances to the bay, two of which, the main entrance and Quicks Hole, are used by sailing vessels. Woods Hole and Quicks Hole, the entrances from Vineyard Sound, are described under separate headings preceding.

The western and main entrance is northward of Cuttyhunk Island and has a clear width of 4.3 miles between Sow and Pigs and Hen and Chickens Reefs. The bottom in this entrance is irregular and rocky, and there are spots with 2¾ to 5¾ fathoms (5.1 to 10.4 m.) (on which the sea breaks in heavy southwest gales), surrounded by deeper water, so that extra caution is necessary for vessels of 16 feet (4.9 m.) or more draft when entering the bay. Cuttyhunk Lighthouse, Vineyard Sound Lightship, and Hen and Chickens Lightship* are the guides for entering, and Gay Head Lighthouse is a guide for vessels approaching from southward.

Pilots.—State pilotage is compulsory for all vessels over 7 feet (2.1 m.) draft, except fishing vessels other than whalers, vessels regularly employed in the coasting trade and steam vessels carrying United States licensed pilots. Pilots for Buzzards Bay and for many of its harbors can be had at Cuttyhunk or off the entrance of the harbor to which the vessel is bound. Vessels bound through Cape Cod Canal make signal for a pilot off Wings Neck Lighthouse.

Towboats can be had at New Bedford. Towboats for Cape Cod Canal can be had by making signal off Wings Neck Lighthouse.

*Lat. 41°27'.0, Long. 71°01'.1 : Charts 237, 1210.

Hen and Chickens is the ledge making off nearly 1.5 miles southward from Gooseberry Neck, on the northern side of the entrance to Buzzards Bay. It has a number of spots with 4 to 9 feet (1.2 to 2.7 m.) over them and near the southern end are several rocks bare at half tide. **Old Cock,** one of these rocks, bares 1 foot (0.3 m.) at low water and is marked by a black spindle with cage. The south end of the ledge is marked by a buoy, which lies 0.8 mile north-northwestward from Hen and Chickens Lightship. Rocks with 22 feet (6.7 m.) over them lie 1 to 1.3 miles, and another rock with 17 feet (5.2 m.) over it lies 1.8 miles 189° true from Old Cock spindle. A lighted whistle buoy marks the southern side of the 17-foot (5.2 m.) spot.

Sow and Pigs Reef extends 1.4 miles in a west-southwest direction from Cuttyhunk. It is, in part, dry or awash at low water and has an average width of about 400 yards; at its westerly end it has a depth of 15 feet (4.6 m.), and is marked by a bell buoy, which lies about 1.4 miles northeastward from Vineyard Sound Lightship.

Ribbon Reef is a small detached ledge with 18 feet (5.5 m.) over it lying 1.5 miles northwestward of Cuttyhunk Lighthouse. It is surrounded by deep water and marked off its northern side by a buoy. A lighted gong buoy is located 1,500 yards west of the reef. About 1.2 miles northward of Ribbon Reef is a ledge with 23 feet (7.0 m.) over it, on which the sea breaks in heavy southwest gales; it lies about 1.6 miles 88° true from Hen and Chickens Lightship.

Mishaum Ledge is a number of shoal, rocky spots, one of which has a depth of 8 feet (2.4 m.) over it. The ledge extends 1.8 miles off the northern shore, about 3 miles eastward of Gooseberry Neck; it is marked by a red sector in Dumpling Rock Lighthouse, and off its south end at a distance of about 500 yards by a lighted gong buoy, which is replaced by a spar when endangered by ice. Strangers should pass southward of this buoy.

A rock with 22 feet (6.7 m.) over it lies nearly 1 mile north-northwestward of the northern end of Penikese Island, and another rocky spot with 18 feet (5.5 m.) over it lies 0.5 mile northward of the northern end of the island. There is a lighted bell buoy about 0.3 mile to the westward of the 22-foot (6.7 m.) spot, and the channel between the buoy and the one at Mishaum Ledge is about 1.1 miles wide.

Hen and Chickens Lightship has a black hull with "Hen & Chickens" on both sides. It has two masts with a lantern gallery at each masthead. The light is 67 feet (20.4 m.) above the water, and visible 12 miles. If the regular light is extinguished, a fixed white light will be shown from the gallery. The fog signal is an air diaphragm chime. If the diaphone is disabled, a bell will be struck by hand. A fixed white riding light is exhibited from the forestay to indicate the heading of the vessel.

A low-powered radiobeacon operated at the lightship is synchronized with the fog signal for distance finding.

Anchorage.—New Bedford Harbor affords anchorage for vessels of 23-foot (7 m.) draft and is described on page 108. Cuttyhunk Harbor, described on page 92, affords anchorage in 12 to 24 feet (3.7 to 7.3 m.), but is exposed to northeasterly winds. There is a good anchorage, sheltered from all southerly winds, in the northerly side of Nashawena Island eastward of Penikese and Gull Islands, in

7 to 8 fathoms (13 to 15 m.). This anchorage is frequently used by tows, and is available for vessels of any draft.

Prohibited anchorages.—Regulations prescribed by the Secretary of War prohibit anchorage in the fairway leading to Cape Cod Canal or the fairway leading through New Bedford Outer Harbor. Officers of the Coast Guard are charged with the enforcement of the regulations governing anchorage grounds. Copies of the rules and regulations with descriptions of the anchorage areas for Narragansett Bay, New Bedford Outer Harbor, Buzzards Bay (in the approach to Cape Cod Canal), and Vineyard and Nantucket Sounds can be obtained from the United States Engineers, Providence,* R. I.

Anchorage areas prescribed by these rules are shown on the large scale charts of the Coast & Geodetic Survey.

A **dumping ground** for material from Cape Cod Canal adjacent to the northern limit of anchorage C has been discontinued and a new dumping ground the minimum depth of which shall not be less than 27 feet (8.2 m.) has been established on the east side of Buzzards Bay southeast of Cleveland Ledge. The limits are marked by temporary lighted buoys and a spar buoy. See chart No. 249.

Tides.—The ocean tides have access to Buzzards Bay through the main entrance and through the several passages connecting with Vineyard Sound.

In Buzzards Bay the rise and fall of the tide is practically simultaneous with that in Vineyard Sound. The mean rise and fall being about 4 feet, high water occuring in all parts of the bay at about the same time. The amplitude of the movement, however, is from 1½ to 2½ feet less in Vineyard Sound than in Buzzards Bay. This condition produces alternating differences in water level between the two bodies of water, the water surface of Buzzards Bay being higher at high water and lower at low water than that of Vineyard Sound. As a result, the currents through the connecting passages are to a great extent hydraulic in character and attain large velocities, the southward maximum occurring near the time of high water and the northward maximum near the time of low water.

Currents.—In the passages between Buzzards Bay and Vineyard Sound the currents have considerable velocity, and require special attention (see pages 74 and 77). At Hen and Chickens Lightship, the tidal current is rotary, turning clockwise. The strength of flood occurs about 1½ hours after low water at Boston and sets 65° true, with an average velocity of about ½ knot. The strength of ebb occurs about ½ hour after high water at Boston and sets 215° true with an average velocity of about ½ knot. Since the current is rotary, there is no true slack. The average minimum velocity is about ¼ knot and sets northwestward about 2 hours before low water at Boston and southeastward about 2¼ hours before high water at Boston.

Velocities due to a combination of tidal and wind currents seldom exceed 1½ knots.

Storm-warning displays are made at Cuttyhunk, Fairhaven, and Wings Neck Lighthouse.

Ice.—The head of the bay and the harbors in its vicinity are generally closed to navigation during the winter months; the approaches

*Lat. 41°49', Long. 71°24' : Charts 352, 353, 1210.

to the harbors on the eastern shore are rendered dangerous by drift ice, which in exceptionally severe winters extends across the bay and joins the local formations on the western shore, thus forming an impassable barrier for short periods. It forms more rapidly in the bay with the wind from north to west. Under ordinary circumstances a northeast wind, if continued for 48 hours, will clear the bay of ice. Southerly winds, especially southeasters, diminish the extent and weaken the strength of the pack. The ice does not usually affect the positions of the spar buoys in the bay, but the light vessels, and even the buoys, are sometimes carried away by unusually heavy floes.

Ice forms rapidly in calms or light winds from north to west, and strong winds from north to northeast break it up and carry it off.

Directions, Buzzards Bay.—Keeping in mind the broken character of the bottom, vessels should proceed with caution when crossing areas where the charted depth is not more than 6 feet (1.8 m.) greater than the draft. Vessels of over 16-foot (4.9 m.) draft should avoid the broken ground in the entrance of Buzzards Bay.

For directions, see page 46.

Cuttyhunk Harbor is on the south side near the western entrance of Buzzards Bay, and is formed by a bight between the eastern end of Cuttyhunk and western end of Nashawena Islands. It is about ¾ mile wide, and affords anchorage in 12 to 24 feet (3.7 to 7.3 m.), but is exposed to northeasterly winds. Northward of the harbor are Penikese and Gull Islands and a number of ledges, which shelter it from that direction. The shores on both sides of the harbor are foul, and the anchorage is in the middle; it is sometimes used by weather-bound coasting vessels and fishermen. The principal dangers are marked by buoys, and the approach from westward is marked by Cuttyhunk Lighthouse, which is near the western end of the island. There is a prominent lookout tower on the highest part of the island.

On a small island (Gosnold) in West End Pond, about 400 feet east of Cuttyhunk Lighthouse,* is **Gosnold Monument.** It is 156 feet (47.6 m.) high and is a prominent landmark.

Penikese Island is grassy and hilly. Shoal water extends from Penikese to **Gull Island** and no attempt should be made to pass between them. Rocky ledges extend southward and westward from Gull Island and are marked by buoys. The eastern point at the entrance and the eastern shore of the harbor should be given a berth of over 300 yards.

Shoals extend out about 0.5 mile northeastward from Cuttyhunk Island, **Whale Rock** and **Pease Ledge** being the names given to the parts which show at low water. A detailed description of the dangers would be of but little use; vessels must be guided mainly by the buoys and the chart.

Cuttyhunk Pond, on the southwest side of the harbor, has an entrance between jetties. The northern jetty is marked at the outer end by a light. Between the jetties a channel with a depth of 10 feet (3.0 m.) has been dredged to the town landing at **Cuttyhunk** and continues westerly through the inner harbor where it terminates in a turning basin near the westernmost wharf. The turning basin, 800 feet long and widths of 75 to 200 feet, has depths from 7½ to 12 feet

*Lat. 41°24'.8, Long. 70°57'.0; Charts 297, 249, 1210.

(2.3 to 3.7 m.). There is an anchorage basin 900 feet long, 800 feet wide which had a controlling depth of 10 feet (3.0 m.) in July 1939.

Gasoline and a small quantity of provisions can be had. Communication is by daily launch with New Bedford.

Canapitsit Channel, the dredged cut between Nashawena and Cuttyhunk Islands, forms a connection between Cuttyhunk Harbor and Vineyard Sound.

The channel has depths from 6 to 14 feet (1.8 to 4.3 m.) and is marked by buoys. It is reported that a 4-foot (1.2 m.) spot exists just east of the black buoy at the south end. It is used by local craft of 5-foot (1.5 m.) draft. The currents are strong and have been reported to be as much as 4 knots. The channel should never be used during a heavy ground swell. With southerly winds heavy seas will break across the entrance.

Storm-warning displays are made at the Coast Guard station on the south side of the harbor.

Ice.—Drift ice is carried into the harbor with northerly winds and closes the harbor for short periods during severe winters.

Directions, Cuttyhunk Harbor.—Strangers should not enter except in the daytime with clear weather. If entering from westward, a greater draft than 15 feet (4.6 m.) should not be taken in.

From eastward.—Care should be taken to avoid Lone Rock, which lies about 0.8 mile northward of the northeastern end of Nashawena Island. When westward of Quicks Hole and Lone Rock, steer 246° true for the northern end of Cuttyhunk Island. When 100 yards southward of the buoy southward of Gull Island, steer 222° true, heading for the red buoy northeastward of Pease Ledge. When this buoy is 0.3 mile distant and Gay Head is just open westward of Nashawena Island, anchor in the middle of the harbor eastward of the buoy. Or, if less than 9-foot (2.7 m.) draft, steer 184° true for the Coast Guard station on the south side of the harbor, and anchor a little over 0.3 mile from the shore, in 16 to 18 feet (4.9 to 5.5 m.).

From westward.—From a point midway between Ribbon Reef buoy and Cuttyhunk Lighthouse steer 51° true, heading for approximately the south knob on Penikese Island,* until abeam of Middle Ground black buoy at a distance of about 600 yards (bearing 141° true); steer 90° true for about 700 yards until Middle Ground black buoy and Cuttyhunk Lighthouse are in range on a bearing of 214½° true; steer 124° true passing northeastward of Middle Ledge buoy at a distance of about 150 yards, continue on this course passing about 100 yards northeastward of a 12-foot (3.7 m.) shoal until Edwards Rock buoy is in range with the north tangent of Cuttyhunk Island (Copicut Neck) (bearing about 250° true); then steer 180° true until Cuttyhunk North Jetty Light bears about 232° true where anchorage may be made in depths of about 20 feet (6.1 m.)

Gay Head Lighthouse, open a little westward of Nashawena Island, clears the rock westward of the southern end of Penikese Island, and the light just shut in leads between the shoals making off Gull and Cuttyhunk Islands.

To enter **Cuttyhunk Pond** from the anchorage, steer any course avoiding Pease Ledge to a midchannel position southward of the light on the end of the breakwater, then steer midchannel courses

*Lat. 41°27′, Long. 70°55′: Charts 297, 249, 1210.

through the dredged channel to the anchorage basin in the inner harbor.

EAST SIDE, BUZZARDS BAY

The Elizabeth Islands, Quicks Hole, and Robinsons Hole are described on page 76.

Weepecket Island and the two islets northeastward of it are bare and rocky. **Weepecket Rock,** 1.3 miles northeastward of Weepecket Island, has 10 feet (3 m.) over it and is marked by a buoy. These, with **Lone Rock,** off the north entrance to Quicks Hole, are the principal off-lying dangers between Cuttyhunk Harbor and Woods Hole.

Woods Hole is described on page 74.

The easterly shore of Buzzards Bay northward of Woods Hole has shoals, many of them rocky, making out a greatest distance of about 1 mile, the ends of which are usually marked by buoys. The harbors are shoal and are frequented only by small local craft. Gasoline, provisions, ice, and a small quantity of motorboat supplies can be obtained at the villages. A railroad extends southward to Woods Hole, affording communication to the towns and villages on the eastern shore.

Quamquisset Harbor (chart 249), a small harbor lying 1.5 miles northeastward of the northern entrance of Woods Hole, has a narrow, buoyed entrance with a depth of about 9 feet (2.7 m.). Small craft, closely following the buoys, can anchor in the middle of the harbor in 16 to 18 feet (4.9 to 5.5 m.), sticky bottom, width of anchorage 250 yards. Local boats anchor in the northeastern part of the harbor. To go to this anchorage, pass midway between the small, grassy islet and the point northward of it, and anchor in the middle in 15 to 18 feet (4.6 to 5.5 m.). A shoal extends about 75 yards off the point on the west side northward of the islet.

There are several landings on the southeastern shore and several small wharves near the head of the harbor. The residences on the southeastern shore are prominent when off the entrance: the northern point of the entrance is a small, prominent knoll. There is a prominent standpipe about 1 mile east-northeastward of the entrance.

Hamlin Point is marked by a prominent hotel. A shoal with 12 feet (3.7) m.) near its end extends 0.9 mile northwestward from Hamlin Point and **Gunning Point,** and is marked at its end by a buoy.

Gifford Ledge, with 10 feet (3 m.) near its end, extends 0.9 mile from the shore 1.4 miles northward of Hamlin Point; Westward and northward is a dumping ground for material from Cape Cod Canal.

West Falmouth Harbor (chart 249), 2.2 miles northward of Hamlin Point, has depths of 1 to 4 feet (0.3 to 1.2 m.) and bares in places at low water. A narrow channel with depths of 5 to 7 feet (1.5 to 2.1 m.) leads along the south shore to an anchorage basin 6 feet (1.8 m.) deep and 300 feet wide off the town of West Falmouth. The channel is not marked, but the shoals are visible. The currents have an estimated velocity of 1½ knots. A rock with 4 feet (1.2 m.) over it lies 500 yards 256° true from the outer end of the small breakwater extending northward from the southern point at the entrance. A bowlder reef extends about 400 yards westward and northwestward from the northern point of the entrance and is marked at the western

side by a buoy. **Chappaquoit Point,*** on the south side of the entrance, has numerous summer cottages.

To enter, steer southeastward for the end of the breakwater and round it closely; then steer east-southeastward and pass 100 feet off the rounding point on the south side, marked by a number of boat sheds, and 200 feet off the next point; then steer south-southeastward and round the point extending from the north shore at a distance of 80 yards; a reef extends 70 yards southward from this point. Anchor about midway between this point and the town wharf. The wharf has a depth of about 1 foot (0.3 m.) at low water.

Wild Harbor (chart 251), a small cove on the south side of **Nyes Neck,** 1.8 miles northward of West Falmouth Harbor, affords anchorage during northerly or easterly winds just inside the entrance, in 12 to 18 feet (3.7 to 5.5 m.). The shores of the harbor are foul, and its easterly part shoal. The entrance is clear in midchannel. A channel 50 feet wide and 6 feet (1.8 m.) deep has been dredged to a small basin, with the same depth in the northeastern part of the harbor. There is a stone jetty on the south side of the entrance to the basin. The channel is subject to shoaling and is not marked.

Megansett Harbor (chart 251), between Neyes Neck and Scraggy Neck, has its entrance 1.8 miles southward of Wings Neck Lighthouse.

Cataument Rock with a depth of 7 feet (2.1 m.) over it lies on the south side of the entrance and is marked by a buoy.

The harbor has extensive shoals and ledges, but the channel is buoyed, and a draft of 9 feet (2.7 m.) can be taken well inside to an anchorage in 18 to 22 feet (5.5 to 6.7 m.).

Halftide Rock, bare at low water, lies 600 yards 248° true from the end of the wharf at **Megansett.** A depth of 6 feet (1.8 m.) can be taken to the wharf at Megansett by passing 50 yards north of the north end of the breakwater; then steering a course of about 105° true until the wharf bears 180° true, and then steering for it. A crooked channel dredged 60 feet wide and 6 feet (1.8 m.) deep, leads to **Squeteague Harbor,** which has depths of 4 feet (1.2 m.) in the northern part. The channel is not marked, but the shoals are visible. The village of **Cataumet** lies near the northern part of Squeteague Harbor.

Seal Rocks, partly bare at half tide, extend 3/8 mile southwestward from **Scraggy Neck,** on the north side at the entrance of Megansett Harbor, and are marked at the southwest end by a buoy. The narrow channel between the ledge and Scraggy Neck has a depth of about 6 feet (1.8 m.).

Southwest Ledge is two patches with little water in places, lying 0.8 mile southwestward and 0.4 to 0.6 mile westward from the westerly end of Scraggy Neck; the two patches are marked at their westerly and northerly ends by buoys. There are depths of 12 to 16 feet (3.7 to 4.9 m.), rocky bottom, between the patches and Seal Rocks.

Pocasset Harbor (chart 251) lies between Wings Neck and Scraggy Neck, and its inner part is separated from Red Brook Harbor by **Bassett Island.** Broken ground, with depths of 17 to 18 feet (5.2 to 5.5 m.) in places, extends across the entrance. Entering between Wings Neck Lighthouse and Southwest Ledge north part

*Lat. 41°35'.3, Long. 70°39'.1: Charts 251, 249, 1210.

buoy and giving Scraggy Neck and Wings Neck a berth of 400 yards, vessels of about 14-foot (4.3 m.) draft can anchor westward of Eustis Rock buoy in about 5 fathoms (9 m.); this anchorage is exposed to westerly winds. Eastward of **Eustis Rock** the entire eastern part of the harbor between Scraggy Neck and Bassett Island is shoal.

A narrow channel with a depth of about 7 feet (2.1 m.) leads between Scraggy Neck and Bassett Island to a small anchorage with depths of 8 to 15 feet (2.4 to 4.6 m.) south-southeastward of the southern end of Bassett Island. The channel is well marked by buoys.

The boulder reef extending northeastward from Scraggy Neck westward of the southern point of Bassett Island, is marked by a buoy. There are several landings with depths of 5 to 8 feet (1.5 to 2.4 m.). A draft of 4 feet (1.2 m.) can be taken northward to Red Brook Harbor. A rock, bare at half tide, lies 250 yards from the eastern shore of Bassett Island, 0.4 mile from the southern point.

The inner part of Pocasset Harbor is frequented only by small craft of about 6-foot (1.8 m.) or less draft. Its entrance is through a narrow buoyed passage northward of the western end of Bassett Island. Following a careful midchannel course, anchorage can be selected below buoy No. 1, in 14 to 18 feet (4.3 to 5.5 m.). Above this point the navigation is not difficult in the daytime for vessels of 6-foot (1.8 m.) or less draft, with the aid of the chart and the buoys.

Barlows Landing at the northwest end of the harbor has a landing, but it is nearly dry at low water.

Red Brook Harbor lies eastward of Bassett Island and is very shallow. A draft of about 6 feet (1.8 m.) can be taken into the harbor around the north end of Bassett Island, which is the better entrance. There is a marine railway for small craft under 30 feet in length. The village of **South Pocasset** lies near the eastern end of Red Brook Harbor.

Wings Neck Lighthouse* is a white hexagonal tower with a covered way to a dwelling located at the end of Wings Neck. The light is 50 feet (15.2 m.) high, and visible for 13 miles. The fog signal is a reed horn. If the horn is disabled, a bell will sound. **Storm warnings** are displayed near the lighthouse.

NORTH END, BUZZARDS BAY

Back River, Onset Bay, Monument River, Cohasset Narrows, and Buttermilk Bay (chart 251) lie at the northeast end of Buzzards Bay; the common entrance is between **Wings Neck,** marked by **Wings Neck Lighthouse** on the south, and **Great Neck** marked by **Tempes Knob** (a prominent hill), on the north. The indentation, of which these waters are a part, includes a large number of bights, coves, and shallow streams, whose channels are all more or less obstructed by shoals and rocks. These waters are important as the western entrance of the Cape Cod Canal.

Phinneys Harbor, off the village of **Monument Beach,** must now be entered by passing southward of Mashnee Island. A buoyed channel with depths from 19 feet (5.8 m.) to 30 feet (9.1 m.) enters Phinneys Harbor between Mashnee Island and Tobys Island. A

*Lat. 41°40'.8, Long. 70°39'.7: Charts 251, 249, 1210.

water tank on the hill back of the rear mark of the range for the lower and southwest part of this channel should not be mistaken for the range mark. The tank is to the right of the range when entering from Buzzards Bay.

Its size makes it available as an anchorage only for small craft and very small vessels, for which the chart is a sufficient guide. There is a marine railway for boats 75 feet long and 6 feet (1.8 m.) draft; gas engine and hull repairs can be made. A group of 3 rocks lies about 370 yards 245° true from the end of the wharf at Monument Beach. The rocks have about 2 feet (0.6 m.) of water over them.

Back River, emptying into the north side of Phinneys Harbor, is obstructed by rocks, and nearly bare at low water, except in its entrance, and is crossed by two fixed bridges having a least headroom of 6 feet (1.8 m.) at high water. Small craft sometimes anchor in the entrance.

Tobys Island, on the south side of Phinneys Harbor, is connected to the mainland by a causeway. The front light of the lower range is on this island.

The fog signal at **Hog Island** Light now operates automatically only upon the blast of an approaching ship's whistle instead of continuously as heretofore. The bell should stop sounding within a few minutes after the ship has stopped whistling.

A narrow and crooked buoyed channel leads through **Cohasset Narrows** to **Buttermilk Bay.** (Cohasset Narrows is crossed by two drawbridges, having a horizontal clearance of 25 feet, and overhead clearance when closed of 6 feet (1.8 m.) at mean high water. The currents in the narrows are strong. Buttermilk Bay has depths of 1 to 7 feet (0.3 to 2.1 m.) and about 4 feet (1.2 m.) in the channel. It is seldom entered except by small craft.

Butler Cove, on the western side of Cohasset Narrows, southward of the bridges, has depths of 3 to 5 feet (0.9 to 1.5 m.) in the middle; there are several private landings with depths of 2 to 3 feet (0.6 to 0.9 m.).

Onset Bay.—A depth of about 17 feet (5.2 m.) can be carried to an anchorage in Onset Bay through the buoyed channel which enters the Hog Island Channel at a distance of about 600 yards northward of Hog Island. Caution should be exercised in the vicinity between Onset Bay buoys Nos. 3 and 5 where a shoal which has depths of 7 feet (2.1 m.) extends into the channel from the south side of the dredged cut (July 1939).

Depths of 14 to 17 feet (4.3 to 5.2 m.) exist on the north side of the channel line opposite this shoal.

Wickets Island* is high and wooded and is marked by a large private dwelling. Westward of Wickets Island a buoyed channel, which has a controlling depth of 14 feet (4.3 m.) leads to the wharf at **Onset,** a village and summer resort.

The depths at the wharf are from 6 to 12 feet (1.8 to 3.7 m.).

A shoal with a depth of 10 feet (3.0 m.) extends slightly into the east side of the channel in the vicinity of the red buoy south of Wickets Island.

*Lat. 41°44'.3, Long. 70°39'.3: Charts 251, 249, 1210.

A depth of 3 feet (0.9 m.) can be carried into East River to an anchorage just above the closed bridge, which has an overhead clearance of 11 feet (3.4 m.) at mean high water.

Anchorages.—May be made in the bight east and north of Wickets Island in depths of 8 to 10 feet (2.4 to 3.0 m.) with good holding ground. Also off the town landing in depths of 9 to 15 feet (2.7 to 4.6 m.). Visiting small craft sometimes tie up at the wharf for short periods of time.

Supplies.—Gasoline, oil, water, and ship chandlery supplies can be obtained.

Repairs.—There is a marine railway with facilities for handling boats up to 70 feet in length. General repairs can be obtained.

Communication.—There is railroad and bus communication. During the summer months there is both marine and land taxi service.

The Widows Cove, westward of **Mashnee Island,** has depths of 3 to 5 feet (0.9 to 1.5 m.); there are several private landings with depths of about 3 feet (0.9 m.).

From Stony Point, on the southwest side of Great Neck, a breakwater 5 feet (1.5 m.) above mean high water extends in a general south southwesterly direction to **Abiels Ledge.** This affords protection for Hog Island Channel, the western approach channel to Cape Cod Canal. During an ebb tide and southwesterly winds this section of the channel becomes choppy and small craft sometimes seek protection by following the southwest side of the breakwater and west of the lighted aids on the west side of the channel. Caution is necessary if this is done to avoid Abiels Ledge which has a depth of water of only 3 feet (0.9 m.) over it. Many small craft ground on this ledge each year because a chart had not been previously consulted.

A small breakwater lies about 100 yards off the southern shore of Great Neck southward of Tempes Knob and protects a private landing.

A State pier built at the southeast end of **Bourne Neck,** on the north side of the western entrance to Cape Cod Canal provides facilities for the handling of passengers and freight of ocean-going and other vessels. A depth of 25 feet (7.6 m.) is dredged alongside the southeast face of the dock and a depth of 20 feet (6.1 m) on the southwest side.

CAPE COD CANAL

Cape Cod Canal connects the northern part of Buzzards Bay with Cape Cod Bay. It has a length of 11.5 miles from Wings Neck Lighthouse, in Buzzards Bay, to a depth of 5 fathoms (9 m.) in Cape Cod Bay. It shortens the distance between points north of Cape Cod and points west of Buzzard Bay by 53, 67, or 144 miles, according to the different routes considered, and avoids the outside run along the easterly side of Cape Cod and the exposed ocean route outside of Nantucket Shoals. The western approach to the canal is shown on chart 249 or 251 and the eastern approach on chart 1208.

The Cape Cod Canal has been purchased and is operated by the United States Government. No tolls are charged. The following **Rules and Regulations*** Relating to the Navigable Waters of the

*Revised rules effective August 26, 1940, may be obtained from U. S. Engineer Office. Principal change is change of purple light to amber.

United States, Revised to January 1, 1939 relative to the use of this canal have been prescribed by the Secretary of War.

1. **Limits.**—The Cape Cod Canal, including approaches, is defined as the waterway from a point in Buzzards Bay, Massachusetts, about one mile west of Wings Neck Light, thence through dredged channels and land cuts to the outer extremity of the northerly stone breakwater in Cape Cod Bay at Sandwich.

2. **Authority of canal officers.**—The movement of all boats, or craft of every description in the canal, shall be subject to the supervision of the district engineer of the Engineer Department at Large, in general charge of Federal waterway improvements in the locality, whose address is Third Floor, Park Square Building, 31 St. James Avenue, Boston, Mass.

3. **Signals.**—All vessels desiring to enter the canal may signal by three long blasts of the whistle when arriving at Wings Neck Light or Sandwich Breakwater.

A vessel approaching the railroad bridge when the lift span is lowered shall signed by three long blasts of the whistle for raising the span. Vessels or other craft without steam power shall hail the bridge by horn or megaphone or notify the operator by verbal communication of the desire to pass under the span.

The span shall be raised with the least possible delay upon receiving the signal: Provided, that the span shall not be raised when there is a train upon the bridge or approaching it so closely that the train cannot be stopped. If the span of the bridge is ready to be raised immediately, the operator shall so indicate by sounding one long blast of a whistle or horn; but, if it will not be raised immediately, he shall so indicate by sounding four short blasts in quick succession upon such whistle or horn. These signals shall be made as soon as possible after receiving the boat signal.

Vessels shall not attempt to pass the bridge until the span has been fully raised.

4. **Precedence.**—Ordinarily, vessels will be given precedence in order of arrival, but when several vessels are to be passed precedence shall be given:

First.—To vessels owned by the United States or employed on canal-improvement work.

Second.—To passenger vessels.

Third.—To freight vessels and towboats.

Fourth.—To small boats and craft bent on pleasure only.

5. **Mooring.**—Anchorage or mooring basins are located at both the eastern and western terminals. The eastern basin is on the north side of the canal. It is 2,000 feet in length, 300 feet in width, and dredged to a depth of 25 feet (7.6 m.) at mean low water. The western basin is on the southeast side of the Hog Island Channel, opposite the dredged cut to Onset Bay. It is 2,600 feet in length, 350 feet in width, and 32 feet (9.7 m.) in depth at mean low water. Mooring dolphins are provided. Vessels mooring or anchoring shall do so in such a manner as not to obstruct the canal channel nor to impede vessel movement to and from the basins.

6. **Location of traffic light—Eastern or Cape Cod Bay terminal.**—Red, green, and purple electric lights, visible for a distance of about 2 miles in clear weather, day or night, are located at Sandwich on the south side of the entrance. The lights, which are at an elevation of about 30 feet (9.1 m.) above high water, are located on a pole structure.

Western or Buzzards Bay terminal.*—Red green, and purple electric lights, visible for a distance of about 2 miles in clear weather, day or night, are located near Wings Neck lighthouse, on the south side of the entrance. The lights, which are at an elevation of about 35 feet above high water, are located on a pole structure.

7. **Westbound traffic.**—When a green light is showing at the eastern or Cape Cod Bay terminal at Sandwich, vessels may proceed through the canal. The green light indicates that the canal and approaches are open to westbound traffic. When the purple light is showing, vessels may proceed as far as the mooring basin at the eastern entrance, where they must stop and await the green signal light at the Sandwich terminal before passing west through the canal. The purple light indicates that the canal proper is not open to westbound traffic and that eastbound traffic may have to be passed in the Cape Cod Bay approach channel. The red light means that vessels must stop clear of the outer end of the Cape Cod Bay approach channel.

*Lat. 41°40'.8, Long. 70°39'.7; Charts 251, 249, 1210.

8. **Eastbound traffic.**—When a green light is showing at the western or Buzzards Bay signal block at Wings Neck, vessels may proceed through the canal unless later stopped by motorboat or other signal. The green light indicates that the canal and approaches are open to eastbound traffic. When the purple light is showing, vessels may proceed through the Buzzards Bay approach channel as far as the mooring basin near Hog Island, where they must stop and from whence clearance will be granted by motorboat or other signal. The purple light indicates that the canal proper is not open to eastbound traffic and that westbound traffic may have to be passed in the Buzzards Bay approach channel. The red light means that vessels must stop clear of the southern entrance to the Buzzards Bay approach channel and must not enter the Buzzards Bay approach channel. In daytime when sunshine obscures the signal lights or if the electric current should be temporarily interrupted, a red ball or shape will be operated from a pole about 60 feet southwest of the traffic lights. When the ball is raised, vessels must stop; when the ball is lowered to the ground, full clearance is granted.

9. **Warning lights.**—At both terminals, vessels tied up at dolphins or anchored may be warned by the red light's flashing three times, that about 15 minutes later they will be given a green light. If, on receiving the green light they do not proceed within 15 minutes, they may forfeit their priority to pass through the canal.

10. **Meeting of vessels.**—Vessels navigating the canal or its approaches in opposite directions at the same time under proper lights are subject to the usual customs, rules, and laws of navigation applicable to restricted channels.

11. **Two-way traffic.**—Two-way traffic through the canal will be allowed when, in the opinion of the representative of the United States Engineer Department charged with directing traffic, the conditions are suitable.

12. **Obtaining clearance.**—Vessels should not attempt to transit the canal until clearance has been obtained. When conditions render visibility poor, clearance should be procured by radio or other reliable medium.

13. **Speed.**—No boat in the canal shall be raced or crowded alongside another or moved at a speed which will cause excessive wash. Speed will be reduced to a minimum consistent with safe navigation. All vessels must pass mooring dolphins, wharves, landings, and dredging plants at minimum speed, with engines stopped, if practicable, to avoid wave and suction damage.

14. **Management of boats.**—The boat entering first shall have precedence. As a rule the vessel following shall keep at least 1,000 feet astern of the vessel ahead. Restricted passing is permissible, particularly when a leading, low-powered vessel is unable to stem the current, but extreme care to avoid collision is imperative.

15. **Handling of tows.**—Tows should be assembled outside the canal entrances when practicable, and vessels in tow should be securely fastened to the towing vessel and to each other. Long hawsers are not permitted. Vessels without engine motive power must not attempt to sail through the canal.

16. **Unnecessary delay in canal.**—Vessels must not obstruct navigation by unnecessary delay in entering or passing through the canal or by anchoring in the channel.

17. **Landing of freight, etc.**—Except in emergencies, vessels shall not stop to land passengers, freight, or baggage or to transfer same to another vessel under such conditions as would in any way interfere with navigation.

18. **Deposit of refuse.**—No ashes, oil, or other material or liquid of any kind shall be thrown, pumped, or swept into the canal or approaches or deposited on canal grounds.

19. **Statistics.**—Masters or pursers of vessels shall furnish the district engineer, or his authorized representative, on each passage through the canal, such written statement of passengers, freight, and registered tonnage as may be indicated by blanks furnished for the purpose. Failure to furnish this statement will result in the offending boats being refused passage through the canal or any part of it.

20. **Persistent violation of regulations.**—If the owner or master of any boat persistently violates these regulations after due notice of the same, legal proceedings may be instituted under the act or acts covering such violations.

21. **Pilots.**—The United States Engineer Department does not maintain pilot service. Pilots licensed by the Department of Commerce are usually available. Signals from vessels or requests by radio, etc., will be transmitted to pilots, but no responsibility therewith is assumed.

22. **Trespass upon canal property.**—Trespass upon the canal property or injury to the canal, lands, banks, bridges, breakwaters, dolphins, fences, culverts,

trees, telephone lines, or to any other property of the United States pertaining to the canal is prohibited.

23. **Fish and game.**—All persons are forbidden to enter upon the United States land or canal for the purpose of fishing or hunting, or taking fish or game by any means, without a written permit from the district engineer. The fish and game laws of the United States and of the State of Massachusetts will be enforced upon the canal and the lands of the United States pertaining thereto.

24. **Effective date.**—These regulations shall take effect and be in force from and after January 1, 1938. All previous regulations are hereby rescinded.

The bottom width of the approach channels, both ways, is from 480 to 500 feet, and the bottom width of the canal is from 315 feet to 480 feet. In December 1939 the controlling depth in the canal was 28 feet (8.5 m.) at mean low water.

Controlling depths at mean low water in the east mooring basin (north side of east entrance) is 16 to 28 feet (4.9 to 8.5 m.); in the new boat basin (south side of east entrance) it is 13 feet (4.0 m.); and in the west mooring basin (near Hog Island) it is 30 feet (9.1 m.). The above depths are as reported in January 1940.

Passage through the canal is made both with and against the current, according to individual preference of shipmasters. The maneuvering quality of the vessel is usually the decisive factor in making the choice. A launch meets incoming ships and obtains information for statistics.

Revised regulations governing the use of the Cape Cod Canal may be obtained from the District Engineer, United States Engineer Office at Boston, Mass. (see paragraph No. 2 of Cape Cod Canal Regulations).

Information Bulletins are published bi-monthly and contain the latest pertinent information regarding changes, controlling depths, widths and improvements for the navigation of the Canal.

Radio service is available for obtaining information on operating conditions in the canal at all hours day or night. The nearest radio station is at Chatham (call letters WIM and WCC) from whence messages are relayed by telephone to the canal authority.

The nearest ship-to-shore telephone station is at Scituate (call letters WOU) through which conversations may be had with canal authority. The **radio telephone** installation at the Canal Office, Buzzards Bay, is in operation for 10-minute periods beginning each hour and half hour. Call letters are WZBA and the frequency is 2,350 kc. Only calls on the above frequency can be answered. Authority to install crystals of the above frequency on ships using the Cape Cod Canal may be obtained on application at the U. S. Engineer Office, Boston, Mass.

The **entrance** to the canal off Wings Neck Lighthouse, Buzzards Bay, is marked by two lighted buoys, one with a bell, which, in addition to the fog signal on Wings Neck, makes the entrance accessible in thick weather. From the entrance of the dredged channel to the canal proper there are lighted buoys and lights at frequent intervals.

On Hog Island there is an **automatic fog signal** which operates only upon the blast of an approaching ship's whistle and not continuously as heretofore. The bell should stop sounding within a few minutes after the ship has stopped whistling.

Caution at bridge.—When the railroad lift span at Buzzards Bay is lowered in thick weather, or when visibility is low, there will be

4 blasts of an air whistle on the span every 2 minutes. Vessels in transit, especially with the favorable current, must exercise extreme caution when the span is lowered. The position of the span is noticeable for some distance in both east and west directions.

This bridge is maintained in a raised position except when in use.

Fixed white lights on the canal bank are placed at intervals of about 500 feet the entire length of the canal. In some cases the lights are at highwater line while the remainder are on the top of the revetment about 140 feet from the edge of the canal. At a distance approximately 4,000 to 5,000 feet east of the Sagamore Highway bridge the standard canal bank lights have been replaced by sodium lights of greater power.

The **entrance from Cape Cod Bay** is protected on its north side by a breakwater 3,000 feet long, built out from the shore to a depth of 5 fathoms (9.1 m.) and a short breakwater which extends from the shore on the south side of the entrance. **Canal Breakwater Light*** (red skeleton tower) is established on the north breakwater near the outer end. The light is 40 feet (12.2 m.) high and visible for 12 miles. The fog signal is an air oscillator.

A radiobeacon is operated at this station during fog and on schedule during clear weather.

There is a lighted buoy off the north breakwater, a can buoy off the south breakwater, and a bell buoy a little farther out. A lighted bell buoy lies 2.5 miles 30° true from the entrance. A lighted entrance range on course 245° true leads into the canal.

In approaching the eastern entrance of the canal in clear weather the jetties and the light at the entrance, a large square building, the Coast Guard station on the south bank of the canal and the range are the guides. In thick weather the buoys are the guides. Strangers should not confuse the entrance jetties with the smaller ones at Sandwich Harbor, 1 mile southeastward. The fog is said to be always less dense inside the entrance than outside. Strangers should be careful not to mistake two white church spires near the eastern entrance for the entrance range towers.

Storm-warning displays are made from a tower at the Coast Guard station at the eastern entrance to the canal.

Pilotage is not compulsory for vessels carrying a pilot licensed by the United States Bureau of Marine Inspection and Navigation for the canal. Pilots or towboats may be obtained by making a signal upon approaching either end of the canal. The signal for a pilot is 3 long and 1 short blasts of whistle. A telephone office is established at Wings Neck Lighthouse and also on the wharf at the east end of the canal, from which vessels are reported. Pilotage is maintained by the Canal Pilots' Association.

Tides.—The mean rise and fall of the tide at the Cape Cod Bay entrance is about 9.4 feet and at the Buzzards Bay entrance it is 4.1 feet. As the tide at Cape Cod Bay occurs approximately 3 hours later than that at Buzzards Bay the periodic differences in level are large and this causes strong currents.

Subnormal tides, which occur fortnightly, may reduce the channel depth 2 feet below mean low water or to even greater extent if attended by heavy off-shore winds.

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*Lat. 42°46'.8, Long. 70°29'.4: Chart 1208.

Currents.—Predictions for the time of slack water and the times and velocities of strength of current for every day in the year are given in the Current Tables, Atlantic Coast. Slack water occurs about 2 hours before high and low water at Boston, the east current beginning before Boston low water and the west current before Boston high water. About halfway through the canal the average maximum easterly current occurs about 1 hour after low water at Boston and the westerly current about ¾ hour after high water at Boston. Under ordinary conditions the currents have an average velocity at strength of about 3½ knots in midstream. The average strength of current at spring tides is about 4 knots.

Water vapor.—It is reported that at times a water vapor hangs over the canal to such an extent that traffic has to be suspended.

Ice.—The canal proper has never been closed by ice, but Buzzards Bay is closed at times, so as to prevent navigation through the canal. See "Ice, Buzzards Bay," on page 91.

Bridges cross the canal at the villages of Buzzards Bay, Bourne and Sagamore, at distances of 4.3, 5.6, and 8.8 miles from Wings Neck Lighthouse.

The highway bridges at Sagamore and Bourne have vertical clearances of 135 feet (41.1 m.) above mean high water and horizontal clearance of 550 feet between channel piers.

The railroad bridge at Buzzards Bay has a vertical clearance of 7 feet (2.1 m.) when closed and 135 feet (41.1 m.) when raised, a position at which it is normally maintained. (See page 99 for signals when bridge is in lowered position.) The horizontal clearance between fenders is 466 feet.

WAREHAM RIVER TO NEW BEDFORD

(CHART 249)

From Wareham River to New Bedford the shore is much indented and rocks and ledges extend offshore nearly 2 miles in places.

Dry Ledge, bare at half tide, lies 1 mile from the western shore and east of Great Hill. It is sometimes marked by a private spindle. A buoy marks the southwest side of the ledge. The depths north of the ledge, to Little Bird Island, range from 4 to 9 feet (1.2 to 2.7 m.).

An obstruction or shoal having a depth of 10 feet (3 m.) or less over it, has been reported about 400 yards southwestward of Dry Ledge.

Extensive shoals extend southward from the eastern side of the entrance to Wareham River. The southern end of the shoal is marked by a buoy.

Wareham River (chart 251) empties into the northern end of Buzzards Bay, the entrance lying 3.5 miles northward of Bird Island* and 3.5 miles northwestward of Wings Neck Lighthouse. The river is the approach to the town of Wareham, on the west bank at the head of navigation, nearly 2 miles above its mouth. Off the entrance and in the river are extensive shoals and numerous ledges, through which a channel, marked by buoys, leads to the wharves of the town.

*Lt. 41°41'.2, Long. 70°43'.1: Charts 251, 249, 1210.

There has been no recent examination of the river but local fishermen report that there is a controlling depth of about 9 feet (2.7 m.) from Buzzards Bay to the wharves at Wareham.

Wareham is a small town on the western bank of the river at the head of navigation, nearly 2 miles above the mouth. The depth at the wharves is about 10 to 12 feet (3 to 3.7 m.).

Pilots are necessary for strangers, and may be obtained by making signal when off Bird Island or at anchor off Great Hill. State pilotage is not compulsory for coasting vessels.

Towboats are usually employed by the larger vessels, especially in winter. They may be ordered from New Bedford by telegraph or telephone.

There is no anchorage in the river except in the channel. **Great Hill** is high and wooded and is marked at its eastern end by a prominent large stone building.

Tides.—The mean rise and fall of the tide is about 4.1 feet.

Currents.—The velocity of the currents is not great enough to materially interfere with a vessel having a good breeze. During the first half of the ebb the current below the wharves of the town sets across the flats westward of the channel; and during the whole of the ebb it sets across the flats eastward of the channel below Long Beach at the mouth of the river.

Ice.—The river is closed part of each winter by ice.

Directions, Wareham River.—Pass 0.8 mile eastward of Bird Island and steer 351° true, passing about 350 yards eastward of the northeastern end of Great Hill, and anchor about 400 yards eastward of the wharf on its northeastern side in 15 feet (4.6 m.), soft bottom, until a pilot is obtained.

Strangers should obtain local information regarding channel depths before navigating the river.

Supplies.—Gasoline, water, and a limited amount of ship chandlery supplies can be obtained.

Repairs.—A marine railway capable of handling small craft up to lengths of 40 feet and 6-foot (1.8. m.) draft is available. There is a depth of about 6 feet (1.8 m.) alongside the wharf at the boat yard.

Communication.—Transportation by bus and railroad can be obtained.

Weweantic River, northward of Great Neck, has a narrow, crooked channel, partially obstructed by rocks. It is navigable for a distance of over 2 miles above the highway bridge by small craft. The vertical clearance at the highway bridge is about 5 feet (1.5 m.) at mean high water.

Wings Cove, southward of **Great Hill Point,** has depths of 8 to 17 feet (2.4 to 5.2 m.) in the outer part, and is sometimes used by small fishing vessels as an anchorage with westerly winds.

The old tower of the former lighthouse on Bird Island is a prominent landmark.

Bird Island Reef, situated about 0.4 mile eastward of Bird Island, has depths from 15 to 18 feet (4.6 to 5.5 m.) and is marked on its southeast side by a buoy.

Centerboard Shoal, southwest of Bird Island, has depths from 12 to 18 feet (3.7 to 5.5 m.) and is marked by a lighted buoy.

Cleveland Ledge and Cleveland East Ledge have depths of 16 to 18 feet (4.9 to 5.5 m.). These are important dangers and the western approach to the Cape Cod Canal is between these shoals. Cleveland Ledge is marked by a buoy and Cleveland East Ledge by a lighted bell buoy. Approximately half way between Centerboard Shoal and Cleveland Ledge there is a 17-foot (5.2 m.) shoal marked by a lighted gong buoy on the south side.

It is reported that when navigating in the head of Buzzards Bay, Mass., a good set of ranges may be found, leading between the two 16-foot shoal spots on Cleveland Ledge, by bringing Wings Neck Lighthouse in range with the south tower of the railroad bridge over the Cape Cod canal.

This range may be useful at night should, for any reason, Cleveland East Ledge lighted bell buoy be extinguished.

The Bow Bells are shoals with depths of 11 to 18 feet (3.4 to 5.5 m.) situated about 1 mile southwest of Centerboard Shoal. A buoy marks the southeast end of the 11-foot (3.4 m.) shoal.

Butler Point, north of **Bird Island,** is marked by a yacht club and by a prominent flagstaff. Bird Island is joined to Butler Point by a bar with little water over it. Small local craft, of less than 4 feet (1.2 m.) draft, cross the bar about 200 yards southward of the point.

Sippican Harbor* (chart 251) makes into the north shore of Buzzards Bay about 2.5 miles northeastward of Mattapoisett entrance. The entrance is marked on the eastern side by Bird Island and on the western side by a prominent large house on **Blake Point (Charles Neck).** The entrance is about 1.1 miles wide and has few dangers. Above the entrance the width of the harbor gradually lessens, and at Ram Island, 2.2 miles above Bird Island, the width between the island and the western shore is only 300 yards. The harbor is seldom used as an anchorage except by yachts. Some local knowledge is necessary to keep in the best water up to the town. The deepest draft entering the harbor is about 10 feet (3.0 m.).

Blankenship and **Planting Island Coves** have a common entrance northward of Ram Island, and have general depths of 3 to 5 feet (0.9 to 1.5 m.). A rock, bare at low water, lies in midchannel northward of Ram Island.

Gibbs Rock Beacon formerly known as Hood Rock Beacon is situated on the south side of the channel north of Ram Island. It is privately maintained.

Ram Island is low and partly wooded and is marked by a large house. **Little Island** lies on the opposite side of the channel about 0.2 mile northwestward of Rum Island. The channel is narrow abreast Ram Island and the currents have considerable velocity at times.

Briggs Cove, locally known as **Jennys Cove** in the northeastern part of the harbor, has a small marine railway near the head to which a draft of 4 feet (1.2 m.) at high water can be taken with local knowledge.

There are rocks on each side of the entrance.

*Lat. 41°42′, Long. 70°45′: Charts 251, 249, 1210.

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Marion is a small town on the western shore of Sippican Harbor, about 2.5 miles above Bird Island. The depth at the wharf is about 5 feet (1.5 m.). About 1 mile northward of Marion is a group of prominent radio masts.

5 **Pilots** may be had by signaling at the entrance, westward of Bird Island, anchoring there if necessary.

Ice usually closes the harbor about a month or more each winter.

Tides.—The mean rise and fall of the tides is about 4 feet.

Directions, Sippican Harbor.—Enter midway between the buoys 10 marking the Bow Bells and Centerboard Shoal, steer 348° true for 1.4 miles and pass over 100 yards eastward of **Mendells Rocks** buoy eastward of the end of Blake Point. When close eastward of Seal Rocks black buoy, 700 yards beyond, steer 328° true and pass close eastward of the black buoy (Black Rock) west-southwest of Ram 15 Island. Change course if necessary to pass close westward of the red buoy (Ram Island Point Shoal) west of Ram Island.

Then steer 358° true about 75 yards eastward of Little Island. Anchor about 200 yards eastward of the black buoy southeastward of the wharf at Marion in 10 to 13 feet (3 to 4 m.).

20 **Repairs and supplies.**—There are two boat yards with marine railways. The largest, with a capacity of 40 tons, is capable of handling craft up to 50 feet in length and a draft of 6 feet (1.8 m.). The other boat yard has facilities for maintaining service on standard marine equipment, and carries ship-chandlery supplies. Gasoline 25 and water can be obtained at the dock where there is a depth of about 3 feet (0.9 m.) at mean low water.

Aucoot Cove, about 0.8 mile southward of Sippican Harbor, has depths of 10 to 19 feet (3 to 5.8 m.) and is only occasionally used by small fishing vessels as an anchorage with westerly winds. The 30 other coves between Sippican and Mattapoisett Harbors are foul and seldom entered, even by local boats.

Mattapoisett Harbor.—This harbor (chart 251 or 252) lies about 5 miles northeastward of New Bedford Harbor and is marked on its north side by **Ned Point Lighthouse,** which is lighted between April 35 15 and October 15 only.

The entrance, between **Angelica** and **Strawberry Points** on the east and **Mattapoisett Neck** on the west, is about 1.5 miles wide, but is much obstructed by shoals and ledges, between which a buoyed channel leads to the anchorage off the village of **Mattapoisett,** which 40 is situated on the north shore about 0.8 mile above Ned Point. The harbor is exposed to southeasterly winds, but the ledges at the entrance somewhat break the sea from that direction. It is little frequented except by yachts. There is a great deal of yachting activity during the summer months.

45 The least found depth in the channel as far as the anchorage off the village is 14 feet (4.3 m.), but, due to the broken character of the bottom, vessels should proceed with caution over areas where the charted depths are not more than 6 feet (1.8 m.) greater than the draft. The stone wharf has a depth of about 5 feet (1.5 m.) 50 at the end. There is a marine railway for small craft not over 25 feet long. Gas-engine repairs for small craft can be made. Strangers should not attempt to enter at night.

A 3-foot (0.9 m.) shoal near the town landing is marked by a buoy.

Tides.—The mean rise and fall of tides is about 4 feet.

Directions, Mattapoisett Harbor.—From a position 600 yards east of Nye Ledge bell buoy a 313° true course for 2 miles leads through the buoyed channel, passing about 100 yards eastward of the buoy at **Gallatin Rock.** When about 150 yards southwestward of the buoy marking **Barstow Rock,** steer 320° true for the stone wharf and anchor 0.3 mile from the northeast shore between Ned Point and the wharves, in 13 to 17 feet (4 to 5.2 m.).

Mattapoisett Ledge extends in a southeasterly direction for a distance of about 1 mile from **Mattapoisett Neck.** It has depths ranging from 1 to 8 feet (0.3 to 2.4 m.) with an area generally foul near the inshore end. It is marked near the east end by a buoy. Southeastward of Mattapoisett Ledge is **Nye Ledge** with depths of 7 to 17 feet (2.1 to 5.2 m.) and marked by a bell buoy.

Cormorant Rock,* which shows bare at half tide and is marked by a black spindle with cage, lies 1.4 miles east-northeastward of the easterly point of West Island and 0.9 mile south-southeastward of **Ram Island,** the low, grassy island off Mattapoisett Neck. Ledges with little water over them surround the spindle at a distance of 150 yards, and depths of 18 to 21 feet (5.5 to 6.4 m.) extend 0.3 mile southward from it; a rock with 14 feet (4.3 m.) over it lies 0.2 mile east-northeastward from the spindle. There is a channel with a depth of about 15 feet (4.6 m.) between the rock and Ram Island.

Nasketucket Bay (chart 252) has its entrance between West Island on the west and Cormorant Rock on the east, and is sometimes used by sailing vessels as an anchorage in southwesterly winds. Northward and westward of West Island the bay is much obstructed by rocks.

There is a line of rocks across the passage between West and Long Islands with an opening 10 feet wide and 7 feet (2.1 m.) deep for small launches. The opening can be seen only at or near low water when the rocks uncover. The approach from the southward winds among many sunken rocks and shoals and is very dangerous. The passage between Long Island and Sconticut Neck is completely obstructed by a line of rocks which are covered at high tide.

Day beacons privately maintained mark the best water leading into **Little Bay** and thence into Nasketucket River.

Old Kelick Rock, northwest of West Island and **Whale Rock** east of West Island are sometimes marked by private beacons.

West Island Shoal extends nearly 1 mile southward from **West Island,** and for half this distance is mostly bare at extreme low water; for the remainder of the distance the depths range from 10 to 18 feet (3 to 5.5 m.). A buoy is placed off the south end of the shoal.

A rock with a depth of 17 feet (5.2 m.) over it lies about 0.8 mile northeastward, a small ledge with 13 feet (4.0 m.) over it lies 0.4 mile westward, and another with 16 feet (4.9 m.) over it lies nearly 1 mile southwestward from the buoy.

An area south of West Island has been used as a **dumping ground.** No recent examination has been made to determine depths in this area and caution is recommended.

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*Lat. 41°36′.3, Long. 70°47′.5: Charts 252, 249, 1210.

A detailed description of the remaining dangers would be of little use; strangers must be guided mainly by the chart and buoys.

NEW BEDFORD HARBOR AND APPROACHES

(CHARTS 249 AND 252)

New Bedford Harbor is a tidal estuary at the mouth of the Acushnet River on the northwestern side of Buzzards Bay. It is the approach to the city of New Bedford, on the west side of the river, and the town of **Fairhaven** on the east side of the river. By water it is about 163 miles, via Long Island Sound, to the Battery at New York City and 80 miles, via Cape Cod Canal, to Boston. The harbor includes all the tidewater lying northerly of a line from the southern extremity of Clark Point to Sconticut Point at the southern end of Fairhaven and extending to the head of navigation on the river at **Acushnet.** The outer harbor consists of the area south of **Palmer Island** and the inner harbor, the area north of the island to a short distance above the New Bedford-Fairhaven bridge.

The approach from Buzzards Bay and the entrance to the harbor are much obstructed by ledges and shoals, between which several well-marked channels lead to the entrance of the dredged channel. The bottom is very broken, characterized by large bowlders, and as a matter of safety vessels should proceed with caution when crossing areas away from the general track of vessels, where the charted depths are not more than 6 to 8 feet (1.8 to 2.4 m.) greater than the draft.

Clark Point,* on the western side of the entrance to New Bedford Harbor, is marked by a granite fort. A little to the northward of it is an amusement park.

A very prominent landmark for New Bedford is the group of six large white cement stacks of the Associated Gas and Electric Co.

New Bedford, a manufacturing city on the western side of the harbor, has considerable trade by water; the deepest draft entering the harbor is about 23 feet (7.0 m.). The wharves have depths up to 25 feet (7.6 m.); privately dredged channels lead from the anchorage basin to some of the wharves.

Fairhaven is a town on the eastern side of the harbor and is connected with New Bedford by a drawbridge.

The **Acushnet River** empties into the northern part of New Bedford Harbor. There is about 23 feet (7.0 m.) in a narrow channel from the basin off Popes Island to within 1,200 feet of the Coggeshall Street Bridge. The eastern side of this channel is marked by red buoys, and a fixed red light is exhibited from a green post off the Shell Eastern Petroleum Products, Inc., wharf on the west side of the channel at its head. A depth of 7 feet (2.1 m.) can be carried through the draw in the Coggeshall Street Bridge but the channel above the bridge is not marked and there is little traffic except by launches.

Channels.—There are several channels leading up to Clark Point, between the ledges in the approach. The eastern channel has the deeper water; with the aid of the chart a depth of about 25 feet (7.6 m.) can be taken through this channel to an anchorage eastward or

*Lat. 41°35'.6, Long. 71°54'.1: Charts 252, 249, 1210.

southward of Clark Point. The middle and western channels are good for a depth of about 21 feet (6.4 m.).

The entrance channel had a width of 350 feet and a controlling depth of 28 feet (8.5 m.) in 1939 through the harbor and bridge and in the turning basin above the bridge. Along the Fairhaven waterfront the channel has a width of about 150 feet and the controlling depth is 15½ feet (4.7 m.) to a line south and east of Crow Island and 10 feet (3.0 m.) above.

Pilotage into New Bedford is compulsory for vessels of 7 feet or more draft engaged in foreign trade or in whaling, except that outwardbound whaling vessels are exempt. It is not compulsory for vessels in the coastwise trade.

Pilots are generally taken by larger vessels and may be had by making signal off Hen and Chickens Lightship. Pilots usually leave and board vessels in this general vicinity.

Pilot boats do not cruise continually off New Bedford, and vessels desiring a pilot should make arrangements therefor in advance through their agents or through the deputy commissioner of pilots. For pilotage rates see *Port and Terminal Charges* published by the Corps of Engineers, United States Army. For sale by the Superintendent of Documents, Washington, D. C.

Vessels of not more than 200 tons burden, which decline the services of a pilot are, if otherwise liable to pilotage, liable for one-half the regular fee. If the pilot offers his services outside of Mishaum Ledge, he shall be entitled to full pilotage, provided he is taken. If not, he is entitled to one-half. If taken between Mishaum Ledge buoy to opposite Penikese, he shall be entitled to three-quarters pilotage. If taken on board from Sand Spit Bell Buoy to Mosher Ledge he shall be entitled to one-half pilotage. If the vessel should arrive at Butler Flats before being spoken, it shall be exempt from the inward pilotage.

If steam towage is taken by the desire of the master, the vessel is required to pay full pilotage fees, but if taken by direction of the pilot in charge, such vessel is required to pay to the pilot 75 percent of the regular fees.

Towage.—Steam vessels usually proceed to and from the harbor without assistance, but towboat service is sometimes used in docking and undocking larger steamers. Rates for towboat services are by agreement.

Towboats are generally taken by sailing vessels entering the inner harbor and can be had by making signal.

The **Immigration Service** maintains a branch office in the Post Office Building, under the immediate jurisdiction of its Boston office.

The **customhouse** is located at the southwest corner of William and North Second Streets, about one-fourth mile from the principal wharves.

Quarantine.—The United States Public Health Service conducts the quarantine inspection of vessels and their crews at an anchorage ground in the outer harbor, bounded as follows: Butler Flats on the south, east shore of Clark Point on the west, Eleven Foot Bank on the north, and Egg Islands on the east.

Hospitals.—There is no quarantine hospital at New Bedford, and vessels with quarantinable diseases on board are remanded to ports having such facilities. The United States Public Health Service is

represented by a designated physician, who maintains an office and dispensary where out-patients receive treatment. The city of New Bedford is well equipped with private hospitals. St. Lukes Hospital is a designated United States contract hospital.

Anchorage.—The anchorage known as the outer harbor, westward of Sconticut Neck, has depths of 2 to 4½ fathoms (3.7 to 8.2 m.) but is exposed to southerly winds. (See limits as given below.) The dredged anchorage basin northward of Palmer Island is 1,400 feet wide and 29 feet (8.8 m.) deep and over, except along its southwestern edge, is well sheltered, and has good holding ground. Vessels of less than 8-foot (2.4 m.) draft can anchor southwestward of the dredged anchorage basin, giving the wharves a berth of about 150 yards.

Vessels sometimes anchor about 0.75 mile south of Clark Point in depths of 20 to 30 feet (6.1 to 9.1 m.) before proceeding into the outer or inner harbor.

Prohibited anchorages.—Regulations prescribed by the Secretary of War prohibit anchorage in the fairway leading through New Bedford outer harbor.

Anchorage areas in New Bedford outer harbor are defined on large scale charts.

The harbor master has control of the anchoring and lightering of vessels in the harbor. His office is located at the foot of city pier No. 3. **Harbor regulations** have been established and are enforced by the harbor master. Copies of these regulations can be obtained from him.

Caution is recommended to avoid the 18-foot (5.5 m.) and 20-foot (6.1 m.) shoals situated east of the dredged entrance channel and about 0.9 mile east of Clark Point. These shoals are in surrounding depths of 24 to 26 feet (7.3 m. to 7.9 m.) and are in the approach to Egg Island anchorage.

Tides.—The mean range of the tide is 3.7 feet. Extreme tides due to wind and other causes have a maximum range of 7 feet or more.

Storm warning displays are made at Fairhaven.

Prevailing winds.—The prevailing winds during the winter months are from north to west, and during the summer months from south to southwest.

Ice.—The channels and anchorage area of this harbor are usually navigable throughout the year, although in prolonged periods of extreme cold weather the harbor, and even the whole of Buzzards Bay, may become closed to navigation on account of ice. Such conditions are infrequent and of short duration.

In New Bedford Harbor steamers can generally make their way, but sailing vessels require the assistance of a towboat to break the ice.

Bridges.—The New Bedford and Fairhaven Bridge has a draw opening (east of Fish Island) 94 feet wide and a vertical clearance of 8 feet (2.4 m.). The Coggeshall Street Bridge has a center pier opening with a least width of 38 feet and vertical clearance of 2.8 feet (0.8 m.).

The Slocum Bridge has a vertical clearance of 5½ feet (1.7 m.) at mean high water under the center span.

Deep-draft vessels should use the west draw opening of New Bedford-Fairhaven Bridge.

Regulations have been prescribed by the Secretary of War governing the opening of the New Bedford and Fairhaven Bridge, as follows:

1. The signal for opening the draw shall be given by three short blasts of a horn or steam whistle; except that for vessels drawing 15 feet (4.6 m.) and over desiring to pass through the bridge between the hours of 6.30 and 7.15 a. m., the signal shall be given by three short blasts followed by one long blast of a horn or steam whistle. The signal for opening shall be answered by one long blast of a whistle or horn on the bridge when the operation of opening is commenced, or, if the draw cannot be promptly opened by three long blasts, and in addition a red flag or ball by day and a red light by night shall be conspicuously displayed on the bridge.

2. Except as hereinafter provided the draw shall be immediately opened, upon the prescribed signal, for the passage of foreign vessels and "vessels of the United States," as defined in section 4311 of the Revised Statutes. *Exceptions:* (*a*) Between 6.30 and 7.15 a. m. the draw shall not be opened for any of the above-described vessels drawing at the time less than 15 feet (4.6 m.) of water. (*b*) Between 1 hour after sunset and 1 hour before sunrise (almanac time) the draw shall be opened upon notice given to the draw tender a reasonable time in advance. Arrangements shall be provided whereby the draw tender can be conveniently reached by telephone and notice of such arrangements shall be kept conspicuously posted on the bridge.

3. For all other vessels which cannot pass the closed bridge the draw shall, upon the prescribed signal, be opened as soon as practicable, but, subject to the exceptions in paragraph 2 above, in no case shall delay be more than 20 minutes.

4. For every vessel that cannot pass the closed bridge the operation of the draw shall afford full horizontal and vertical clearance in the draw opening regardless of the size or requirements of the passing vessel.

DIRECTIONS, NEW BEDFORD HARBOR

Keeping in mind the broken character of the bottom, vessels should proceed with caution where the charted depths are not more than 6 to 8 feet (1.8 to 2.4 m.) greater than the draft. Clear weather, when the aids are visible, is necessary for a stranger. Sailing vessels should not attempt to beat into the harbor unless well acquainted with the dangers. Directions for entering Buzzards Bay are given on page 45.

Eastern Channel.—From a position 0.3 mile southward of Mishaum Ledge lighted bell buoy, steer 57° true to a position about 0.5 mile southward of Wilkes Ledge buoy; then steer 40° true to a position 0.3 mile southeastward of Hursell Rock Gong buoy. Pass 300 yards eastward of the buoy and steer 334½° true with Palmer Island Lighthouse in range with Butler Flats Lighthouse.* This range leads between Brooklyn Rock, marked by a lighted bell buoy, and Henrietta Rock, marked by a red buoy.

To enter the **inner harbor** steer 337° true when abeam of Brooklyn Rock lighted bell buoy, changing course as necessary to keep in midchannel, passing eastward of Palmer Island. After passing Palmer Island Lighthouse the course can be laid to the anchorage north of Palmer Island, to the wharves or through the drawbridge as desired.

If, coming down Buzzards Bay, where Dumpling Rock Lighthouse bears 252° true, steer for it, passing 0.6 mile southward of West Island Shoal red buoy and 600 yards southward of Mosher Ledge lighted bell buoy. Round this buoy at this distance and then steer 334° true and proceed as in the preceding paragraphs.

* Lat. 41°36'.2, Long. 70°58'.7: Charts 252, 249, 1210.

Middle Channel.—From a position 0.2 mile southward of Mishaum Ledge lighted bell buoy, steer 57° true to a position 0.5 mile southward of Wilkes Ledge buoy; steer a course of 6° true with the high elevated tank at Fairhaven as a leading mark, passing 450 yards eastward of Wilkes Ledge buoy, and westward of the red buoy off the westerly side of Great Ledge, and to the entrance of the dredged channel eastward of Butler Flats Lighthouse.

West Channel.—Pass 0.2 mile southward and 0.2 mile eastward of Mishaum Ledge lighted bell buoy and steer 26° true for 5.6 miles, passing 200 yards westward of the horizontally banded buoy 0.7 mile southward of Dumpling Rock Lighthouse and 0.2 mile eastward of this lighthouse. When 450 yards northwestward of Decatur Rock buoy, steer 6° true and proceed as in the preceding paragraph.

Dockage.—At city pier No. 3 there are no dockage charges for fishing vessels; rates for other vessels are by arrangement with the wharfinger.

Wharfage.—Wharfage charges at the State pier are fixed by the Massachusetts Department of Public Works.

Supplies.—Coal in unlimited quantities, water, gasoline, provisions, and supplies of all kinds can be obtained.

Coal bunkering.—Two companies supply bunker coal to vessels. The wharves of both of these companies are located just above the New Bedford-Fairhaven Bridge. Neither of the companies maintains any floating equipment for bunkering vessels in the stream, but suitable lighters are available in the harbor by arrangement. One plant is located on Fish Island and has a storage capacity of 10,000 tons. The plant can deliver 100 tons per hour. About 250 feet of berthing space is available with a depth alongside of 28 feet (8.5 m.) at mean low water.

The other plant is located at the foot of Hillman Street, and has a storage capacity of 12,000 tons. Bunkering is done with a telescopic chute from an overhead hopper. The maximum delivery capacity is 200 tons per hour. Berthing space of 180 feet is available with a depth alongside of 18 feet (5.5 m.) at mean low water.

Oil bunkering.—There are two concerns equipped to supply fuel oil to vessels at this port. The normal quantity carried in stock is 1,000 barrels of light fuel oil. Delivery can be made at the rate of about 220 barrels per hour.

Fresh water.—The water is of excellent quality for domestic use and for use in boilers. It can be obtained at the State pier, the city pier, and at some of the private wharves. There are also facilities for supplying water to vessels anchored in the harbor.

Floating equipment.—Towboats and derrick lighters are available. Some of the lighters are equipped with air compressors and driving equipment.

Repairs.—There are three boat yards at Fairhaven and one at New Bedford. The largest marine railway has a capacity of 700 tons, and is able to accommodate vessels up to 120 feet in length with a draft of 13 feet (4.0 m.). There are facilities for obtaining repairs to boilers, dynamos, and machinery. In addition forgings can be made and iron, brass, or bronze castings are available.

Commerce.—The principal items of commerce are coal, petroleum products and lumber carried in barges, schooners, and steamers, drawing from 8 to 24 feet (2.4 to 7.3 m.).

Communication is by railroad and steamer with New York. Daily steamers operate during the entire year to Martha's Vineyard and Nantucket. A mail boat makes daily trips to Cuttyhunk. There is bus service to Fall River.

NEW BEDFORD* TO SAKONNET RIVER

(CHART NO. 1210)

The coast between New Bedford Harbor and the entrance of Sakonnet River is fringed with extensive shoals, many of them rocky and some well offshore. The entrances are shoal and of little importance except to local boats.

Mishaum and Hen and Chickens Ledges are described with Buzzards Bay, on page 90.

Clark Cove, between Apponaganset Bay and New Bedford Harbor, affords anchorage in 12 to 22 feet (3.7 to 6.7 m.), but is exposed to southerly weather and is seldom used. There are no dangers in the cove except near the shore. A fish pier with 5 feet (1.5 m.) at its end is located near the northern end of the cove. Four sewer outlets, consisting of rock cribs which bare 2 and 3 feet (0.6 and 0.9 m.) above high water, are also located near the head of the cove."

Apponaganset Bay is the bight 2 miles northward of Dumpling Rock Lighthouse. The bay is used considerably by small craft as an anchorage during the summer but is insecure in southeasterly gales. **Nonquitt** and **Bayview** are villages on the solth side of the entrance. **South Dartmouth (Padanaram)** is on the east side of the bay. The wharf has a depth of about 12 feet (3.7 m.) The approach to the bay is obstructed by numerous ledges and rocks, and a stranger should not attempt to enter except in the daytime with clear weather.

A yacht club, situated on the east side of the bay, has depths of about 8 feet (2.4 m.) at the end of the wharf. Gasoline, fresh water, and diesel oil are available at Tiffany's wharf at South Dartmouth where there are depths of 8 to 10 feet (2.4 to 3.0 m.) at mean low water.

A breakwater, marked at the outer end by a light, extends 700 feet southward from the shoal on the east side of the entrance. An anchorage basin with a least depth of 6 feet (1.8 m.) has been dredged westward of the wharf at South Dartmouth (Padanaram), between it and a line extending 208° true from the western end of the draw span of the bridge.

The bridge has an opening 31 feet wide and an overhead clearance above mean high water of about 8 feet (2.4 m.) when closed; above it, numerous small craft find anchorage in a narrow channel near the eastern shore.

To enter, pass 500 yards eastward of Dumpling Rock Lighthouse and steer 352° true, passing about 300 yards eastward of White Rock. When midway between **Hussey Rock** black buoy and **Lone Rock** red buoy, steer 315° true, and enter Apponaganset Bay southward of the breakwater. Anchorage can be selected as far up as 200 yards northwestward of the first red buoy, in 13 to 17 feet (4 to 5.2 m.), sticky bottom.

* Lat. 41°38', Long. 70°55' : Charts 252, 249, 1210.

Caution is recommended to avoid **Dartmouth Rock,** a 4-foot (1.2 m.) rock about 650 yards 328° true from the breakwater light.

White Rock and **Ragged Rocks** show above water and extend about 0.5 mile offshore and about the same distance northward of Dumpling Rock Lighthouse.

The most important dangers in this area are marked by buoys. **North Ledge** has depths of 9 to 18 feet (2.7 to 5.5 m.) and is marked on the northeast and southeast sides by buoys. South of North Ledge is **Decatur Rock** which has a depth of 7 feet (2.1 m.) and **Church Rock** which has a depth of about 15 feet (4.5 m.). The north and south extremities of this reef are marked by buoys. **Phinney Rock** has a depth of 11 feet (3.4 m.) and is marked by a buoy. **Great Ledge,** about 1 mile east of Dumpling Rocks Lighthouse, is about 0.25 mile in diameter with depths of 1 to 16 feet (0.3 to 4.9 m.). It is marked on the east side by a buoy and on the southwest side by a buoy. **Bents Ledge** with a depth of 6 feet (1.8 m.), Lone Rock with a depth of 2 feet (0.6 m.), and **Middle Ledge,** with a depth of 5 feet (1.5 m.), are marked by buoys. A lighted buoy on the east side of Middle Ledge marks the channel on that side of the ledge. **Inez Rock** and Hussey Rock are marked by buoys and have depths of water of 11 feet (3.4 m.) and 4 feet (1.2 m.), respectively.

As this area has a very broken bottom, vessels should proceed with caution if away from the general sailing track that is usually followed. Navigators should pay careful attention to the chart, which is the best guide, in order to navigate in the safest water, since attention has been directed only to the more important dangers.

Dumpling Rocks* is a group of bare and sunken rocks extending 0.4 mile southeastward from Round Hill Point.

Dumpling Rock Lighthouse is a white tower attached to the corner of a dwelling on the outermost bare rock. The light has a red sector from 27° to 43° (from seaward) covering Mishaum Ledge (see p. 90); 48 feet (14.6 m.) high and visible for 12 miles. The fog signal is a reed horn.

Round Hill Point is marked by a prominent round hill on which is a white tower.

The tower was formerly an aviation beacon to mark a privately owned airport, both of which have been abandoned. Caution should be exercised not to confuse this tower (in day time) with Dumpling Rock Lighthouse.

Westward of the point are four prominent radio masts. A famous old sailing ship is set in concrete on the beach on the south side of the point.

Wilkes Ledge is about 0.4 mile in diameter, with depths less than 24 feet (7.3 m.) and has a least depth of 9 feet (2.7 m.) near its northern side. The middle of the ledge lies nearly 1.6 miles 162° true from Dumpling Rock Lighthouse, and is marked on its southern side by a buoy; the buoy should be given a good berth.

Slocums River, westward of Mishaum Point, has a bar at the entrance nearly bare at low water. The channel inside is narrow and unmarked and seldom used by strangers.

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*Lat. 41°32'.3, Long. 70°55'.3: Charts 252, 249, 1210.

Slocums Ledge, extending 1,200 yards west of Mishaum Point, is marked on its west side by a red buoy with reflector.

Mishaum Ledge, and Old Cock are described under the heading of Buzzards Bay. See page 90.

Hen and Chickens Reef.—This reef consists of many large boulders mostly baring a foot or less at high water. It is in two groups, the southerly group being the larger. Numerous sunken rocks are to be found well away from the visible part of the reef. A narrow ledge, with from 5 to 13 feet (1.5 to 4.0 m.) of water, extends northward from the reef. See page 90.

Small local boats pass inside the Hen and Chickens Reef, between it and Gooseberry Neck. However, boats should be careful not to cross the ledge running north from the reef. Boats not familiar with these waters are advised not to use this pass.

In general this section is extremely rocky with many pinnacle rocks and it is recommended that all boats having no local knowledge of the section stay outside the 5-fathom curve.

Tidal currents are very strong near this reef running in a general north and south direction. As a result tide rips make this territory very rough when there is any sea running against the current.

Gooseberry Neck, extends southward from **Horse Neck Beach** for a distance of nearly 1 mile. The water surrounding it is generally foul and strangers should avoid the inshore area. Shoal water extends southward to Hen and Chickens Reef and also to the southwestward for about 0.5 mile to **Lumber Rock.** At low water and with moderate to strong southeasterly winds heavy seas break over this entire area. Lumber Rock has a depth of 4 feet (1.2 m.) over it and marked by a buoy to the southwest of it.

Twomile Rock lies a little over 1 mile south-southeastward of The Knubble, and is marked by a black spindle with cage, and a buoy, 400 yards southward of the spindle. A bell buoy is moored 0.3 mile southeastward of the spindle.

The bight eastward and northeastward of Twomile Rock spindle is free from dangers, and the shore can be approached as close as 400 yards.

Halfmile Rock is a bare rock lying close southward of the channel into Westport Harbor.

South of Halfmile Rock is **Dogfish Ledge** which has depths of 4 to 7 (1.2 to 2.1 m.) over it. It is marked at the east end by a buoy.

Close attention should be given the chart and buoys, which are the best guides for a stranger.

Twomile Ledge has depths of 2 to 10 feet (0.6 to 3.0 m.) over it. It is extremely dangerous for any boat to cross it especially near the southward end. Eastward of this ledge is **Markham Ledge** which has a depth of about 8 feet (2.4 m.) over it. Westward and northwestward from Twomile Ledge is **Palmer Ledge** with depths of 11 to 15 feet (3.4 to 4.6 m.), **Newet Rocks** with depths of 4 to 7 feet (1.2 to 2.1 m.) and **Briggs Rock** with depths of 3 feet (0.9 m.) of water. **Old Whale Rock** and **Cutty Wow Rock** are awash at low water.

Westport Harbor.*—This is the name given to the small anchorage just inside the mouth of Westport River, which empties into the northern part of the large bight between Gooseberry Neck and Sakonnet Point.

The entrance to Westport Harbor is shoal and heavy seas break over the entrance bar so boats should not try to enter with strong southerly winds.

Westport River has a narrow crooked channel, with a depth of 7 feet (2.1 m.) on the outer bar and 3 feet (0.9 m.) on the inner bar below the village of **Westport Point,** which is about 1.5 miles above its mouth, on the point of land between the two branches. The channel is well marked by buoys, but is too narrow and crooked to be followed, except with local knowledge; 8 feet (2.4 m.) is the deepest draft that can be taken to the village at high water.

The depths over the bars are continually changing and local information should be obtained before entering with a draft closely approaching the controlling depths given above.

Vessels should not attempt to enter at night. On the western side of the entrance is a peculiar rounded knubble, about 30 feet (9.1 m.) high, which serves as a guide to the entrance. A light is maintained on the eastern end of **The Knubble** from March 15 to December 15.

Tides.—The mean rise and fall of tides is about 3 feet.

The **tidal currents** set in and out of the entrance with considerable velocity.

It is reported that the velocity sometimes becomes as high as 3 knots and caution is recommended when navigating the river.

Directions, Westport Harbor.—Pass eastward of bell buoy 1A, about 400 yards and steer 324° true to pass about 50 yards west of red buoy No. 2 and about 150 yards northeast of Halfmile Rock. Then head for the entrance and when north of The Knubble favor the south shore of the river at a distance of about 100 yards and then be guided by the buoys. Although the entrance is well buoyed, local information should be obtained regarding depths and the best channel across the inner bar.

About 1 mile above its mouth Westport River divides into two branches, **East Branch** and **West Branch,** which have narrow and shallow channels and are navigated only by small craft. The bridge crossing East Branch at Westport Point has openings 32 feet wide and an overhead clearance of 6 feet (1.8 m.) at high water.

About 2 miles above Westport Point, the channel follows the eastern side of East Branch. The privately maintained buoy in this locality marks the eastern side of the channel and rocks awash at low water lie between the buoy and nearby shore. It is reported that several vessels have passed to the eastward of the buoy and have been wrecked on the rocks.

Hix Bridge, about 0.6 mile above Cadman Neck, has a horizontal clearance of 35 feet and a vertical clearance of 7 feet (2.1 m.) at mean low water. The bridge does not open.

A private dock where gasoline and oil may be obtained and a public dock are located on the west side of Westport Point Bridge.

There is a depth of about 10 feet (3.0 m.) alongside the face of this dock.

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*Lat. 41°31′, Long. 71°05′: Charts 287, 1210.

A small boat yard where repairs can be obtained has a marine railway capable of handling small craft of 60 feet in length and a draft of 6 feet (1.8 m.).

A yacht club situated on the south side of East Branch about 0.5 mile east of **Horse Neck Point** has a pier alongside the face of which there are depths of about 8 feet (2.4 m.).

Numerous rocks and ledges extend about 1 mile offshore for a distance of 2.5 miles westward of Westport Harbor, and the shore in this vicinity should be given a berth of about 1.3 miles.

Chapter 7.—NARRAGANSETT BAY

GENERAL INFORMATION

(CHART 353)

The entrance to this bay is between **Brenton Point,** the southwestern point of Aquidneck Island, on the east and **Point Judith Neck** on the west. The length of the bay from the entrance to its northern extremity at the mouth of the Providence River is 18 miles. It is the approach by water to the cities of Newport, Providence, Fall River, and Taunton, and to a number of towns and villages, the most important of which are Bristol, Wickford, and East Greenwich. The bay is well marked by lights, making its navigation easy either day or night in clear weather. **Conanicut** and **Prudence Islands** and several smaller ones lie in the bay and divide it into two passages.

The approaches to Narragansett Bay have been examined by means of a wire drag from longitude 71° 25′ W. eastward to the entrance of Buzzards Bay for a width of about 6 miles southward of Brenton Reef Lightship. The East Passage and parts of the West Passage abreast Conanicut Island have also been partly examined.

East Passage, between Aquidneck Island on the east and Conanicut and Prudence Islands on the west, is good for a least depth of about 10 fathoms (18.3 m.) in the channel for a distance of 12 miles above the entrance, and a depth of about 5 fathoms (9.1 m.) to the entrance of the dredged channel leading to Providence, which is 30 feet (9.1 m.) deep. East Passage is the most direct passage to Newport, Bristol, Mount Hope Bay, and Taunton River.

West Passage, between Conanicut and Prudence Islands on the east and the mainland on the west, is the approach to Dutch Island Harbor, Wickford, Greenwich Bay, and Providence River. The channel south of **Warwick Neck** and north of Prudence Island forms a passage through which a depth of 18 feet (5.5 m.) can be taken to Providence. Strangers with over 16 feet (4.9 m.) draft rarely go above Dutch Island Harbor without a pilot, but vessels of 16 feet (4.9 m.) draft should have no difficulty in going to the head of the bay and Providence by following the directions.

Pilots for Fall River and the harbors in Rhode Island will sometimes be found cruising between Point Judith and Cuttyhunk and also off Block Island. A pilot can be obtained by making signal off Block Island, Beavertail Lighthouse, and Brenton Point. If a vessel passes into the bay without having been boarded by a pilot, one may be obtained at Newport or Dutch Island Harbor. State pilotage is compulsory for foreign vessels or vessels from a foreign port.

For pilotage rates see Port and Terminal Charges published by the Corps of Engineers, United States Army; for sale by the Superintendent of Documents, Washington, D. C., price $1.00.

Towboats are frequently used by sailing vessels in the bay, especially those bound to Providence by the West Passage, and may sometimes be found off the entrance or in Newport Harbor. It is usual for vessels entering by the West Passage to put into Dutch Island Harbor and from there telephone to the towboat office at Providence. A towboat may be had by making signal off Point Judith, Beavertail Lighthouse or Brenton Point.

Immigration regulations are administered by the inspector in charge located at the Customhouse, Providence. There is no detention station and immigrants are required to be delivered to the immigration station at East Boston, Mass.

Customs examination is available at Newport, Providence, and Fall River. See detailed information under corresponding heading for these ports.

Quarantine inspection is made at the United States Public Health Service at Providence and Newport. There are no quarantine hospitals at either port but treatment is made by arrangement of the U. S. Public Health Service with a local hospital.

Hospitals are available at Newport, Providence, and Fall River. The United States Public Health Service maintains relief stations or dispensaries at each of the above-mentioned ports. See detailed information under corresponding heading for these ports.

Anchorages.—The principal anchorages for vessels seeking shelter are Newport Harbor, in the East Passage, and Dutch Island Harbor, in the West Passage. These harbors afford anchorage with good holding ground for deep-draft vessels, and are used by coasting vessels on the passage between Vineyard Sound and Long Island Sound. Good anchorage will be found almost anywhere in the bay under the lee of the islands or the shore, and vessels becalmed or at night frequently anchor. Point Judith Harbor of Refuge is just west of the point.

Anchorage areas have been established by the Secretary of War in the East and West Passages and in Bristol Harbor. Vessels are prohibited from anchoring outside these areas, and officers of the Coast Guard Service are charged with the enforcement of the regulations governing these anchorages. A publication defining the anchorage areas, with the rules and regulations relating thereto, can be obtained from the Army engineers, Providence, R. I. These anchorage areas are shown on large scale charts.

Tides.—The tidal movement in Narragansett Bay with its vertical and horizontal constituents—tide and current, respectively—is a continuation of the tide wave of the Atlantic Ocean which sweeps into the three entrances between Sakonnet Point and Point Judith and continues up the bay and into each of its tributaries until stopped by rapids or other obstructions. As is usual when oceanic tidal movements enter inland waterways, the nature of the movement is modified by the hydrographic features encountered, and in this area the local features are such that the current movement in particular is subjected to considerable distortion. The mean rise and fall of the tides varies from about 3½ feet at the entrance to 4½ feet at Providence.

Currents.—Over the greater part of Narragansett Bay, the usual maximum flood or ebb velocity is from one-half knot to 1 knot, the first mentioned value applying approximately to the broad portions of the waterways, and the last mentioned to the more constricted sections. Velocities between 1 knot and 1½ knots occur at the bridges in the Seekonk River, a velocity of about 2 knots in the Narrows at the mouth of the Kickamuit River, and velocities of approximately 2¼ and 2¾ knots at the railway and highway bridges, respectively, in the Sakonnet River. In the Sakonnet River, from the highway bridge to its mouth, current velocities are small being generally less than one-half knot.

Tidal current velocities are subject to periodic variations corresponding to variations in the range of the tide. Due to these variations, the velocity at a given time may differ by 20 percent or more from a mean value, the velocities being greater than the mean at times of spring tides and perigean tides and less than the mean at times of neap tides and apogean tides. The velocities mentioned are approximate mean velocities.

Observations made at **Brenton Reef Lightship*** give the following results:

The strength of flood occurs about 1 hour after low water at Boston and the strength of ebb about the time of high water at Boston, the flood setting northward with a velocity of about ½ knot and the ebb setting southward with a velocity of about ½ knot. Slacks occur about 3 hours after times of high and low waters at Boston. Velocities of over 2 knots have been observed with strong winds.

Coast and Geodetic Survey Special Publication No. 208, **Currents in Narragansett Bay, Buzzards Bay and Nantucket and Vineyard Sounds** contains a set of hourly tidal current charts for each area mentioned in the title, as well as complete results from recent current surveys.

See List of Publications in Chapter 1.

Storm-warning displays are made at Block Island, Point Judith, Saunderstown (opposite Dutch Island, West passage), Wickford, Edgewood, and Providence. The signals are also displayed at Coast Guard stations.

Fogs.—In the entrance to the bay and its approach fogs are more prevalent from April to October than during the rest of the year; they are brought in by winds from east through south to southwest, and are cleared off by northerly and westerly winds; their usual duration is 4 to 12 hours, but periods of 4 to 6 days have been known, with but short clear intervals. The head of the bay will sometimes be free from fog when the entrance is completely shut in.

See General Information for table indicating hours of operation of fog signals, page 410.

Ice.—Navigation in the bay and its tributaries is sometimes impeded by floating ice, and in severe winters by pack or field ice. The ice breaking up in Providence River and Mount Hope Bay is set by north and northeast winds down the bay through the East Passage, and if there is much ice a gorge is sometimes formed at Fort Adams, but it is of short duration. The passages are rarely

*Lat. 41°25'.8, Long. 71°22'.6: Charts 236, 353, 1210.

closed for any length of time below Gould Island in the East Passage and Dutch Island in the West Passage. During January and February, Mount Hope Bay, Bristol, Providence River, East Greenwich, Warren, and Wickford are usually closed to sailing vessels unaided by steam. The inner harbor of Newport is also sometimes closed during the same months, with the exception of a channel kept open by the New York steamers.

Supplies.—Coal, water, gasoline, and ship chandler's stores can be obtained at Newport, Providence, and Fall River, and gasoline and provisions at most of the towns on the bay or its tributaries.

Repairs to the hulls of vessels can be made at Newport, Fall River, and Providence, and to the machinery of steamers at Providence. For further information see the descriptions of the ports, and the table in appendix.

Speed trial course.—A naval trial course has been established on the east shore of the north end of Conanicut Island. The course is about 1 nautical mile, the measured length being 6,082.1 feet and the true bearing is 357.7° true.

Torpedo-testing range.—The range is marked by a series of white rafts. Both east and west of each raft is a small white barrel buoy distant 100 to 300 yards. From December 15 to March 15, any of these rafts may be replaced by a white barrel buoy. The testing barge, moored near Gould Island, may be temporarily absent and its mooring marked by three white barrel buoys.

The following information concerning the establishment of a restricted zone in Narragansett Bay for the testing of torpedoes, and the rules and regulations governing the use of this zone by vessels, has been received from the Secretary of War and is published for the information and guidance of mariners:

Under authority of law the following zone in which navigation is likely to be endangered by reason of the operations of the United States Naval Torpedo Station and in which vessels may navigate only subject to rules and regulations is hereby defined and established, and the following rules and regulations relating thereto are hereby prescribed and are in force:

The Danger Zone.—Within the area north of Gould Island, west of a line bearing 13°30′ true from the east shore of Gould Island through the spindle of Halfway Rock to the south end of Prudence Island, south of Patience Island and east of a line bearing 353° true tangent to the west shore of Gould Island and ranging through the northwest point of Patience Island.

Rules and Regulations.—1. During the period from March 15 to December 31, between the hours of 9 a. m. and 4 p. m. on all days except Saturdays, Sundays, and legal holidays, no vessel shall enter into or pass through the area above defined and established if forbidden to do so by the inspector of ordnance in charge, United States Naval Torpedo Station, or his duly accredited representatives.

2. From March 15 to December 31 all vessels are forbidden to anchor within the area defined except in cases of great emergency. Any vessel anchoring under circumstances of great emergency within the area shall move away immediately after the emergency ceases, or upon notification by the officer or employee charged with the enforcement of these regulations.

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3. Any vessel upon being notified to shift its position or course must change position or course as directed with reasonable promptness.

4. During periods when testing is in progress, all vessels in or near the danger zone will be met by representatives of the inspector of ordnance in charge, suitably warned, and given necessary instructions and orders relative to navigating zone. Government vessels, seaplanes, or other equipment patrolling the zone will fly or expose a square red flag.

5. Nothing in these regulations shall prevent the setting of fish traps within the area under permits granted by the War Department, nor shall the passage of fishing vessels to and from authorized traps be unreasonably interfered with or restricted.

Five white **torpedo range bell buoys** have been established off the Rhode Island seacoast, in an approximately west by northerly direction from a point 4 miles 175° true from Sakonnet Lighthouse. The distance from buoy A to buoy E is about 7.5 miles. They are usually taken up in the winter and planted again in the spring. Chart 1210 shows their positions.

SAKONNET RIVER

(CHART 353)

Sakonnet River on the easterly side of Narragansett Bay, lies between the mainland on the east and Aquidneck Island on the west, and is marked on the easterly side of its southerly entrance by Sakonnet Lighthouse. The width of the river varies from 0.7 mile to 2 miles, except its northern end, where its least width is 0.3 mile. The river is little used except by fishing vessels and small local craft.

The **channel** of Sakonnet River is good for a depth of 20 feet (6.1 m.) to **Mount Hope Bay,** a distance of 12 miles. There are many shoals and outlying rocks, but the dangers are well marked by buoys.

Except for the lighted bell buoy off Sandy Point the channel buoys are not lighted, and strangers should not attempt to pass through at night. Two drawbridges, described below, cross the river near its upper end.

Sakonnet Point, at the eastern entrance to Sakonnet River, is surrounded by bare and sunken rocks. Schuyler Ledge, the southernmost of these ledges, has 8 feet (2.4 m.) over it and lies 0.8 mile 156° true from Sakonnet Lighthouse and is marked by a bell buoy.

Sakonnet Lighthouse* is a white conical tower on a brown cylindrical pier, at the western end of the foul ground off Sakonnet Point. The light is 68 feet (20.7 m.) high and visible 12 miles. The fog signal is an air diaphragm horn.

Sakonnet Harbor is a boat harbor 0.9 mile north-northeastward of Sakonnet Lighthouse. A short breakwater marked at its end by a flashing white light, extends northward from its westerly point. There are depths of 5 feet (1.5 m.) at the landing just inside the breakwater.

*Lat. 41°27'.2, Long. 71°12'.2: Charts 353, 1210.

Two bare rocks with ledges close to lie 75 to 125 yards eastward of this wharf. The depths in the cove inside the rocks are 4 to 7 feet (1.2 to 2.1 m.) until 100 yards from its head.

There is a depth of 5 feet (1.5 m.) at the end of the wharf on the east side of the harbor and also at the end of the yacht club wharf.

There is no protection in the harbor from northwesterly and northerly winds.

Gasoline and some provisions can be had in summer.

Cormorant Rock is a bare, dark rock off the western side of the entrance to Sakonnet River, lying about 0.8 mile southward of **Sachuest Point,** the southern point of **Sachuest.** Vessels should not pass between the rock and **Cormorant Reef,** which has 2 feet (0.6 m.) over it, lies about 0.2 mile southward of Cormorant Rock, and is marked on its south side by a bell buoy.

The western side of Sakonnet River, from the entrance to Sandy Point, should be given a berth of 0.4 mile to avoid spots with 18 feet (5.5 m.) which make out that distance in places. Rocks extend nearly 0.2 mile off the northeast side of **Sachuest;** a ledge with 7½ feet (2.3 m.) over it, lying 0.4 mile northeastward from the northerly end of Sachuest, is marked by a buoy. **Black Point** is a rocky bluff on the western side 4.7 miles northward of Sakonnet Lighthouse. **Sandy Point** and **McCurry Point** are low and backed by high land, and lie 1.4 and 2.9 miles northward from Black Point.

The western half of the river from McCurry Point to the stone bridge is shoal, with depths of 7 to 14 feet (2.1 to 4.3 m.), and shoals fill the broad bights in the eastern shore northward of Fogland Point. The channel between the shoals is about 0.2 mile wide, and leads from the buoys off McCurry Point toward **Gould Island.** The latter is high and wooded; a shoal with 15 feet (4.6 m.) at its end extends southward from it.

The eastern side of the river is bolder than the western side. The principal dangers are a reef, with bare rocks near the end, which extends 0.4 mile southwestward from **Church Point,** and is marked at its end by a bell buoy; and **Almy Rock,** bare at low water, lying 350 yards southwestward from Fogland Point, and marked 0.3 mile off its southwest side by a lighted bell buoy. A shoal with 15 feet (4.6 m.) over it lies 150 yards eastward of this lighted bell buoy. Church Point is level and **High Hill Point*** is a prominent small hill, and both have bluffs at the water. **Fogland Point** is projecting and prominent; its westerly and northerly sides should be given a berth of over 200 yards.

Nannaquaket Pond, on the eastern side of the river eastward of Gould Island, has a narrow entrance crossed by a closed bridge having an overhead clearance of about 6 feet (1.8 m.) at mean high water. The deeper water in the entrance is along the north shore, several rocks lying off the southern shore. The currents have considerable velocity. The northern part of the pond has depths up to 30 feet (9.1 m.); elsewhere the general depth is about 3 feet (0.9 m.).

The Cove, on the western side of the river between the bridges, is entered only by small local craft. The general depths are 3 to 4 feet (0.9 to 1.2 m.).

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*Lat. 41°32'.9, Long. 71°13'.0: Charts 353, 1210.

Tiverton, a town on the eastern bank, between the bridges, has railroad communication with Providence. Gasoline, provisions, and other supplies can be obtained.

Bridges.—Two bridges cross the contracted part of the river, just southward of Mount Hope Bay. The southerly one, a stone bridge, is a double-leaf bascule, with an opening 100 feet wide and a vertical clearance of 8 feet (2.4 m.) when closed. The railroad bridge is a center pier draw with openings 100 feet wide; the western opening only is used. The vertical clearance is 12 feet (3.7 m.) when closed.

Regulations prescribed for the bridges require that they shall be opened for vessels on signal, except in case of the railroad bridge, which may be kept closed for a period not exceeding 4 minutes after the signal is given, provided a train is approaching the bridge. The signal for opening is 3 short blasts, to be answered by 1 long blast if bridge can be opened or by 3 long blasts and conspicuously displaying a red flag or ball by day or a red light by night, if opening is delayed. Small craft which cannot pass under the closed bridge shall not be delayed more than 20 minutes.

Anchorages.—There is good anchorage for vessels of 20-foot (6.1 m.) or less draft in mid-river about 5 miles above Sakonnet Lighthouse and just below High Hill Point, in 3½ to 4½ fathoms (6.4 to 8.2 m.). Though open southward, a heavy sea seldom reaches as far as the anchorage, and in southeasterly gales the water is comparatively smooth inside the mouth of the river. Fishermen seeking shelter frequently anchor on the flats in the bight northward of Fogland Point, where the depths are 10 to 14 feet (3 to 4.3 m.).

Tides.—The mean rise and fall of tides at Sakonnet Point is about 3½ feet.

Currents.—The two bridges act as dams to maintain the water at different levels on either side of them, and cause dangerous currents through the draws. The currents change with great rapidity both in velocity and in direction, and are characterized by a double flood. They are described in considerable detail in the Current Tables, Atlantic Coast, and in Coast and Geodetic Survey Special Publication No. 208.

Vessels usually pass through the draws near the times of slack waters, which occur about 1 hour before the times of high and low water at Newport.

Ice.—The river northward of Fogland Point is usually closed by ice for short periods each winter. Ice packs occur at the railroad bridge.

Directions, Sakonnet River.—Pass 0.8 mile westward of Sakonnet Lighthouse and steer 2° true for 4.5 miles, heading for High Hill Point. The course leads near the middle of the river, passing 0.4 mile westward of the bell buoy southward of Church Point, and to a position 0.5 mile eastward of Black Point. Then steer 340° true to a position 100 yards westward of the Sakonnet River lighted bell buoy, No. 6, leaving a black can buoy No. 5, 100 yards to port. Then steer 15° true for 1.5 miles to a position midway between two channel buoys. Then steer about 3° true, passing to westward of three red buoys and to eastward of two black buoys and giving Gould Island a berth of about 150 yards. Pass through Stone Bridge draw and keep near the middle of the river until through the second

draw (west opening) and then steer 9° true, following the eastern bank at a distance of 250 yards until 0.5 mile northward of the second bridge to avoid a shoal with 11 feet (3.4 m.) making out from **Cedar Island.** Then follow mid-channel courses until in Mount Hope Bay.

EAST PASSAGE

Brenton Reef Lightship is anchored in 84 feet (25.6 m.) off the entrance to the east passage. It has a red hull with **Brenton** on each side. A tubular mast amidship is surmounted by a circular gallery from which the light is exhibited. The light is 50 feet (15.2 m.) high and visible 13 miles. If the light is inoperative a fixed white light will be exhibited. The fog signal is an air diaphone. If the diaphone is disabled a bell will be sounded. The radio beacon is synchronized with the sound signal for distance finding.

The southern shore of Aquidneck Island is rocky, with numerous off-lying rocks and ledges. There are several private landings northward of Gooseberry Island, but local knowledge is required. Eastward of Newport is a bathing beach with a prominent pavilion. There are numerous prominent residences on the eastern side of **Newport Neck,** the southwestern part of Aquidneck Island. A large brick residence, with several towers, on the southeastern point of Newport Neck is conspicuous. About 0.8 mile north of Easton Point is St. Georges Church tower which has a short spire at each corner of the stone tower. It is very conspicuous and can be seen well offshore.

Brenton Point, the southwestern point of Aquidneck Island, and the eastern point at the entrance to East Passage, is marked by a large residence with cupola. **Brenton Reef,** extending 0.5 mile south-southwestward from the point, is bare in places at low water and is marked at the southern end by a gong buoy. **Seal Rock** is a bare rock near the end of a reef extending 0.5 mile from the shore just eastward of Brenton Point.

Seal Ledge, about 0.5 mile south of Seal Rock has depths of 17 to 29 feet (5.2 to 8.8 m.) and is marked on the south side by a lighted bell buoy.

Butter Ball Rock, a small bare rock about 200 yards from the southern end of Castle Hill, is marked off the southwestern side by a bell buoy.

Beavertail Lighthouse is a square granite tower, upper half white, attached to a white dwelling, on the south point of Conanicut Island. The light is 64 feet (19.5 m.) high and visible for 14 miles. The fog signal is an air siren.

Castle Hill Lighthouse* is a conical granite tower, upper half white, on the east side of the entrance to East Passage. The light is 40 feet (12.2 m.) high and visible 10 miles. The fog signal is a bell.

Mackerel Cove, indenting the southern shore of Conanicut Island, is exposed to sea and wind in southerly weather and is seldom entered. **Kettle Bottom Rock** is bare and lies about 300 yards southeastward of the eastern entrance to Mackerel Cove. There is a gong buoy on the southern end of the shoal surrounding this rock.

*Lat. 41°27′.7, Long. 71°21′.8: Charts 236, 353, 1210.

The Dumplings are a group of bare and sunken rocks off the southeastern point of Conanicut Island. The Dumplings are marked on the eastern side by two buoys, the southernmost buoy being a bell buoy, and the other a gong buoy.

Gould Island is flat and sparsely wooded near the middle. It is marked on the eastern side by a lighthouse, which is a conical tower, upper half white, lower half brown. The lighthouse is obstructed by trees from a westerly direction. There is a prominent tall, red and gray checkered, water tank in about the center of the island; a fixed red light is shown from the top of this tank. A flashing aeronautical light is located toward the southern end of the island and a flashing green light on a steel tower at the southeast end of the island.

Gould Island is a United States Navy reservation. There is a narrow wooden wharf on the eastern side of the island near its northern end. A depth of 27 feet (8.2 m.) has been reported to lie about 250 yards off the southern end of the island.

Potter Cove on the northeast side of Prudence Island is a small landlocked harbor much used by small boats and yachts.

Cable crossings.—Submarine cables have been laid in East Passage and the limits are shown on charts 236 and 353.

NEWPORT HARBOR

(CHART 236)

Newport Harbor is on the eastern side of the East Passage of Narragansett Bay, about 3.5 miles above the entrance. It is about 12 miles northeast of Point Judith, 44 miles from Vineyard Haven, 103 miles from Boston via the Cape Cod Canal and 138 miles from New York. It is divided by Goat Island into an inner and outer harbor and is an important harbor of refuge for coasters, tows, and yachts. The approach is well marked by lighthouses and fog signals, and the harbor is easy of access both day and night.

Prominent objects.—Many prominent objects will be seen, whether the harbor is approached from southward or northward, among which are the following: Fort Adams (stone), buildings of the training station and naval war college on Coasters Harbor Island, the buildings of the Torpedo Station on Goat Island, and the large hotels and a tall water tank at Jamestown on the eastern shore of Conanicut Island, opposite Rose Island. The lighthouses are the principal guides at all times.

Newport, on the eastern shore of the inner harbor, is one of the principal summer resorts on the Atlantic coast. It has considerable trade in coal, lumber, and building material, carried in coasting vessels; few foreign vessels enter the port.

Rose Island is marked at its southwest end by a lighthouse and an aeronautical beacon near the center. It is a United States Navy reservation. This island is surrounded by a shoal, with little water in places, which extends about 400 years northeastward and northward from the island, and rises abruptly from deep water. A black buoy is placed on the end of the shoal which extends 225 yards southward from the island. **Mitchell Rock,** 14 feet (4.3 m.), lies 200 yards southeastward, and **Tracey Ledge,** 9 feet (2.7 m.), lies nearly 300 yards eastward from the edge of the shoal surrounding Rose

Island. They are marked by buoys. A buoy marks a detached rock, 9 feet (2.7 m.), which lies 150 yards northeastward of the edge of the shoal north of Rose Island. The northwest end of the shoal is marked by a red buoy.

Gull Rocks lie about midway between Rose Island and Coasters Harbor Island and are small in extent. Gull Rocks Lighthouse, on the middle of the rocks, is 43 feet (13.7 m.) above high water on a black square skeleton steel tower 33 feet southeast of the former lighthouse which is now used as a dwelling. It may be approached as close as 100 yards on its eastern and western sides, but the shoals and rocks extend over 100 yards northward of it and 300 yards southward. These rocks are surrounded by a depth of 4¼ to 5 fathoms (7.8 to 9.1 m.). North of the lighthouse they are marked by a buoy and south of the lighthouse by a buoy. A 17-foot (5.2 m.) spot lies 600 yards 336° true from Gull Rocks Lighthouse, and is marked by a horizontally banded buoy.

There is a deep channel between Rose Island and Gull Rocks and also between the latter and Coasters Harbor Island; the latter channel is the safer for strangers.

Goat Island and the breakwater extending from its northern end to Newport Harbor Lighthouse should be given a berth of 150 yards. The edge of the shoal at the south end of the island is marked at its west end by a buoy.

The southeast end of the island is marked by Goat Island Shoal Light and the offlying shoal by a buoy. The fog signal at the light is a bell.

The Outer Harbor is on the western side of Goat Island, northward of the Dumplings and southward of Gould Island. Its entrance from southward is unobstructed; the entrance from northward, passing either side of Gould Island, is clear, but the passage eastward of Rose Island is partly obstructed by the rocks and ledges which lie between **Coasters Harbor Island** and Rose Island. The depths range from 6 to 23 fathoms (11 to 42 m.) and the holding ground is good. The anchorage is anywhere westward of Gould Island and westward of a line extending 189° from the east shore of Gould Island at its southern end to the easternmost Dumpling, with the exception of a channel 300 yards wide extending 285° to the ferry landing at Jamestown. An anchorage area is also established westward of Goat Island and eastward of Rose Island, within limits prescribed by the Secretary of War. (See "Anchorages" on p. 7.)

The Inner Harbor is on the eastern side of Goat Island, and extends along the western front of Newport. It has two entrances, the northern leading northward and eastward of Newport Harbor (north end of Goat Island) Lighthouse and the southern leading around the southern end of Goat Island, between it and Ida Lewis Rock Light.

A channel 21 feet (6.4 m.) deep is maintained along the south and east sides of Goat Island. An anchorage basin, depth 17 feet (5.2 m.), lies southward and eastward of the dredged channel to a line extending 44° true from Ida Lewis Rock Light to the wharves. Southeast of this basin is another anchorage area with a depth of 12 feet (3.7 m.). Vessels are prohibited from anchoring within 50 yards of the wharves in these areas. (See "Prohibited anchorages" on p. 119.)

Brenton Cove is the bight in the southern part of Newport Harbor between Ida Lewis Rock Light on the east and Fort Adams on the west. It has good anchorage in 15 to 17 feet (4.6 to 5.2 m.) and is frequently used by yachts. There are no dangers if the westerly shore of the cove be given a berth of 200 yards. The passage southward of Ida Lewis Rock Light is obstructed by rocks and a bridge.

Shoals with little water over them make out nearly 300 yards from the south shore of the harbor to **Ida Lewis Rock Light** and the granite beacon with spindle and cage on **Little Ida Lewis Rock.** Northward of these shoals the depth in the harbor is 12 feet (3.7 m.), obtained by dredging, except near the wharves; the southerly edge of the 17-foot (5.2 m.) dredged area in the harbor passes 200 yards northward of the beacon. A channel with a depth of from 12 to 9 feet (3.7 to 2.7 m.) has been dredged along the face of the Oil Company wharf in Lat. 41°28.7′ N., Long. 71°19.0′ W. In approaching, it is necessary to pass north of Little Ida Lewis Rock and go in close to the waterfront before turning southward to the wharf.

Pilots.—There is no association which maintains a pilot boat on station to meet vessels. Instead there are individual pilots among whom competition is keen.

Ships on scheduled runs are met at stated times by pilots who usually have contracts. Foreign ships are met at expected times by arrangements made by agents in Providence.

Vessels which arrive unexpected can probably obtain a pilot by blowing whistle or setting a signal which can be seen by the Coast Guard lookout at Castle Hill. The Coast Guard will then make a telephone call to Newport for a pilot.

Pilotage into Newport, with few exceptions, is compulsory for all vessels engaged in foreign trade. It is not compulsory for vessels engaged in coastwise trade. Pilots usually board incoming vessels in the vicinity of Brenton Reef Light vessel, but no vessel bound into Newport is obligated by law to take a pilot or pay pilotage unless a commissioned pilot offers his services before the vessel passes the line from Whale Rock Light to Brenton Reef Lightship.

Towage.—Towboats are available at Newport Harbor the charges for which are by mutual agreement.

The **Immigration Service** has no office at Newport. An official from the Providence office of the Immigration Service visits Newport when necessary. Entrance of immigrants through the port of Newport is of rare occurrence.

Customs.—The customhouse is located in the Federal Building at the corner of Thames and Franklin Streets, within one-eighth mile of the wharves at the center of the inner harbor.

Quarantine is enforced in accordance with the regulations of the United States Public Health Service. Vessels bound for Newport and subject to quarantine inspection are boarded in the outer harbor at the quarantine anchorage located north of Fort Adams, south of Gull Rock Light, and west of Goat Island. Inspection is made by the United States Public Health Service physician, whose address is given in Appendix.

Hospitals.—There is no quarantine hospital at Newport. A vessel arriving with quarantinable diseases on board is refused entry and is remanded to one of the larger ports where quarantine facilities are available. The Newport hospital is a contract hospital for marine

and Public Health Service cases. Application for admission should be made to the Public Health Service physician. There is also a naval hospital in Newport.

Anchorages are described under the harbors above. Vessels of light or moderate draft putting into Newport usually proceed to the inner harbor anchorage grounds. Vessels drawing 18 feet or more are obliged to use the outer harbor anchorage grounds, where there are ample accommodations.

Harbor regulations have been established and are enforced by a harbor master.

Harbor Regulations.—According to the ordinances of the city of Newport copies of which may be obtained from the harbor master and which are given in Port Series No. 18 published by the United States Army Engineers, vessels must be entered as directed by the harbor master who also has authority to have vessels moved under certain circumstances. Pollution of the harbor is prohibited and speed is limited to 5 miles per hour in a harbor.

Tides.—Daily predictions for high and low waters are given in the Tide Tables, Atlantic Ocean. The mean range of tide is 3.5 feet, and the maximum range due to the combined effects of wind and other causes is 6 feet or more.

Currents.—In the entrance to the harbor between Newport and Conanicut Island, south of Fort Adams, the velocity of the current at its greatest strength is about 1½ to 2 knots, but this velocity is reduced as the harbor width increases north of Fort Adams, and is probably not over 1 knot throughout the greater part of the harbor. The tidal currents in the inner harbor have little strength.

Weather.—The prevailing winds are southwesterly in the summer and northwesterly in the winter months. The heaviest gales are usually from the northwest and northeast.

Ice.—The harbor and its approach are navigable throughout the year, although in severe winters ice may interfere with navigation to and from the wharves in the inner harbor for short periods. Steamers of regular transportation lines and tugs keep the ice well broken up in the main channel through the inner harbor.

Bridges.—There are no bridges crossing the approach to this harbor or any portion of the harbor used for commercial purposes. Two small fixed bridges cross the shoal and narrow waterway between Coasters Harbor Island and the extreme north portion of Newport.

Directions, Newport Harbor.—The following directions are good either day or night for the deepest draft vessels to the outer harbor, and for vessels of 18 feet (5.5 m.) draft to the inner harbor.

From southwestward.—Enter Narragansett Bay by the East Passage and steer 47° true for Newport Harbor Lighthouse,* which will lead to the anchorage in the outer harbor westward of Goat Island. Or, steer this course until Ida Lewis Rock Light is opened from the light on the dock northward of Fort Adams, and then round the northern end of the dock, giving it a berth of 150 yards. Then steer 111° true and round the south end of Goat Island at a distance of about 250 yards, passing 100 to 200 yards southward of the black buoys and Goat Island Shoal Light. Then stand northeastward to the anchorage. Anchor in 18 feet (5.5 m.), soft bottom, but not

*Lat. 41°29'.6, Long. 71°19'.7: Charts 236, 353, 1210.

close enough to the wharves to interfere with the steamer and ferry traffic, and over 400 yards from Goat Island to avoid the track of the sound steamers.

When passing off the west side of Goat Island, care should be taken to avoid the numerous mooring buoys in this vicinity.

From northward.—Large vessels generally pass westward of Rose Island and enter the inner harbor around the south end of Goat Island. Passing 400 yards westward of Rose Island Lighthouse steer 138° true for Ida Lewis Rock Light until Goat Island Shoal Light bears 77° true. Then haul eastward and round the south end of Goat Island at a distance of about 250 yards as in the preceding directions.

Or, passing eastward of Gould Island give it a berth of over 200 yards. Then bring Gould Island Lighthouse astern on a 164° true course heading for Newport Harbor Lighthouse. On this course pass about 200 yards westward of Coasters Harbor Island and 150 to 200 yards eastward of Gull Rocks Lighthouse; then steer 154° true so as to pass about 200 yards eastward of Newport Harbor Lighthouse. Then steer 175° true, pass about 100 yards off the railroad wharves and the same distance off the wharf at the Torpedo Station on Goat Island, and then stand over for the wharves of the city to the anchorage as described in the first paragraph.

Dockage and wharfage.—There are no fixed rates covering these charges at the city or private wharves. Terms and conditions of use must be arranged with owners or lessees.

Piers, wharves, and docks.—There is a Government landing, a yacht-club pier, and a public landing for small boats in addition to the many piers operated by private interests, the city, and the Federal Government.

The depth at the principal wharves is 18 feet (5.5 m.) and at the railroad wharves 16 to 18 feet (4.9 to 5.5 m.).

Lighterage.—There is no free lighterage service at Newport, and no lighterage is performed by any of the regular established transportation lines. Lighters, with cargo capacities of 40 to 300 tons and bunkering capacities of 25 to 100 tons per hour are available for general lighterage work.

Coal bunkering.—Coal may be taken either at the wharves or in the stream. Delivery of coal at the wharves is by means of automobile trucks where it is transferred to the ship by portable machinery at the rate of about 50 tons per hour. Vessels at anchor in the stream are bunkered by lighters or barges equipped with handling machinery at a delivery capacity of 30 to 75 tons per hour.

Oil bunkering.—There are facilities for furnishing fuel oil directly to vessels from storage tanks. Normally there is a supply on hand of about 2,300 barrels. There is a depth of about 16 feet (4.9 m.) along the face of the docks at mean low water. Arrangements can be made for the delivery of bunker oil by barge or tank truck.

Fresh Water.—Water may be obtained at the wharves of the coal companies and also in the stream by lighter from the local towing company. It may also be obtained at various other wharves by arrangement. The water is of excellent quality both for drinking and boiler purposes. The price depends upon the quantity taken.

Repairs.—There are two repair yards with marine railways. One located at the foot of Brewer Street has two railways. These ways

have cradles of 140 and 120 feet in length, widths at the bottom of 32 and 27½ feet, and capacities of 750 and 400 tons, respectively. The depths of water range from 7 feet (2.1 m.) forward to 15 feet (4.6 m.) aft. The other repair yard at the foot of West Howard Street, has three railways. Two are small, with 25- and 30-foot cradles and a capacity of 20 tons each; the third has a capacity of 500 tons and can accommodate a boat 120 feet long, 22 feet wide, and 10 feet (3.0 m.) draft. This latter railway has a depth forward of 9 feet (2.7 m.) and aft of 14 feet (4.3 m)

Supplies.—Provisions, gasoline and some ship chandler's stores can be obtained in the city.

Commerce.—Shipments from Newport are chiefly comprised of stone, coal, and general merchandise while incoming consignments consist of coal, petroleum products, stone, sand, gravel, and miscellaneous supplies.

Communication.—Newport has railroad communication and connection by steamers with New York, Providence, and Fall River.

There are hourly ferries from Newport to Jamestown; busses from Jamestown across Conanticut Island; and ferries from Conanticut Island across West Passage to Saunderstown, passing north of Dutch Island.

The Saunderstown ferry will be discontinued after completion of the bridge across West Passage at Plum Beach, probably in the summer of 1940.

There is a Government (naval) ferry from Newport to Goat Island. The Navy operates its own boats to Rose Island and Gould Island but civilians are not allowed.

There is hourly bus service to Fall River and Providence.

EAST PASSAGE ABOVE NEWPORT

Coddington Cove is a good anchorage in southerly or easterly winds.

Halfway Rock, a small ledge showing bare at its southern end, lies 0.9 mile south-southwestward of the southern end of Prudence Island. A black spindle with cage is on the bare part of the ledge.

Fiske Rock, with 12 feet (3.7 m.) over it, lies 0.2 mile northeastward of the spindle on Halfway Rock, and is marked by a buoy. Strangers should not pass between the buoy and spindle.

Dyer Island is low and brush covered. A reef extending northward of the island, with depths of 10 to 18 feet (3 to 5.5 m.), is marked at its northern end by a lighted bell buoy. A reef, partly bare at low water, extends 0.4 mile southward and southwestward from the island, and is marked on the southwestern side and at the southeastern end by buoys. A bar with 8 to 17 feet (2.4 to 5.2 m.) over it extends southward from this reef to the shore. A lighted range ahead guides across the bar in a depth of about 15 feet (4.6 m.).

Mount Hope Bay and Taunton River are described on page 135.

Hog Island is a large island in the entrance to Bristol Harbor. Shoals make out over 0.4 mile southward of the island, and vessels must pass at least 350 yards southeastward of Hog Island Shoal Lighthouse. The eastern shore of Hog Island should be given a berth of at least 350 yards.

Hog Island Rock, with 4 feet (1.2 m.) over it, is on the eastern edge of the shoal about 0.5 mile northward of the southeastern end of the island and is marked on its eastern side by a buoy.

The southern and western shores of Bristol Neck should be given a berth of at least 300 yards to avoid the shoals making off that distance. Pearce Rock, about 0.2 mile westward of Bristol Ferry unused light tower lies about 100 yards off the southwest side of the end of Bristol Neck. A bowlder with a least depth of about 9 feet (2.7 m.) is reported to lie 100 yards southward of Pearce Rock and is marked by a buoy just south of it.

Making northward from Hog Island is an extensive shoal with depths of 3 to 12 feet (0.9 to 3.7 m.). For about ½ mile northward of the island this shoal has a width of ½ mile, thence it narrows to a point at the junction of the eastern and western channels 1 mile northward of the island. The northern end of the shoal, known as the **Middle Ground,** has a depth of only 5 feet (1.5 m.) and is marked by a buoy. Near the western edge of the shoal, about 0.4 mile northward of the northwestern end of the island, is **Castle Island,** a rock bare at low water, marked by Castle Island Light.

Usher Rocks, bare at low water, lie on the western side of the channel 0.4 mile north-northwestward of **Castle Island Light.** Eastward of the rocks on the edge of the channel is a buoy.

Usher Cove, lying westward of Usher Rocks, is shoal.

Northeast of **Arnold Point** there is an establishment which has a dock about 600 feet in length with a special narrow gauge railroad for handling lumber products. The dock is approached by a dredged channel 100 feet wide extending into the bay about 1,000 feet beyond the dock towards Hog Island Shoal Light. The entrance of the channel is marked on the west side by a buoy. The controlling depth is reported to be 24 feet (7.3 m.) by the dock superintendent. When entering the channel and berthing, all vessels dock with port side to the wharf and use a towboat on the starboard quarter. When leaving the dock a towboat is also used to tow the vessel stern first as there is not room for the towboat to maneuver the ship from alongside.

Bristol Harbor (chart 354).—This harbor is a cove lying between **Bristol Neck** on the east and **Popasquash Neck** on the west and northward of Hog Island, which lies in the middle of the entrance with a good channel on either side of it. The cove is about 2 miles long and 1.3 miles wide at its southern end, narrowing to 0.4 mile at its northern end. The harbor proper (northern part of the cove) is about 1 mile long and nearly 0.5 mile wide, has a depth of 15 to 17 feet (4.6 to 5.2 m.), and excellent anchorage in soft bottom abreast the town. The northern part of the harbor above the railroad wharf is shallow, having a depth of 7 to 12 feet (2.1 to 3.7 m.). Fifty yards westward of the railroad wharf is a small reef, bare at half tide. It is marked by a buoy.

Bristol, a town on the eastern side of the harbor, has little maritime trade but is of some commercial importance. A buoy depot of the United States Coast Guard is located here. Near the southern end of the water front of the town is a shipyard where yachts are built. There are four marine railways and vessels up to 300 tons can be accommodated.

Provisions, gasoline, and coal can be obtained. At low water 8 to 11 feet (2.4 to 3.4 m.) can be taken to some of the wharves. Bristol has railroad communication and bus service with Fall River, Providence, and Newport. Motorboats run regularly to Prudence and Hog Islands.

Tides.—The mean rise and fall of tides is about 4 feet.

Anchorage regulations for Bristol Harbor require all vessels to anchor at least 400 feet off the ends of the wharves and westward of a line extending northeast by east from Usher Rocks buoy.

Directions, Bristol Harbor—East Channel.—Enter about midway between Bristol Neck and the southeast point of Hog Island, steer 340° true, and pass 150 to 200 yards eastward of Hog Island Rock buoy and the buoy at the north end of the Middle Ground. Anchor in 16 to 17 feet (4.9 to 5.2 m.) at least 400 feet off the wharves, giving the shores a berth of over 200 yards.

West Channel.—Pass 300 yards southwestward of Popasquash Point bell buoy and rounding the buoy at that distance steer 33° true for the prominent white church spire in Bristol, passing about 250 yards off Castle Island Light and Usher Rocks buoy and 200 yards northwestward of Middle Ground buoy. Then stand up the middle of the harbor and anchor as in preceding paragraph.

Warren River (chart 355) is a small river emptying into the head of Narragansett Bay, about 2 miles southeastward of **Conimicut Lighthouse,*** at the mouth of Providence River. The channel leading up to the town of **Warren** has a depth of about 10 feet (3.0 m.) at mean low water and is narrow and crooked but is well buoyed. A draft of about 12 feet (3.7 m.) can be taken up to the town at high water. Coal can be obtained at the wharves, and gasoline, fresh water, and provisions can be had. The principal wharves have depths of 7 to 12 feet (2.1 to 3.7 m.). Warren has railroad (for freight only) and bus communication with Providence and Fall River.

The **Barrington River** enters the Warren River from westward, opposite the northern portion of the town of Warren. A depth of about 8 feet (2.4 m.) can be carried nearly to the highway bridge about 0.5 mile above the entrance. There is a small boat anchorage in the central portion of the Barrington River with depths of 5 to 14 feet (1.5 to 4.3 m.) hard bottom but good holding ground; strong currents may be encountered. Small craft should anchor with two anchors (fore and aft). There is a yacht club and a boat yard. The largest of several marine railways is capable of handling boats up to lengths of 65 feet and a draft of 6½ (2.0 m.). Supplies of all kinds are available and there are facilities for covered storage.

Rumstick Shoal extends nearly 0.6 mile southward from **Rumstick Neck,** is about 0.4 mile wide, and has depths of 2 to 12 feet (0.6 to 3.7 m.), the ruling depth southward of Rumstick Rock being about 7 feet (2.1 m.). Near its southeastern extremity it is marked by a lighted buoy, and on its eastern edge, nearly 0.2 mile southeastward of the southern extremity of Rumstick Neck, is a can buoy. **Rumstick Rock,** a bare rock, lies on the western point of the shoal, ¼ mile from Rumstick Neck; and **Rumstick Ledge,** bare at low water, lies 200 yards northwestward of the rock.

*Lat. 41°48'.0, Long. 71°20'.7: Charts 278, 353, 1210.

Anchorage.—There is excellent anchorage at the mouth of the river about 0.2 mile from the eastern shore, southward or just eastward of buoy No. 3, in 14 to 15 feet (4.3 to 4.6 m.), soft bottom. There is not room for anchorage in the river except for small craft. Abreast the lower end of Warren, the channel is about 450 feet wide with depths of 16 to 18 feet (4.9 to 5.5 m.) in the middle; a very small vessel can anchor temporarily at this point.

Tides.—The mean rise and fall of the tide is about 4.6 feet.

Currents.—The tidal current off the town of Warren has an average velocity at strength of about 1 knot.

Directions, Warren River.—The river is well marked by buoys. Chart 355 is the guide.

Directions, East Passage of Narragansett Bay.—The following directions are good for the deepest-draft vessels to the anchorage off Newport and up the bay to the entrance of Mount Hope Bay, and for a draft of 28 feet (8.5 m.) to the entrance of Providence River and to the city of Providence. Vessels of over 20-foot (6.1 m.) draft bound to Providence or Fall River should take a pilot.

Approaching Brenton Reef Lightship from eastward, care should be taken to keep it bearing northward of **268°** true to give **Seal Ledge** a good berth. In clear weather vessels may pass 0.4 mile eastward of Brenton Reef Lightship; Brenton Reef and other dangers on the easterly side of the entrance will be avoided by keeping Castle Hill Lighthouse bearing eastward of 3° true, and passing westward of the bell buoy off Butter Ball Rock.

In thick weather Brenton Reef Lightship should be made and passed close-to. From the lightship a stranger should be able to make the anchorage in Newport outer harbor by closely following the directions and paying attention to the fog signals. See also "Directions Newport Harbor", page 129.

From Buzzards Bay.—From a position 0.2 mile southeast of Seventeen Foot Ledge Lighted Whistle Buoy (southwest of Hen and Chickens Lightship) steer **270°** true for 15 miles to a position 0.4 mile southeast of Brenton Reef Lightship.

From Vineyard Sound.—From a position 0.5 mile south of Vineyard Sound Lightship steer **281°** true for 17 miles to a position 0.4 mile southeast of Brenton Reef Lightship.

From Block Island.—From a position 1.5 miles south-southeast of Block Island Southeast Lighted Whistle Buoy steer **13°** true for 21.5 miles to a position 0.4 mile southeast of Benton Reef Lightship.

From Block Island Sound.—From a position 0.2 mile north of Point Judith Eastbound Lighted Gong Buoy No. 1 steer **29°** true for 9 miles to a position 0.4 mile west of Castle Hill Lighthouse.

From a position 0.4 mile, 135° true from Benton Reef Lightship steer **358°** true to a position 0.4 mile **270°** true from Castle Hill Lighthouse.

Then steer **47°** true for Newport Harbor (north end Goat Island) Lighthouse, which will lead to the anchorage in Newport outer harbor westward of Goat Island. Or, when southeastward of the Dumplings, with Rose Island Lighthouse bearing 10° true and Fort Adams Light bearing 73½° true, steer **358°** true, and pass 400 yards eastward of the Dumplings gong buoy and 400 yards westward of Rose Island Lighthouse. When Gull Rocks Lighthouse bears 88° true, make good at **19°** true course for 6.5 miles, passing nearly 0.5 mile

eastward of Gould Island Lighthouse, in midchannel westward of Dyer Island or slightly favor Prudence Island, passing 200 yards westward of Dyer Island North Point Shoal lighted bell buoy, and to a position 500 yards eastward of Prudence Island Lighthouse. If bound to Fall River, follow the directions on page 138.

If bound to Providence, steer **1°** true for 1.2 miles until Hog Island Shoal and Musselbed Shoal Lighthouses are in range, bearing 68½° true. Then steer **339°** true to a position close to eastward of Popasquash lighted bell buoy; then steer **358°** true for nearly 2.2 miles with the lighted bell buoy at the eastern side of the dredged channel ahead. When 250 yards southward of this buoy, steer **322°** true in the dredged channel, heading for Bullock Point Lighthouse (square skeleton tower on granite pier) until 200 yards northeastward of Conimicut Lighthouse (white conical tower on brown pier). Then follow directions for Providence River on page 150.

MOUNT HOPE BAY AND TAUNTON RIVER

CHART 353

Mount Hope Bay, in the northeastern part of Narragansett Bay, is the approach to the city of Fall River and to Taunton River. There are two approaches by water to this bay, one through Sakonnet River and the other through the East Passage of Narragansett Bay. The former is little used (see "Sakonnet River," page 122; the latter is well marked by lighthouses and other aids and has a depth of over 6 fathoms (11 m.) in the channel until in the bay.

Mount Hope Bridge is of the suspension type and spans the entrance of the bay at **Bristol Point** between Bristol and Portsmouth. It has a clear width between the main span piers of 1,156 feet and a vertical clearance at the center of the span of 135 feet (41.2 m.). The towers are prominent landmarks.

A 400-foot channel has been dredged through Mount Hope Bay and Fall River Harbor. The controlling depths as determined in 1939 are 30 feet (9.1 m.) in the entrance channel up to the lower wharves; 28 feet (8.5 m.) to Slades Ferry Bridge; and 30 feet (9.1 m.) above the bridges except on the western edges of the channel.

Mount Hope is a prominent hill on the western side of the bay 2 miles northeastward of Mount Hope suspension bridge. The eastern and western slopes are wooded and there is a flagstaff on the summit.

Spar Island is a small, low island near the center of Mount Hope Bay.

A buoy, with reflector, marks the western edge of the shoal area surrounding the island.

Old Bay Rock, on which there is a depth of 3 feet (0.9 m.) is marked by a lighted bell buoy maintained from May 1 to September 30, annually. A station buoy is maintained throughout the year.

Three shallow streams empty into the northern part of Mount Hope Bay. They are entered only by small local craft. **Kickamuit River,** the western one, has a narrow entrance through which the currents have considerable velocity. **Cole River,** the middle one, and **Lee River,** the eastern one, are crossed by closed railroad bridges about 1 mile above their entrances; they have an overhead clearance of 6 feet and 13 feet, respectively, at mean high water.

Fall River is a city situated on the eastern shore at the mouth of the Taunton River.

The depth at the wharves is 10 to 25 feet (3 to 7.6 m.).

Taunton River empties into the northeastern part of Mount Hope Bay. It has a narrow crooked channel. From Slades Ferry Bridge, Fall River, to the village of Somerset, the channel has a minimum width of 400 feet and a controlling depth of 30 feet (9.1 m.), as determined in 1933. From Somerset to Dighton, the channel is about 100 feet wide and the controlling depth is about 12 feet (3.7 m.), as determined in 1933; between Dighton and the head of the improved channel at Weir Village, Taunton, the controlling depth is not over 6 feet (1.8 m.) and the width varies from 100 to 60 feet, as determined in 1933. This channel is subject to change both in width and depth.

Pilots can be obtained at the entrance to Narragansett Bay or by wiring ahead to the Pilots' Association at Fall River the vessel will be met at Brenton Reef.

Pilotage is compulsory for foreign vessels of 7 feet (2.1 m.) or more draft, and is under rules and regulations formulated by the deputy commissioner of pilots of the State of Massachusetts.

All vessels subject to pilotage are required to pay the full pilotage fees regardless of the place of accepting the services of the pilot. Vessels of not more than 200 tons burden, which decline the services of a pilot are, if otherwise liable for pilotage, liable to one-half of the regular fee. If steam towage is taken by the desire of the master, the vessel is required to pay full pilotage fees, but if taken by direction of the pilot in charge, such vessel is required to pay to the pilot 75 percent of the regular fee.

Towboats are used by the larger vessels and those bound into Taunton River; they can be had from Fall River or Newport. They can also be obtained at Fall River for use in the harbor and for towing on the Taunton River.

There is no **Immigration Service** office at Fall River, the administration of the immigration regulations at this port being conducted by the Providence office of the Immigration Service. Very few immigrants enter through this port.

Customs.—The customhouse is located in the Federal Building at Bedford, Second, Pocasset, and Third Streets, about three-fourths of a mile from the principal wharves.

Quarantine.—Vessels subject to quarantine come to anchor in the main harbor anchorage grounds, where they are boarded. Quarantine inspection is made by the United States Public Health Service physician, whose office address is given in the appendix.

Hospitals.—There is no quarantine hospital or detention station at this port. Any cases of quarantinable disease which might be found on board an arriving ship, and which under United States laws would be permitted to land, would be cared for at the Fall River General Hospital, operated by the city, and all expenses in connection with such care are payable by the owners or agents of the vessel. The Union Hospital is a designated United States contract hospital. Sick or injured seamen apply at the office of the United States Public Health Service physician for treatment under the Seamen's Act.

Anchorage.—There are no designated anchorage areas for Fall River Harbor. Vessels may anchor on either side of the dredged approach channel in the outer harbor or at any locality in Mount Hope Bay where there is suitable bottom and depth.

The **harbor master** controls the anchoring and berthing of vessels in the main harbor. His office is located on the city wharf.

There is good anchorage in 3 to 5 fathoms (5.5 to 9.1 m.) abreast Fall River. An anchorage 25 feet (7.6 m.) deep has been dredged in the eastern half of the harbor from abreast the Old Colony Railroad wharf to deeper water 0.5 mile farther up. The controlling depths in this area on June 30, 1939, were from 18 to 25 feet (5.5 to 7.6 m.) and over.

Tides.—The mean rise and fall of the tides at Fall River is about 4.9 feet and at Taunton about 3 feet. The maximum range, due to the combined effect of wind and other causes, is about 8 feet.

Currents.—Tidal currents are strongest on the ebb tide, due to discharge from the Taunton River. It is estimated that the velocity of the current does not usually exceed 2 knots. The currents generally follow the direction of the channel and except at bridges do not hinder navigation.

Prevailing winds.—The prevailing winds are northwesterly for all but the summer months, when the direction is southwesterly. The heaviest gales are usually from the northwest.

Ice.—The approach channel and harbor are navigable throughout the year. Taunton River is commonly closed from December to March. During severe winters the harbor and Mount Hope Bay are occasionally frozen over, but the ice is usually kept broken up in the approach channel, through the center of the harbor, and to the principal wharves by the steamers and towboats using the harbor.

Bridges.—The following bridges cross the Taunton River between the mouth and the city of Taunton (vertical clearances mentioned below are heights above mean high water): Slades Ferry Bridge (highway), Fall River, single-leaf bascule with openings 100 feet wide and vertical clearance 6.8 feet (2.1 m.); Brightman Street Bridge, Fall River, double-leaf bascule with an opening 98 feet and vertical clearance of 27 feet (8.2 m.) when closed; the railroad bridge at Somerset, center-pier draw, with openings 100 feet wide and vertical clearance 5 feet (1.5 m.); the highway bridge at Berkley, 9 miles above the entrance, center-pier draw, with openings 49 feet wide and vertical clearance of 7 feet (2.1 m.); Plain Street Bridge, Taunton, center-pier draw, with openings 35 feet wide and a vertical clearance of 8 feet (2.4 m.).

Bridge regulations.—Regulations governing the operation of the bridges crossing the Taunton River are the same as those for the Pawtucket River, which are shown under Providence on page 150, with the following exception:

Berkley Highway Bridge.—Between 10 p. m. and 5 a. m. during the period from May 1 to October 31, and between 6 p. m. and 6 a. m. during the remaining months of the year, the draw shall be opened for the passage of all vessels which cannot pass the closed bridge upon notice given by telephone or otherwise to the operator at least 30 minutes in advance of the time the vessel desires to pass

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through the draw. The owner of the bridge shall provide arrangements whereby the draw tender can be reached by telephone or otherwise from the bridge, or through a public telephone exchange and notice of such arrangements shall be kept conspicuously posted on the bridge.

Regulations prescribed for the bridges require that they shall be opened for vessels on signal, except in the case of the railroad bridges, which may be kept closed for a period not exceeding four minutes after the signal is given, provided a train is approaching the bridge. The signal for opening is 3 short blasts, to be answered by 1 long blast if bridge can be opened, or by 3 long blasts and conspicuously displaying a red flag or ball by day or a red light by night, if opening is delayed. Small craft which cannot pass under the closed bridges shall not be delayed more than 20 minutes.

Directions, Mount Hope Bay.—Follow the directions for the eastern passage of Narragansett Bay given on page 134 to a position 500 yards east-southeastward of Prudence Island Lighthouse.* Then steer 41° true, passing about 200 yards northwestward of Coal Mine lighted bell buoy and the same distance southeastward of the buoy off Hog Island Shoal. (Four buoys, maintained by private interests, on the south side of the passage 0.5 mile southwestward from Musselbed Shoal Lighthouse, mark the channel leading to a lumber wharf.) Pass 200 yards northwestward of Musselbed Shoal Lighthouse and then steer 43° true passing under the center of the main span of the Mount Hope Bridge. Continue this course for about 1.8 miles beyond the bridge to a position 100 yards westward of the lighted bell buoy southeast of Mount Hope Point.

The range for the lower section of the dredged channel is Borden Flats Lighthouse and Mechanics Mill stack; the latter will be identified by a church with twin spires and a belfry which shows just to the right of it when on the range. This range leads in the dredged channel 40 feet from its southerly edge, so that care should be taken to go nothing southward of it to keep in the dredged channel. Steer 45° true on this range through the buoyed channel until about 0.8 mile from Borden Flats Lighthouse and nearly up with the large coal piers on the southern shore. Then steer 58° true for the end of the Old Colony Railroad wharf, and pass about 250 yards off the coal piers and 300 yards southward of Borden Flats Lighthouse. Pass the wharf of the Fall River Iron Works (large red-brick factory) at a distance not greater than 200 yards, and anchor above the Old Colony Railroad wharf, in the eastern half of the harbor, in a depth of 25 feet (7.6 m.). Anchorage can also be selected nearer Borden Flats Lighthouse, where the least depth is 16 feet (4.9 m.).

Wharfage.—At the city wharf rates are fixed by city ordinance.

Dockage.—The municipal wharf on Davol Street is open upon equal terms to all for the loading and discharging of cargoes.

These charges are omitted at the option of the wharfinger under certain conditions where wharfage is involved. At other wharves in the port rates are by agreement.

Supplies.—Coal, water, gasoline, provisions, and supplies of all kinds can be had at Fall River.

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*Lat. 41°36′.3, Long. 71°18′.2: Charts 262, 353, 354, 1210.

Coal bunkering.—There are several companies at Fall River prepared to furnish bunker coal to vessels. These are situated at Globe wharf at the foot of Shaw Street and at Davol Street. Normally, a stock of 10,000 to 15,000 tons of coal are on hand. At the Globe wharf delivery is made from an elevated hopper by means of an adjustable chute. With these facilities 20 to 125 tons of coal per hour can be delivered depending on the amount of trimming required. The depth alongside the wharf is about 24 feet (7.3 m.) with an available berthing space of about 300 feet.

At the Davol Street plant the coal is delivered by a grab bucket, the delivery capacity of which is about 100 tons of coal per hour. There is berthing space of about 350 feet with depths of 18 to 23 feet (5.5 to 7.0 m.) at the wharf. As the wharfage facilities are limited, arrangements for the use thereof must be made in advance.

Oil bunkering.—There are facilities for fuel oil bunkering at a terminal at the north end of the harbor almost 0.7 mile above the Brightman Street Bridge. Fuel oil of grades Navy A, Bunker C, and industrial fuel is supplied. The normal quantity kept in stock is 100,000 barrels. The facilities permit a bunkering capacity of 4,000 barrels per hour through the pipe lines on the wharf. Controlling depth to the wharf of the plant is about 30 feet (9.1 m.) where there is berthing space of about 1,600 feet with depths of water alongside from 20 to 30 feet (6.1 to 9.1 m.). Bunker oil can also be obtained by arrangement for fueling vessels at anchor in the stream.

Fresh water.—The supply of fresh water is ample and of excellent quality for domestic use and for boilers. It can be obtained at the city wharf and at various other wharves along the water front. There are facilities for obtaining delivery to vessels at anchor in the stream.

Repairs.—There is a marine railway at **South Somerset,** opposite Fall River, capable of hauling out vessels of 15-foot (4.6 m.) draft forward, 18 feet (5.5 m.) aft, 325 feet long, and with a capacity of 2,500 tons. In 1939 this plant was inoperative.

There is a small boat yard on the east side of the Taunton River about 1.5 miles above the Slades Ferry Bridge. The marine railway can accommodate small craft up to lengths of 60 feet and a draft of 5 feet (1.5 m.). There are facilities for wet and dry storage, light repairs, and a limited quantity of supplies can be obtained. There is about 9 feet (2.7 m.) alongside the dock at mean low water.

Although there are no firms regularly engaged in wrecking or salvage work as a business, there is equipment such as lighters, diving gear, and pumps which are available should an emergency arise.

Commerce.—Coastwise shipments and receipts constitute the major part of the maritime traffic and are comprised of petroleum products, coke and coal, lumber, textiles, and raw cotton.

Communication.—Fall River has railroad communication. There is bus service with Providence and Newport.

Somerset, about 5.3 miles, and **Dighton,** about 7.5 miles, above Fall River, on the west bank of Taunton River, are two villages to which vessels occasionally bring oil cargoes. At high water a draft of 30 feet (9.1 m.) can be taken to Somerset and 12 feet (3.7 m.) to Dighton.

Taunton is an important manufacturing city at the head of navigation, 12.5 miles above Fall River. It has a large coasting trade in petroleum products and coal, carried principally in barges. Vessels bound to Taunton, requiring a towboat, take one at Fall River. All towing is done on the tides.

WEST PASSAGE

(CHART 353)

This passage is the approach to Dutch Island Harbor, Wickford, and East Greenwich. Vessels may also go to Providence by this route, although the route through the East Passage is deeper and generally used.

The shore for a distance of 3 miles northeastward of Point Judith is foul, and should be given a berth of 0.5 mile. Abreast the tall tower it is bold, but abreast Narranganset Pier there are shoals and rocks which extend about 300 yards from the shore. A rock, locally known as River Ledge, with 14 feet (4.3 m.) over it, lying 0.8 mile southwestward from Whale Rock Lighthouse and 0.4 mile from shore, is marked by a buoy.

Scarborough Beach, about 1.5 miles north of Point Judith Light is a recent State development. The stone bathing pavilion is a prominent landmark. **League Rock, Little League Rock, Peaked Rock,** and **Champlin Rock** are small rocks showing above high water. These rocks are situated approximately 0.3 mile from shore between Point Judith and Black Point.

On **Point Judith Neck,** about 1.8 miles northward from Point Judith Lighthouse, there is a very prominent elevated water tank which shows well from all seaward directions.

Black Point, northward of Scarborough Beach, is a rocky promontory. There is a prominent stone house with dormer windows on the south roof near the highest part of the point.

Brenton Reef Lightship is described on page 125.

Beavertail Lighthouse is described on page 125.

Newton Rock has 3 feet (0.9 m.) over it and is part of the ledge which extends 400 yards southward from Beavertail Lighthouse. A bell buoy is placed about 350 yards from the southern end of the ledge.

Whale Rock, on the western side of the entrance to the West Passage is marked by Whale Rock Light, a 30-foot (9.1 m.) brown skeleton steel tower on the base of the former lighthouse. The light is 59 feet above the water and visible 13 miles. There is a lighted gong buoy eastward of the light.

There is a 7-foot (2.1 m.) spot about 200 yards northward of Whale Rock Lighthouse. A channel with a depth of about 8 fathoms (14.6 m.) leads between the light and Dickens Reef off the western shore, but strangers should not use it.

Narragansett Pier is a summer resort having railroad coumunication; the large hotels and a square granite tower are prominent. A municipal bathing beach and pavilion is situated at **Narragansett Upper Pier** and is prominent from an easterly direction. The entire section is becoming increasingly more active as a summer resort.

Pettaquamscutt River is a shallow, unimportant stream with a narrow, foul entrance about 1 mile northeastward of Narragansett Pier.

River Rock, Cormorant Rock, Old Antonio and **Clump Rocks** are rocks situated off the entrance to Pettasquamscott River. River Rock and Clump Rock show at high water but the others are awash or covered at that stage of the tide. About 0.5 mile offshore a rock with a depth of 14 feet (4.3 m.) over it is marked by a buoy.

Austin Hollow, is a bight in the eastern shore 1 mile northward of Beavertail, the eastern shore of West Passage from above this bight to the entrance of Dutch Island Harbor can be approached as close as 200 yards. The western shore between **Bonnet Point** and South Ferry should be given a berth of 400 yards.

The Bonnet, a prominent hill, the shoreward face of which is bold and rocky, is on the west side of the passage opposite Austin Hollow. A bathing pavilion at **Wesquage Beach** is prominent from a southeasterly direction. **Jones Ledge** with a depth of 9 feet (2.7 m.) over it is marked by a buoy.

Saunderstown is on the western shore abreast Dutch Island. A ferry runs to the western side of Conanicut Island at the southern part of Dutch Island Harbor. **Storm-warning signals** are made. **Pilots** for the West Passage may be had.

Anchorage areas in the West Passage are defined by the Secretary of War, and vessels are prohibited from anchoring outside these areas. (See Anchorages on large scale charts.)

Cable Crossings.—Submarine cables have been laid in the West Passage and the limits are shown on charts 236 and 353.

Dutch Island Harbor (charts 353 or 236).—This harbor lies in the West Passage of Narragansett Bay about 3 miles above Beavertail Lighthouse, and is a semicircular indentation 0.5 by 1 mile in extent, making into the western side of Conanicut Island. **Dutch Island** is on the western side of the harbor, and vessels may enter by passing either northward or southward of the island. The harbor affords excellent anchorage in 2 to 8 fathoms (3.7 to 14.6 m.), sticky bottom, is easy of access, and is frequently used as a harbor of refuge. The southern entrance is good for a depth of 28 feet (8.5 m.); the northern entrance has an extensive shoal with 16 to 18 feet (4.9 to 5.5 m.) over it.

Dutch Island Lighthouse* is a square white tower attached to a dwelling on the extreme southern end of Dutch Island, and is the guide for vessels coming up the West Passage and entering Dutch Island Harbor by the southern entrance. The light is 56 feet (17.1 m.) high and visible 9 miles. The fog signal is a bell.

A narrow spit makes out about 150 yards south-southwestward from Dutch Island Lighthouse, and has 6 feet (1.8 m.) near its end, where it is marked by a buoy. The shoal making out on the northwest side of the island is marked by a bell buoy.

On the south side of the entrance is a high point known as **Fox Hill,** which terminates in a bluff, rocky face northward, known as **Beaverhead.** From it a shoal makes out 200 yards westward and 350 yards northward. At its northern extremity the shoal rises

*Lat. 40°29′.8, Long. 71°24′.3: Charts 236, 353, 1210.

abruptly from 8½ fathoms to 5 feet (15.5 to 1.5 m.), and is marked by a buoy.

In the southeastern part of the harbor there is a shallow cove which makes southeastward about 0.5 mile, and is only separated from **Mackerel Cove** by a narrow neck of land which joins Beavertail Peninsula to the main body of the island.

Directions, Dutch Island Harbor.—In seeking anchorage, if of over 18-foot (5.5 m.) draft, give the eastern shore of the harbor a berth of at least 0.4 mile; if of less than 14-foot (4.3 m.) draft, the eastern shore may be approached much closer, the general depth being 15 to 17 feet (4.6 to 5.2 m.). The eastern shore of Dutch Island should be given a berth of 100 yards.

From southward.—Steer 4° true for Dutch Island Lighthouse until about 400 yards from it; then steer 43° true into the harbor, being guided by the buoys. Select anchorage according to draft, within the anchorage areas prescribed by the Secretary of War.

From northward.—From a position about 150 yards west of the buoy off Slocum Ledge steer 164° true into the harbor.

Give the northeastern end of Dutch Island a berth of over 100 yards, and select anchorage according to draft, within the prescribed anchorage limits.

At **Casey Point** shoaling is reported to have occurred extending in a southeasterly direction for approximately 0.1 mile.

Plum Beach Shoal has 12 to 16 feet (3.7 to 4.9 m.) over it, and extends 0.5 mile from the western shore about 1 mile above Dutch Island. The northeastern end of the shoal is marked by Plum Beach Lighthouse, and the south end by a buoy which lies 0.5 mile southward of the lighthouse, in line between it and Dutch Island Lighthouse. To insure a depth of more than 18 feet (5.5 m.) vessels should keep over 350 yards eastward of a line joining the buoy and Plum Beach Lighthouse. The lighthouse is a conical tower, lower half white, upper half brown, on a black cylindrical pier. The fog signal is a bell.

It is reported that the light is obscured at various locations to vessels bound north from Dutch Island Lighthouse due to the construction of the bridge across the West Passage between the towns of Jamestown, on Conanicut Island, and North Kingston on Boston Neck.

When completed the bridge will have a horizontal clearance of about 600 feet and a vertical clearance of 135 feet (41.2 m.) above mean high water.

Great Ledge stretches along the west shore of Conanicut Island for a distance of 1.5 miles. **Slocum Ledge,** its southern end, lies about 1 mile northward of Dutch Island. The distance to which this ledge extends from the shore varies from 175 yards at its southern to 500 yards at **America Ledge,** its northern end; it is comprised of **The Brothers, Fowler Rock, Dick Rock, Sinker Rock** and a number of sunken rocks close inshore.

Old Ferry Shoal has a depth of 23 feet (7 m.) and is marked on its west side by a red buoy.

Fox Island, southward of Wickford Harbor, is small and low, with a few trees. A shoal, with numerous submerged rocks, extends 0.3 mile southward from the island. Bare and sunken rocks including **The Clump, and The Brothers on Johnson Ledge** extend north-

eastward and eastward from **Rome Point,** southwestward of Fox Island. A narrow channel, suitable only for small craft, leads between these rocks and Fox Island.

Whitestone Ledge with a depth of 26 feet (7.9 m.) and **Halfway Ledge** with a depth of 22 feet (6.7 m.) are east of Fox Island at distances of 0.2 mile and 0.4 mile, respectively.

Bissel Cove, west-southwestward of Fox Island, can be entered at high water with a draft of 3 or 4 feet (0.9 or 1.2 m.). There are strong currents through the entrance. The cove is shoal and the channel unmarked.

Annaquatucket River enters the westerly arm.

Wickford Harbor.—This harbor (chart 357), in the west shore of Narragansett Bay, westward of the northern end of Conanicut Island, comprises an outer and inner harbor. The outer harbor is a broad bight between **Quonset Point** on the north and **Wild Goose Point** on the south; between these points it is about 2 miles wide and has good anchorage in 14 to 17 feet (4.3 to 5.2 m.) in the middle and southern parts.

A shoal, with numerous ledges and rocks, extends nearly 1.2 miles southwestward from Quonset Point. A number of these rocks and ledges are buoyed, the most important being **Bill Dyer Rock** which has 4 feet (1.2 m.) over it and marked by a buoy: **Flat Rock,** marked by a buoy and **Manney Rock** with 2 feet (0.6 m.) over it is marked by a buoy. These buoys mark a channel through which a craft drawing 7 feet (2.1 m.) may be taken across the shoal; but strangers should pass southward of **General Rock.**

This rock is the southern limit of the shoal and has a depth of 10 feet (3.0 m.) over it. It is marked by a bell buoy fitted with reflectors.

James Ledge has 2 feet (0.6 m.) over it, and is marked by a buoy.

Brig Ledge, with 9 feet (2.7 m.) over it, is marked by a buoy. These three are the easternmost of the dangers, and lie from 0.6 to nearly 1.2 miles south-southwestward of Quonset Point.

Westward of General Rock is an 8-foot (2.4 m.) shoal marked by a buoy.

South White Rock, marked by a granite beacon, is 0.4 mile north-northwestward of General Rock.

A reef which extends northward from White Rock beacon includes Middle White Rock and North White Rock as well as numerous sunken rocks.

Charles Rock, with 4 feet (1.2 m.) over it, is at the south end of the shoals making out from Sauga Point, and is marked by a red buoy which lies nearly 300 yards northwestward of Wickford Harbor Lighthouse.

A shoal extends from Wickford Harbor Lighthouse to the steamboat wharf, and makes offshore 200 to 300 feet just eastward of the wharf.

The entrance to the inner harbor is about 0.3 mile wide between **Sauga Point** on the north and **Poplar Point** on the south, but the shoals making out from these points leave only a narrow channel, marked by and lying just northward of **Wickford Harbor Lighthouse,** which is on **Old Gay Rock,** about 300 yards northeastward from the unused light on Poplar Point. The entrance channel between the points leads to the common junction of three coves,

Fishing Cove making northward, **Mill Cove** making northwestward, and Wickford Cove making southwestward. The first two of these coves are shallow and of no importance.

Wickford Cove has a depth of about 9 feet (2.7 m.) in a narrow dredged channel, which leads between flats that are mostly dry at extreme low water. Strangers should not go above the wharves at the entrance without a pilot, who may be had by making signal while eastward of the lighthouse. The town of **Wickford,** on the west side of Wickford Cove, is of little commercial importance.

The depth at low water at the steamer wharf, on the easterly side of the entrance, is 8 feet (2.4 m.) at the northern end, and at those on the westerly side about 6 to 8 feet (1.8 to 2.4 m.).

In severe winters the inner harbor is closed by ice, but the outer harbor is usually open, although drift ice is occasionally encountered.

Gasoline, coal, and some provisions can be had.

There are two marine railways which are capable of handling small craft up to lengths of 65 feet and draft of 6 to 14 feet (1.8 to 4.3 m.).

Directions, Wickford Harbor.—From a position 0.2 mile eastward of Plum Beach Lighthouse* steer 341° true and pass 0.2 mile eastward of Fox Island; or, passing 0.3 mile or more eastward of Quonset Point and eastward of the black buoy off the point, steer 202° true and pass eastward and southward of General Rock bell buoy. All dangers off the southern shore of the harbor will be cleared by giving Fox Island a berth of over 300 yards when eastward of it, and keeping eastward of a line joining Fox Island and Wickford Harbor Lighthouse. Then steer for Wickford Harbor Lighthouse on any bearing between 313° true and 286° true and anchor 0.2 mile or more southeastward or eastward of the lighthouse in 14 to 15 feet (4.3 to 4.6 m.), soft bottom.

A depth of 10 feet (3 m.) can be taken nearly to the steamboat wharf, on the easterly side of the entrance to the inner harbor, by passing 200 feet northward of Wickford Harbor Lighthouse and a slightly greater distance southward of Charles Rock Buoy, on about a 285° true course. When the entrance to the inner harbor is open, swing slowly to 203° true heading to favor the wharf on the easterly side. Small craft or a few small vessels can anchor in the channel from Charles Rock buoy to abreast the entrance of the inner harbor. Small craft can enter Wickford Cove by keeping in mid-channel.

Allen Harbor and **Flat Cove** are shallow coves with a common entrance, southward of Calf Pasture Point.

There is a depth of about 4 feet (1.2 m.) in the entrance and it is used only by local craft. **Old Sow Rock,** bare at low water, lies in the center of the entrance close by and south of the channel.

There are several shoals in the bight between Quonset Point and **Calf Pasture Point,** the point about 2.2 miles northward. To avoid these a vessel should haul eastward when the water shoals to 18 feet (5.5 m.). Abreast Calf Pasture Point and for some distance northward of it a shoal extends 0.5 mile from shore.

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*Lat. 41°31'.8, Long. 71°24'.3: Charts 236, 353, 1210.

Calf Pasture Rock with a depth of 2 feet (0.6 m.) of water over it lies offshore, northeasterly and 500 yards, from Calf Pasture Point.

Hope Island has a few trees and low grassy hills. Bare and sunken rocks surround the island for a distance of about 0.2 mile. **Despair Island** is on the outer end of a rocky ledge extending 0.2 mile northeastward from Hope Island, and is marked by a bell buoy off the northeast side.

Shoals make eastward from the entrance to Greenwich Bay, and extend nearly to **Patience Island.** For a distance of nearly 1 mile from shore the shoal has depths of 2 to 12 feet (0.6 to 3.7 m.), and has a number of rocks and ledges.

Crack Rock with a depth of 5 feet (1.5 m.), **Flat Rock** with a depth of 1 foot (0.3 m.) and **Round Rock** which is awash at half tide are about 0.8 mile from shore east of the entrance of **Potowomut River.** Round Rock is marked by a buoy.

Hunt Ledge, with 12 feet (3.7 m.) over it, is the easternmost of the rocks. From this ledge a shoal with 14 to 17 feet (4.3 to 5.2 m.) over it extends 0.5 mile eastward and 1.5 miles south-southeastward; its southern point is marked by a buoy. Between this shoal and the shoal making westward and southward from Patience Island there is a channel with a least width of 300 yards and a depth of from 3¼ to 12 fathoms (5.8 to 22 m.), leading up to **Warwick Neck.** This channel is marked by buoys, leads on a 349° true bearing for Warwick Lighthouse and forms the approach through West Passage to Greenwich Bay and Providence River.

A shoal with 11 to 15 feet (3.4 to 4.6 m.) over it extends about 600 yards westward of Patience Island, and its northwest edge is marked by a lighted bell buoy, lying 0.5 mile southward from Warwick Lighthouse.

Warwick Lighthouse is a white, conical, steel tower at the south end of Warwick Neck. The light is 51 feet (15.5 m.) high and visible 12 miles. The fog signal is an air diaphragm horn.

Potowomut River, on the south side of **Potowomut** has a bar at the entrance with depths of 2 to 4 feet (0.6 to 1.2 m.). Inside the channel is narrow and crooked. Caution is necessary to avoid rocks at the entrance of the river over which there is a depth of only 1 foot (0.3 m.) at low water. Strangers should not enter.

Goddard Memorial Park is on Potowomut.

Greenwich Bay, at the northwestern end of Narragansett Bay, has its entrance between Warwick Neck and Potowomut; the general depth for the greater part is 10 feet (3.0 m.).

From **Sandy Point,** shoals with depths 2 to 9 feet (0.6 to 2.7 m.) extend northeasterly for about 0.7 mile. Sandy Point Shoal is marked on its northeast side by a buoy.

Sally Rock, with a depth of 4 feet (1.2 m.) over it lies about 400 yards northward of **Sally Rock Point.** A lighted bell buoy is just northward of a buoy which marks the rock.

Old Warwick Cove, at the northeastern part of the bay, has a depth of 4 feet (1.2 m.) in the entrance, with a narrow channel of greater depth inside. A shoal, bare at low water, extends 200 yards eastward from the western point at the entrance.

Brush Neck Cove, westward of Old Warwick Cove, is fronted by a flat with a general depth of about 2 feet (0.6 m.).

Oakland Beach, between these coves, is a summer resort with bus communication. The large hotel and flagstaff are conspicuous.

Apponaug River is a shallow stream emptying into the north western port of Greenwich Bay. The general depth is 4 feet (1.2 m.) for about 0.3 mile, above which the stream is nearly bare at low water. **Apponaug** is a village nearly 1 mile above the entrance. A depth of 3 feet (0.9 m.) can be carried to the town.

At **Cowesett** on the northwestern side of the bay there is a wharf to which 8 feet (2.4 m.) can be taken at high water.

Chepiwanoxet Island is the small neck of land, with yellow bluff facing eastward, in the extreme western part of the bay, and northward of the entrance to Greenwich Cove. From this island shoals, with little water over them, make off 500 yards northward and 250 yards eastward and southeastward; the southeastern extremity is marked by a buoy.

Shoals make out northward and northwestward for a distance of about 300 yards from **Long Point,** the northwestern point of Potowomut. The western end of the shoals is marked by a buoy.

Greenwich Cove, 1.3 miles long, 300 to 600 yards wide, and with a general depth of 8 to 10 feet (2.4 to 3 m), makes southward from the southwestern end of Greenwich Bay. On the western shore of the cove is the town of **East Greenwich.** The narrow channel into the cove has a depth of 10 feet (3.0 m.), and there are depths up to 12 feet (3.7 m.) at high water at some of the wharves. A depth of 4 feet (1.2 m.) can be carried to the yacht club landing at low water. There is good anchorage off the wharves in 8 to 11 feet (2.4 to 3.4 m.), the deepest water being found on the eastern side of the cove.

Tides.—The mean rise and fall of tide is about 4½ feet.

Directions, Greenwich Bay.—Pass 500 yards southwestward of **Warwick Lighthouse,*** then steer **302°** true and pass about 150 yards northward of **Sandy Point Shoal** buoy. Then steer **284°** true to a position 75 yards northward of **Sally Rock** lighted buoy. Then steer **238°** true for the red buoy; pass close southward of it and continue the course, passing 75 yards northward and 50 yards westward of the black buoy off Long Point; then steer about 156° true into the cove. Keep in the middle of the cove, and anchor not more than 0.5 mile above the entrance, in 8 to 11 feet (2.4 to 3.4 m.).

Supplies and Repairs.—Supplies of all kinds may be obtained including gasoline and diesel fuel oil.

A repair yard has a marine railway with a capacity of 100 tons and capable of handling vessels up to 120 feet in length with a draft of 9 feet (2.7 m.). There are facilities for boat storage, both dry and wet. A small towboat is available.

Extensive shoals make off from the eastern side of **Warwick Neck,** and extend out about 2 miles to **Ohio Ledge,** with depths of 15 to 18 feet (4.6 to 5.5 m.). The Ledge is about 350 yards long within the 12-foot (3.7 m.) curve and the least depth found on it was 8 feet (2.4 m.).

The east side of the ledge is marked by two buoys one of which is a bell buoy.

The channel between these shoals and those making northward from Patience and Prudence Islands is about 0.3 mile wide, with

*Lat. 41°40'.0, Long. 71°22'.7: Charts 278, 353, 1210.

depth of 4 to 10 fathoms (7.3 to 18.2 m.). This channel is now used by vessels of over 12-foot (3.7 m.) draft in preference to the abandoned channel across the shoal eastward of Rocky Point.

Rocky Point, on the eastern side of **Warwick Neck,** about 1.5 miles northeastward of the lighthouse, was the site of an amusement park which was destroyed in the hurricane of 1938. In 1939 it was being rebuilt.

Directions, West Passage of Narragansett Bay.—The least depth on the sailing lines is about 19 feet (5.8 m.) as far as Providence River entrance, but local knowledge is required for a greater draft than 12 feet (3.7 m.).

Pass clear of Brenton Reef Lightship and steer toward Whale Rock Lighthouse until southwestward of Beavertail Lighthouse. Then pass 0.4 to 0.5 mile westward of Beavertail Lighthouse and steer 4° true for Dutch Island Lighthouse, with Plum Beach Lighthouse open westward of it. Or, from just north of Point Judith lighted gong buoy, steer 21° true about 7.5 miles, to a position midway between Whale Rock and Beavertail Lighthouses. Then steer 4° true toward Dutch Island Lighthouse. At night a careful study of the characteristics of the lights is necessary, as a number of the lights marking the East Passage will be seen on the starboard bow when approaching from Point Judith.

When 0.5 to 0.8 mile from Dutch Island Lighthouse, steer more to the left so as to pass 500 yards west of it. Then steer 7° true toward Plum Beach Lighthouse until abreast the north end of Dutch Island, and then steer northeastward. When Dutch Island Lighthouse bears 186° true bring it astern and steer 6° true passing 500 yards eastward of Plum Beach Lighthouse. When Conanicut Island Lighthouse is abeam, steer 18° true for 3.5 miles, passing about 0.5 mile westward of Hope Island.

When Warwick Lighthouse bears 349° true, head for the lighthouse on this bearing, passing between the red and black buoys at the southern end of the shoals. When 0.4 mile from Warwick Lighthouse and Patience Island lighted bell buoy is abeam, steer 53° true with lighted buoy No. 9 ahead. Pass 100 yards northward of the buoy off Providence Point, and, when Conimicut light bears 1° true, steer 99° true for 1.2 miles and then 3° true for 1 mile. On the last course, lighted buoy No. 9 will be a little on the port bow. Round this buoy at a distance of 100 yards and steer 322° true heading for Bullock Point Lighthouse and pass 200 yards northeastward of Conimicut Lighthouse. Then follow the directions for Providence River.

PROVIDENCE RIVER

CHART 278

Providence River empties into the head of Narragansett Bay and is the approach to the city of Providence and to the Seekonk River. The entrance, between **Nayatt Point** (marked by an unusual light tower) on the east and **Conimicut Point** on the west, is about 0.9 mile wide but is obstructed by shoals on both sides, which leave an available channel about 0.2 mile wide.

Conimicut Lighthouse is a white conical tower on a brown pier on the eastern end of the shoal making out from Conimicut Point.

Pawtuxet is a village on the west bank of Providence River west-

ward of Sabin Point Lighthouse. It has no commerce and can be reached at high water only by vessels up to 7-foot (2.1 m.) draft. It is frequented by oyster boats and small pleasure craft, for which there is a marine railway. The entrance channel leads between rocks bare at low water. A lighted range ahead guides through the channel. The remains of a stone beacon, covered at high water, is marked by a buoy.

Pawtuxet Cove is a well-protected anchorage with many small boat facilities and is the nearest such anchorage to Providence which can be readily reached by car or bus lines.

Providence, about 7 miles above the entrance to the river and at its junction with Seekonk River, is an important commercial port.

The **Seekonk River** is the approach by water to **Phillipsdale** and **Pawtucket.** The distance from the mouth of the river at Providence Harbor to the head of navigation at Pawtucket is about 5 miles.

East Providence, a suburb of Providence, is on the east bank and is connected with the city proper by four bridges crossing Seekonk River.

Channel.—The channel of Providence River, leading between extensive shoals which make out from both shores, is well marked by lighthouses and other aids and can be readily followed in the daytime with clear weather.

In 1939 the controlling depths in the channel from deep water in Narragansett Bay to Sabin Point Lighthouse were 32 feet (9.8 m.); thence 30 feet (9.1 m.) to Field Point and in the harbor area 27 to 30 feet (8.2 to 9.1 m.). Dredging and rock-removal operations were in progress to provide a depth of 35 feet (10.7 m.) in the channel as far as Squantum Point.

Pilotage.—Pilotage is compulsory for vessels engaged in foreign trade, but is not compulsory for coastwise vessels. Pilots usually board incoming vessels between Brenton Reef Lightship and the entrance to Narragansett Bay and leave outgoing vessels at the same locality. No vessel bound for Providence is required to take a pilot unless spoken by a branch pilot below Nayatt Point.

See pilotage—Narragansett Bay, page 118, and Newport, page 128.

Towboats are generally taken by the larger sailing vessels, and may sometimes be found at the entrance of the river when vessels are expected; they may also be obtained from Newport or by telephone from Dutch Island Harbor.

Steamers usually proceed to and from Providence Harbor without the assistance of towboats, but towboat service is generally necessary in docking and undocking the larger steamers.

Immigration.—The regulations of the Immigration Service at Providence are administered by the inspector in charge of immigration, whose office is in the customhouse on Weybosset Street. There is no immigration detention station at this port, steamship companies being required to deliver immigrants to the station at East Boston, Mass., for detention or further examination, upon order of the local immigration officer.

Customs.—The customhouse is located on Weybosset Street at the corner of Custom House street, about 1.3 miles from the anchorage place at quarantine.

Quarantine is enforced in accordance with the regulations of the Public Health Service. Vessels subject to inspection are boarded in the harbor.

Hospitals.—There is no quarantine hospital at Providence. When diseases are found aboard ship which require hospital treatment, the patients are sent to the Charles V. Chapin Hospital. The Public Health Service has an office and dispensary in the new Federal Building, Providence, where out-patients are treated by an officer of the service, who is also the official to whom application should be made for admission to a hospital.

Anchorage.—Vessels anchor as directed by the harbor master on the edge of the channel between Field Point and Fox Point. There is anchorage for a few vessels eastward of Fox Point, where **Green Jacket Shoal** has been removed. Small craft anchor westward and northward of **Sunshine Island,** on the western side of the river, southward of Field Point in 3 to 4 feet (0.9 to 1.2 m.). The southern entrance is better, giving Sunshine Island a berth of over 100 yards.

Harbor regulations have been established and are enforced by a harbor master, whose headquarters are at the eastern end of Point Street Bridge. Copies of the Harbor Regulations can be obtained from the harbor master.

Tides.—The mean range of tide at Providence is 4.6 feet and the maximum range due to the combined effect of wind and other causes may reach 8 feet or more at times.

Currents.—Tidal currents are of moderate strength in the approach channel and the harbor, excepting opposite Fox Point where the Pawtucket River enters.

At **India Point Bridge** and **Red Bridge,** the tidal currents have average velocities at strengths at about 1.5 knots. In the Seekonk River the double flood is very pronounced. The velocity near the middle of the flood period is generally less than 0.5 knot and is sometimes in an ebb direction.

Storm-warning displays are made at Providence and at **Edgewood,** southwest of Field Point.

The prevailing winds are northwesterly except in July, when southwesterly as well as northwesterly winds occur. The heaviest gales are usually from the northwest.

Fog.—Fog is more prevalent during the winter and spring months and is most frequent with easterly and southerly winds. Northerly and westerly winds will usually clear the fog. See "Winds," "fogs," etc., in General Information, page 120.

Ice.—The approach channel and the harbor are navigable throughout the year. During severe winters the harbor and several miles of Providence River and Upper Narragansett Bay are occasionally frozen over, but the ice is usually kept broken up in the approach channels, through the center of the harbor, and to the principal wharves by the normal traffic using the harbor.

Bridges.—Point Street Bridge, crossing Providence River 600 yards above **Fox Point,** is a center-pier draw, with openings 99 feet wide and a vertical clearance of 9 feet (2.7 m.). Four drawbridges cross Seekonk River within a distance of 1 mile from its mouth, as follows: India Street Bridge, a center-pier draw, openings 83 feet

wide, vertical clearance 4.9 (1.5 m.); Fox Point Boulevard Bridge, a single-leaf bascule, width of opening 100 feet, vertical clearance 40 feet (12.2 m.) when closed; Tunnel Bridge, a single-leaf bascule, width of opening 92 feet, vertical clearance 17 feet (5.2 m.); Red Bridge, a center-pier draw, openings 69 feet and vertical clearance 13 feet (4.0 m.).

Bridge regulations.—The following regulations govern the opening and closing of the bridge which crosses Providence River at Point Street and the four bridges crossing the Seekonk (Pawtucket) River.

1. The signal for opening the draws of the above-named bridges shall be given by three short blasts of a horn or steam whistle. The signal for opening shall be answered by one long blast of a whistle or horn on the bridge when the operation of opening is commenced, or, if the draw cannot be promptly opened, by three long blasts, and, in addition, a red flag or ball by day and a red light by night shall be conspicuously displayed on the bridge.

Closed periods when the draw of the Point Street bridge across the Providence River need not be opened are authorized as follows:

Between 6:45 a. m. and 7 a. m.
Between 7:45 a. m. and 8 a. m.
Between 12:45 p. m. and 1 p. m.

Directions, Providence River.—Having followed the directions for the East Passage or West Passage of Narragansett Bay, pass 200 yards northeastward of Conimicut Lighthouse and steer 304° true for 1 mile; when Sabin Point Lighthouse opens westward of Bullock Point Lighthouse, make the turn with an easy port helm (right rudder) and steer 343° true for 2.1 miles, passing 250 yards westward of Bullock Point Lighthouse. When 175 yards westward of Sabin Point Lighthouse, steer 20° true for Pomham Rocks Lighthouse until abreast red buoy No. 8, then steer 8° true with Sabin Point Lighthouse nearly astern until 200 yards northwestward of Pomham Rocks Lighthouse. Then steer 339° true for Fuller Rock Lighthouse* until abeam the lighted bell buoy off Sunshine Island. Then steer 326° true into the harbor, and anchor on the side of the channel as directed by the harbor master.

Dockage.—Most of the wharves at this port are reserved for the exclusive use of their owners or operators. Fixed rates are established at the two public wharves for vessels not loading or discharging cargo. At the State pier there is a charge for dockage computed on the basis of the net registered ton per calendar day, including Sundays and holidays.

At the Municipal wharf there is a fixed charge computed on the basis of the length of the vessel in feet per day on inactive dockage. When a vessel is engaged in loading or discharging cargo, the wharfage charge also includes dockage.

Wharfage.—Wharfage charges are assessed on all freight handled over the Municipal wharf and the State pier. The various rates for handling freight at the State pier are contained in "Rules, Regulations and Charges Covering the Uses of State Piers," published by the State Division of Harbors and Rivers and is available at the State Office Building, Providence. The wharves below the bridges have depths from 10 to 30 feet (3 to 9.1 m.). At high water a draft of

*Lat. 41°47'.7, Long. 71°22'.8; Charts 352, 278, 353, 1210.

23 feet (7 m.) can be taken to the coal wharves above Point Street Bridge.

Lighterage.—Very little lighterage service is performed at Providence. There are no fixed rates for lighterage, the service being by agreement.

Wrecking and salvage.—Although there are no firms engaged in wrecking and salvage as a regular business, there is equipment available for use for this purpose. There is complete diving equipment, and experienced divers can be obtained on short notice. Other equipment, including centrifugal pumps, underwater power tools, anchors, rigging and lighters which are equipped with lifts with a capacity of 10 tons, may be obtained.

Supplies.—Coal, fuel, oil, gasoline, provisions, and ship supplies of all kinds are obtainable.

Coal bunkering.—There are several coal-handling plants with facilities for supplying bunker coal to vessels. There are no regular facilities for coaling vessels at anchor in the stream by the coal companies, but lighters can be obtained by charter arrangements. There is a normal storage of about 20,000 tons at all times. All plants have a delivery capacity of 250–300 tons per hour, with the coal being transferred either by grab buckets or by gravity through chutes from elevated hoppers.

Oil bunkering.—There are good facilities for oil bunkering of vessels, the largest plants being located near **Kettle Point.** Delivery is made at the wharves of the plants, directly to the vessel through pipe lines from storage tanks. There are also facilities for bunkering vessels at anchor in the stream. The usual commercial grades of fuel oil are available, with normal storage stocks of about 100,000 barrels. The delivery capacity is about 2,000 barrels per hour.

Fresh water.—The supply of fresh water is both ample and of excellent quality for either domestic use or for use in boilers and can be obtained at nearly all the wharves on the west side of the harbor. In addition, there are facilities for watering vessels at anchor in the stream.

Repairs.—The marine repair facilities at the port are limited, as there is no drydock and no marine railway of sufficient capacity to be of interest to general shipping. There are, however, several marine railways for small craft up to lengths of 50 feet and a draft of 5 feet (1.5 m.). Repairs to machinery, steel hulls, and boilers can be obtained in the several well-equipped machine shops.

Communication.—Providence is well served both by railroad and steamship lines. In the intracoastal freight traffic there are about six of the major steamship lines which schedule Providence as a port of call. A regular schedule is maintained for passenger traffic by steamer to New York. There is also bus and air communication, the latter being obtained at the municipal airport 7 miles south of the city.

Seekonk River (chart 278) has been improved by dredging.

The controlling depth as determined in January 1939 was 16 feet (4.9 m.) for a channel width of about 150 feet to the lower wharves at Pawtucket, thence 15 feet (4.6 m.) for a channel width of 60 feet through the ledge section between the wharves to the Division Street Bridge. The channel is well marked and the chart is the best guide.

There are rocky shoals at the edges of the channel opposite Bass Rocks.

Pawtucket is a city at the head of navigation on the Seekonk River about 4.5 miles above the mouth. The principal wharves have depths from 9 to 14 feet (2.7 to 4.3 m.); the deepest draft taken to Pawtucket is 17 feet (5.2 m.) at high water.

Chapter 8.—BLOCK ISLAND SOUND

GENERAL INFORMATION

Block Island Sound is a deep, navigable waterway which forms the eastern approach to Long Island Sound, Fishers Island Sound, and Gardiners Bay from the Atlantic Ocean. It has two entrances from the Atlantic Ocean, an eastern entrance between Block Island and Point Judith, R. I., and a southern entrance between Block Island and Montauk Point, Long Island. It is separated from Long Island Sound by the passage known as The Race and by the passages between the Gull Islands and also between Great Gull and Plum Islands.

Block Island Sound is separated from Fishers Island Sound by the several passages located between rocky reefs along the stretch from Watch Hill Point, R. I., to East Point, Fishers Island.

Anchorages.—The more important places, either commercially or as harbors of refuge, are Point Judith Harbor and Great Salt Pond, in Block Island Sound; Gardiners Bay and Greenport; and Stonington and Mystic River, in Fishers Island Sound.

Tides.—Full tidal information, including daily predictions is given in the tide tables which are published annually by the United States Coast and Geodetic Survey. (See General Information—Tides and Currents, page 4.)

The effect of strong winds, in combination with the regular tidal action, may at times cause the water to fall several feet below the plane of reference of the chart, which is mean low water. The water has been known also to rise about the same amounts above mean high water, due to similar causes.

Currents.—Current data for a number of locations in Block Island Sound are given in the current tables which are published annually by the United States Coast and Geodetic Survey. (See page 4.) Current directions and velocities throughout the Sound for each hour of the tidal cycle are shown on "Tidal Currents Charts, Long Island and Block Island Sounds." (See List of Publications, page 25.)

The tidal currents throughout Block Island Sound have considerable velocity; the greatest velocities occur in the vicinity of The Race and in the entrances between Montauk Point, Block Island, and Point Judith. Soundings alone cannot be depended upon to locate the position; approaching the shores or dangers the shoaling is generally abrupt.

In the passage between Point Judith and Block Island, about 1.5 miles north of Sandy Point, slack waters before flood and ebb, respectively, occur about ½ hour after low water at Boston and ¾ hour before high water at Boston. The velocity at strength is about 2 knots. In the middle of the passage and near Point Judith the velocity at strength is about 1 knot.

In the middle of the passage between Block Island and Montauk Point slack waters before flood and ebb, respectively, occur at about the times of low water and high water at Boston. The velocity at the strength of flood, or northwestward current, is about 1.5 knots in the middle of the passage and about 2.5 knots off Montauk Point. The velocity of the ebb, or southeastward current, is about 2 knots in the passage.

Between Shagwong Reef and Cerberus Shoal the currents have a velocity at strength of about 1¾ knots.

Between Cerberus Shoal and Fishers Island the velocity of the flood and ebb current at strength is about 1½ knots.

Fog.—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. In the autumn "land fogs," as they are termed locally, sometimes occur with northerly breezes, but they are generally "burnt off" before midday.

Ice.—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 some obstruction in Block Island Sound and around Montauk Point. These obstructions are the most extensive about the middle of February.

DIRECTIONS, BLOCK ISLAND SOUND

Entering between Point Judith* and Block Island.—This entrance is used by all coasting vessels from the bays and sounds eastward to Long Island Sound. The generally used route is through the Race. Tows of light barges and steamers of 14 feet (4.3 m.) or less draft sometimes go through Fishers Island Sound, especially during daylight with a smooth sea. This entrance is clear with the exception of Block Island North Reef. The coast from Point Judith nearly to Watch Hill should be given a berth of over 1 mile, avoiding the broken ground with depths less than 6 or 7 fathoms (11 to 13 m.).

Entering between Block Island and Montauk Point.—In thick weather vessels approaching Block Island Sound from the sea and not being sure of the position are advised to remain offshore until the weather clears. Vessels equipped with radio transmitters should make use of radio direction-finder bearings from radio direction-finder stations. Approaching Block Island from southward, a depth of less than 10 fathoms (18.3 m.) indicates less than 0.8 mile from shore; and a depth of 10 fathoms (18.3 m.) is found close to some of the broken ground between Montauk Point and Block Island.

Coming from southward or southwestward, to insure clearing the shoals off Montauk Point and Block Island, the usual route followed by coasting vessels is to stand in for the south shore of Long Island anywhere between Montauk Point and Shinnecock Bay Light, sounding frequently, until in a depth of 15 to 16 fathoms (27 to 29 m.),

*Lat. 41°21'.7, Long. 71°29'.0: Charts 276, 1210, 1211.

when the vessel will be from 3.5 to 4.5 miles from the beach. The course can be then shaped along the coast of Long Island or to clear Block Island, as desired.

Small coasting vessels and tows, bound into Block Island Sound or Vineyard Sound from southward, usually follow the coast until Barnegat Lighthouse is made and then haul across for Shinnecock Bay Light, and follow the south shore of Long Island.

Many vessels have grounded in fog on the south sides of Block Island and Long Island. Undoubtedly many of these could have been avoided if frequent soundings had been taken when approaching the coast or if use had been made of radio direction-finder bearings.

From 0.5 mile off Block Island westward to longitude 71°46.5′ W. this entrance of Block Island Sound has been examined by means of a wire drag. The deepest passage in this entrance is just westward of Southwest Ledge and has a width of over 2 miles; this is the best passage for deep-draft vessels. Rounding the southwest end of Block Island at a distance of 1.5 miles leads through the middle of a passage about 1.5 miles wide with a depth of 6 fathoms (11 m.).

It is not advisable to use the latter passage during heavy weather and vessels desiring to enter tthe sound westward of Block Island should pass westward of Southwest Ledge Lighted Bell Buoy.

BLOCK ISLAND

Block Island is 5 miles long, hilly, with elevations up to 211 feet (64 m.), and is bare of trees. The shore of the island is fringed in most places by bowlders, and should be given a berth of over 0.3 mile even by small craft; the shoaling is generally abrupt in approaching the island.

Block Island North Reef is a sand shoal which extends 1.5 miles north-northeastward from Block Island North Lighthouse to the 6-fathom (11.0 m.) curve. Depths less than 18 feet (5.5 m.) are found for a distance of over 1 mile north-northeastward of the lighthouse, and the shoal should be avoided by all vessels. The depths on the shoal change frequently, and its position is also subject to a slow change. It is practically steep to on all sides, so that the lead alone cannot be depended upon to clear it. A lighted bell buoy is moored in a depth of about 16 fathoms (29.3 m.) ⅜ mile northward of the 6-fathom (11.0 m.) curve at the end of the shoal.

Block Island North Lighthouse is a brown tower on gray granite dwelling situated on **Sandy Point** at the north end of the island. The light is 58 feet (17.7 m.) high and visible 13 miles. For light characteristics see Light List, North Atlantic Coast.

On **Clay Head** on the northeast side of Block Island there is a lone prominent house situated on the top of the bluff. About 1.25 miles east-southeast of Clay Head is **Block Island Northeast Whistle Buoy.**

Block Island Southeast Lighthouse* is a red brick, octagonal, pyramidal tower, attached to dwelling situated on Monhegan Bluffs at the southeast point of the Island.

*Lat. 41°09′.1, Long. 71°33′.1: Charts 1210 1211.

The light is 201 feet (61.3 m.) above the water, and visible 21 miles. The fog signal is an air diaphragm horn. It has been reported that the fog signal is indistinct and difficult to hear when close to, yet is plainly audible several miles away. Because of this phenomenon caution should be exercised. A radio beacon operates at the light.

At a distance of about 450 yards southeast of the lighthouse there is a wreck of a large tanker. At low water the main deck is awash.

Southwest Ledge lies 3.5 miles west-southwestward of the southwest end of Block Island, and has a least depth of 25 feet (7.6 m.). It is marked at its southwest end by a station buoy and a lighted, red bell buoy. Rocky patches, with least depths of 4.5 and 4.8 fathoms (8.2 and 8.7 m.) extend 1.5 miles northeastward from Southwest Ledge. The sea breaks on the shoaler places in heavy weather and vessels entering Block Island Sound by passing westward of Block Island should pass to the westward of the lighted buoy during this kind of weather. Between the inner patch and the shoals which extend 0.9 mile from Block Island, there is a channel 1.3 miles wide, with a depth of about 6 fathoms (11 m.). The deepest passage in the entrance to Block Island Sound is just westward of Southwest Ledge, and has a width of 2 miles.

New Shoreham (Block Island post office) is the principal village and summer resort on the Island.

The harbor (chart 276) is an artificial harbor formed by the breakwaters, and lies on the east side of Block Island 1.4 miles northward of Block Island Southeast Lighthouse. The entrance is a dredged channel 100 feet wide and in June 1939, the controlling depth in the channel through the outer and inner harbor and thence to the head of the basin was 15 feet (4.6 m.). The inner harbor had depths of 15 feet (4.6 m.) except at the edges, is about 600 by 800 feet in the clear, and is occupied by pleasure craft during the summer. The breakwater on its north side should be given a berth of 100 feet, the one on its western side 150 feet, and the southwestern shore 250 feet. The eastern part of the inner harbor is left clear for the passage of the steamer to the wharf. The basin at the south end of the inner harbor is 250 feet square, and is usually occupied by fishing and other local craft which moor to piles on the sides of the basin and to the bulkhead on its south side. The deepest draft using Block Island Harbor is about 12 feet (3.7 m.).

The east breakwater extends about 850 feet northward of the entrance of the inner harbor, and is marked at its end by a light; there is a buoy close northward of the end of the breakwater, and a buoy 600 yards northeastward. There is a light on the end of the breakwater on the west side at the entrance of the inner harbor.

Directions—The Harbor, Block Island.—Steer a 185° true course, passing 250 feet westward of the light at the end of the east breakwater, about 140 feet eastward of the light on the west side of the inner harbor, and continuing to the middle of the entrance of the basin. An 11-foot (3.4 m.) spot is located on the west side of the channel opposite the east breakwater light and is marked by a buoy.

Great Salt Pond (chart 276) is the best harbor in Block Island Sound for vessels of 18-foot (5.5 m.) or less draft. In easterly gales, when the sea is too heavy to enter The Harbor, a landing can be

made at Great Salt Pond. The entrance is on the west side of Block Island, 2 miles southwestward of Block Island North Lighthouse. It is a dredged cut from 500 to 600 feet wide through the narrow strip of beach which separates the pond from Block Island Sound, and in 1939 had a controlling depth of about 19 feet (5.8 m.) on the outer bar and 25 feet (7.6 m.) in the central part of the dredged channel. The southwest side of the entrance is formed by a jetty which extends to a depth of about 18 feet (5.5 m.) in the sound. On the jetty are two lights, and at the outer light there is a horn fog signal. The shoal on the southeast side of the pond is marked by a black buoy. A shoal extends about 0.3 mile from the north side of the pond. The 18-foot (5.5 m.) curve lies 150 to 200 yards from the west side of the pond, except off Cormorant Point, where it makes off 250 yards. There is a depth of about 12 feet (3.7 m.) at the steamboat wharf.

Pilotage.—All piloting is done by local fishermen and one may be obtained by displaying the signal. Charges are by private arrangement.

Anchorage.—The usual anchorage in Great Salt Pond is near the southeast end, off the steamboat wharf, in 15 to 48 feet (4.5 to 14.6 m.) taking care to have a clear track for steamers going to and from the wharf.

Between the steamboat wharf and a row of piles about 150 yards southeastward there is a dredged channel with a depth of about 12 feet (3.7 m.) leading to Trim Pond where local fishing craft are moored.

Block Island Coast Guard Station is situated on the west side of the pond at the south side of the entrance. A communication cable has been laid from the north side of the entrance across the channel to the Coast Guard station, thence across Great Salt Pond to the steamboat wharf. Caution is recommended to avoid anchoring and fouling the cable in this vicinity.

Tides.—The mean rise and fall of the tide is about 3.0 feet.

Currents.—The currents in the entrance to the pond are small, the average velocity at strength being about 0.5 knot.

Storm warnings.—Storm warnings are displayed near Block Island Southeast Lighthouse and from a skeleton tower about 0.25 mile from the south end of Great Salt Pond.

Directions.—To enter **Great Salt Pond** pass 50 yards eastward of the bell buoy which lies nearly 0.2 mile north-northwestward of the end of the jetty and steer **143°** true through the middle of the entrance, heading for the steamboat wharf at the head of the pond passing 300 feet off the southwest jetty and midway between the buoys marking the inner end of the entrance channel. This course leads to the usual anchorage.

Supplies.—There are supplies of all kinds for small boats available both at **The Harbor** and at Great Salt Pond. In the latter at about 0.3 mile to the westward of the steamboat wharf is a private wharf with about 14 feet (4.3 m.) at its face. Water and gasoline can be obtained at the wharf and mooring buoys have been established to the northwestward of the wharf.

Repairs.—A marine railway capable of handling small craft only is located on the west side of the island at New Harbor.

Communication.—There is a daily boat from Providence, via Newport. During the summer (June 25 to September 10) a boat from New London makes two round trips daily in addition to the regular service from Providence. The Providence boat enters The Harbor while the New London boat uses the facilities at Great Salt Pond. In heavy southeasterly weather the Providence boat also uses this harbor.

The island is also served by a cable to the mainland. A portion of the cable which is owned and maintained by the United States Coast Guard is leased to the telephone company making public telephone service available.

A radio station near the Shoreham Coast Guard Station is available for use.

POINT JUDITH TO GARDINERS ISLAND

Point Judith Lighthouse is an octagonal, pyramidal tower, lower half white, upper half brown, connected with a dwelling. The light is 65 feet (19.8 m.) high, and visible for 14 miles. The fog signal is an air diaphragm horn. A radiobeacon is established at the light. For light characteristics and fog signals, see Light List, North Atlantic Coast.

On **Point Judith,** about 100 yards north of the lighthouse, is a Coast Guard station and a **storm warning** display station. About 1.2 miles southward of the lighthouse is a lighted whistle buoy, moored in a depth of about 8 fathoms (14.6 m.)

Further southward at a distance of about 2.2 miles from the lighthouse is a lighted gong buoy. East-bound traffic usually makes this buoy while west-bound traffic usually makes the whistle buoy.

At a distance of 1.75 miles northward from Point Judith Lighthouse there is a prominent elevated water tank which is a conspicuous landmark from all seaward directions.

The area, with depths less than about 7 fathoms (12.8 m.) around Point Judith, including the approaches to Point Judith Harbor of Refuge, is irregular, with rocky bottom, and indications of boulders. As a measure of caution it is advisable to avoid the shoal spots, even with a smooth sea, and to exercise extra care where the depths are not more than 6 feet (1.8 m.) greater than the draft.

Point Judith Harbor of Refuge (Chart 276).—This harbor, on the west side of Point Judith, is formed by a main, V-shaped breakwater and two shore-arm breakwaters extending to the shore. The harbor is easy of access for steamers and sailing vessels except with a heavy southerly or southeasterly sea. It is little used by tows.

In Point Judith Harbor of Refuge the only soft bottom is found in the southern part of the deeper water inclosed by the main breakwater. On its north side the shoaling is gradual, the 18-foot (5.5 m.) curve lying about 0.25 mile from shore.

A shoal area with depths of 1 to 6 feet (0.3 to 1.8 m.) extends southward into the harbor from the north shore off the entrance to Point Judith Pond. A red buoy marks the southwest limit of this shoal. Shoals with depths of 8 to 12 feet (2.4 to 3.7 m.) exist about 300 yards north of the buoy and depths of 12 to 18 feet (3.7 to 5.5 m.) about 200 yards south of the buoy. Near the central part of the harbor there are two shoals; the northernmost one having depths of 16 to 18 feet (4.9 to 5.5 m.) and the southern-

most one having a depth of 18 feet (5.5 m.). The latter is marked by a buoy.

The range of Main Breakwater East Light and East Breakwater Light, bearing 102° true, leads clear southward of these rocky patches. The angle and western arm of the main breakwater should be given a berth of 200 yards when anchoring to avoid broken and hard bottom. A good berth for a large vessel is on the range of Main Breakwater East Light and East Breakwater Light, bearing 102° true, with Main Breakwater Center Light bearing 205° true, in 5½ fathoms (10.0 m.). If anchored farther westward soft bottom in places and ample swinging room will be had by anchoring on the range of the east end of the main breakwater and Point Judith Lighthouse with the Main Breakwater Center Light bearing 171° true.

The **east entrance to Point Judith Harbor of Refuge** is 400 yards wide, and the controlling depth is 22 feet (6.7 m.), with deeper water lying in the western half of the entrance. Lying 0.6 mile southward of the entrance there is a shoal ridge which extends in a curve from the angle of the main breakwater to Point Judith. Spots with 25 to 28 feet (7.6 to 8.5 m.) have been found on this ridge, and less water for a distance of nearly 0.4 mile off Point Judith Lighthouse and nearly 0.3 mile off the angle of the breakwater. On account of the broken bottom 20 feet (6.1 m.) is about the deepest draft that should cross the ridge with a comparatively smooth sea.

Directions.—Approaching the east entrance from eastward, give Point Judith a berth of about 0.5 mile and steer for Main Breakwater Center Light on any bearing northward of 270° true until the entrance bears northward of 314° true, and then haul up for it. From westward, pass southward of the bell buoy, lying over 0.3 mile southward of the angle of the main breakwater, on an east course, and haul up for the entrance when Main Breakwater East Light bears northward of 4° true. When passing through the entrance the course should be westward of north to insure making the turn westward in the harbor. Deep-draft vessels should favor the west side of the entrance.

At the north end of the upper pond there are landings, boat building plants, and railways where repairs can be made to hulls and motors. The largest marine railway is capable of handling small craft 60 feet in length and a draft of 5 feet (1.5 m.).

Motorboat supplies and provisions can be obtained from **Wakefield.** The latter is a town with railroad communication on a small stream about 0.5 mile northward of the upper pond; the stream is dry at low water. The tides in the entrance to the pond have a range of about 3 feet, and the currents have a velocity of about 3 knots at strength. The slack waters before flood and ebb, respectively, occur about 2 hours before low water and high water at Boston. The upper pond is usually closed by ice from 1 to 3 months, while the main pond is generally open during the winter.

The **west entrance to Point Judith Harbor of Refuge** is 500 yards wide, with controlling depth of 19 feet (5.8 m.).

Point Judith Pond, a shallow salt pond, has an entrance with depths ranging from 8 to 12 feet (2.4 to 3.7 m.) between two jetties

at the northerly end of Point Judith Harbor of Refuge, and has a length of about 3 miles to the head of the upper pond.

The extreme southernmost part of the pond has depths in its central portion ranging from 1 to 12 feet (0.3 to 3.7 m.), and a depth of 8 feet (2.4 m.) can be taken to the wharves on the southeast and southwest sides. A 6-foot (1.8 m.) channel has been dredged and buoyed through Point Judith Pond to the wharves at Wakefield and navigation should not be difficult. As a matter of precaution a stranger should obtain local information at the wharves near the entrance.

Gasoline and provisions are available in small quantities. There is a small repair yard on the west side of the pond about 0.6 mile from the entrance. The marine railway is capable of handling only small craft with a draft of not more than 3 feet (0.9 m.). Light repairs to both hulls and motors can be obtained.

Directions.—To enter **Point Judith Pond** pass midway between the jetties and steer 0° true to pass 60 yards east of the west pier, and the same distance west of the red buoys on the east side of the dredged channel. When east of Gooseberry Island steer 32° true, and then follow mid-channel courses to Wakefield, passing off the buoys at a distance of about 50 feet.

From Point Judith to Watch Hill the shore is low and for the most part consists of sandy beaches which are broken by several projecting rocky points. Back from the immediate shore there are areas of cultivation interspersed with rolling grass covered or wooded hills. With the exception of Point Judith Pond, the outlets of the ponds are generally closed and not used. The coast is fringed by broken ground and boulders in places, which should be avoided by deep-draft vessels where the depths are less than 6 or 7 fathoms (11 or 13 m.)

Matunuck is a summer resort situated about 3 miles west of Point Judith. There is a very prominent building (Matunuck Beach House) at the west end of the beach. In 1939 this building was painted an orange color and had a conspicuous red roof with three gables on the south side. South and west of **Matunuck Point** at a distance of about 2 miles there is a patch of boulders with a depth of 21 feet (6.4 m.) over them and marked on the south side by a buoy. The patch is at the south end of broken ground, with depths less than 5 fathoms (9.1 m.), making off from the coast; the water deepens abruptly around the patch.

Charlestown Beach is a small summer settlement on the beach between **Green Hill** and **Ninigret Ponds.**

Quonochontaug Beach is a summer settlement at the outlet of **Quonochontaug Pond.** The entrance of the pond is practically closed but is used to some extent by local shallow draft boats. About 1 mile westward is the village of **Weekapaug,** which is marked by several large hotels and numerous summer homes. **Weekapaug Point** is bold and rocky and is prominent from the southwest and southeast.

The entrance to **Winnapaug Pond** is shallow and is used only by local boats. Strangers should never attempt to enter. A bridge crosses the entrance which has a horizontal clearance of about 50 feet and a vertical clearance of about 6 feet (1.8 m.) at high water. **Old Reef** with a depth of 4 feet (1.2 m.) over it is located about 1

mile west of the entrance and about 0.5 mile offshore. It is marked by a buoy.

Misquamicut is a summer resort near the west end of Winnapaug Pond.

Watch Hill is a high, bare bluff, with a number of large hotels and summer houses. There is communication by bus with Westerly.

Watch Hill Lighthouse,* on the low point southward of Watch Hill, is a square gray-granite tower attached to a white dwelling. The light is 61 feet (18.6 m.) high and is visible 13 miles. The fog signal is an electric diaphragm horn. It is reported that the fog signal is not easily heard when eastward of the light. From the southwest, however, it can be heard nearly to Montauk Point.

Watch Hill Coast Guard station is located about 300 yards northward of the lighthouse.

Gangway Rock is awash at low water and is part of a boulder reef which extends 400 yards southward from Watch Hill Lighthouse. A lighted bell buoy marks the south end of the reef and the north side of Watch Hill Passage. A sunken obstruction has been reported 100 yards westward from this buoy.

Watch Hill Passage is the principal entrance, and the only one used by strangers, to Fishers Island Sound from eastward. It has a least depth of about 17 feet (5.2 m.). The currents are sufficiently strong to tow spar buoys under at times, but set with the course through the passage. A spot, with 12 feet (3.7 m.) over it, in the passage is marked by a horizontally banded buoy; the best channel is northward of the buoy, giving it a berth of about 100 yards. There is a whistle buoy 2.5 miles 172° true from Watch Hill Lighthouse.

Watch Hill Reef, on the southwest side of Watch Hill Passage, has rocks bare at low water and is marked by a black gong buoy on the northeast end. A wreck, with one mast showing about 30 feet (9.1 m.) above the water, lies on the northwestern side of the reef. In the vicinity of the reef the current has an average velocity of about 2 knots at strength.

Sugar Reef Passage, between Watch Hill Reef and Sugar Reef, has a width of 0.3 mile in which the least depths found are 20 to 23 feet (6.1 to 7 m.). The tidal currents have about the same velocity as in Watch Hill Passage.

Sugar Reef has little depth in places and is marked at its northwest end by a spindle with conical cage. The reef extends 600 yards east-southeastward and 0.3 mile southward from the spindle.

Catumb Passage, between Sugar Reef and Catumb Rocks, has a width of 250 yards in which the least depth found is 22 feet (6.7 m.). The tidal currents are stronger than in Watch Hill Passage.

Catumb Rocks, the highest part awash at high water, is marked by a red buoy at the west end and two black buoys at the east end. Rocks with 2 to 18 feet (0.6 to 5.5 m.) over them extend 0.8 mile westward of Catumb Rocks to a red buoy which marks the rocks on east side of Lords Passage.

Lords Passage, eastward of Wicopesset Rock, has a width of nearly 0.3 mile, in which the least depth found is 20 feet (6.1 m.). The tidal currents set diagonally across the passage and have an

*Lat. 41°18'.2, Long. 71°51'.6; Charts 358, 1211.

average velocity of nearly 2 knots at strength, the ebb being greater than the flood.

On the east side of Lords Passage a reef with depths of 5 to 15 feet (1.5 to 4.6 m.) extends in a general northwesterly and southeasterly direction for a distance of over 1 mile. The west side is marked by a red buoy. Near the center of the reef there is a broken-off spindle which is awash at low water.

Wicopesset Island, small, low, and rocky, is surrounded by foul ground. **Wicopesset Rock,** at the eastern end of the foul ground, is marked on the northeast side by a black buoy.

Wicopesset Passage lies between Wicopesset Island and East Point. This channel is narrow and is obstructed by a rock in the middle which is marked by a buoy; it is suitable only for small craft and should not be used by strangers. A bell buoy marks the southern entrance.

Extreme **caution** is recommended when using the passage, as boats are apt to be set by the ebb current on the foul ground which extends 0.3 mile northwestward from Wicopesset Island.

Fishers Island is hilly, 6 miles long, and sparsely wooded. **Chocomount,** 136 feet (41.5 m.) high, is the highest land in the vicinity. The Coast Guard station at East Harbor, about 1 mile from East Point of Fishers Island, is prominent; there are numerous buildings on the western part of Fishers Island, a large yellow hotel being conspicuous. **Storm warning displays** are made from a signal mast east of the Coast Guard station. The north side of the island is described with Fishers Island Sound. The south side of the island is fringed with foul ground which rises abruptly from depths of 7 to 8 fathoms (13 to 15 m.); but by giving the shore a berth of ½ mile all dangers will be avoided.

Coast Artillery experimental area off Fishers Island and Little Gull Island.—Mariners are requested to keep clear of and not anchor in the following areas: (*a*) within a line extending from Race Point, Fishers Island, to Race Rock Lighthouse, thence 116° true 0.7 mile, thence 76½° true 3.3 miles, thence 0° true to the south shore of Fishers Island; (*b*) within the area south of Little Gull Lighthouse bounded on the east by a 150° true line through Little Gull Lighthouse, on the south by an east and west line through Constellation Rock, on the west by a north and south line through the western end of Great Gull Island, and on the north by Great Gull Island and Little Gull Island Lighthouse. These areas are used for experimental purposes by the Coast Artillery Corps, United States Army.

Race Point Ledge, partly bare at low water, extends nearly 0.3 mile southwestward from the southwest end of Fishers Island and is marked at its end by a buoy, in a depth of 18 feet (5.5 m.). Inside of the buoy there are boulders with 3 to 9 feet (0.9 to 2.7 m.) over them at lowest tides. The passage between this buoy and Race Rock Lighthouse has very irregular bottom, although the least depth found was 25 feet (7.6 m.). It is suitable only for small vessels with a comparatively smooth sea.

Race Rock, on the northeast side of the Race, is nearly 200 yards in diameter, with a depth less than 18 feet (5.5 m.), and is marked by Race Rock Lighthouse.

Race Rock Lighthouse is a granite tower, attached to a dwelling on a granite pier. The light is 67 feet (20.4 m.) high and visible for 14 miles. The fog signal is an air siren.

Little Gull Island Lighthouse* is a gray granite tower, attached to a red dwelling, on a pier. The light is 91 feet (27.7 m.) high and visible 15 miles. The fog signal is made by two air diaphragm horns which are sounded alternately. The radio beacon and sound signal are synchronized for distance finding. For light characteristics and fog signals see Light List, North Atlantic Coast.

Little Gull Island Reef, with little depth over it, extends nearly 0.3 mile east-northeastward from Little Gull Island Lighthouse, and is marked by a buoy. Depths less than 5 fathoms (9.1 m.) extend nearly 0.4 mile eastward and northeastward from the lighthouse, which should not be approached closer from these directions. Deep-draft vessels should avoid this locality. The passage between Little and Great Gull Islands is foul.

The Race is the main entrance from eastward to Long Island Sound. It is marked by Race Rock and Little Gull Island Lighthouses, between which it has a width of 3.5 miles. Between these lighthouses the only dangers are Valiant Rock and Little Gull Island Reef, and Cerberus Shoal is the only outlying danger in the southeasterly approach.

Vessels should pass from 0.5 to 0.8 mile southwestward of Race Rock Lighthouse in passing north of Valiant Rock. Passing southward of the rock, vessels will keep in the clearest part of the passage on a southeasterly course by passing about 1 mile northeastward of Little Gull Island Lighthouse. For currents see page —.

Valiant Rock, nearly in the middle of the Race, has a least found depth of 18 feet (5.5 m.), and is nearly 0.4 mile long in a northeast and southwest direction with depths of 4 to 5 fathoms (7.3 to 9.1 m.). The 10-fathom (18.3 m.) curve surrounding Valiant Rock includes the area that should be avoided by deep-draft vessels, and preferably by all vessels, on account of the heavy swirls and rips. The lighthouses are the guides, as the lead cannot be depended on.

Cerberus Shoal, which lies 6 miles 136° true from Race Rock Lighthouse, has a length of about 0.4 mile in a north and south direction, with depths less than 6 fathoms (11.0 m.), has a least depth of 14 feet (4.3 m.) on a small rocky patch near its north end. Seas break on this shoal during heavy swells. It is marked by a lighted whistle buoy. Near the shoal there are usually strong tide rips.

Great Gull Island is 0.4 mile long, about 30 feet (9.1 m.) high, rocky, and has a number of large buildings. There is a wharf with about 15 feet (4.6 m.) at its end on the north side of the island. Except for about one-half hour after the beginning of the flood current in the Race, the current sets eastward at the wharf, and vessels generally land at the wharf heading westward. There are rocks both eastward and westward of the wharf, which extend outside the line of its face, those eastward of the wharf being marked by a buoy. Approaching from eastward, keep the outer small house on the west end of the island open from the wharf, and in leaving swing the bow out from the wharf to insure clearing the rocks westward.

*Lat. 41°12'.4, Long. 72°06'.4: Charts 298, 1211, 1212.

The passage between Great Gull Island and Plum Island has a number of known dangers and very irregular bottom with bowlders, and should be avoided by vessels. The part of the passage between **Old Silas Rock** and **Plum Island** has been examined by means of a wire drag; boulders with depths of 3 to 10 feet (0.9 to 3 m.) were found as shown on the chart. The maximum observed velocity of the tidal currents is 2¼ knots, but it is considerably higher at times, being reported to be as much as 4 knots. The tide rips are bad in heavy weather. **Old Silas Rock** is awash at high water.

Bedford Reef is broken ground, on which the least depths found are 13 to 16 feet (4.0 to 4.9 m.), extending about 1.5 miles southward from the broken ground lying between Great Gull and Plum Islands. It should be avoided by vessels. **Constellation Rock** is on the southeasterly extension of this broken ground; it has 17 feet (5.2 m.) over it, is marked by a buoy and lies 1.9 miles 184° true from Little Gull Island Lighthouse.

Plum Island, Gardiners Island, and the passage southward of the latter are described with Gardiners Bay. (See page 167.) Shoals extend about 1.3 miles off the eastern side of **Gardiners Island** to the 6-fathom (11.0 m.) curve, and inside this depth the bottom is generally rocky and irregular, with indications of bowlders.

EAST END OF LONG ISLAND

Fort Pond Bay is a semicircular bay about 1 mile wide on the north side of Long Island, 5 miles westward of Montauk Point. A lighted bell buoy marks the entrance from Apr. 1 to Dec. 15. The bay is free from dangers, but flats with 8 to 12 feet (2.4 to 3.7 m.) over them make out 0.3 mile from its eastern shore. The bay affords anchorage for vessels in 7 to 8 fathoms (12.8 to 14.6 m.), soft bottom, but is exposed to northerly and northwesterly winds; the shoaling is abrupt on its east and south sides. The flats at the southeast corner of the bay are generally occupied as an anchorage by launches and other small craft during the summer. **Montauk,** a summer resort at the southeast end of the bay, is the terminus of the Long Island Railroad. The railroad pier at Montauk has a depth of 25 feet (7.6 m.) at the end, shoaling to 14 feet (4.3 m.) at the head of the dock and 20 feet (6.1 m.) about 200 feet westward on the line of its face; the shoaling is abrupt. The northerly wharf at Montauk has a depth of about 13 feet (4.0 m.) at its end. The smaller wharves have depths of from 5 to 10 feet (1.5 to 3.0 m.) at their ends. Gasoline, fresh water, and provisions can be obtained at Montauk. There is a steamer connection with New London during the summer.

Montauk Harbor.—This harbor, formerly called Great Pond, has been developed by private interests and is a good harbor for small craft. The approach is marked by a bell buoy 0.3 mile northward of the entrance. The entrance channel, which had a controlling depth of about 10 feet (3.0 m.) in 1939 for a width of 50 yards, leads between stone jetties the seaward ends of which are marked by flashing lights. From the inner end of the land cut the channel leads directly to the anchorage basin eastward of Star Island on which the yacht club is located.

Star Island is connected to the mainland by a causeway on the southwest side of the island.

Anchorage.—In the anchorage area there are depths ranging from 8 feet (2.4 m.) near the wharves on Star Island to 15 feet (4.6 m.) about 200 yards off the yacht club landing. Local crafts consisting mostly of fishing boats anchor in the bight south of the island in depths of 5 to 8 feet (1.5 to 2.4 m.). Anchorage in the harbor is designated by the harbor master at the yacht club. Mooring buoys are maintained by the yacht club and a charge is made for their use. Local regulations regarding speed, moorings, garbage disposal, and the navigation within the harbor may be obtained from the harbor master.

Tides.—The mean rise and fall of the tide is about 2 feet.

Currents.—During spring tides there are strong currents in the entrance, reported to be as high as 3 knots. They decrease rapidly after entering the harbor and are practically negligible near the yacht club landing.

Directions, Montauk Harbor.—Enter the harbor midway between the jetties on a course of **167°** true. When abreast the wharf on the west side of the entrance steer **128°** true heading for the northeast tangent of Star Island, continue on this course until the east jetty bears **347°** true (prolongation of the center lines of the jetty) and then steer **100°** true for about 200 yards. When northward of the north end of Star Island steer on mid-channel course of **135°** true between Star Island and the shore of the mainland northeast of the island to the anchorage east of the yacht club landing.

Piers and wharves.—On the westward side of the entrance there is a well constructed wharf the face of which parallels the channel for a distance of about 180 feet and which has a depth of about 6 feet (1.8 m.) along the entire length. There are several private landings on the east side of the harbor with depths of about 8 feet (2.4 m.) at the ends. On the east side of Star Island there are several piers and landings for use by the yacht club. There are depths of 8–10 feet (2.4 to 3.0 m.) at the ends.

Supplies.—Gasoline, Diesel oil, lubricants, fresh water, and ice are available at the dock on the west side of the entrance. Provisions and other supplies may be obtained at the village of Montauk.

Communications.—Montauk has railroad communication and during the summer months there is steamboat service to New London.

Fish pounds.—Regulations prescribed by the Secretary of War require that an opening for small craft shall be placed about 400 feet offshore in all pounds between **Culloden** and **Shagwong Points,** and in those pounds placed off **Rocky Point** on the west side of Fort Pond Bay. On the offshore side of these openings signboards 3 feet long and 1 foot wide shall be placed at an elevation of 8 feet above high water. They shall be painted black and shall bear the following notice: "Opening for small boats." This notice shall be painted in white letters 4 inches high and underneath a white arrow indicating position of opening shall be placed.

Broken ground with rocky bottom and bowlders extends 2 miles northward to **Shagwong Reef,** which is marked by a lighted bell buoy. **Shagwong Rock,** marked by a buoy, and **Washington Shoal** lie 0.3 mile and 1.0 mile respectively northward of **Shagwong Point.** The principal danger outside Shagwong Reef lighted bell buoy is a shoal with a depth of 30 feet (9.1 m.) 1.8 miles northwestward of the buoy. An obstruction with 10 feet (3 m.) over it has been reported

as lying 600 yards 228° true from Shagwong Reef. Vessels should avoid this broken ground.

Montauk Point Lighthouse* is a white tower with a brown band midway of its height, and is connected by a covered way to a white dwelling.

The light is 168 feet (51.2 m.) above the water and visible for 19 miles. The fog signal is made by two air diaphragm horns which sound alternately. One horn points 30° true and the other 140° true.

Montauk Shoal, with depths of 5 to 6 fathoms (9.1 to 11.0 m.), lies between 2 and 3 miles southward and south-southeastward of Montauk Point Lighthouse. The shoal is 1.5 miles long in a west-northwest direction. It has been examined by means of a wire drag, and the least depth found is 32 feet (9.8 m.). The shoaling is abrupt from 11 fathoms (20.1 m.) on the south side of the shoal. Detached shoals, on which the least depth found is 5.5 fathoms (10.0 m.) lie about 1.5 miles south-southeastward of Montauk Point. A lighted whistle buoy is moored 4.0 miles southeastward of Montauk Point.

Great Eastern Rock, as shown by a careful examination, has a least depth of 24 feet (7.3 m.) and lies 1.5 miles 74° true from Montauk Point Lighthouse. The rock is marked by a bell buoy. **Phelps Ledge** has a least found depth of 28 feet (7.7 m.).

The least depth found on **Endeavor Shoals** are 21 to 24 feet (6.4 to 7.3 m.) on a narrow ridge about 0.4 mile long, which lies 2¼ miles 28° true from Montauk Point Lighthouse, detached shoals also extend further eastward for a distance of about 2 miles where there is a depth of 27 feet (8.2 m.). A lighted gong buoy marks the eastern extremity.

Montauk Point, the easterly extremity of Long Island, is a high sandy bluff, on the summit of which is the lighthouse. The land is grass-covered and has a greatest elevation of 165 feet (50.3 m.) at **Prospect Hill,** 2 miles westward of the point. The south side of the point is bold, the 10-fathom (18.3 m.) curve lying about 0.5 mile from shore; depths of 4 fathoms (7.3 m.) and less extend 0.8 mile off the northeast side of the point.

Surrounding Montauk Point to a distance of about 4 miles is an area which includes Montauk Shoal, Great Eastern Rock, Phelps Ledge, and Endeavor Shoals. This area has been closely developed, but the bottom is very broken and extra caution should be observed where the depths are less than about 10 feet (3.0 m.) greater than the draft. In general, the shoals are a series of long, narrow ridges, in places only a few yards wide, and their positions are indicated by the rips over them at the strength of the tidal currents.

By giving Montauk Point a berth of over 1 mile and avoiding Great Eastern Rock and the shoalest part of Endeavor Shoals, the dangers eastward and northeastward of Montauk Point would not in smooth weather interfere with vessels of 20 feet (6.1 m.) or less draft. From longitude 71°46.5′ W. (3.8 miles eastward of Montauk Point Lighthouse) to within 0.5 mile of Block Island, the area with depths less than 10 fathoms (18.2 m.) has been examined by means of a wire drag, and the least depths are shown on the chart.

*Lat. 41°04′.2, Long. 71°51′.5; Charts 1211, 1108, 70.

GARDINERS BAY

(CHART 298)

Gardiners Bay is at the western end of Block Island Sound, from which it is separated by Gardiners Island. It is an excellent anchorage and easily entered either day or night. It is the approach to Shelter Island Sound and the Peconic Bays, localities frequented by numerous yachts and motorboats during the summer. The main part of the bay has been examined by means of a wire drag. In addition to the lighthouses, the white church spires at Orient and Sag Harbor are prominent and can be used as aids to navigation. The principal entrance is from eastward, northward of Gardiners Point, and is available for vessels of any draft. The entrance from Long Island Sound is through Plum Gut, and there is an entrance southward of Gardiners Island (Promised Land Channel), that is used by fishing vessels. The nearest marine railways are at Greenport, New London and Fishers Island Sound.

There are numerous oyster stakes in the bay and small craft should proceed with caution when crossing areas where they are found.

Plum Island is 2.5 miles long, hilly, bare of trees except near the southwest end, has a number of large buildings, and is marked at its westerly end by Plum Island Lighthouse.

Plum Island Lighthouse is a white tower on granite dwelling. It is situated on the west end of Plum Island, is 75 feet (22.9 m.) high and visible 14 miles. The fog signal is a bell.

The bight in the southeast side of Plum Island is foul out to **Plum Island Rock,** which lies 0.5 mile from shore abreast the middle of the island, has 1 foot (0.3 m.) over it, and is marked by a red buoy.

Plum Gut Harbor, on the southwest side of Plum Island, has an entrance between jetties and had depth of 13 feet (4.3 m.) in the entrance and harbor, but it is reported that there has been some shoaling up in this area. It is necessary only to stand in midway between the jetties on a 25° true course and go to the wharves.

Small yachts seeking shelter in the harbor lie alongside the wharves. Plum Island Harbor is under the supervision of the War Department and may be used only with the permission of the local representative of that department.

Plum Gut, the entrance to Gardiners Bay from Long Island Sound, is nearly 0.8 mile wide and has sufficient water for vessels of the deepest draft; in the passage there are several rocks, with depths of 17 to 19 feet (5.2 to 5.8 m.) 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.

Currents.—Slack water before flood occurs about ½ hour after low water at New London and slack before ebb occurs about 1 hour after high water at New London. The strengths of flood and ebb, respectively, occur about 2½ hours before high water and 3 hours before low water at New London and have average velocities of about 3¾ knots. The flood sets northwestward and the ebb southeastward. Heavy tide rips occur. Caution is recommended when using this passage.

Orient Point Lighthouse* is a brown, conical tower on a black pier near the eastern end of the shoalest part of **Oyster Pond Reef,** on the western side of the passage.

The light is 64 feet (19.5 m.) above the water and is visible 9 miles. The fog signal is an air diaphragm horn. Caution is recommended when using the sound signals during fog as aids to navigation as they are difficult to hear, particularly with an easterly wind. There are numerous boulders and little depth between the lighthouse and Orient Point. The lighthouse should be given a berth of over 600 yards when northward and east-northeastward of it.

A wire drag set to 16 or 17 feet (4.9 or 5.2 m.) has been passed over the broken ground in Plum Gut between (but not over) **Midway Shoal** and the end of Oyster Pond Reef, passing 350 yards east-northeastward of Orient Point Lighthouse; and over the **Middle Ground,** passing 250 yards westward of Plum Island Lighthouse. This insures a clear channel for vessels of about 15 feet (4.6 m.) draft at low water by avoiding Midway Shoal; it is well to give Plum Island and Orient Point Lighthouses and the shore of Plum Island, just southward of Plum Gut Harbor, a berth of over 0.2 mile. The best water in the passage will be found on a 295° true course, passing **Pine Point** and Midway Shoal buoy at a distance of 350 yards and passing midway between Orient Point and Plum Island Lighthouses.

The wharf on the south side of **Orient Point,** 1 mile westward of the lighthouse, has a depth of 8 feet (2.4 m.) at its end. A steamer from New London and Montauk stops here during the summer.

Ram Head is a prominent yellow bluff on the western shore of Gardiners Bay. There is a lower bluff nearly 1.5 miles westward of Ram Head with a house on top. A shoal with 7 to 12 feet (2.1 to 3.7 m.) over it extends 1.5 miles southeastward from Ram Head.

A boulder with 1 foot (0.3 m.) over it and sometimes marked by a bush stake, lies 230 yards from shore about 650 yards northeastward of the northern point of the entrance to Coecles Harbor. There are other boulders with little depth between this boulder and Ram Island.

A sunken rock with about 1 foot (0.3 m.) over it at mean low water has been reported to be 250 yards from shore, eastward of the above-mentioned point.

Coecles Harbor has its entrance at the south end of Ram Head; it is little used except by local craft of shallow draft.

Threemile Harbor, on the south side of Gardiners Bay, has a dredged channel, over a shifting bar, leading into it.

The controlling depth at mean low water across the bar and to the head of the improved channel was 6 feet (1.8 m.) in 1939. Buoys mark the entrance channel which leads between two short jetties. There is a light on the north end of the east jetty which is maintained locally during the summer months. After passing the entrance buoys the channel is marked by small red and small black spars which are maintained locally.

There is a public landing on the east side of the channel about 0.6 mile from the entrance with depths of 6 feet (1.8 m.) at mean low water.

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*Lat. 41°09'.8, Long. 72°13'.5; Charts 298, 1211, 1212.

Anchorage.—Anchorage is available in Threemile Harbor in depths of 9 to 14 feet (2.7 to 4.3 m.) with soft bottom and good holding ground.

Tide.—The mean rise and fall of the tide is about 2.4 feet.

Currents.—The tidal currents have a velocity of about 3 knots through the entrance of the harbor.

Repairs.—There are several boat yards in Threemile Harbor with marine railways. At **Maidstone,** on the east side of the harbor, there are two railways with a maximum capacity of 30 tons and capable of handling small craft up to lengths of 60 feet with a draft of 7 feet (2.1 m.). The yard is equipped to make all major repairs; it also has a lift with a capacity of 8 tons and has ample space for mooring. There is a depth of 7 feet (2.1 m.) at mean low water along the face of the dock and in the mooring basin.

The boat yard at the southeast end of Threemile Harbor has marine railways capable of handling small craft up to lengths of 75 feet with a draft of 8 feet (2.4 m.). Repairs to both hull and machinery can be obtained.

Supplies.—Gasoline, lubricants, fresh water, ice, and ship chandlery supplies are available. Provisions can be obtained at the town of East Hampton, 3.5 miles south of Threemile Harbor.

Hog Creek Point, south of Gardiners Bay, is generally flat, with bluffs of approximately 25 feet (7.6 m.) in height. There is a boys' school with a landing at Fireplace just east of the point. **Lionhead Rock,** off the point, is awash at high water. There are fish traps westward of the point.

Cartwright Island, locally known as **Ram Island,** is a narrow, low sandy island 1 mile long, extending in a southerly direction off the south tip of Gardiners Island. Its size and shape are subject to considerable change by storms.

It is reported that a shoal sandy hook is making out in a general southeastwardly direction from the south end of the island and depths of 1 to 3 feet (0.3 to 0.9 m.) extend about 250 yards from shore.

Napeague Bay.—The passage southward of Gardiners Island, known as Promised Land Channel, is used principally by fishing vessels. The deepest draft of the vessels using the channel from Napeague Bay to Promised Land is 16 feet (4.9 m.).

Promised Land Channel leading to Gardiners Bay is well marked by buoys. The channel has a least depth of 14 to 16 feet (4.3 to 4.9 m.) in the center, but the shoals are shifting in character and local knowledge is necessary for vessels of over 10-foot (3.0 m.) draft. The tidal currents have an average velocity at strength of about 1½ knots through all the channels between the shoals.

Promised Land is a fishing village on the southwest side of Napeague Bay. Diesel oil, gasoline, fresh water, and provisions in limited quantities can be obtained here. The depths at the wharves are 17 feet (5.2 m.) and under. A depth of 7 feet (2.1 m.) can be carried to the landing of the yacht club, 1.3 miles westward of Promised Land.

Directions, Promised Land Channel.—In the absence of local knowledge it is not considered advisable for vessels of greater draft than 10 feet (3.0 m.) to attempt the passage of Promised Land or

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through to Gardiners Bay, and then only when the buoys can be seen. Due to frequent changes occurring here, no directions are given. The buoys should be followed with the aid of the latest edition of chart 298.

Napeague Harbor, having its entrance northeastward of **Hicks Island,** can be entered by vessels up to 7-foot (2.1 m.) draft at low water and is frequently used by small local craft, especially in northeasterly weather, when the adjoining bays are unsafe. The entrance is very narrow and is usually staked. There are no landings in the harbor.

Gardiners Island is partly wooded and has an elevation of 130 feet (39.6 m.) near its middle. **Crow Head** is the high bluff at the western end of Gardiners Island.

Shoal water with depths of 9 to 16 feet (2.7 to 4.9 m.) extend 1.75 miles southwestward from the west end of Gardiners Island and terminates at Crow Shoal. **Crow Shoal** with depths of 3 to 10 feet (0.9 to 3.0 m.) is marked on the western side by a buoy. A rock with 3.0 feet (0.9 m.) over it lies near the northern part. The shoal is generally steep-to.

The bight between the south part of Gardiners Island and Crow Shoal is known locally as **Cherry Harbor.** It has depths of about 24 to 27 feet (7.3 to 8.2 m.) with mud bottom and affords shelter from northeasterly winds.

Bostwick Bay is the bight on the northwest side of Gardiners Island. It affords excellent anchorage in easterly winds in depths of 24 to 25 feet (7.3 to 7.6 m.), but is exposed to all westerly winds. There are no dangers in the bay or its approaches, with the exception of Crow Shoal and the bar extending from the north point of Gardiners Island to Gardiners Point.

Gardiners Point is a low spit on which there are the ruins of a concrete structure about 20 feet (6.1 m.) high, and lies at the northerly end of the very shoal bar which extends 1.5 miles north-northwestward from Gardiners Island. This shoal is steep-to on its north and west sides and is marked at its north end by a lighted buoy and a bell buoy. There is a rock with a depth of 2 feet (0.6 m.) over it, just east of the north point of Gardiners Island (about 3,960 yards 128½° true from the ruins at Gardiners Point), which is marked by a buoy lying just to the eastward of it.

Directions, Gardiners Bay.—Courses to Gardiners Bay entrance are given in the directions for Block Island Sound. Little Gull Island and Orient Point Lighthouses and Gardiners Island lighted and bell buoys are the principal guides for the entrance from Block Island Sound. This entrance is over 1 mile wide between the 6-fathom (11.0 m.) curve on the broken ground surrounding Constellation Rock and Bedford Reef and the 6-fathom (11.0 m.) curve eastward of Gardiners Point. A 274° true course for Orient Point Lighthouse leads in about the deepest water through the middle of this channel.

When past Gardiners Island lighted and bell buoys vessels can stand over for an anchorage which affords the best lee in the prevailing winds, or from abreast Gardiners Island lighted and bell buoys deep-draft vessels can steer westward or west-southwestward until Orient Point Lighthouse bears north, and then bring it astern on a 167° true

course, which leads in a least depth of about 6 fathoms (11.0 m.) until approaching the southern end of the bay.

The principal dangers are the broken ground between **Constellation Rock* and Bedford Reef,** the shoal making out to Gardiners Point, and Crow Shoal. The shoaling is generally abrupt in approaching these dangers. In general the shoaling is gradual in approaching these shoals on the western side of the bay. There are fish pounds and many oyster stakes on most of the shoals.

Plum Gut is used by vessels entering Gardiners Bay from Long Island Sound.

From a point about 0.3 mile southeast of Midway Shoal buoy at the south end of Plum Gut a course of **214°** true for 4.5 miles will lead to a position about 200 yards southeast of Shelter Island North Channel Entrance Bell Buoy; or, passing 0.25 mile northward of Gardiners Island Lighted Buoy, a course of **239°** true for 6 miles will also lead to the bell buoy.

If bound for Sag Harbor from Plum Gut a course of **191°** true from a point about 0.3 mile southeast of Midway Shoal buoy will lead to about 200 yards east of the buoy on Ram Head Shoal; or, passing 0.25 mile northward of Gardiners Island Lighted Buoy a course of **214°** true will also lead to the same position eastward of Ram Head Shoal buoy.

SHELTER ISLAND SOUND AND PECONIC BAYS

(CHARTS 298 AND 299)

These waters extend westward from Gardiners Bay about 22 miles to Riverhead, the head of navigation on Peconic River. They are much frequented by yachts and motorboats in summer, and there are many summer resorts. There are fish traps and oyster stakes on many of the shoals.

Channels.—At low water a depth of 21 feet (6.4 m.) can be carried through the north part of Shelter Island Sound and Little Peconic Bay as far as Robins Island, and 18 feet (5.5 m.) through the south part of Shelter Island Sound. Across the bar between Little and Great Peconic Bays 14 feet (4.3 m.) can be carried at low water, and there is a greater depth in Great Peconic Bay. A depth of 6 feet (1.8 m.) at low water can be carried to South Jamesport; above this only launches and lighters go as far as Riverhead. From Great Peconic Bay boats of 4½-foot (1.4 m.) draft can be taken through Shinnecock Canal and by inside waters along the south side of Long Island to East Rockaway Inlet.

Pilots.—There are no regular pilots. The piloting is generally done by fishermen or masters of small local vessels.

Towboats are rarely used, but they can be obtained from New London. The oyster steamers are available in case of necessity.

Tides.—The mean rise and fall of the tides is about 2½ feet.

Currents.—The tidal currents have considerable velocity wherever the channel is narrowed. The average velocity at strength in the narrower places is 1½ knots or more.

In the entrance to Little Peconic Bay slack before flood and ebb respectively, occur approximately 2½ hours after low and high water

*Lat. 41°10′.5, Long. 72°06′.6; Charts 298, 1212, 1213

at New London. The average velocity at strength of current is about 1¾ knots.

Ice obstructs navigation in the coves and shallow harbors for about two months (January and February). There is some drift ice at Greenport, but not sufficient to interfere with navigation. In the south arm of Shelter Island Sound the ice is sufficiently heavy at times to be destructive to structures exposed to it.

Supplies.—Coal, gasoline, provisions, ice, water, and ship chandlery can best be obtained at Greenport and Sag Harbor.

Repairs.—There are several shipyards and marine railways at Greenport, also inclosed basins with excellent facilities for laying up and fitting out yachts. The largest marine railway is 180 feet long, with a capacity of 700 tons, and can haul out vessels up to 28-foot (8.5 m.) draft. Ordinary repairs to machinery can be made.

SHELTER ISLAND SOUND, NORTH PART

Extensive flats make off from Ram Head and the shore between it and Hay Beach Point. Southward and southwestward of Long Beach Bar Lighthouse there are depths of 5 feet (1.5 m.) for a distance of nearly 0.8 mile from the south shore, and the edge of the shoal is marked by a buoy. The northerly part of these shoals, extending 0.5 mile off the eastern side of Hay Beach Point, are known as **Hay Beach Point Flats** and are marked at the north end by a lighted buoy. From southward of Long Beach Bar Lighthouse to Hay Beach Point the edge of the shoal is steep-to. **Hay Beach Point** is a low flat with a clump of scrub at the end, backed by wooded highland. There are fish pounds in places on the shoals and on both sides of Long Beach Point.

Long Beach Point is a low spit from which a bar with little depth extends to **Long Beach Bar Lighthouse,** a white tower and dwelling on concrete foundation. The light is 53 feet (16.2 m.) high and visible 8 miles. The fog signal is a bell.

Shoals with 10 to 12 feet (3.0 to 3.7 m.) over them extend 0.5 mile eastward from Long Beach Point. The south and west sides of the shoal have depths of 14 to 15 feet (4.3 to 4.6 m.), and rise abruptly from the channel. The limit of the shoal south of the point is marked by a bell buoy.

Orient Harbor is an excellent anchorage lying northwestward of Long Beach Point and lighthouse, the depths ranging from over 20 feet (6.1 m.) in its southern part to 16 feet (4.9 m.) at its northern end. A shoal extends 0.9 mile from the western shore at the entrance of Orient Harbor and is marked at its end by a buoy, which lies 0.6 mile northwestward of Long Beach Bar Lighthouse.

Orient is a village at the northeast end of Orient Harbor. There is a depth of 8 feet (2.4 m.) at the end of the main wharf.

Directions, Orient Harbor.—To enter, pass between the buoy and lighthouse, giving the latter a berth of over 300 yards, and steer about 359° true up the middle of the harbor; select anchorage as desired, avoiding shoals extending off the shores. The eastern part of Orient Harbor, eastward of a line from Long Beach Bar Lighthouse to the end of the wharf at Orient, has depths of 7 to 9 feet (2.1 to 2.7 m.), with the exception of a channel 0.2 mile wide about midway between them, which leads to Long Beach Bay. This channel is shoaling and

caution is recommended. There are fish pounds in places on the shoals.

About 0.4 mile northeast of **Cleaves Point,** at the southwest end of Orient Harbor, the shore has been cut through to a small pond which is used as a basin for small craft. The entrance is between two jetties. Although a private basin, permission for its use is not necessary.

South of the entrance is **Sheepshead Rock,** which is marked by a buoy.

Long Beach Bay makes eastward from Orient Harbor on the north side of Long Beach Point. A dredged channel, with a least width of 35 feet and protected by dikes in places, leads through the bay to a wharf on the west side near its north end. In 1939 there was a least depth of 3 feet (0.9 m.) at mean low water in the channel and 6 feet (1.8 m.) at the wharf. This channel is marked by the dikes and private aids. Leave the first dike, on the port hand, then follow the next dike, leaving it on the starboard hand until in the channel between the dikes, and when past them follow the bush stakes, leaving them on the port hand. The aids and dikes should be passed at a distance of about 20 feet. This channel is shoaling and local information is necessary before entering, even then considerable caution should be maintained.

Stirling Basin, on the northeast side of Greenport is a part of Greenport Harbor. It was dredged in 1939 to form an anchorage basin 1,000 feet long and 360 feet wide with a controlling depth of 8 feet (2.4 m.). A channel 100 feet wide with a controlling depth of 8 feet (2.4 m.) connects the anchorage basin to Greenport Harbor.

There is a railway for small motorboats at the head of the basin. A staked channel good for 2½ feet (0.8 m.) leads to oyster wharves in the northern part. In the approach to the basin there is a marine railway together with several wharves, of which the principal and only public one is Union Wharf, which has a depth of about 11 feet (3.4 m.) at its outer part. A 323° true course for Union Wharf leads in the best water.

Greenport is an important town and the terminus of a branch of the Long Island Railroad. The white church spire, near the northern end of town, and the standpipe in the center of town, are prominent.

Greenport Harbor is formed on the northeast by a breakwater, 5 feet (1.5 m.) high, which extends 0.3 mile south-southeastward from Youngs Point, nearly to the 18-foot (5.5 m.) curve, and is marked at its outer end by **Greenport Harbor Light.*** From the shore end of the breakwater a flat extends 200 yards southward to the 6-foot (1.8 m.) curve and 300 yards to the 12-foot (3.7 m.) curve, and the generally used anchorage is off the edge of this flat in 2 to 6 fathoms (3.7 to 11.0 m.), the lead being a good guide. The depths at the wharves range from 7 to 19 feet (2.1 to 5.8 m.), according to location. The steamship and railroad wharves are on the south front of the town. There is a bus communication with Orient Point, where a steamer can be obtained for New London in the summer. There are several shipyards, marine railways, and a well-equipped machine shop.

The largest marine railway has a capacity of about 700 tons and is capable of handling vessels up to 180 feet in length, with draft of

*Lat. 41°06'.2, Long. 72°20'.9; Charts 298, 1212.

14 feet (4.3 m.) forward and 28 feet (8.5 m.) aft. There is also another repair yard with a marine railway with a capacity of 500 tons which can accommodate vessels up to drafts of 15 feet (4.6 m.).

Supplies of all kinds are available. Gasoline, Diesel oil, and fresh water are obtainable at the docks of the various oil companies. A chart agency is located near the ferry landing.

Dering Harbor, opposite (southward of) Greenport, is a favorite anchorage for yachts and motorboats. A shoal, with 5 to 7 feet (1.5 to 2.1 m.) over its outer part, extends halfway across the entrance from the southwest point at the entrance, and is marked at its northeast end by a buoy. The entrance is between the buoy and the eastern shore. The depths in the harbor range from about 12 to 15 feet (3.7 to 4.6 m.) just inside the entrance to 8 or 9 feet (2.4 to 2.7 m.) near the shores. Motorboats anchor eastward of the line of the coal pier at the southwest end of the harbor to avoid the grassy shoal on the west shore. Vessels too large to enter can anchor outside the entrance buoy in 3 to 6 fathoms (5.5 to 11.0 m.).

Shelter Island Heights is a post office on the southwest side of Dering Harbor. A ferry operates daily between Greenport and Shelter Island, the landing being at the southwest part of Dering Harbor.

Fanning Point is on the north shore of the channel at the southwest end of Greenport. There are several prominent oil tanks on the point. A shoal extends 300 yards off the point and is marked at its end by a buoy. There are two lights on dolphins just northward of the point, which are privately maintained from March 1 to December 1.

Currents of 2 knots, running fair with the channel, have been reported in the vicinity of Fanning Point.

Pipes Cove, about 0.8 mile in extent, lies on the north side southwestward of Greenport and between Fanning Point and Conkling Point. Extensive shoals make off from the shores, and it is not much used except by motorboats, which moor on its northeast side, where there are a few private landings. There are boulders in places on the northwest side of the cove, and in general motorboats should give the shores a berth of over 200 yards.

Conkling Point, on the north shore 1 mile southwestward of Fanning Point, is low and sandy at the end and has deep water as close as 150 yards.

Mill Creek is the entrance to **Hashamomuck Pond.** The entrance is obstructed by a bar which is nearly bare at mean low water. About 400 yards eastward of the entrance there is a small bight into which there is a 6-foot (1.8 m.) dredged channel. There is a small repair yard on the west side with a marine railway capable of hauling out small craft up to lengths of 45 feet and a draft of 4½ feet (1.4 m.). Gasoline and fresh water are available and there are facilities for boat storage. Repairs to both wooden hulls and gasoline motors can be made.

Currents.—There is considerable current in all parts of Shelter Island Sound.

Jennings Point, the western end of Shelter Island, is high and wooded. There are rocks off the point close to, and it should be given a berth of over 150 yards.

The town of **Southold** is situated at the head of **Southold Bay,** which is the bight at the western end of Shelter Island Sound west-

ward of Jennings Point. The public wharf with a depth of 6 feet (1.8 m.) at mean low water is situated at **Founders Landing.** The wharf should be approached on a course of 270° true to obtain the deepest water.

For a distance of 1 mile northeastward of the wharf shoals with 12 feet (3.7 m.) or less extend nearly 0.4 mile from shore and are generally steep-to. The southwest part of the bay is also shoal for a distance of 600 yards from shore. Anchorage can be selected with the wharf bearing between 292° true and 253° true and distant from 0.1 to 0.4 mile, in 12 to 18 feet (3.7 to 5.5. m.).

About 0.5 mile northeast of Founders Landing there is a small basin, the entrance to which is between jetties. The controlling depth in the entrance and basin is about 4½ feet (1.4 m.) at mean low water.

On the opposite shore south of Founders Landing there is a prominent white tower (an imitation lighthouse), which is a conspicuous landmark. There is a small repair yard with a marine railway capable of hauling out small craft up to 38 feet in length and a draft of 4½ feet (1.4 m.). Repairs to both hull and motors are obtainable and there are facilities for boat storage. Gasoline, lubricants, fresh water, and ship chandlery supplies can be obtained.

Paradise Point, on the west side of the sound, is low and wooded, and from the point a sloping sand spit shows nearly out to Hallocks Point Shoal lighted buoy, which marks the end of the shoal off the point. Southward of Paradise Point shoals with depths of 10 to 15 feet (3.0 to 4.6 m.) extend from the west shore to mid-sound; the southeast point of the shoals is marked by a red buoy, which lies about 0.7 mile southeastward of Paradise Point. There are oyster stakes in places on the shoals.

Directions, Shelter Island Sound, north arm.—The channel north of Shelter Island is good for a depth of 21 feet (6.4 m.), is easily followed when the buoys can be seen, and is generally used by all vessels, including those going to Peconic Bays.

Vessels of less than about 7-foot (2.1 m.) draft can follow the south side of Long Beach at a distance of ¼ mile on a 239° true course, passing about the same distance southward of Long Beach Bar Lighthouse.

Gardiners Bay to Hay Beach Point.—From a position about 200 yards southeast of Shelter Island North Channel Entrance Bell Buoy steer **273°** true with the can buoy a very little on the port bow, passing south of the bell buoy south of Long Beach Point and when Long Beach Bar Lighthouse bears 337° true, steer **305°** true, passing 250 yards northeastward of the lighted buoy. Rounding the lighted buoy at this distance, steer **259°** true to a position 350 yards northward of Hay Beach Point, and then, if going to Greenport, steer southwestward and pass south of the bell buoy off the light on the end of the breakwater.

Hay Beach Point to Little Peconic Bay.—Rounding Hay Beach Point at a distance of 350 yards, steer **222°** true, follow the southern shore at a distance of 350 yards, and round Conkling Point and Jennings Point at this distance. Then steer **154°** true, pass 100 yards eastward of the lighted buoy off Paradise Point, and continue the course about ½ mile past the lighted buoy until approaching a nun buoy. Round this buoy at a distance of about 200 yards, steer **208°**

true, and pass 100 yards northwestward of Jessup Neck Shoal lighted buoy.

SHELTER ISLAND SOUND, SOUTH PART

The channel south of Shelter Island has numerous shoals, but is easily followed by vessels of 13 feet (4.0 m.) or less draft when the buoys can be seen. The approach from Gardiners Bay is across a shoal or bar which extends in a southeasterly direction from Ram Head to the south shore, the depths on which range from 7 to 11 feet (2.1 to 3.4 m.) for a distance of 1¼ miles from Ram Head, and thence 13 to 17 feet (4.0 to 5.2 m.) to the buoys which mark the south side of the entrance. The southern end of this shoal, across which the channel leads, is called **Ram Head Shoal,** good for a depth of 17 feet (5.2 m.), and is marked by a buoy.

Four hundred yards south of the channel which crosses the shoal, in surrounding depths of about 12 feet (3.7 m.) there is a rock awash at low water. It is marked by a buoy on the north side.

Cedar Point Shoal extends 0.3 to 0.4 mile north of the shore of **Cedar Point.** The shoal has boulders, and its edge is marked by buoys.

Cedar Island Light* is a black skeleton tower on the southwest point of Cedar Island. The light is 48 feet (14.6 m.) high and visible 9 miles.

Nichols Point Shoal, with boulders and little water in places, extends nearly 0.5 mile east-southeastward from Nichols Point and is marked at its end by a buoy, which lies 0.5 mile northward of Cedar Island Lighthouse.

Single Rock buoy marks a boulder with 3 feet (0.9 m.) over it, which lies on the western edge of the channel, 600 yards from shore, and 0.4 mile westward of Cedar Island Lighthouse.

Northwest Harbor lies between Cedar Island Lighthouse and **Barcelona Point** and is strewn with boulders with from 4 to 6 feet (1.2 to 1.8 m.) over them.

A group of rocks, locally known as **Gull Island,** showing bare at half tide, lie nearly 0.4 mile northeastward of the breakwater at Sag Harbor, and are marked off their north end by a buoy.

Gull Rock, bare at mean low water, lies about 100 yards off the northeast side of the breakwater and about 400 yards southeast of Sag Harbor Breakwater Light. The rock is unmarked.

Sand spit is the extensive shoal, partly bare at half tide, lying between **Mashomack Point** and Sag Harbor. The southeast and south sides of the shoal are marked by buoys and a light. The shoal extends 1.4 miles northwestward from the light has, 5 to 9 feet (1.5 to 2.7 m.) over it, and its western edge is marked by a buoy.

Sand Spit Light is a red skeleton tower on the south end of Sand Spit shoal and marks the north side of the main channel.

Sag Harbor lies about 2.5 miles southwestward of Cedar Island Lighthouse and is formed on the northeast by a breakwater, which is marked by **Sag Harbor Breakwater Light,** a black skeleton tower on the northwest end. The light is about 28 feet (8.5 m.) high.

A standpipe is a conspicuous landmark.

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*Lat. 40°02'.5, Long. 72°15'.7: Charts 298, 1212.

The harbor has recently been dredged and provides an entrance channel 100 feet wide from near the end of the breakwater to the wharves, thence in an east-southeasterly direction to a point near the oil docks in the southeast part of the harbor. The controlling depth in 1939 was 10 feet (3.0 m.).

An anchorage area between the entrance channel and the breakwater has a controlling depth of 8 feet (2.4 m.) in the north portion and 6 feet (1.8 m.) in the south portion. There is a depth of about 6 feet (1.8 m.) in the channel to Sag Harbor Cove. A fixed bridge crosses the entrance which has a horizontal clearance of 37 feet and a vertical clearance of 20 feet (6.1 m.) at high water.

Supplies of all kinds can be obtained at Sag Harbor and there is also railroad communication.

Smith Cove, a bight 0.6 mile in diameter on the south side of Shelter Island, is a good anchorage for small craft in northerly weather. The depths range from 14 to 30 feet (4.3 to 9.1 m.). A lighted buoy south of the entrance to the cove marks a 16-foot (4.9 m.) shoal about 400 yards north of the northeast point of **North Haven.** A ferry operates between **South Ferry** on the southwest side of the cove to **North Haven.** A private concrete wharf, with boathouse and a large dwelling, is located about 500 yards westward of the South Ferry slip.

No landings are allowed at this private wharf.

West Neck Harbor and **West Neck Creek** are shallow, connecting bodies of water on the southwest side of Shelter Island. A depth of 5 feet (1.5 m.) can be carried from Shelter Island Sound through a narrow staked channel in West Neck Harbor to a yacht-club landing on West Neck Creek. The entrance is close to eastward of the jetty at the northeast end of a small island which separates the harbor from the sound, and the channel follows along the north side of this island to the west side of the harbor and thence to the landing on the west side of the creek, 0.5 mile above its mouth.

During the summer months there is a light on the end of the jetty which is maintained locally.

There is a small boat yard with marine railways which can accommodate small craft up to lengths of 70 and 100 feet and a maximum draft of 5 feet (1.5 m.). Gasoline, lubricants, and ship chandlery supplies can be obtained.

Noyack Bay lies between North Haven and Jessup Neck and southward of the western end of Shelter Island. There are no dangers if the shores be given a berth of about ⅜ mile.

Directions, Shelter Island Sound, south arm.—This entrance is little used except by vessels going to Sag Harbor, the usual draft of which is 10 feet (3.0 m.) or less and the greatest draft about 11 feet (3.4 m.). Vessels from Greenport going to Sag Harbor or the reverse generally use the inside route around the western end of Shelter Island.

From a point about 300 yards south of Shelter Island South Channel, east entrance, Buoy No. 2, steer 252° true for 1 mile, passing about 150 yards north of the buoy on the south side of the channel. When abeam of Cedar Point Shoal Buoy steer 230° true until Cedar Island Light bears 90° true; then steer 164° true, heading for the east end of the bluff on Barcelona Point; when abeam of Shelter Island South Channel Buoy No. 5 at a distance of about 200 yards gradually

swing onto a course of **201°**, heading directly for Sag Harbor Light No. 3, with buoy No. 5 dead astern, until the southwest tangent of Mashomack Point is on the starboard beam; then steer **225°** true and pass about 125 yards northwestward of buoy No. 9; continue with **midchannel courses,** passing about 100 yards southward of Sand Spit Light, to a position about 75 yards northeastward of buoy No. 13.

Directions to enter Sag Harbor.—Pass midway between black buoy No. 13 and the horizontally striped buoy to the northwestward of it and steer **224°** true to a position 150 yards westward of the light on the end of the breakwater. Then steer for the east side of the wharf house on a course of about **174°** true, passing west of a black buoy. The end of the breakwater should not be rounded too closely, as a depth of about 6 feet (1.8 m.) is found near its end. The deepest water is found near the buoy. Anchor eastward or northeastward of the end of the steamboat wharf, taking care to keep westward of the range of the end of the breakwater and the foot of the bluff on the east side of North Haven.

Directions, Sag Harbor to Peconic Bays.—Leave the horizontally striped buoy on the port hand and red buoy No. 12 at the southwest end of the Sandspit, about 100 yards on the starboard hand. Then steer **337°** true, passing about 100 yards westward of buoy No. 14 and 350 yards eastward of the lighted buoy off the north end of North Haven. Steer **249°** true and pass 100 yards northward of this buoy, keeping at least 150 yards off the beach at South Ferry. When the northeast end of the small island at West Neck Harbor bears 0°, true change course to **225°** true and pass southward of West Neck Shoal lighted buoy at a distance of about 300 yards; then steer **270°** true, passing about 100 yards northward of Jessup Neck Shoal lighted buoy at the entrance of Little Peconic Bay, or from a position about 0.8 mile westward of the red lighted buoy in Noyack Bay steer **North** true for 1.5 miles to a position about 300 yards eastward of the buoy southeast of Paradise Point.

PECONIC BAYS

(CHART 299)

Jessup Neck is a long, narrow strip, partly high and wooded, which separates Noyack Bay from Little Peconic Bay. The north end of the neck is a sand spit, from which a shoal with 5 to 11 feet (1.5 to 3.4 m.) over it extends nearly 0.4 mile north-northwestward. The end of the shoal is marked by a lighted buoy.

Little Peconic Bay is about 5 miles long and 4.0 miles wide at its widest part. The southeasterly shore of the bay is clear if given a berth of 0.4 mile, but shoals extend 0.6 mile from the shore at the south end of the bay. There is a prominent yellow bluff, known locally as **Holmes Hill,** just westward of the entrance of **North Sea Harbor.**

This harbor was dredged in 1938 and provides a channel 50 feet wide and a controlling depth of 5 feet (1.5 m.) at mean low water. The channel is marked by stakes and the entrance by a light during the summer months. It provides an excellent harbor of refuge for small boats with drafts not exceeding 3½ feet (1.1 m.). The bottom is soft with good holding ground. A marine railway and repair

yard is located at the southwest part of the harbor. Small boats up to lengths of 40 feet and 3½ feet (1.1 m.) draft can be hauled out. There is a machine shop and facilities for repairing motors. Gasoline and a limited amount of yachting supplies are available.

A shoal with depths of 5 to 7 feet (1.5 to 2.1 m.) extends 1.5 miles southwestward from **Great Hog Neck,** on the northwest side at the entrance of Little Peconic Bay; this shoal is marked near the middle of its southeast side by a buoy, a guide for the main channel of the bay.

Heavy tide rips occur southeast of Great Hog Neck during flood tide with a southwesterly wind. During such times small craft can avoid the worst of them by favoring the shore on the northwest side of the passage.

Corey Creek, at the north end of **Hog Neck Bay,** is a shallow creek which has been dredged out to form a basin for small craft. It is not navigable except by small pulling boats.

Nassau Point, the long neck on the northwest side of Little Peconic Bay, has high bluffs on its eastern side. A shoal with little depth over it extends 0.5 mile southward from Nassau Point and is marked at its end by a lighted buoy. The southeast part of the shoal has 5 to 8 feet (1.5 to 2.4 m.) over it and lies 0.4 mile northeastward from the buoy.

On the east shore of Cutchogue Harbor, northwestward of Nassau Point, two channels leading from the harbor into the ponds, have been dredged by private interests. At the northerly one there is a private wharf and the channel leads between two jetties.

Cutchogue Harbor, between Nassau Point and New Suffolk, is used by a number of local oyster boats of as much as 12-foot (3.7 m.) draft.

A depth of 8 feet (2.4 m.) can be taken to within 100 feet of the wharves at **New Suffolk** by passing eastward and about 200 yards northward of the buoy westward of Nassau Point and steering for the wharves on a course of about 280° true. A small basin, with a depth of about 10 feet (3.0 m.), lies northward of the wharf. At the north end of the town of New Suffolk, where a small stream used to be, considerable dredging has been done and a basin has been built extending to the highway. There was a depth of about 6 feet (1.8 m.) in the basin in 1939.

Wickam Creek has a controlling depth at the entrance of about 3 feet (0.9 m.). Several fishing boats tie up in this basin in slips. In southeast gales, local craft of less than 6-foot (1.8 m.) draft seek shelter in the small cove, locally known as **Horseshoe Cove,*** in the northeast part of Cutchogue Harbor.

There are several boat-repair shops and marine railways at New Suffolk, the largest of which has a capacity of about 35 tons and can accommodate small craft up to lengths of 50 feet with a maximum draft of 5 feet (1.5 m.). Gasoline, lubricants, fresh water, and ship chandlery supplies are available.

The through channel northward of **Robins Island** has no aids and is not used except by light-draft boats. The channel southward of Robins Island has a controlling depth of 14 feet (4.3 m.), and is marked by buoys.

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*Lat. 41°00'.2, Long. 72°27'.3; Charts 299, 1212.

Tide rips occur between the mainland and the south end of Robins Island during flood tide and a southwest wind, or an ebb tide and a northeast wind. They can be avoided to some extent by favoring the southeast side of the passage, passing about 250 yards southeast of the black, channel buoys.

Great Peconic Bay is about 5 miles in diameter. The navigation is confined mostly to local motorboats from Shinnecock Canal and a few yachts. The bay is generally clear, but there are extensive shoals making off from the shores except on its south side. **Shinnecock Canal** is the entrance of a passage, good for boats of 4½-foot (1.4 m.) draft in 1939, which leads through the bays on the south side of Long Island. (See p. 304.)

Shoal water extends southwestward from Robins Island, and for a distance of over 1 mile there are depths of 4 to 10 feet (1.2 to 3.0 m.). As the shoal continues to trend southwardly the depths increase, ranging from 12 to 15 feet (3.7 to 4.6 m.). The shoal is steep-to on the west and east sides, the latter being marked by red buoys.

Rodgers Rock, with a depth of 6 feet (1.8 m.) over it, is marked on the northeast side by a buoy. It is situated about 1 mile offshore from **Cow Neck** and about 1.25 miles south-southwest of Robins Island.

About 0.8 mile west of the south end of Robins Island there is a rock awash at low water, which is marked on the south side by a buoy. Caution is recommended when navigating in the vicinity of this danger.

Sebonac Creek, on the southeast side of Great Peconic Bay, is used extensively by yachts, and serves as the principal yacht harbor for the town of Southampton.

The entrance is marked by a lighted buoy. A lighted range is maintained from June 1 to November 15 by the local yacht club. See Light List, North Atlantic Coast, for distinguishing marks and light characteristics. Strangers should obtain local information before entering as it is reported that the range does not lead in the best water. A channel 50 feet wide with a controlling depth of 5 feet (1.5 m.) is buoyed by the yacht club. Buoys are maintained during the summer only.

A depth of 5 feet (1.5 m.) can be carried to the landings at **West Neck,** a small settlement northeastward of **Ram Island.**

A light is locally maintained during the summer to mark a rock about 100 feet westward of the town landing.

There is a small repair yard and marine railways at West Neck capable of hauling out small craft 36 feet long with a maximum draft of 4 feet (1.2 m.). Light repairs and a limited amount of yachting supplies can be obtained.

Near the middle of the western part of the bay is a lighted buoy which marks the entrance of a channel, good for a depth of 6 feet (1.8 m.) at low water, leading to South Jamesport. Passing close southward of this buoy a 260° true course will lead to the buoy south-southeast of **Miamogue Pt.,** then steer northwestward to a buoy south of that point and then northward for the wharf at South Jamesport.

Local knowledge is necessary to avoid the shoals in this area and strangers should sound frequently to keep in the best water.

Motorboats anchor or moor to piles in the bight westward of the wharf. **South Jamesport** is a summer resort and has railroad com-

munication. There is a railway for boats 40 feet long, 3 feet (0.9 m.) draft forward and 4 feet (1.2 m.) aft.

At the public dock there is depth of about 4 feet (1.2 m.) at mean low water.

Flanders is a small village at the head of **Reeves Bay,** 2.5 miles west-southwestward of South Jamesport.

Riverhead, on the **Peconic River,** 4 miles above South Jamesport, is at the head of navigation and has railroad communication; the deepest draft of the boats going there is about 6 feet (1.8 m.).

Boats continuing through Flanders Bay to Riverhead should steer a westerly course for about 250 yards after passing the buoy south of South Jamesport before setting the course for the lighted buoy which marks the shoal extending from the point 0.6 mile westward of South Jamesport. After passing close southward of this buoy, the channel into Riverhead, through **Flanders Bay,** is staked.

From May 1 to October 31 the channel is marked by a lighted black buoy and by lights which are maintained by local interests.

There is a repair yard with marine railways capable of hauling out boats up to 50 feet in length with a draft of 9 feet (2.7 m.). The yard has facilities for making all major repairs and has a large stock of ship chandlery supplies. Boat storage and mooring facilities are also available.

A towboat is stationed here. The river is usually frozen from about December 15 to February 1 of each year.

Supplies of all kinds are available.

Directions, Little and Great Peconic Bays.—Passing 100 yards northwestward of Jessup Neck Shoal lighted buoy, continue the **208°** true course for about 1 mile to position 0.3 mile southeastward of the buoy south of Great Hog Neck. Then steer **218°** true, pass 300 yards southeastward of the lighted buoy off Nassau Point, and continue the course, passing midway between the buoys which mark the dredged channel southward of Robins Island. Westward of the dredged channel vessels of about 10 feet (3.0 m.) or less draft can cross the shoal west-southwestward of the south end of Robins Island on a course between **240°** and **270°**. Deeper-draft vessels should follow the buoys southward, the courses for which are: Passing 100 yards westward of buoy No. 11, steer **180°** true, passing 200 yards eastward of buoys Nos. 20 and 22; then steer **202°** true, passing 100 yards eastward of buoy No. 24, and then **247°** true, passing northward of buoy No. 13.

Chapter 9.—FISHERS ISLAND SOUND

(CHART 358)

Fishers Island Sound lies between the mainland of Connecticut and Fishers Island and forms one of the entrances into Long Island Sound that is used to some extent by light tows and other vessels of as much as 14-foot (4.3 m.) draft. Fishers Island Sound has numerous shoals, and the entire area is exceedingly treacherous, being characterized by boulder patches which rise abruptly from deeper water. Vessels should follow the deep channels between the shoals and proceed with caution if obliged to cross shoal areas. In general, all shoal spots or abrupt changes of depth are indications of bowlders and should be avoided as anchorages. The south side of the sound is first described.

Seal Rocks, partly bare at low water, lie 0.1 to nearly 0.4 mile off the north side of **East Point** of Fishers Island, and are marked off the north side by a buoy. A rocky patch with 13 feet (4.0 m.) over it lies northeastward of this buoy and is marked by a buoy on its north side.

Youngs Rock, about 0.3 mile northward of Fishers Island and about 0.5 mile westward of Seal Rocks, has about 1 foot (0.3 m.) over it at low water and is marked by a buoy. A rocky patch extends about 400 yards to the northeastward.

East Harbor and **Chocomount Cove,** in the north shore of Fishers Island, are sometimes used as anchorages by small craft owned in the vicinity. There is considerable foul ground in East Harbor and in the approach to Chocomount Cove, and they are exposed to northerly winds. The approach to East Harbor is marked by two buoys. There is a prominent Coast Guard station * near the south side of East Harbor. There are two wharves in East Harbor, the western one for a boat shed with about 7 feet (2.1 m.) at the end and the other the landing of the Fishers Island Club, with about 12 feet (3.7 m.) at the end. There are two fixed range lights on the club wharf, which are maintained by the club during the summer. Passing about 100 yards east of the nun buoy at the entrance a 130° true course, and on the range of the lights on the club wharf, leads through the best water.

The north shore of the island from East Harbor around into West Harbor has many private landings.

East Clump is a small cluster of rocks, partly bare at high water and marked on the north side by a buoy, lying 0.8 mile from Fishers Island and 1.3 miles 250° true from Latimer Reef Lighthouse.

Middle Clump, a cluster of rocks awash at high water, lies about 0.7 mile from Fishers Island, northward of Chocomount Cove.

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*Lat. 41°17'.0, Long. 71°56'.7 : Charts 358, 1211.

Rocks with 7 to 10 feet (2.1 to 3 m.) over them have been found on the shoals which extend south-southeastward from Middle Clump to Fishers Island.

There is a buoyed channel, with a depth of about 15 feet (4.6 m.) between the shore of Fishers Island and these rocks.

From Middle Clump a shoal with rocky bottom and boulders extends westward to South Dumpling. The least depths found are 5 feet (1.5 m.) between Middle Clump and **West Clump;** the latter is bare at low water. **Pulpit Rock,** 0.2 mile westward of West Clump, is bare at low water and is marked by a buoy on the north side. **Flat Hammock** is a low grassy islet, from which a shoal with a grassy islet on it extends nearly 0.2 mile northeastward, and is marked at its end by a buoy. The shoal between Flat Hammock and South Dumpling has depths of 6 to 10 feet (1.8 to 3.0 m.). **South Dumpling** is a grassy and brush covered island, from which a rocky shoal with 13 feet (4.0 m.) on it extends 0.3 mile southward, being marked at its south end by a buoy.

A boulder reef partly bare at low water extends 0.2 mile northwestward from the northwest end of Fishers Island, and is marked on its northeast side by red buoys.

North Dumpling is a small grassy island marked by **North Dumpling Lighthouse,** a white tower on dwelling.

The light is 69 feet (21.0 m.) above the water and is visible about 11 miles. It has a red sector between the bearings (from seaward) from 257° true and 23° true visible about 8 miles which covers East Clump on the north side and the shoal waters on the west side of Fishers Island. The fog signal is a bell. For light characteristic and fog signal see Light List, North Atlantic Coast.

West Harbor is on the north side of Fishers Island southeastward of North Dumpling Lighthouse and affords shelter from southerly winds. A depth of about 10 feet (3.0 m.) can be taken to the wharves on the west side of the harbor; a dredged channel with a depth of 14 feet (4.3 m.), in 1936, leads into the harbor. Anthracite and bituminous coal, provisions, and fresh water can be obtained. The post office is Fishers Island. A steamer from New London lands at the wharf. Foul ground extends halfway across the entrance of West Harbor to a bare rock, which should be given a berth of nearly 300 feet; the northern limits of the foul ground are buoyed.

Directions, West Harbor.—Approaching West Harbor from eastward small craft can cross the shoal between Pulpit Rock and Flat Hammock, where the general depth is between 13 and 14 feet (4.0 and 4.3 m.) by passing about 300 yards eastward of Flat Hammock buoy and steering **193°** true for Hawks Nest Point in range with the end of the wharf in West Harbor. A 9-foot (2.7 m.) spot has been reported to be 130 yards west of this range and east of Flat Hummock, When the northwest end of Fishers Island bears 270° true, steer **177°** true for the channel entering West Harbor, passing about 100 feet eastward of the lighted entrance buoy. From westward, pass close to the bell buoy lying 0.4 mile south-southwestward of North Dumpling Lighthouse, steer **140°** true, passing about 150 yards south of a black buoy and then steer **117°** true, which leads about 300 yards northward of Hawks Nest Point. Pass about 50 feet eastward of the buoy at the entrance of the harbor and steer **173°** true, leaving the horizontally banded buoy about 225 yards on the port hand, and when

just past abeam of the horizontally banded buoy steer **189°** true for about 125 yards and change to **222°** true, passing about 150 yards northwestward of the bare rock, and then ease gradually for the wharf. Chart 358 is the guide. The Fishers Island Yacht Club wharf is in the southwest end of the harbor. The head of the harbor is used by motor boats of less than 5-foot (1.5 m.) draft which enter by the narrow channel eastward of Goose Islet.

Hay Harbor is used only by small craft. It is a summer resort, and near its head are several hotels with small landings. The channel into the harbor is marked by four lights which are privately maintained during the summer.

Silver Eel Pond is on the west end of Fishers Island, 0.6 mile northeastward of Race Point. The entrance is about 75 feet wide between jetties and has a depth of 16 feet (4.9 m.), shoaling to 14 feet (4.3 m.) inside. There are dolphins on the northeast side of the pond, and the channel is clear between them and the wharves on the southwest side. Vessels must go to the wharves as there is no room for anchorage. Buoys lie off the entrance at a distance of 300 to 500 yards.

It is only necessary to open the entrance and stand in midway between the jetties. The entrance is difficult with northwesterly or westerly winds.

Silver Eel Pond Light, located on the inshore end of the southwest jetty is about 15 feet (4.6 m.) high and visible about 9 miles. At the same location there is a fog signal consisting of a manually operated whistle.

On the **north side of Fishers Island Sound** are Little Narragansett Bay and Pawcatuck River leading to Westerly; Stonington Harbor, and Mystic River.

Napatree Point Ledge is a boulder reef on which there is little depth for a distance of nearly 0.3 mile southward of the point. At the end of the ledge is a 15-foot (4.6 m.) spot lying 0.35 mile south-southwestward of the point; it is marked by a lighted bell buoy and a station buoy.

Napatree Beach, between Watch Hill Point and Napatree Point, is thickly settled; the sand spit extending northward from **Napatree Point** to **Sandy Point** is bare.

At a distance of about 0.5 mile northward of Napatree Point the beach was broached during the hurricane of 1938 and in July 1939, there was a depth of 9 feet (2.7 m.) at mean low water in the cut, with depths of 1 to 3 feet (0.3 to 0.9 m.) off the entrance.

As a result of this break the southwest part of the bay has shoaled considerably.

The west side of Napatree Point should not be approached closer than 175 yards to avoid a stone jetty which is covered at high water.

Between Napatree Point and the East Breakwater off Stonington Harbor there is an extensive flat on which the general depths are 5 to 10 feet (1.5 to 3.0 m.). The bottom is generally rocky, with boulders in places. **Middle Ground,** at the western end of the flat, is marked on its west side by two buoys.

Stonington Outer Breakwater extends from **Bartlett Reef** to the north end of the Middle Ground, and is marked at its west end by a flashing light.* A depth of over 15 feet (4.6 m.) can be taken to an

*Lat. 41°19'.0, Long. 71°54'.5; Charts 358, 1211.

anchorage inside this breakwater by passing from 100 to 200 yards westward of the Middle Ground buoys and giving the light on the west end of the breakwater a berth of over 250 yards. When anchoring give the inside of the breakwater a berth of over 300 yards to avoid shoals and fish weirs which extend about this distance from it. This anchorage is not used much, although the shelter is good except in southwesterly and westerly winds.

Little Narrangansett Bay.—This shallow bay at the eastern end of Fishers Island Sound is the approach to Pawcatuck River, which leads to Westerly, and is also used by small craft of about 5-foot (1.5 m.) or less draft going to **Watch Hill.** A channel 100 feet wide has been dredged through the bay to the entrance of Pawcatuck River. This channel had a controlling depth of 8 feet (2.4 m.) in 1939 and is well marked by buoys.

Caution is recommended when using the channel as the entrance is subject to change. Strangers are advised to obtain local information before entering as there are rocks and shoal water near the edges of the channel. Local fishermen who will act as pilots may be obtained at Stonington.

The **channel** leading to Watch Hill Cove, the extreme southeastern part of the bay, is buoyed and in 1939 had a controlling depth of about 6 feet (1.8 m.). Depths within the cove vary from 3 to 8 feet (0.9 to 2.4 m.) the deeper depths being in the east central portion about 200 feet northeast of the yacht club wharf. The depth at the yacht club wharf is about 6 feet (1.8 m.) and at the other wharves 6 to 8 feet (1.8 to 2.4 m.).

A sunken rock with 1 foot (0.3 m.) lies about 200 feet southwestwardly from the point on the north side of the entrance to **Foster Cove.** The rock is unmarked and caution is recommended to avoid it.

Dennison Rock, with a depth of 2 feet (0.6 m.) over it, is marked by a buoy on the southeast side. The rock is located about 0.5 mile northwestwardly from Watch Hill Cove.

Supplies.—Gasoline, lubricants, fresh water, ice, and a limited amount of ship chandlery supplies are available. Light repairs to motors can be obtained.

Currents.—In the dredged channel northward of Sandy Point the currents have an average velocity at strength of about 1½ knots. Slack waters before flood and ebb, respectively, occur about ¾ hour after low water and about the time of high water at New London. The strength of flood sets eastward about 3½ hours after low water at New London, and the strength of ebb sets westward about 3½ hours after high water.

Directions, Little Narragansett Bay.—Pass southward and about 100 yards eastward of the horizontally striped buoy southward of Stonington Point, and then head to pass 75 feet northwestward of Academy Rock lighted buoy, and then pass 100 feet northward of Rhodes Folly Light, on a red skeleton tower on stone foundations, 60 feet from south edge of channel. Steer **95°** true, passing 50 yards south of lighted buoy No. 9 and then steer **116°** true and pass lighted buoy No. 13 in midchannel; steer **131°**, passing 100 yards clear of Pawcatuck Point and avoiding the rock on north side of channel opposite buoy 16. From a point 175 yards south of Pawcatuck Point

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steer 187° true, passing about 75 yards westwardly from west point of Foster Cove to the buoyed channel into Watch Hill Cove. Steer a midchannel course of about 163° true and select anchorage in depths of 6 to 8 feet (1.8 to 2.4 m.).

Pawcatuck River has a length of about 4 miles to Westerly, and has been improved by dredging a channel with a width of 100 feet, except through the ledge at Pawcatuck Rock, where the width is only 80 feet, to the lower wharves at Westerly and 40 feet wide along the wharves. The controlling depth, up to the head of the improved channel, was 9.5 feet (2.9 m.) in 1938. The deepest draft towed up to Westerly is about 9 feet (2.7 m.) at high water. The channel is well marked by buoys. Vessels should pass close to the buoys as the channel is narrow and its edges rocky in places. A pilot can be obtained at Stonington, or by telephoning from there to Westerly. About 1 mile above the entrance the current has a velocity of about ½ knot at strength. The river is generally closed by ice from January to March.

At **Colonel Willie Cove,** 0.5 mile above the mouth of the river, there is a marine railway 60 feet long and capable of hauling out vessels up to 6-foot draft. There are also facilities for storing yachts here.

Westerly is an important manufacturing town and has railroad communication. There is a depth of about 9½ feet (2.9 m.) at some of the coal wharves and about 7 feet (2.1 m.) at the others. Coal, water, and supplies of all kinds can be obtained.

Wequetequock Cove is shallow, but a narrow unmarked channel passes eastward of **Elihu Island** at a distance of about 75 yards and a depth of 6 feet (1.8 m.) may be taken as far as **Goat Island. Wequetequock River** enters the northern part of the cove. The river is shallow and is used only by local craft. A railroad bridge crosses the river which has a horizontal clearance of about 64 feet and a vertical clearance of 6.5 feet (2.0 m.) at high water.

Stonington Point, at the south end of the town of Stonington, is marked by a white unused light tower. An unlighted buoy is placed off the south end of the shoal which surrounds the point to a distance of about 200 yards from the point and about the same distance westward of the lighted buoy marking **Academy Rock.**

Stonington Harbor is well sheltered by the breakwaters, and is available for vessels of about 11 feet (3.4 m.) or less draft at low water. Anchorage can be selected between the West Breakwater and **Penguin Shoal,** where the depths are 15 to 18 feet (4.6 to 5.5 m.), taking care to keep the south end of Wamphassuck Point bearing northward of 270° true. Vessels of about 10 feet (3 m.) or less draft can anchor in the inner harbor from Penguin Shoal and Inner Breakwater to the steamboat wharf, taking care to give the western shore a berth of 250 yards. Small vessels of less than 8 feet (2.4 m.) draft can anchor in the eastern half of the harbor, above the steamboat wharf, taking care to avoid a rock which bares at low water, about 50 yards to the southward of the railroad wharf.

A red barrel is moored near the rock.

Stonington Breakwater extends 2,400 feet in a southeasterly direction off **Wamphassuck Point,** and is marked at its eastern end by a light.*

*Lat. 41°19'.5, Long. 71°54'.8: Charts 358, 1211

Inner Breakwater is about 400 yards northward of Stonington Point, on the east side of the entrance. It extends westward about 250 yards, and is marked at its western end by a light.

Stonington is a town with railroad communication, and there is bus service to Westerly and New London. A motorship runs to Block Island the year round. Coal, water, and boat supplies can be obtained at the wharves, where the depths are 7 to 12 feet (2.1 to 3.7 m.).

There is a small repair yard with a marine railway capable of hauling out boats up to 85 feet in length.

Directions, Stonington Harbor.—The harbor is approached from southeastward and westward. Vessels with local knowledge sometimes cross Noyes Shoal and approach from the southwestward. The southeastern approach is the best, having fewer dangers, and the lights serve as guides to avoid them. In the daytime, with clear weather, no difficulty should be experienced in entering by any of the approaches.

From southeastward.—Pass 100 yards southward of Napatree Point Ledge lighted bell buoy and steer 298° true for about 1.1 miles until about 175 yards southwest of the buoy at the southwest end of the Middle Ground. Then steer a 354° true course for the lighthouse on the east end of Stonington Breakwater, which leads about midway between the northern Middle Ground buoy and the bell buoy marking the east end of Noyes Shoal. Pass 350 yards westward of the light on the west end of Stonington Outer Breakwater and when about 150 yards past this light change course to 5° true to pass about 200 yards or more eastward of the lighthouse on the east end of Stonington Breakwater, and enter the harbor between Inner Breakwater and the black buoy marking the eastern end of Penguin Shoal.

From westward.—From Ram Island Reef lighted bell buoy steer 51° true for White Rock, passing about midway between Ellis Reef south buoy and the buoy at the northwest end of Eel Grass Ground. When 400 yards off white Rock change course as necessary to pass 200 yards southward and about 0.3 mile eastward of White Rock, and bring the rock in range with the stone building with red roofs on Baker Island astern, course 88° true, which leads 200 yards northward of **Noyes Rock.** Pass southward of the fish weirs which extend 100 yards or more southward from Stonington Breakwater, pass 100 yards or more eastward of the lighthouse on its east end, and enter Stonington Harbor between Inner Breakwater and the black buoy marking the eastern end of Penguin Shoal.

Noyes Shoal, with 10 to 15 feet (3 to 4.6 m.) over it, is nearly 1.5 miles long in a west-northwesterly direction, its easterly end lying 300 yards westward of the northerly Middle Ground buoy, and is marked by a bell buoy.

Latimer Reef is a very broken and rocky area 0.4 mile long; it is marked at its west end by **Latimer Reef Lighthouse,** a white conical tower, with a brown band midway of its height, on a brown cylinder. The light is 55 feet (16.8 m.) high and visible about 13 miles. The fog signal is a bell.

The shoal extending southward from the lighthouse is marked at its southern end by a buoy which lies about on the northern limit of the red sector of North Dumpling Lighthouse.

The eastern end of the reef has a least found depth of 6 feet (1.8 m.), and is marked by a buoy. A rock, with 15 feet (4.6 m.) over it, lies nearly 300 yards south-southwest of the buoy. Latimer Reef north buoy marks a 11-foot (3.4 m.) rock patch lying 0.4 mile northeastward of Latimer Reef Lighthouse.

Eel Grass Ground is a shoal with a least depth of 6 feet (1.8 m.) lying 0.8 mile northwestward of Latimer Reef Lighthouse. The southeast and west ends of this shoal are marked by buoys. A rock with 16 feet (4.9 m.) over it lies 600 yards westward of the shoal.

The bight in the north shore of Fishers Island Sound between Wamphassuck Point and Mason Island is shoal and very broken, the rocks rising abruptly from deep water. **White Rock** is a prominent bare rock off the middle of the bight. **Red Reef,** a rock with 1½ feet (0.5 m.) over it, lies 400 yards northward of White Rock, and is marked on its south side by a buoy. **Cormorant Reef,** on the northwest side of the bight, is awash at highwater. There is a buoy off the south end of this reef and another buoy off the south end of the reef halfway between Cormorant Reef and Baker Island.

Baker Island, known locally as **Ender Island,** is about 0.3 mile eastward of the southern end of Mason Island, and is connected thereto by a causeway. It is marked by a prominent stone building with red roof. The south end of **Mason Island** is strewn with boulders. There is an anchorage for small craft on the west side of the south end of Mason Island, where the general depths are 8 to 11 feet (2.4 to 3.4 m.). Care should be observed, as there are bowlders in places.

Ellis Reef is the easterly end of broken ground, which should be avoided by vessels, extending 1 mile eastward from Ram Island. The southeast end of the reef is awash at low water and is marked by a buoy. The northeast side of the reef is also marked by a buoy. **Gates Islet** lies on the shoals about midway between Ellis Reef and Ram Island.

Ram Island Reef lies 600 yards southward of Ram Island, with a shoal and no safe passage for vessels between. The reef is nearly awash at low water, and is marked at the west end by a red buoy. Another buoy marks the south side of a rock with 6½ feet (2 m.) over it at the south end of the reef. Ram Island Reef lighted bell buoy is located about 1,300 yards a little east of south of Ram Island.

Ram Island, 0.4 mile long, is wooded and grass fringed. A shoal, on which are two rocky islets, extends 400 yards northeastward from Ram Island and is marked at its northeast end by a buoy. **Ram Island Shoal,** extending nearly 0.5 mile westward from Ram Island, has little water over it and numerous rocks bare at low water. **Whaleback Rock** and the islet 300 yards northward of it are bare rocks. **Swimming Rock,** 200 yards westward of Whaleback Rock, is a boulder awash at high water. The narrow, deep, buoyed channel along the north side of Ram Island Shoal is the easterly entrance to Mystic River. **Whale Rock,** bare at low water, at the northwest end of the shoal, is marked by a red spindle which lies 200 yards east-southeastward of Mouse Island.

Between Ram Island Shoal and Groton Long Point is a shoal area, with rocks in places, which should be avoided by vessels. Leading across the shoal is a buoyed channel, good for a depth of about 11 feet (3.4 m.) at low water, used by vessels in entering Mystic River

from westward. The south side of the shoal is marked by a buoy, which lies 0.4 mile east-southeastward of Groton Long Point. A rock, with 10 feet (3 m.) over it, lying 300 yards eastward of Groton Long Point is marked by a buoy; the channel leading to Mystic River is northward of this buoy, and vessels will avoid the rock by giving the buoy a berth of over 100 feet. Vessels should not pass eastward of this buoy or between it and Ram Island Shoal.

Intrepid Rock, with 13 feet (4 m.) over it, lies 0.5 mile southward of Groton Long Point, and is marked by a buoy on its south side. A 26-foot (7.9 m.) shoal lies 450 yards south of Intrepid Rock.

Mouse Island, marked by a lone tree, lies 150 yards southwestward of Morgan Point, the passage between them being blocked by rocks bare at low water. There are rocks which show at extreme low water, on the shoal about 250 yards northwestward of Mouse Island, and there is a narrow channel between them and the island.

Morgan Point, on the west side at the entrance of Mystic River, is marked by an unused lighthouse tower.

Noank Light * is a black skeleton tower on the east point of the shoal extending eastward from Morgan Point. The light is 43 feet (13.1 m.) high and visible about 7 miles.

Noank, a village on the west bank at the entrance, is on the New York, New Haven & Hartford Railroad. The mean rise and fall of the tide at Noank is about 2.6 feet.

The depths at the principal wharves are 10 to 12 feet (3.0 to 3.7 m.), at the town landing there is a depth of 11 feet (3.4 m.). Gasoline, diesel oil, fresh water and other supplies are available. There are facilities for the repair of boats, the largest marine railway having a capacity of about 1,500 tons and can haul out boats up to lengths of 150 feet and a draft of 14 feet (4.3 m.). In 1939 the largest repair plant was in operation.

Mystic River has a natural channel with a least depth of 15 feet (4.6 m.) and ample width, with the bends eased by dredging, to Willow Point. Between Willow Point and the first bridge a channel 100 feet wide and with a controlling depth of 14½ feet (4.5 m.) has been dredged. Between the bridges there is a natural channel with a least depth of 15 feet (4.6 m.). A channel 100 feet wide and 11½ feet (3.5 m.) deep has been dredged for about 0.8 mile above the second bridge.

At Mystic the river is crossed by two drawbridges—railroad bridge, 67 feet opening, and town bridge, 65 feet. The vertical clearances of these bridges is about 4.5 feet (1.4 m.) above high water, when closed. There is not room in the channel for anchorage, except for small craft, and vessels go to the wharves. Above **Sixpenny Island** the river is usually closed by ice during January and February. A pilot for the river can be obtained from Noank or New London.

Willow Point is on the west bank 0.6 mile below Mystic. There is a plant here for building yachts and motors, and a railway with a capacity of about 60 tons, capable of hauling out boats up to lengths of 80 feet and a draft of 15 feet (4.6 m.). The yard has facilities for boat storage and for making all types of repairs, especially propeller work. A channel with a depth of about 12 feet (3.7 m.) has been dredged to the railway from abreast the red beacon oppo-

*Lat. 41°19'.0, Long. 71°59'.2; Charts 358, 359, 1211.

site, and this depth can also be taken to the north side of the wharf. Water, gasoline, and provisions can be obtained.

Mystic is a town with railroad communication on both banks of the river, about 2 miles above Noank. The depth in the channel up to Mystic is 14½ feet (4.5 m), and there is 9 to 12 feet (2.7 to 3.7 m.) at the principal wharves (1939).

There is a well-equipped boat yard on the east bank of the river south of the highway bridge with three marine railways capable of hauling out vessels up to 110 feet in length and a draft of 11 feet (3.4 m.). The yard has a 5-ton lift and facilities for boat storage. A small towboat is also available. Gasoline, lubricants, Diesel oil, fresh water, ship chandlery supplies, and all other supplies are available.

Directions, Mystic River.—From Fishers Island Sound there are two buoyed channels leading between shoals to the entrance; the channel from eastward is very narrow but is good for a depth of about 15 feet (4.6 m.) at low water, that from westward 12 feet (3.7 m.). The channel is marked up to Mystic, but some local knowledge is needed to follow the channel and keep in the best water, and it is advisable for strangers to take a pilot.

From eastward.—From southward of Napatree Point Ledge lighted bell buoy a 293° true course for a little over 3 miles will lead 250 yards northward of North Latimer Reef buoy and northward of the buoy on the northeast side of Ellis Reef. Passing 150 yards northward of this buoy steer 261° true for Morgan Point unused lighthouse in range with the north end of the northern rocky islet off the north end of Ram Island until Mason Point is abaft the beam. Then haul northward and then westward, following the buoyed channel, and pass 225 feet eastward of Noank Light.

From westward.—Vessels using this channel should proceed with caution on account of the rocky bottom, with boulders in places. Pass 100 yards or more southward of Groton Long Point buoy and steer northeastward for the buoy 400 yards eastward of Groton Long Point. Pass over 100 feet northward of this buoy, then steer a course of about 57° true and pass midway between the buoys marking **Planet Rock** and the shoal to the westward. Then leave **Whale Rock** spindle 150 feet on the starboard hand, and pass southward and eastward of Noank Light, rounding it at a distance of 225 feet.

From Noank Light to Mystic.—Passing 225 feet northeastward of Noank Light steer mid-channel course and pass about 150 feet off the buoys. The channel is well buoyed and no difficulty should be had by using the most recent chart of the area as a guide.

The channel leads through the west side of the railroad draw opening, then follows the wharves on the west side, and then midway between the wharves to the highway bridge.

Mystic River above Mystic.—From the highway bridge the channel follows the wharves on the east side and continues on the same course 600 feet past the landing of the marine engine manufactory. It then curves gradually northward, favoring slightly the east bank, and passes close to the southwest and west of the turning point on the east. Passing 200 feet off the north side of this point, the channel leads to the first wharf adjoining a group of brick buildings occupied as a marine museum.

The channel to this point has a controlling depth of 8 feet (2.4 m.) at low water, and is kept plainly marked on both sides by the **Marine Historical Association, Inc.,** for the convenience of the public which may wish to visit the museum by water. From the museum wharf the course leads to the second wharf abreast a prominent factory, where the dredged channel ends. Above this point the channel is very narrow but boats of about 5-foot (1.5 m.) draft can be taken to the Narrows. From the last wharf the channel curves northward, passing 125 feet off the first point where there was formerly a rope-walk, and the same distance off the next point. The channel then trends a little more westward until the end of the **Halfway Dock** is in range with the west side of the north end of the Narrows, and then passes close to the dock and in the middle through the Narrows and for nearly 500 yards above it. Above this point the channel is very narrow and winding, has a depth between 1 and 2 feet (0.3 and 0.6 m.) at low water to **Old Mystic.** This channel is not marked. It follows the east bank to the next narrows and the west bank to a building, formerly a casino, in the bight, about 0.3 mile below Old Mystic.

Groton Long Point has a summer settlement. A reef extends nearly 300 yards southwestward from the point, and is marked near its end by a buoy. A local marker on the southerly edge of the reef was formerly an iron tripod but only part of it remains.

About 600 yards to the west a rock, awash at low water, lies 150 yards off the southwest end of Groton Long Point. It is marked by a buoy on the south side.

Horseshoe Reef is bare at low water, and is marked at its south end by a buoy. Broken and rocky ground extends northward from Horseshoe Reef to the shore, eastward of **Mumford Point.**

Seaflower Reef lies near the middle of the western entrance of Fishers Island Sound and 0.8 mile northwestward of North Dumpling Lighthouse.

It is marked near its south end by **Seaflower Reef Light,*** which is a red skeleton tower on a white tank house. The light is 40 feet (12.2 m.) high and visible about 11 miles. The light should not be passed closer than 150 yards and preferably not closer than 350 yards northeastwardly where there are depths of 18 feet (5.5 m.).

Vixen Ledge, with a depth of 10½ feet (3.2 m.) is marked by a buoy on the north side. This reef is about one mile northwest of Seaflower Reef Light.

Currents, Fishers Island Sound.—In the main channel of Fishers Island Sound, including Watch Hill Passage, the slack waters before flood and ebb, respectively, occur about 0.5 hour before low water and high water at Boston. The strengths of flood and ebb, respectively, occur about 2.5 hours after low water and high water at Boston. The flood currents set westward and the ebb eastward.

In **Watch Hill Passage** the currents have sufficient velocity at times to tow spar bouys under water. The flood current sets nearly in the direction of the channel, but has a tendency northward and the ebb a tendency to southward. The northerly and southerly set is more marked between Napatree Point and Latimer Reef Lighthouse.

*Lat. 41°17'.7, Long. 72°02'.0: Charts 358, 359, 1211.

In the main channel northeastward of Wicoposset, the strength of the flood occurs about 2.5 hours after low water at Boston and sets 295° true with a velocity of about 2 knots. The strength of the ebb occurs about 2.5 hours after high water at Boston and sets 115° true with a velocity of about 2.5 knots.

In **Catumb** and **Sugar Reef Passages** the tidal currents set obliquely across the axis of the channel. The flood current sets northwestwardly and the ebb southeastwardly.

At **Ram Island Reef** slack waters before flood and ebb, respectively, occur about 0.5 hour before low water and high water at Boston. The strength of flood occurs about 2.5 hours after low water at Boston and sets 255° true with a mean velocity of about 1.25 knots. The strength of ebb occurs about 2.5 hours after high water at Boston and sets 90° true with a mean velocity of about 1.5 knots. The observed velocity at strength of the flood current ranged from 0.4 knot to 1.9 knots, and of the ebb 1.1 to 2.2 knots. The direction and velocity of the current are affected by strong winds and the period of flood or ebb may be increased or diminished.

Ice.—The strong tidal currents prevent the formation of heavy local ice, except in the shoal tributaries. The only ice to give trouble is that set in from Long Island Sound by wind and current. The ice formations in Little Narragansett Bay are sufficiently heavy to be destructive to structures exposed to it.

Directions, Fishers Island Sound.—Fishers Island Sound is characterized by boulder patches which rise abruptly from deeper water. and vessels should proceed with caution if obliged to cross shoal areas. The deepest draft of vessels passing through Fishers Island Sound is about 14 feet (4.3 m.). Watch Hill Passage is the principal entrance from eastward, and the only one used by strangers.

Passing close southward of Gangway Rock lighted bell bouy the course is 270° true for Napatree point Ledge lighted bell buoy, and after passing close southward of this buoy steer 275° true for the red buoy at the south end of Latimer Reef. When abeam and 350 yards northward of the horizontally banded buoy that is about 0.3 mile northeastward of Seal Rocks and Latimer Reef Lighthouse bears 289° true, steer 266° true for Ram Island Reef lighted bell buoy passing 100 yards south of the buoy at the south end of Latimer Reef and about 200 yards north of the 18-foot (5.5 m.) spot which is about 650 yards northwestward of **Youngs Rock.**

From close southward of Ram Island Reef lighted bell buoy a 257° true course will lead 0.2 mile northward of North Dumpling Lighthouse, from which the course can be shaped for Bartlett Reef lighted bell buoy. (See also the directions for New London Harbor.)

Chapter 10.—LONG ISLAND SOUND, NEW LONDON TO NEW HAVEN

GENERAL INFORMATION

Long Island Sound is a deep navigable waterway situated between the shores of Connecticut and New York and the northern coast of Long Island.

In this region there are boulders and broken ground, but there is little or no natural change in the shoals. The waters are well marked by lighthouses, lightships, and other aids so that strangers should experience no difficulty in navigating them. All of the more important places are entered by dredged channels and during fog, vessels are advised to anchor until the weather clears before attempting to enter. There are numerous oyster grounds in this region which are usually marked by stakes and flags. These stakes may become broken off and form obstructions dangerous to small craft, especially at night, so that they should proceed with caution when crossing areas where **oyster stakes** are found.

CURRENTS, LONG ISLAND SOUND AND TRIBUTARIES

The Race.*—Predicted times of slack water and times and velocities of strength of current for every day of the year are given in the Current Tables, Atlantic Coast. In the middle of the Race, the current turns from east to west about ¾ hour ofter low water at Boston and from west to east about ½ hour after high water at Boston. The strength of flood occurs about 2½ hours before high water at Boston and sets 300° true. The strength of ebb occurs about 2¾ hours before low water at Boston and sets 115° true. Near Race Rock and Little Gull Island the current turns about ½ hour earlier than in the middle of the Race.

The mean velocity at strength of the tidal currents through the Race is about 3½ knots. There are always strong rips and swirls in the wake of all broken ground in the Race, except for about ½ hour at slack water. The rips are exceptionally heavy during heavy weather, and especially when a strong wind opposes the current, or the current sets through against a heavy sea.

Long Island Sound.—West of Eatons Neck slack water occurs late than at the Race by about ¼ hour off Great Captain Island, 1 hour jus eastward of Execution Rocks and 3 hours off Hart Island.

In the Eastern portion of the Sound the current turns from ½ to 1½ hours earlier along the north shore than in the middle of the Sound.

Proceeding westward from the Race in the middle of the Sound the velocity at strength of current is 1¾ knots at Cornfield Point Lightship, about 1 knot off New Haven, 1 knot off Eatons Neck, ½ knot

*Lat. 41°14′, Long. 72°03′: Charts 298, 1211.

between Rye Neck and Matinicock Point, and ½ knot eastward of Hart Island.

About 0.2 mile south of **Bartlett Reef** slack waters before flood and ebb, respectively, occur about the time of low water and 1 hour after the time of high water at New London. The average velocity at strength of current is about 1¼ knots. The flood current sets 255° true and the ebb 90° true.

At **Cornfield Point Lightship** slack waters before flood and ebb, respectively, occur about 1¼ hours after low water and 2 hours after high water at New London. The flood current sets 255° true with an average velocity at strength of about 2 knots and the ebb sets 100° true with a velocity of about 1¾ knots.

About 1 mile north of **Stratford Shoal (Middle Ground) Lighthouse,** the average velocity at strength is 1 knot, the flood setting westward and the ebb eastward about 1 hour before high water and 1¼ hours before low water, respectively, at New London.

About 0.5 mile northward of **Eatons Neck Lighthouse** the flood and ebb are markedly different. Slack before flood occurs about 2 hours after low water at New London. The strength of flood has an average velocity of about ½ knot, sets 310° true, and occurs about 1½ hours before high water at New London. Slack before ebb occurs about the time of high water at New London. The strength of ebb has an average velocity of about 1½ knots, sets 70° true and occurs about 2 hours before low water at New London.

About 0.7 mile north of **Lloyd Point** the velocity at strength is about 1½ knots; about 0.4 mile north of Matinicock Point it is about 1 knot.

East River.—Predicted times of slack water and times and velocity of strengths of current for Hell Gate, in advance for every day in the year, are given in the Current Tables, Atlantic Coast. In East River, the flood current sets eastward and the ebb westward. From Governors Island to Rikers Island, including **Hell Gate,** the currents turn practically simultaneously, and slack waters before the flood (eastward current) and ebb (westward current), respectively, occur about 1½ hours after low water and high water at the Battery.

Between Throgs Neck and Willets Point the slack waters before flood (eastward current) and ebb (westward current), respectively, occur about ½ hour after low water and high water at the Battery.

From Governors Island to Lawrence Point the mean velocity at strength of current ranges from 2 to 5 knots, the higher velocities occurring in the narrow parts of the channel eastward of Brooklyn Bridge, abreast Blackwells Island, and in Hell Gate. In **Hell Gate,** off Mill Rock, the mean velocity at strength is about 3½ knots for the eastward current, 4½ knots for the westward current.

The mean velocity at strength of current from North Brother Island to Whitestone Point is about 1½ knots. At Throgs Neck it is about 1 knot.

The currents generally set with the channel, but there are heavy swirls between Negro Point and the north end of Blackwells Island.

A further discussion of currents and a current diagram for East River is given in the **Current Tables,** Atlantic Coast.

The direction and velocity of the current are affected by strong winds. The period of flood or ebb may be increased or diminished by winds.

The direction and velocity of the current in the East River, and from Point Judith to Throgs Neck, for each hour of the tidal cycle will be found in **"Tidal Current Charts, New York Harbor,"** and **"Tidal Current Charts, Long Island Sound and Block Island Sound,"** respectively, published by the United States Coast and Geodetic Survey and sold for 25 cents. See publications, page 25.

Anchorages.—New London Harbor is the most important of the anchorages sought for shelter in the eastern part of Long Island Sound. Niantic Bay and the approach between Bartlett Reef and Hatchet Reef are used to some extent by sailing vessels bound foreign, and having unfavorable winds on reaching the eastern part of the sound. Small vessels can select anchorage eastward or westward of Kelsey Point Breakwater, also in Duck Island Roads. Off Madison there is anchorage sheltered from northerly winds. New Haven Harbor is an important harbor of refuge. There is anchorage for large vessels in the bight outside of Bridgeport Harbor Lighthouse and in the harbor. Cockenoe Island Harbor is sometimes used by small vessels; but Sheffield Island Harbor is preferred, and is sometimes used by tows. Westward of Norwalk Islands seagoing vessels can anchor toward the north shore, and with good ground tackle hold on in northerly winds. Captain Harbor affords good shelter, but is not much used except by local vessels. On the south shore, Huntington Bay and Hempstead Harbor are available for large vessels; Oyster Bay is also used, and Manhasset Bay is available for light-draft vessels. City Island Harbor is a great resort for coasters.

Tides.—Full tidal information, including daily predictions for Newport, New London, Willets Point, and New York, is given in the tide tables, Atlantic Coast.

The effect of strong winds, in combination with the regular tidal action, may at times cause the water to fall several feet below the plane of reference of the charts, which is mean low water. The water has been known also to rise about the same amounts above mean high water, due to similar causes. (For additional general information concerning Long Island Sound and adjacent waters, see p. 30 and the local descriptions.)

Fog.—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 offshore 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 farther eastward. (See also table of "Hours of operation of fog signals," on p. 410.)

Ice.—In ordinary winters the floating and pack ice in Long Island Sound, while impeding navigation, does not render it absolutely unsafe, but in exceptionally severe winters the reverse is the case, none but powerful steamers being able to make their way.

Drift ice (formed principally along the northern shore of the Sound), under the influence of the prevailing northerly winds, drifts across to the southern side and accumulates there, massing into large fields, and remains until removed by southerly winds, when it drifts back to the northerly shore.

In ordinary winters ice generally forms in the western end of the Sound as far as Eatons Neck; in exceptionally severe winters ice may extend to Falkner Island and farther eastward.

Effect of tides and winds on ice.—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 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 eastward and if of long enough duration drive it through the Race into Block Island Sound, whence it goes to sea and disappears.

Navigators must not depend too implicitly upon the lightships and buoys. In severe winters these are liable to be carried away; and, in fact, during every winter it is better to depend on the lighthouses and other permanent objects than on the buoys.

The buoys in New London Harbor are not usually disturbed by ice, but Cornfield Point Lightship is sometimes forced from its station.

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 north to northwest clear the harbor of drift ice, and those from southeast through south to southwest force the ice into the harbor from the Sound. The outer buoys are apt to be carried out of position by heavy ice during severe winters.

Additional information concerning ice conditions in the waters adjoining Long Island Sound is given under the local descriptions.

Directions, Long Island Sound.—For courses and distances through Long Island Sound see Tables, page 45.

Fishers Island Sound, and Long Island Sound are regions of boulders, and all broken ground is liable to be of this character. As a measure of safety, vessels should proceed with caution when in the vicinity of broken areas where the charted depths are not more than 6 to 8 feet (1.8 to 2.4 m.) greater than the draft.

NEW LONDON HARBOR AND THAMES RIVER

(CHART 359)

The Thames River flows into the eastern end of Long Island Sound 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 and at all seasons. The river channel is marked by buoys and lights to Norwich, 13 miles above its mouth.

Pine Island is a bluff, grassy island. **Pine Island Channel,** between Pine Island and Black Ledge, has a rocky and very broken bottom on which the least depth found is 12 feet (3.7 m.). It is used to some extent by local vessels between New London Harbor and Fishers Island Sound, but should be avoided by other vessels if draw-

ing more than 10 feet (3 m.) **Black Rock,** on the north side at the northwesterly end of the channel, is a prominent rocky islet; a rock, with 3 feet (0.9 m.) over it, lies 100 yards northwestward of it.

Black Ledge lies 0.4 to 0.9 mile from the shore off the east side of the entrance of New London Harbor and 400 yards to nearly 0.6 mile eastward of New London Ledge Lighthouse. The ledge has little depth in places, and its south end has been used as a dumping ground. The ledge is marked on its north side by a buoy, a guide for Pine Island Channel. Two buoys mark the south edge of the dumping ground on the south side of the ledge.

Southwest Ledge, with 3 feet (0.9 m.) over it, is small and is marked on its west side by New London Ledge Lighthouse. A rock, with 22 feet (6.7 m.) over it, lying 0.2 mile 153° true from the lighthouse, is the only danger in its southerly approach.

New London Ledge Lighthouse,* on Southwest Ledge, is a red brick dwelling on a square pier. The light is 58 feet (17.7 m.) high and visible 13 miles. The fog signal is an air horn.

New London Harbor Lighthouse, on the west side of the entrance to the harbor, is a white, octagonal, pyramidal tower with a dwelling attached. The light is 89 feet (27.1 m.) high and visible for 15 miles. A red sector from 0° to 41° true (from seaward), covers Sarah Ledge and the shoals to westward.

Broken ground fringes the shore southwestward of New London Harbor Lighthouse, and lies westward of a line running from the outer rocks near the lighthouse to the black buoy eastward of Cormorant Rock. Rocks, with 2 to 11 feet (0.6 to 3.4 m.) over them, extend 400 yards from shore in the bight just southward of the lighthouse, and a rock with 19 feet (5.8 m.) over it lies over 0.3 mile off the bight at Ocean Beach and 0.7 mile south-southwestward of the lighthouse.

Cormorant Rock, Goshen Ledge, and **Little Goshen Reef** are names of parts of an area of foul ground which extends about 0.7 mile from the shore for a distance of 1 mile southwestward from Ocean Beach. Three black buoys mark the southeasterly and southerly limits of this area, which has numerous rocky patches and boulders, some showing above water, and which should be avoided even by small craft. Between the buoys marking this area and those marking Rapid Rock and Sarah Ledge there is a channel about 0.3 mile wide, suitable for small vessels in the daytime, but the safer course is to pass southward and eastward of Rapid Rock and Sarah Ledge.

Rapid Rock, a shoal with a least depth of about 10 feet (3.0 m.) is marked by a buoy.

Sarah Ledge and other dangers on the west side of New London Harbor entrance are covered by a red sector in New London Harbor Lighthouse, the easterly edge of which bears 0° true.

The ledge is marked by a lighted gong buoy which lies about 250 yards eastward of it.

Ocean Beach is a summer resort lying 0.5 to 0.8 mile southwestward of New London Harbor Lighthouse. It has communication by bus with New London.

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*Lat. 41°18'.4, Long. 72°04'.7; Charts 293, 359, 1211.

New London Harbor is located on the north shore of Long Island Sound at the mouth of the Thames River and is about midway between Boston and New York. The city of New London is situated on the west bank of the river about 2.5 miles above the mouth and the town of Groton occupies the east bank but is connected to New London by a highway and a railroad bridge. The main harbor comprises the lower 3 miles of the Thames River from Long Island Sound to the above-mentioned bridges and includes Shaw Cove and Winthrop Cove. It is approached through the main entrance channel extending from deep water in Long Island Sound to deep water in the upper harbor. This channel is about 600 feet wide and in June 1939 had a controlling depth of 32 feet (9.8 m.) from the Sound to State Pier on the east side of the entrance to Winthrop Cove.

The harbor is used generally by vessels drawing 9 to 30 feet (2.7 to 9.1 m.) and the deepest draft entering the harbor is 32 feet (9.7 m.)

The prominent objects are New London Ledge Lighthouse, New London Harbor Lighthouse, Fort Trumbull on the west bank, the training tank at the Submarine Base, the Odd Fellows water tank, the monument at Fort Griswold, and the Shell Company sign (at night on the east bank), and the railroad bridge that crosses the river at New London.

Shaw Cove, in New London Harbor, has a drawbridge across the entrance with two openings, the horizontal clearances of which are 39 feet and 45 feet; the vertical clearance is 3.7 feet (1.1 m.) above high water. The basin is about 300 to 700 feet wide and about 1,100 feet long and in June 1939 the controlling depth was 15 feet (4.6 m.). There are facilities for the storage of small craft and there are several coal wharves situated on the west side. The small pond which has an outlet into the south part of the basin is being filled in by the city.

Winthrop Cove has been dredged to a depth of 23 feet (7.0 m.), but in June 1939 had a controlling depth of 21 feet (6.4 m.). The deepest draft taken to the coal wharf here is about 22 feet (6.7 m.) at high water. Navigation in the upper part of the cove is limited to small craft by three bridges with fixed spans, the first having a horizontal clearance of 14.6 feet and a vertical clearance of about 4 feet (1.2 m.), the second a horizontal clearance of 22 feet and a vertical clearance of 12.5 feet (3.8 m.) and the third, at Crystal Avenue, has a horizontal clearance of 17.6 feet and a vertical clearance of about 9 feet (2.7 m.) above high water.

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 State pilot at New London, where one can be obtained by inquiry.

Pilotage is compulsory for all vessels in the foreign trade drawing 9 feet (2.7 m.) or over, if spoken. The usual place of boarding is outside of Sarah Ledge.

Towage.—Steam vessels usually proceed to the upper harbor without assistance.

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.

Immigration Service.—There are no officials of the Immigration Service stationed at this port. The necessary officers may be secured from Providence by arrangement with the New London customs office.

Customs.—The customhouse is located at 172 Bank Street at the rear of the United States Coast Guard wharf.

Quarantine.—Vessels subject to quarantine anchor opposite White Rock. Inspection is made by the United States Public Health Service physician.

Hospitals.—New London has two public and three private hospitals. The Lawrence Memorial Hospital on Ocean Avenue and the New London Contagious Hospital are United States contract hospitals. Services are free for all American seamen and at a fixed minimum rate for foreign seamen. There is a relief station of the United States Public Health Service. See Appendix.

Dangers.—White Rock, an islet, lies off **Greens Harbor** and 200 yards from the 18-foot (5.5 m.) curve on the western edge of the channel. It is usually marked by a large pile of old lumber. **Hog Back,** a small ledge awash at low water, lies 150 yards southwestward of White Rock and nearly 0.3 mile from the western shore, and is marked on its southern and southeastern sides, by two buoys.

There are rocks with 3 to 6 feet (0.9 to 1.8 m.) over them in the middle of the northern part of Greens Harbor. **Melton Ledge,** with ½ foot (0.2 m.) over it, lies 125 yards eastward of **Powder Island** and is marked off its eastern side by a buoy.

Anchorage.—In New London Harbor vessels may anchor along the sides of the main channel taking care to do so in such a manner as not to interfere with traffic in the channel.

Vessels of light draft, 7 feet (2.1 m.) or less, can anchor in **Greens Harbor** by following the western bank at a distance of 250 yards when 0.5 mile above the lighthouse. Anchor at this distance from the bank southward or southwestward of Hog Back Shoal buoys. There is good anchorage southward or southeastward of the buoys in 12 to 18 feet (3.7 to 5.5 m.).

Vessels of 12-foot (3.7 m.) draft or less will find good anchorage in 14 to 23 feet (4.3 to 7 m.), 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.

Harbor regulations.—Harbor regulations are in force for New London Harbor, and may be obtained from the harbor master. The harbor master has authority to berth vessels, shifting them if necessary, but occasion for doing so seldom arises.

Tides.—The mean rise and fall of tides at New London is 2½ feet. Extreme tides have been recorded 3 feet below the plane of mean low water and 6 feet above the same datum. Daily predictions for New London are given in the tide tables published annually by the Coast and Geodetic Survey.

Freshets usually occur in the river in the spring. It is reported that they seldom exceed 2 feet above mean high water at Norwich.

Currents.—The tidal currents follow the general direction of the channel and usually are not strong. At Gales Ferry, 4 miles above New London, the average velocity at strength is about ¾ knot, and at Easter Point, 7 miles above New London, ½ knot. During fresh-

ets, 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.

Storm warnings are displayed near the customhouse at New London. The prevailing winds are southwesterly in the summer and northwesterly in the winter.

Ice seldom forms below the naval station. Above the naval station ice obstructs navigation about two months each year. In extremely severe winters, however, heavy ice from the Sound, driven in by winds, has been known to extend about 1.8 miles above the entrance. 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 for sailing vessels 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.

Bridges.—Two bridges cross the river at New London. These bridges are less than 200 feet apart and have draw openings with a least width of 151 feet and vertical clearance of 30 feet (9.1 m.) above mean high water when closed. **Regulations** governing the opening of these bridges have been prescribed by the Secretary of War as follows:

1. As these bridges are less than 200 feet apart, they must be operated as a unit to insure the safety and convenience of navigation. The opening of the State Highway bridge shall be made upon signal from the operator of the railroad bridge, who shall direct the time of opening of both bridges.

2. The signal for opening the draws of both of the above-named bridges shall be given by three short blasts, each of about two seconds duration, of a horn or steam whistle. In case the draws cannot be immediately opened when the signal is given, a red flag or ball by day, and a red light by night, shall be conspicuously displayed on each bridge.

3. The signal for the opening of the draws shall be answered by one short blast of a whistle or horn on the railroad bridge when the operation of opening is commenced, or, if the draws cannot be promptly opened, by a series of not less than four short, sharp blasts (each of not more than one second duration) from either bridge.

4. Except as herinafter provided, the draws of the above-named bridges shall be immediately opened, upon the prescribed signal, at all times during the day or night, for the passage of foreign vessels and "vessels of the United States" as defined in section 4311 of the Revised Statutes.' *Exception*: When a west-bound train scheduled to cross the railroad bridge without stop has passed Midway Station, or a south-bound train, Groton Station, or an east-bound train, New London Station, and is in motion toward the railroad bridge, the draws shall be opened for the above-named vessels as soon as the train has crossed the railroad bridge.

5. For all other vessels which cannot pass the closed bridges the draws shall, upon the prescribed signal, be opened as soon as practicable; but in no case shall the delay be more than 20 minutes, except as hereinbefore provided.

Directions, New London Harbor and Thames River.—The harbor is easy of access either day or night, but local knowledge is required at low water to take a greater draft than about 20 feet (6.1 m.) above the bridges.

From Fishers Island Sound, pass 200 yards or more southward of Seaflower Reef Lighthouse, steer 281° true with North Dumpling

Lighthouse* a little on the port quarter, and pass southward of the buoys marking the south side of Black Ledge.

From the Race, pass southward and westward of Race Rock Lighthouse, giving it a berth of over 200 yards, steer for New London Ledge Lighthouse, and pass westward of it.

The southwest end of Black Ledge lies 0.4 mile **130°** true and a rock with 22 feet (6.7 m.) over it lies 0.2 mile 153° true from the lighthouse.

From westward, shape the course for Bartlett Reef lighted bell buoy, from it steer eastward or east-northeastward until New London Ledge Lighthouse bears anything northward of **33°** true and then haul up for it.

New London Ledge Lighthouse is the principal guide for the entrance. It has a fog signal, and it is necessary only to give it a berth of over 100 yards, passing westward of it.

A **33°** true course for New London Ledge Lighthouse leads over 0.3 mile southeastward of Rapid Rock and 100 yards southeastward of the lighted gong buoy marking Sarah Ledge, which are the easternmost dangers on the west side of the entrance.

Passing 225 yards westward of New London Ledge Lighthouse, steer **354°** true for the middle of the opening in the drawbridge above New London, keeping it in range with the 135-foot tank at the Submarine Base. See anchorage in the description preceding.

Dockage.—At private wharves open to public use there are no fixed rates for dockage. At the railroad wharves no dockage is assessed on vessels handling freight for or from the company's lines. At the city wharf there is a flat daily rate; at the State pier the rates are assessed according to tonnage of the vessel.

Wharfage.—There is a wharfage charge assessed for lumber at the State pier for which there are published rates.

Piers, wharves, and **docks.**—The port's principal terminal, the State pier, is a modern steamship terminal 1,000 feet long and 200 feet wide. It is open to all vessels on the payment of charges. It is the easterly of two long piers southwestward of the Thames River drawbridges.

Depths at the State pier are about 35 feet (10.7 m.); in the waterfront channel about 19 feet (5.8 m.) and at the wharves 10 to 16 feet (3.0 to 4.9 m.).

Lighterage.—There is no free lighterage service at New London.

Storage.—Storage on private wharves is by agreement. At the State pier 90,000 square feet under cover and 10 acres open space are available.

Supplies.—All kinds of supplies are available in large quantities.

Coal Bunkering.—New London is available as a coaling port for large vessels; eastward the nearest one for such vessels is Newport, R. I. Coal can be had alongside the docks of the various coal companies at New London or Groton and by arrangement some of the companies have facilities for bunkering vessels in the stream. Delivery can be made at the rate of from 30 to 100 tons per hour. The normal storage of bunker coal is from 800 to 3,000 tons.

Oil Bunkering.—Bunker fuel oil is available in three grades from the major oil companies which maintain terminal facilities. Most of

*Lat. 41°17'.8, Long. 72°01'.2; Charts 358, 359, 1211.

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these companies are prepared to supply fuel on 48 hours' notice either by barge or by tank car at any wharf with railroad connections. Diesel oil is available in grades of 24° to 30° test. A normal supply of about 2,600 barrels for each grade of fuel oil is kept in stock.

Water supply.—The water supply is controlled by the municipality. There is ample supply of pure water for drinking and for boiler purposes.

Repairs.—The port has marine railways capable of accommodating vessels of medium size. A repair yard on the west side of the Thames River about 1 mile north of the drawbridges operates three railways which have capacities of 1,000, 1,500, and 2,500 tons capacity. The lengths of cradles are 175, 200, and 250 feet, and their widths are 50, 35, and 63 feet, respectively. Depths over forward keel blocks are from 13 to 16 feet, (4.0 to 4.9 m.) and depths aft range from 15 to 18 feet (4.6 to 5.5 m.). The plant is equipped to make repairs to steel and wood vessels, wooden hulls, engines, and boilers. It specializes in repairs to large yachts.

A privately dredged channel reported to have a depth of 15 feet (4.6 m.) leads to the shipyard from the main channel in the vicinity of Bailey Point Light. The entrance is marked by privately maintained dolphins.

On the east bank of the river about 1 mile south of the drawbridges there is a **shipyard** with a marine railway, the capacity of which is 2,500 tons. It is 650 feet long over all and has a 212-foot cradle 40 feet wide. Depths over keel blocks are 12 feet (3.7 m.) forward and 18 feet (5.5 m.) aft. A 15-ton traveling crane is available for service in connection with the railway. The plant is fully equipped for all types of marine repair work. It also operates a woodworking shop, a steel fabricating shop, and a foundry capable of producing iron castings up to 15 tons and brass castings up to 5 tons.

Wrecking and salvage facilities.—There are several firms in New London engaged in the business of wrecking, salvage, and marine contracting work. They are equipped with pumps, divers' outfits, compressors, floating equipment, and other gear necessary for this type of work.

Commerce.—New London has a large amount of water-borne commerce the principal items of which consist of coal, petroleum products, lumber, automobiles, wood pulp, and paper products.

Communication.—There is steamer communication with New York and Norwich and good railroad communication. Ferries operate to Block Island, Greenport, Long Island, and Fishers Island. A marine taxi is operated at the city pier for trips around the harbor or to adjacent ports.

A buoy depot of the United States Coast Guard is located at the customhouse wharf.

About 1 mile north of the center of the city are the new buildings of the **United States Coast Guard Academy.** The administration building, which has a white tower and a clock in it, is very prominent, but is not visible until almost abeam of the academy. Considerable dredging has been done along the waterfront in this locality and the academy wharf had about 22 feet (6.7 m.) at the end and 18 feet (5.5 m.) along the south face in 1939.

The **United States Naval Station** is situated on the east bank about 2 miles above New London. There is a depth of 25 feet (7.6 m.) in the channel to this point. A submarine escape training tank 135 feet (41 m.) high has been constructed at the submarine base. The top of the tank is marked by four red rights.

Thames River.—This river is a tidal estuary varying in width from 400 feet to 0.8 of a mile, and extending from the junction of the **Yantic** and **Shetucket Rivers,** at Norwich, 13 miles southward to Long Island Sound. The lower part of the river, below New London, is described under "New London Harbor" preceding. Above New London the project provides for a channel 250 feet wide and 25 feet (7.6 m.) deep to Allyn Point; thence 200 feet wide to Norwich.

In April 1938 the controlling depth to Allyn Point was nearly 24 feet (7.3 m.). As determined in 1939 the controlling depth from Allyn Point nearly to Thamesville was 17 feet (5.2 m.) and thence 16 feet (4.9 m.) to Norwich. The center of the basin at Norwich has a depth of 13 feet (4.0 m.) or greater. In 1940 dredging to secure depths of 25 feet (7.6 m.) above Allyn Point were in progress. The river is well marked by lights and buoys.

New London to Norwich.—Local knowledge is required to carry the best water in the river, and strangers are advised to take a pilot at New London. With the aid of the chart, small craft should have no difficulty in following the channel.

Gales Ferry, on the east side of the river, about 4 miles above the drawbridges at New London, is the site of the training quarters and the **boat house of Yale University.** About 0.7 mile southward, is the **Harvard College boat house.**

Opposite Gales Ferry is the town of **Bartlett** where there is a prominent power plant. Three tall stacks on the top of the power house are conspicuous. There is a privately dredged channel leading to the dock and coal tipple which has a width of 90 feet and in January 1939 had a controlling depth of 19 feet (5.8 m.).

At **Montville** there is a dock with depths of 15 feet (4.6 m.) on the face. The northeast end of the dock is in ruins.

Allyn Point, on the east bank, about 5 miles above New London, has a large coal receiving pier for the railroad. The deepest draft brought up to the pier is about 22 feet (6.7 m.) at high water.

A power transmission line crosses the river southwestward of Allyn Point. It has a vertical clearance of 175 feet (53.3 m.) above mean high water.

Fort Point, on the east bank about 8 miles above New London, receives considerable lumber in coasting vessels.

Mohegan Dike has settled and is entirely submerged at the higher tides. At such times extreme caution should be observed in navigating in the vicinity of the dike.

The red brick buildings of the **Norwich State Hospital** (asylum) situated on the bluff just north of the point are conspicuous.

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 (4 m.); the usual draft is not more than 10 feet (3 m.).

Depths of 8 to 15 feet (2.4 to 4.6 m.) are found alongside the wharves. Motorboats generally anchor in the Shetucket River just above the bridges at Norwich. Supplies of all kinds are available.

NEW LONDON TO CONNECTICUT RIVER

(CHART 214)

Bartlett Reef is marked at its southern end by a buoy and Bartlett Reef light; at its northern end by a buoy. The light is a red skeleton tower on a white tankhouse about 40 feet (12.2 m.) high and visible 13 miles. The reef is about 1.3 miles long in a general north and south direction and about 0.3 mile wide. The depths range from 2 to 12 feet (0.6 to 3.7 m.) with rocks awash at low water near the northern end. About 0.5 mile southward of the reef there is a lighted bell buoy.

Twotree Island * is a small, bare island lying about 0.8 mile south-southeastward of Millstone Point, the eastern point at the entrance to Niantic Bay. Shoals extend nearly 0.4 mile eastward and southward from the island and also 300 yards northward, where the edge is marked by a buoy, a guide for Twotree Island Channel.

Twotree Island Channel leads northward of Bartlett Reef and Twotree Island. With an adverse current in the Sound this channel is used to some extent by light tows, and by sailing vessels with a leading wind in the daytime, as the tidal currents turn about one hour earlier along the north shore than in the middle of the Sound. The channel is buoyed, but strangers are advised to use it with caution and should never attempt to beat through.

Directions, Twotree Island Channel.—Pass southward of Rapid Rock buoy and Little Goshen Reef buoy, giving the latter preferably a berth of about 0.3 mile, and steer about **300°** true. Pass 200 to 300 yards northward of the buoy at the north end of Bartlett Reef, give the shore northward of Bartlett Reef a berth of over 300 yards, and pass about 300 yards northward of the buoy northward of Twotree Island. Then shape the course to pass 0.4 mile or more southward of Black Point, and then stand westward toward Hatchett Reef and pass southward of it.

The shore westward of **Goshen Point** has scattered boulders, which extend off 400 yards in places. There is a prominent water tank about 1 mile west of Goshen Point. The northern part of **Jordan Cove** is foul. A short breakwater has been built out from the eastern point at the entrance of this cove to form an anchorage on its north side for the boats of a summer settlement here. There is a small wharf and quarry about 0.3 mile northward of the breakwater. **Flat Rock,** bare at low water, lies 400 yards from the shore just southward of the wharf and is marked by a buoy. **High Rock,** which shows at high water, lies in the entrance of the bight 350 yards east-southeastward of **Fox Island,** eastern side of Millstone Point. A rock awash at high water lies 100 yards southward of High Rock, and is marked by a buoy.

Millstone Point, on the east side at the entrance of Niantic Bay, is occupied by the buildings of a stone quarry. There is a cove with depths of 6 to 15 feet (1.8 to 4.6 m.) on the west side of the point.

*Lat. 41°17′.1, Long. 72°09′.2: Charts 214, 1211, 1212.

A reef with 2 feet (0.6 m.) over it lies just off the mouth of the cove, and is marked at its south end by a private stake. Leaving this stake on the port hand, a depth of about 9 feet (2.7 m.) can be taken into the cove and to the inside of the wharf on its north side, where the depth is about 12 feet (3.7 m.).

Niantic Bay (chart 214), lying 4.5 miles westward of New London Harbor, is a good anchorage, sheltered from easterly, northerly, and westerly winds. It is important as a harbor of refuge in northerly gales, and is used by sailing vessels and tows. The general depth in the bay is about 19 feet (5.8 m.), the water shoaling gradually northward. The entrance is 1.5 miles wide, and the dangers are marked by buoys or show above water.

White Rock is an islet on the east side of the entrance, 0.5 mile westward of Millstone Point. **Little Rock,** partly bare at low water and lying 150 yards east of White Rock. A rock, on which the least depth found is 11 feet (3.3 m.), lies about midway between Little Rock and the cove at Millstone Point. A rock with 14 feet (4.3 m.) over it lies 285 yards 151° true from White Rock and is marked by a buoy on the south side.

Black Rock, small and bare, lies 0.4 mile northward of White Rock and 400 yards from shore. It is marked by a buoy.

Waterford Island, small and bare, lies 0.2 mile from the eastern shore, with a shoal between, and 0.5 mile from the head of the bay.

Wigwam Rock, high and bare, lies 200 yards from the northwest shore between Niantic and Crescent Beach. A rock bare at low water lies 250 yards southwestward of Wigwam Rock, and is marked by a buoy. The range of Wigwam Rock and the railroad station or the high white tower above the head of the bay leads clear southeastward of the rock.

There are several small boat yards at Niantic with marine railways which can accommodate small craft up to lengths of 45 feet and a draft of 8 feet (2.4 m.). The yards have facilities for making repairs to hull and motors and do a small amount of building. There is a wharf near the boat yards where gasoline and fresh water can be obtained. There is depth of 6 feet (1.8 m.) at the end of the wharf.

Niantic and Crescent Beach are summer resorts with railroad communication at the north end and northwest side of the bay. There is bus service to East Lyme and New London.

Niantic River, at the northeast end of the bay, is navigable, with local knowledge, about 3 miles above the entrance to **East Lyme** for vessels of 6-foot (1.8 m.) draft on a good high water. The entrance is through a narrow passage crossed by two bridges. The lower or railroad bridge is 11 feet (3.4 m.) above high water, and has a lift opening 45 feet wide; the highway drawbridge is 9 feet (2.7 m.) above high water and has a clear opening 65 feet wide. For a distance of 1 mile above the bridges to 0.3 mile below Sandy Point the river is about 0.4 mile wide, with extensive shoals, between which is a winding staked channel from 100 to 300 feet wide. The river from westward of Sandy Point to the wharf at East Lyme, a distance of 1 mile, is about 800 feet wide, deep, and clear, vessels generally following the west bank. From eastward of Sandy Point a shallow cove extends northeastward. **Sandy Point** and **Pine Grove,** southward of the former, are summer resorts.

Smith Cove is on the west side of the river nearly 1 mile above the entrance; there is a prominent white tower on the south side of the entrance. The river is generally closed by ice for about three months during the winter.

Tides.—The mean rise and fall of the tides is about 2¾ feet in Niantic Bay.

Currents.—The tidal currents through the bridges have an average velocity of about 2 knots at strength and set fair with the channel; it has been reported locally, however, that the maximum velocity has been estimated to reach 7 knots.

Slack waters before flood and ebb, respectively, occur about 1½ hours after low water and high water at New London. The strengths of flood and ebb, respectively occur about 1½ hours before high water and low water at New London.

Directions, Niantic River.—Strangers should not attempt to enter Niantic River without a pilot. One can be had from Niantic. Pilots aim to pass through the bridges either at slack water or against the current. Motor boats can stand for the entrance with the middle stone pier of the railroad bridge a little on the starboard bow and the wharf at Crescent Beach astern. From the railroad bridge the channel leads through the highway draw, then follows the east bank for 100 yards to the first point, then northwestward across the river, then northeastward for 0.5 mile to mid river, thence west-northwestward curving to northward to abreast the entrance of Smith Cove, then about 340° true for the west end of Sandy Point, avoiding a shoal which extends 500 feet southwestward from Sandy Point.

The channel is marked by local interests.

Black Point, on the west side at the entrance of Niantic Bay, is flat with bluffs at the water, and is occupied by a number of summer cottages. Broken ground, on which the least depth found is 21 feet (6.4 m.), extends 0.4 mile south of the southwest side of the point.

The bight between Black Point and Hatchett Point has numerous rocks showing above water. **Griswold Island,** on the northeast side of the bight, is high, wooded, and prominent. Rocks extend 0.2 mile southward and southwestward from Griswold Island. The ends of the reef to the southwest and south are marked by buoys. **South Brother,** in the center, and **North Brother,** in the northwestern part of the bight, are prominent bare rocks. The following sunken rocks were developed by the survey: A rock with 6 feet (1.8 m.) over it lies 250 yards off the west side of Black Point. **Blackboys,*** two rocks bare at low water, lie 0.4 mile southward of Griswold Island and are marked on the north side by a buoy. A rock with 6 feet (1.8 m.) over it lies 150 yards southeastward of them; a rock with 3 feet (0.9 m.) over it, lying 400 yards southward of blackboys, is marked by a buoy. **Johns Rock,** with 5 feet (1.5 m.) over it, lies 0.2 mile off the northwest side of the bay; the range of South Brother open northward of Griswold Island leads southward of Johns Rock. Strangers entering the bight between Black Point and Hatchett Point should proceed with caution, as the bottom is broken; the best route is to pass southward and westward of the buoy off Blackboys, and pass on

*Lat. 41°17'.1, Long. 72°13'.5; Charts 214, 1211, 1212.

either side of South Brother. Seal Rock 160 yards south of the end of Giants Neck is marked by a buoy on the south side.

Hatchett Point has several large residences, and there is a wharf on its southeast side. A reef extends about 400 yards off the southwest side of the point.

Hatchett Reef lies 0.6 to 1 mile south-southwestward of Hatchett Point, has a least depth of 5 feet (1.5 m.), and is marked at its south end and at its northeast end by buoys. There are depths of 5 to 8 fathoms (9 to 15 m.) close to the southeast side of the reef. A bar with 10 to 15 feet (3 to 4.6 m.) over it extends westward from Hatchett Reef to Saybrook Bar.

CONNECTICUT RIVER

(CHART 215)

The Connecticut River rises in the extreme northern part of New Hampshire, near the Canadian border, and flows southerly between the States of Vermont and New Hampshire and across Massachusetts and Connecticut to Long Island Sound. It is approximately 375 miles in length and is one of the largest and most important rivers in New England. The head of commercial navigation is at Hartford, about 45 miles from the mouth, and considerable tonnage consisting mostly of oil tankers is employed in the commerce of the river. Barges must be equipped with steering gear in order to make the sharp turns.

The river is under improvement by dredging and the construction of dikes to maintain a channel 150 feet wide and 15 feet (4.6 m.) deep at mean low water to Hartford. Each year after the spring freshets, shoals, with a least depth of about 10 feet (3.0 m.), are found in places on the bars in the upper river; dredging for the removal of such shoals is begun as soon as the water subsides. Vessels of 14-foot (4.3 m.) draft go to Saybrook Point at high water. The deepest draft usually taken up the river to Middletown and Hartford is 10 to 11 feet (3 to 3.4 m.), but during freshets vessels drawing 12½ feet (3.8 m.) have sometimes gone up to Hartford.

Between the entrance and Middletown the river banks are hard and in some places rocky, but between Middletown and Hartford the river flows through alluvial bottom land, where shoaling may occur from freshets and ice jams.

Saybrook Bar, obstructing the mouth of Connecticut River, is a shifting bar with depths of 2 to 9 feet (0.6 to 2.7 m.) which extends nearly 2 miles off the mouth of the river and is marked off its southeastern end by a lighted bell buoy. At the western side of the entrance jetties have been built, and a channel 300 feet wide and 16 feet (4.9 m.) deep has been dredged between them; this improved channel is not subject to material change. The bar eastward of the jetties has several channels with a depth of 6 feet (1.8 m.) but they shift and are not reliable, lumps with little depth sometimes forming in them.

Saybrook Breakwater Light, a white conical tower on a brown cylindrical pier is situated on the south end of the west jetty. The light is 58 feet (17.7 m.) high and visible about 10 miles. A red sector between the bearings 74° true to 98° true (from seaward)

covers the foul ground south and southwestward of Cornfield Point. The fog signal is a horn.

Saybrook Lighthouse, a white stone tower attached to a gray dwelling is situated on Lynde Point on the west side of the entrance of the river near the inner end of the breakwater. The light is 71 feet high (21.6 m.) and visible about 12 miles. The fog signal is a bell.

In 1939, the controlling depths in the river at mean low water were 16 feet (4.9 m.) in the entrance channel between the jetties as far as Brockway Bar, thence 15 feet (4.6 m.) to Hartford except for a few spots which were being removed in 1939. Maintenance dredging is in progress.

The principal towns or landings, with their distance in nautical miles, above Saybrook Breakwater Light are: **Saybrook Point,** 1.4; **Lyme,** 3; **Essex,** 6; **Brockway Landing,** 8.6; **Deep River,** 10.5; **Hadlyme,** 11.8; **East Haddam,** 14.5; **Haddam,** 17.5; **Rock Landing,** 18.6; **Higganum,** 19.8; **Middle Haddam,** 23; **Middletown,** 27.8; **Portland,** 28; **Cromwell,** 30; **South Glastonbury,** 35; **Glastonbury,** 40; **Wethersfield,** 42; and **Hartford** (bridge), 45.2. A railroad on the west bank of the river affords communication to all the towns and landings on that side. There is communication by busses from the principal towns on the river to Hartford, New London, New Haven, and New York.

Pilots.—Pilots who take care of the traffic on the river are located at Saybrook Point, and strangers bound up the river should take one. Vessels can land at the steamboat wharf at Saybrook Point and communicate with the pilots by telephone, or if a pilot is called up on the telephone when a vessel leaves New York a pilot will be ready when the vessel passes the steamboat wharf. There is no schedule of rates based on draft, but it is customary to vary the rates according to tonnage.

Hospital.—At Hartford there is a relief station of the United States Public Health Service.

Anchorage.—Secure anchorage for vessels can be had eastward or northeastward of Saybrook (Lynde Point) Lighthouse, or abreast the wharf at Saybrook Point. Farther up anchorage can be selected anywhere in the wider parts of the channel.

Tides.—High and low water occur later than at New London, as follows: Saybrook Breakwater 55 minutes each; Deep River 2½ hours each; Higganum 3 hours 5 minutes and 4 hours 0 minutes; Middletown 4 hours 20 minutes and 5 hours 10 minutes; South Glastonbury 5 hours 10 minutes and 6 hours 25 minutes; and Hartford 6 hours 0 minutes and 7 hours 45 minutes.

The mean rise and fall of the tides at Saybrook Breakwater is about 3½ feet; Deep River 2½; Higganum 2¼; Middletown 2; South Glastonbury 1¾; and Hartford 1¼.

Currents.—At the entrance the currents have considerable velocity at times, and always require careful attention, as the tidal current of the sound often sets directly across the direction of the current setting out or in between the jetties.

Off Lynde Point, slack water before flood occurs about 3 hours after low water at New London and slack water before ebb about 2¼ hours after high water at New London. The flood strength occurs about ½ hour before high water at New London and sets about 345° true. At

ebb strength the currents sets in the opposite direction and occurs about ¾ hour before low water at New London.

At the railroad bridge, at Lyme, the average velocity of the tidal current at strength is about 2 knots. The strengths of flood and ebb, respectively, occur about ½ hour before high water and 1 hour before low water at New London.

During the ebb, there is a strong current which runs from the Lyme landing toward the center of the railroad bridge. Towboats with vessels in tow should steer for the east pier of the draw and should not swing out for the draw until almost in it, to avoid being set to the west side of the channel.

Because of river discharge the ebb currents will usually be greater and the flood currents smaller than given above. Ebb-current velocities of 1 knot or more have been observed, under normal conditions, on the bars in Connecticut River between Higganum and Hartford; the velocities of the flood currents are much less.

Freshets occur principally in the spring, when the snow is melting, although occasional floods have occurred in every month of the year except July and September. The average annual variation in the height of the river at Hartford is about 18 feet, and the maximum about 6 feet more. The highest freshets are generally of short duration, but the period during which the river at Hartford is at the level of 8 feet or more above mean low water averages nearly two months each year. It is stated that a freshet of 22 feet at Hartford gives a freshet of about 15 feet at Middletown, and below this point it rapidly decreases. At the mouth the variation in water level is due to the tides.

Aids to Navigation.—The channel of the river is well marked by various aids to navigation, but a number of the buoys are maintained only from May 1 to November 15 annually because of ice conditions.

Ice closes the river to navigation a part of every winter, the average date of closing and opening navigation being January 12 and March 15, respectively. The closed season, however, varies greatly, in one lasting only a few days and in another nearly four months. In recent years the dates of closing navigation have ranged from December 9 to February 27 and of opening from February 20 to April 14.

Bridges.—The Connecticut River, between the entrance and Hartford, is crossed by six bridges.

The railroad bridge at Lyme, 1.5 miles above Saybrook Point, is of the bascule type. It has an opening with a horizontal clearance of 139 feet and a vertical clearance above mean high water of 19.5 feet (6.0 m.) when closed. The highway bridge, nearly 0.6 mile above the railroad bridge at Lyme, is a double bascule, the horizontal clearance of the opening of which is 200 feet. The vertical clearance at the center, when the bridge is closed, is 29.6 feet (9.0 m.) at mean high water.

The highway bridge at East Haddam is a center-pier draw with openings of 180 and 200 feet wide at the west and east sides respectively. The vertical clearance at mean high water when the bridge is closed is 22.7 feet (6.9 m.).

The railroad bridge at Middletown is a center-pier draw with openings 100 feet wide and a vertical clearance of 25.3 feet (7.7 m.) above mean high water when closed. The high level arched highway bridge,

0.2 mile above the railroad bridge, has a vertical clearance (east span) of 92.9 feet (28.3 m.) above mean high water.

At Hartford, there is a closed arched highway bridge the least width of the openings between the piers being 100 feet. The vertical clearance at the center of the arches is 38.8 feet (11.7 m.) above mean high water.

Bridge regulations have been prescribed by the Secretary of War for the drawbridges at Lyme, East Haddam, and Middletown, as follows:

1. The signal for opening the draws of the railroad and highway bridges at Lyme, the highway bridge at East Haddam, and the railroad bridge at Middletown shall be one long blast (of about five seconds duration) of a horn or steam whistle. This signal shall be answered by one long blast of a whistle or horn on the bridge when the operation of opening is commenced, or, if the draw cannot be promptly opened, by a series of not less than four short, sharp blasts (each of not more than one second duration), and in addition a red flag or ball by day and a red light by night shall be conspicuously displayed on the bridge.

2. Except as hereinafter provided, the draws of the above-named bridges shall be promptly opened, upon the prescribed signal, at all times during the day or night, for the passage of foreign vessels and "vessels of the United States," as defined in section 4311 of the Revised Statutes. *Exceptions:* (*a*) Railroad bridge at Lyme.—When a westbound train scheduled to cross the bridge without a stop has passed Lyme and Blackhall Station, or an eastbound train Saybrook Junction Station, and is in motion toward the bridge, the draw shall be opened for the above-named vessels as soon as the train has crossed the bridge. (*b*) Railroad bridge at Middletown.—When a westbound train scheduled to cross the bridge without stop has passed Portland Station, or an eastbound train Middletown Station, and is in motion toward the bridge, the draw shall be opened for the above-named vessels as soon as the train has crossed the bridge.

3. For all other vessels which cannot pass the closed bridges the draws shall, upon the prescribed signal, be opened as soon as practicable, but in no case shall the delay be more than 20 minutes.

4. For every vessel that cannot pass the closed bridge the operation of the draw shall afford full horizontal and vertical clearance in the draw opening, regardless of the size of the requirements of the passing vessel.

Supplies.—Gasoline, fresh water, and other supplies are available at the principal towns and landings. The river water is fresh at and above Deep River.

Repairs.—There are several boat yards at Essex with marine railways; the largest is able to accommodate vessels up to lengths of 90 feet and a draft of 12 feet (3.7 m.). There are also railways and facilities for repairing small craft at Portland and East Hartford. Ship chandlery supplies and boat storage are available at these yards.

Saybrook Point, a village eastward of Saybrook, is about 1 mile northward of Saybrook Lighthouse.* There are depths of 13 to 30 feet (4.0 to 9.1 m.) off the landing on the east side of the point. It is not recommended to make landings at the wharf on the northeast side of the point as the wharf is in poor condition with shoal water along its entire face.

South Cove is not navigable except by pulling boats. **North Cove** is entered only by local small craft.

Essex, a town on the west bank of the river about 6 miles above Saybrook Point has considerable yachting activities. There are three yacht clubs all of which are located near the town landing.

At the town landing there is a depth of 6 feet (1.8 m.) alongside the wharf. A landing can be made at a privately owned dock where

*Lat. 41°16′.3, Long. 72°20′.6; Charts 215, 1212.

there are depths up to 15 feet (4.6 m.) at the end. Fuel oil, gasoline and fresh water are available at this wharf. Repairs can be obtained.

Hamburg Cove and **Eightmile River** are on the east side of Connecticut River, 6 miles above Saybrook Point. The river has been improved by dredging a channel 75 feet wide and 8 feet (2.4 m.) deep for a distance of 1.3 miles to **Hamburg,** with a small turning basin at Hamburg, which is the head of navigation. There are boulders in places outside the dredged channel, and there is a least depth of about 7 feet (2.1 m.) over boulders in the turning basin. The narrow entrance channel from Connecticut River has a depth of 10 feet (3.0 m.) and is indicated by the grassy flats on both sides and is buoyed. There is good anchorage in the cove. The dredged channel between the cove and Hamburg is marked at times by bush stakes on the inside of the turns. The deepest draft of vessels taken to or from Hamburg is about 8 feet (2.4 m.).

A buoy marks a shoal on the south side of the channel near the entrance.

Salmon River, on the east side of Connecticut River, about 1 mile above the bridge at East Haddam, is navigable for vessels of 5- to 6-foot (1.5 to 1.8 m.) draft as far as **Scoville Landing,** about 1½ miles above the entrance, and for small craft of less than 3-foot (0.9 m.) draft about 1 mile farther. The entrance to the river is subject to shoaling.

Wethersfield Cove is on the west side of Connecticut River, 3.2 miles below Hartford Bridge. It has a narrow, dredged entrance channel, with a least depth of about 4 feet (1.2 m.), and is extensively used by motor boats. The entrance channel is marked by two flashing lights, maintained from May 1 to October 31 by private interests. There is a yacht club in the cove.

Connecticut River above Hartford is practically unimproved but is navigable about 30 miles to **Holyoke** for boats of not exceeding 3-foot (0.9 m.) draft, when the river is not low. The channel is constantly shifting. For a distance of about 10 miles above Hartfard to **Enfield Rapids** there are bars with depths of 2½ feet (0.8 m.) at low water and numerous obstructions. At **Windsor Falls** there are locks 88 feet long and 19 feet wide, with a depth of about 3 feet (0.9 m.) on the sill, by which boats can pass around Enfield Rapids, above which the depth is between 6 and 7 feet (1.8 and 2.1 m.) to Holyoke. The bridges are closed, but there is ample overhead clearance for small craft, generally about 18 feet.

DIRECTIONS, CONNECTICUT RIVER

(CHARTS 215, 254, 255, 256)

From eastward.—Pass southward of Hatchett Reef and Saybrook Bar, or keep Cornfield Point Lightship, bearing westward of 241° true until Saybrook Breakwater Light bears 315° true. Steer for Saybrook Breakwater Light on this course, which will lead through the buoyed channel between the south end of Saybrook Bar and the east end of Long Sand Shoal, and on approaching the light keep it on the starboard bow. The dangers eastward of the entrance are described with the coast preceding.

From westward.—Passing 1 mile southward of Falkner Island Lighthouse, a 76° true course will lead about 0.4 mile northward of

the lighted bell buoy on the western end of Long Sand Shoal and about 0.2 mile southward of Cornfield Point Shoal buoy. Then steer about **67°** true, with Saybrook Breakwater Light a little on the port bow. Long Sand Shoal and the dangers westward of the entrance are described with the coast following. Cornfield Point Shoal is covered by a red sector in Saybrook Breakwater Light, the southerly edge of which bears 74° true from seaward.

Entrance to Saybrook Point.—Pass about 200 feet eastward of Saybrook Breakwater Light, steer **4°** true, and pass the buoys which mark the edges of the dredged cut between the jetties, at a distance of about 150 feet. When past Saybrook (Lynde Point) Lighthouse, head to clear the lighted buoy northeast of the north end of Lynde Point, and leave the buoy 200 to 300 feet on the starboard hand on a course about **338°** true. Anchorage can be had in the channel about 200 yards off the steamboat landing at Saybrook Point, in about 4 fathoms.

Saybrook Point to Hartford.—Local knowledge is required to carry the best water in the river, and strangers are advised to take a pilot at Saybrook Point. Small craft, with the aid of the chart, should have no difficulty in following the channel, and the following remarks indicate the channel now used. Most of the range lights have white target daymarks; front diamond shape, and rear square.

From Saybrook Point steer for the draw opening in the railroad bridge at Lyme; follow the east bank between the bridges, and then follow the west side of Calves Island at a distance of about 300 feet. Pass 150 feet westward of Calves Island Light and head for the northwest end of Goose Island until through the cut at **Calves Island Bar.** Follow the southwest side of Goose Island at a distance of about 500 feet, and then keep in mid-river until abreast at the lower end of Nott Island. Pass about 200 feet eastward of **Essex Reef Light** * (off Haydens Point), and when past black can buoy No. 5, head for red nun buoy No. 12, leaving it about 150 feet on the starboard hand and then steer for mid-channel until eastward of the light about 0.3 mile above Ely Wharf.

Above the light follow the eastern bank, or small craft can cross the river below the light and follow the western bank at a distance of about 350 to 600 feet to the lower end of Eustasia Island. At **Brockway Bar** pass 150 feet westward of lighted buoy and Brockway Reach Light. An unmarked channel with depths of about 12 feet (3.7 m.) follows the east bank at a distance of about 300 feet; its use is not recommended. After passing the buoy at the west end of the Brockway Bar cut, the channel widens to nearly the full width of the river to the lower end of Eustasia Island. A channel follows both banks of the river passing **Eustasia Island** and the shoals above it, but the eastern channel is easier to follow.

At **Potash Bar** the channel leads about 300 feet off the edge of the grass at the mouth of Selden Cove; Whalebone Creek range lights (red towers with white targets) lead through the short dredged channel at Potash Bar.

Above Potash Bar the channel follows the east bank until abeam of a creek about 0.8 mile above Hadlyme Landing, then the west bank until past the mouth of the creek 0.3 mile above Eddy Rock

*Lat. 41°20'.7, Long. 72°22'.6: Charts 215, 1212.

Light, then to the center of the drawbridge at East Haddam, beyond which it follows the east bank to the turn at the mouth of the Salmon River. Pass southwestward of the lighted buoy at a distance of about 150 feet and the same distance east and north, respectively, of the two black buoys and then steer about 295° true following the southwest bank of the river at a distance of about 100 yards and pass midway between Warners Quarry Dock Light and the buoy off it. Then follow the west bank to Red Store Landing. The channel then follows the east bank until the Haddam Island range lights are in line astern. This is a range which leads in the channel until approaching Rock Landing Light. Follow the east bank at a distance of about 200 feet until abreast the mouth of the creek just above Rock Landing Light, then cross **Rock Landing Bar** in the dredged cut, and then favor the west bank to Higganum.

Above Higganum follow the west bank at a distance of about 200 feet until abreast Sears Shoal Front Range Light. Then stand across the river with the **Sears Shoal** range lights, in line astern, which leads over 200 yards westward of the training wall extending southward from the mouth of **Hurd Brook.** Then follow the eastern bank past Middle Haddam to **Paper Rock Light.** Pass 150 feet off the light and then 400 yards past it stand across for the point on the south bank 0.5 mile above it, favor the south bank until approaching **Bodkin Rock Light,** and then cross to the north bank at the light. Then follow the south bank through the narrow channel from the next point on that side to **Mouse Island Bar;** the shoal on the north side of this narrow channel has rocky patches, partly bare at extreme low water. Pass 150 feet off Mouse Island Light, and follow the south bank at a distance of about 300 feet off. Caution is recommended when rounding the point which is about 1,300 yards above Mouse Island Light as there is a submerged crib in the water off the point near the 5-foot sounding on the chart. Then follow the south and west bank past Middletown.

From Middletown pass through the railroad bridge and in midchannel eastward of Willow Island, and then cross over gradually and follow the west bank to the upper stone bulkhead at Cromwell. Then cross over and follow the east and south bank, drawing in to 100 feet when passing the point of the shoal making off from the lower end of **Gildersleeve Island.**

Pass about 75 feet off Siam Dock light and then follow the east bank at a distance of 100 feet until on the line of the Pistol Point range lights astern, which lead in the dredged channel across **Pistol Point Bar.**

From Pistol Point Bar follow the west bank for nearly 1.5 miles, and then follow the east bank until on the line of the Dividend Bar range lights astern, which lead in the dredged channel across **Dividend Bar.** The channel then follows the west bank past Rocky Hill to abreast **Goff Brook,** and then through the dredged channel in the next reach on the line of Two Piers Channel range lights.

The channel then leads about 200 feet off the east bank, drawing in to about 125 feet when abreast the **South Glastonbury** range lights. Follow this range for nearly 0.5 mile and then follow the eastern bank at a distance of about 150 feet for another 0.5 mile. The channel then widens and follows the west bank until on the line of the **Press Barn Bar** range lights.

From the Press Barn Bar range follow the east bank to the coal wharf at **Naubuc,** and then cross over and follow the west bank to the mouth of Wethersfield Cove, passing the lights on the south bank in the vicinity of **Cys Hollow Bar** at a distance of 150 feet. There is an old stone pier on the west side of the channel nearly 0.3 mile below the mouth of Wethersfield Cove. From the mouth of this cove cross over gradually and follow the east bank, drawing in to 100 feet from that bank for a distance of 0.3 mile below the Clay Banks range lights; the range leads in the dredged channel across **Clay Banks Bar.** Then follow the east bank at a distance of about 250 feet until crossing the range of **Colt Pier Light** and **Hartford Jetty Light.** When on the range steer to pass about 150 feet northeastward of Colt Pier Light. Follow the jetty and then the west bank at a distance off of about 100 feet to Hartford.

CONNECTICUT RIVER TO NEW HAVEN

Long Sand Shoal extends 6 miles westward from off the entrance of Connecticut River and has a greatest width of nearly 0.3 mile. The general depths on the crest of the ridge are 8 to 12 feet (2.4 to 3.7 m.), bottom hard and lumpy; but as the lumps are shifting in position and size, spots with but 7 feet (2.1 m.) over them may sometimes be found at extreme low tides. The shoaling is abrupt on both sides of the shoal, but especially on the south side, where the 10-fathom (18 m.) curve is only 200 yards from it in places and the 15-fathom (27 m.) curve about 0.3 mile. The shoal is marked at its eastern end by a buoy. The western end of the shoal is marked by a lighted bell buoy, and a marker buoy.

Cornfield Point Lightship * is about 1 mile southward of Long Sand Shoal, midway of its length. The lightship is red, with "Cornfield" in white letters on each side, and has a red skeleton steel tower with a black lantern gallery at the top. An occulting white light is 53 feet (16.2 m.) above water and visible for 12 miles. A fixed white riding light is shown on the forestay. The fog signal is a two-tone air diaphone. If the siren is disabled, a bell will be struck by hand.

In clear weather the radiobeacon operates during the first and fourth 10-minute periods of each hour. It is synchronized with the sound fog signal for distance finding.

About 1 mile to the southward of the lightship is a bell buoy and a lighted whistle buoy.

Lying 1 mile southward of the western end of Long Sand Shoal is an area about 1.5 miles long, with depths less than 6 fathoms (11.0 m.), in which the bottom is rocky and broken. The least depth found is 23 feet (7.0 m.), but the area has not been closely developed.

Sixmile Reef is an area of broken ground about 3 miles long, in a west-northwesterly direction, with depths less than 6 fathoms (11 m.). The shoalest part of the reef is an area about 0.5 mile long with depths of 4 fathoms (7.3 m.) or less, and a least found depth of 19 feet (5.8 m.), lying 6.2 miles 253° true from Cornfield Point Lightship. The bottom is rocky and shoaling abrupt in places. There is a lighted whistle buoy off the southerly edge of this reef.

*Lat. 41°12'.9, Long. 72°22'.2: Charts 298, 1212.

With extreme low tides, due to northerly and westerly winds, this shoal may be dangerous to vessels of as little as 15-foot (4.6 m.) draft. It is on the direct course of vessels from southward of Stratford Shoal Lighthouse to Cornfield Point Lightship. The safer course is to pass southward of Sixmile Reef, keeping Cornfield Point Lightship bearing anything northward of 67° true.

Tide rips occur on the reef whenever the direction of the tidal current is opposed to that of the wind. This is especially true during spring tides and a southwest wind.

A ridge 1.3 miles long, with depths of 4.8 to 6 fathoms (8.5 to 11 m.) as determined by means of a wire drag, lies near mid-sound southward of Sixmile Reef and 5 miles north-northwestward of Horton Point Lighthouse.

Cornfield Point, lying 2 miles westward of Saybrook Lighthouse, is marked by a large red-roofed stone building. **Cornfield Point Shoal,** a small, rocky patch with 3 feet (0.9 m.) over it, lies 0.4 mile southward of Cornfield Point, and is marked on its south side by a lighted bell buoy. Small craft passing inside the shoal should proceed with caution, especially at low water, when crossing the broken ground, on which the least depths found are 10 to 15 feet (3 to 4.6 m.), extending 0.5 mile west-southwestward from Cornfield Point. On the north side of this broken ground and 0.5 mile west of Cornfield Point is **Halftide Rock,** locally known as **Cow Rock,** which has not been closely developed, especially on its northwest side.

Hen and Chickens, bare in places at low water and marked by a buoy near the east side of the rocks, lies 0.9 mile southwestward of Cornfield Point, and is about 0.5 mile long, with depths less than 15 feet (4.6 m.).

At extreme low water there are seven rocks showing.

Crane Reef, lying 0.9 mile westward of Hen and Chickens buoy, is an area of broken ground, about 0.3 mile in diameter, with a least depth of 3 feet (0.9 m.), and is marked on its south side by a buoy.

The open bight between Cornfield Point and Menunketesuck Island, the western part of which is called **Westbrook Harbor,** has numerous unmarked sunken rocks, and is seldom used as an anchorage for vessels; the anchorage in Duck Island Roads is better. The bight is characterized by boulders, and has not been thoroughly developed. The best entrance is between Crane Reef and Menunketesuck Island, heading for Salt Island on any course between 337° true and 22° true; vessels should proceed with caution when inside the 5-fathom (9.1 m.) curve.

Two bare rocks lie 0.3 mile from the eastern end of the bight, and a rock bare at low water lies 300 yards westward of them. Other rocky patches lie about 0.3 mile from shore, as shown on the chart. **Salt Island,** bare and rocky, lies near the shore abreast the eastern end of Westbrook. **Lobster Rock,** which shows at very low water, lies 0.4 mile 219° true from Salt Island.

It is marked on the south side by a buoy. About 0.3 mile westward a buoy marks a small shoal which nearly bares at low water.

Westbrook, a town on the north side of Westbrook Harbor, is marked by a prominent church spire. A large neon sign, with a lobster and the word "Casino" on it, shows up very well at night. The wharf has a depth of about 4 feet (1.2 m.) at its end.

Menunketesuck Island is the outermost of several low narrow islands, connected to the mainland at low water, with boulders at the south end.

A boulder reef extends nearly 0.5 mile south-southeastward from the point to the 18-foot (5.5 m.) curve. Tide rips frequently occur on this reef.

The **range** of Kelsey Point and the south end of Duck Island, bearing 273° true, leads southward of the reef. Reefs extend about 400 yards off the western side of the point.

All broken ground along the north shore between Menunketesuck Island and Hammonasset Point, including Duck Island Roads and approaches, but excluding Clinton Harbor inside the depth of about 14 feet (4.3 m.), has been examined by means of a wire drag, and the dangers are shown on the charts. A drag set at 24½ feet (7.5 m.) was passed over **Southwest Reef,** lying 1 mile southeastward of Kelsey Point Breakwater.

A boulder reef extends nearly 0.5 mile southward from **Duck Island** to the 18-foot (5.5 m.) curve, and is marked at its south end by a buoy. A rock with 1 foot (0.3 m.) on it lies on this reef 350 yards off Duck Island.

Another rock with a depth over it of about 2 feet (0.6 m.) is close by.

Tide rips have been reported to extend from the vicinity of these rocks to the buoy. During strong flood currents and a southwest wind, tide rips extend from the shoal water southwest of Duck Island to the vicinity of Southwest Reef. Caution is recommended when navigating small boats in this vicinity during these conditions.

Duck Island Roads (chart 216) lies between Menunketesuck Island and Kelsey Points and has been made a harbor of refuge by the construction of breakwaters 1,100 feet northward and nearly 0.5 mile westward from Duck Island and the Kelsey Point Breakwater on Stone Island Reef. There is a dark house, with a stone chimney on its west side, on top of Duck Island.

The offshore ends of both Duck Island breakwaters are marked by lights.

The anchorage inclosed by the breakwaters extending northward and westward from Duck Island has been dredged. This area is subject to shoaling and in 1939 had controlling depths from 15 to 20 feet (4.6 to 6.1 m.) except in the extreme southeastern corner where the depth was about 8 feet (2.4 m.). This is a good harbor for vessels of less than 14 feet (4.3 m.) draft, which is about the deepest draft that can anchor with swinging room.

In addition to the area inside the breakwaters there is a small area northward and northeastward of Duck Island North Breakwater Light which can be used as an anchorage in southwesterly weather in case of necessity.

Directions, Duck Island Roads.—The **western entrance** of Duck Island Roads is easy of access and should be used by vessels of a greater draft than 8 feet (2.4 m.). Passing southward of Duck Island keep the light on the end of Kelsey Point Breakwater bearing northward of 264° true until Duck Island West Breakwater Light bears 347° true and then steer northward, keeping the latter light on the starboard bow. In a rough sea avoid the 16-foot (4.9 m.) spots, extending 0.3 mile 194° true from Duck Island West Breakwater

Light. Approaching from westward the only dangers are the two 16-foot (4.9 m.) spots south-southwestward of Kelsey Point Breakwater Light.

The **eastern entrance of Duck Island Roads** is obstructed by a sand shoal with a least depth of 8 feet (2.4 m.) lying 600 yards eastward of Duck Island, and by boulder reefs which extend 400 yards off the western side of Menunketesuck Island. This entrance is easy of access for vessels of 8-foot (2.4 m.) draft. To enter, when westward of Crane Reef steer for Kelsey Point in range with or open southward of the south end of Duck Island, course 273° true until about 0.5 mile from Duck Island. Then a 315° true course will lead about 300 yards eastward of Duck Island North Breakwater Light; steer this course and pass eastward and northward of the light, rounding it at a distance of about 100 yards into the harbor.

Between the 16-foot (4.9 m.) spots which extend 0.3 mile south-southwestward from Duck Island West Breakwater Light and the 17-foot (5.2 m.) rock patches lying about 0.4 mile southeastward of Kelsey Point, a distance of 0.6 mile, anchorage can be had in 3 to 4 fathoms (5.5 to 7.3 m.), bottom generally sticky, sxposed, however, to winds southward of about east and west.

Kelsey Point Breakwater extends on **Stone Island Reef** over 0.6 mile south-southeastward from Stone Island and is marked at its south end by a flashing green **light.*** The least depth on the rocky broken ground southwestward of the light is 16 feet (4.9 m.) on two spots lying 300 yards and about 0.4 mile 210° true of the light. The outer spot is marked by a gong buoy. **Stone Island** at the north end of the breakwater is mostly covered at high water, and there are some rocks bare at low water between the island and the shore. Tide rips frequently occur in the area southwestward from the end of the breakwater to the gong buoy.

Depths of 18 feet (5.5 m.) or less near Kelsey Point Breakwater indicate areas of broken, rocky bottom, which should be avoided in anchoring. Those east of the breakwater include depths of 12 feet (3.7 m.) close to it; the 18-foot (5.5 m.) patch lying 0.2 mile east-northeastward of the end of the breakwater; **East Ledge** (depths 2 to 17 feet (0.6 to 5.2 m.)), which extends 0.4 mile southward from Kelsey Point and 600 yards eastward from the north half of the breakwater; and the broken ground with depths of 8 to 17 feet (2.4 to 5.2 m.) which extends over 0.4 mile southeastward from Kelsey Point.

The bight at the entrance of Clinton Harbor and westward of Kelsey Point Breakwater affords anchorage, exposed, however, to southeasterly and southwesterly winds. **Anchorage** can be selected between the broken ground which extends about 300 yards westward from Kelsey Point Breakwater and the 18-foot (5.5 m.) curve of the shoal which is marked by lighted bell buoy and extends over 0.6 mile southeastward from Hammonasset Point, where there is an area nearly 0.8 mile wide, with depths of 2 to 4 fathoms (3.7 to 7.3 m.), bottom soft in places. Or anchorage can be selected farther northward, toward Wheeler Rock buoy, in a depth of about 14 feet (4.3 m.), taking care to avoid the sunken rocks with depths of 5 to 12

*Lat. 41°14'.6, Long. 72°30'.5: Charts 216, 1212.

feet (1.5 to 3.7 m.) which extend 0.4 mile westward from the north end of the breakwater; these rocks marked by a buoy on the southwest side will be avoided by keeping the light on the south end of the breakwater bearing anything eastward of 122° true. See also the description of Hammonasset Point following.

Clinton Harbor (Chart 216), the bight westward of Kelsey Point Breakwater, is the entrance to **Hammonasset River,** a stream of no commercial importance. There is a depth of about 4 feet (1.2 m.) on the bar, and in the channel to the coal bunker wharf at **Clinton,** northwestward of the eastern end of **Cedar Island.** The greatest draft taken to the wharf does not exceed 8 feet (2.4 m.) at high water.

The landing, locally known as Petri's Dock, at Clinton has depths of 3 to 5 feet (0.9 to 1.5 m.). Gasoline, lubricants, diesel oil, ice, and fresh water can be obtained at the wharf. Mooring facilities are available by arrangement. There is a small repair yard at the north side of the entrance of Hammock River which has a marine railway capable of hauling out small craft up to lengths of 60 feet and a draft of 4 feet (1.2 m.). Repairs to both hull and motors can be obtained.

Wheeler Rock buoy marks a rock with 1 foot (0.3 m.) over it just outside the bar; above the bar the channel is staked to just above the coal bunker wharf. Motorboats can enter by the following directions, but should not depend on carrying more than 3 feet (0.9 m.) at low water across the bar.

Directions, Clinton Harbor.—Pass 200 feet eastward of Wheeler Rock buoy, steer 8° true for a prominent church in Clinton until across the bar, then head up for the eastern end of Cedar Island and be guided by the chart and stakes, the latter being privately maintained and at times supplemented by lighted aids.

Northeastward of Cedar Island there are two narrow, very crooked channels close together and with a depth of about 1 foot (0.3 m.) at low water. The eastern one is usually marked on the port side entering by bush stakes and leads to a landing float just inside the mouth of Hammock River and the western channel on the starboard side by bush stakes and leads into Indian River.

Hammonasset Point is generally a low, marshy area with a number of wooded knolls. The end of the point is a rocky knoll marked by a lone house and barn both of which are conspicious from an easterly or westerly direction. **Hammonasset Beach** extends northwestwardly from the point for a distance of about 1.5 miles and is marked by numerous bathhouses. **Hammonasset State Park** is marked by a conspicious flagstaff and the buildings at the recreational center. During the summer this is a very active and popular resort.

Broken ground, with rocky irregular bottom and least depths of 10 to 11 feet (3 to 3.4 m.), extends 0.5 mile southward of Hammonasset Point. This broken ground has been examined by means of a wire drag.

West Rock is the outermost of the bare rocks which extend a short distance off the east end of Hammonasset Point. A reef, with two bare rocks on its inner part and a depth of 7 feet (2.1 m.) on its outer part, extends 0.2 mile west-southwestward from the point while further offshore in the same general direction there is a rock with a depth of 5 feet (1.5 m.). This rock is marked by a bouy northeast-

ward of which tide rips frequently occur. When rounding the point all crafts should pass westward of buoy as a matter of safety.

Approaching from westward the broken ground, with depths less than 18 feet (5.5 m.) extending southward and southeastward from Hammonasset Point, will be avoided by keeping the light on the end of Kelsey Point Breakwater bearing northward of 77° true and the range of a prominent church in Clinton and the eastern end of Cedar Island, bearing 6° true. The latter range leads eastwardly but close to the lighted bell buoy marking the southeast end of the shoal.

The broad bight westward of Hammonasset Point is sometimes used as an anchorage, and is sheltered in northerly and northeasterly winds, but has little to recommend it. The bight is characterized by boulders, and has not been thoroughly developed. Vessels of as much as 15-feet (4.6 m.) draft can be taken to the anchorage northward of Madison Reef, but should proceed with caution when crossing the ridge with depths less than 4 fathoms (7.3 m.) which extends eastward and westward from Madison Reef. The bottom is soft southward of Madison Reef, and vessels can stand in anywhere eastward of Kimberley Reef and over 1 mile westward of Hammonasset Point and select anchorage in 5 to 6 fathoms (9 to 11 m.).

Madison Reef lies about 0.6 mile southward of Tuxis Island and extends a little over 1 mile east and west. This reef has 4 to 10 feet (1.2 to 3 m.) over it and consists of several rocky patches with deeper water between them. A buoy, lying 164° true from Tuxis Island, marks the west side of a passage across the eastern part of the reef; the eastern end of the reef lies 600 yards eastward of the buoy. The western end of the reef is marked by a buoy.

Directions, Madison Reef.—Vessels can pass **eastward** of Madison Reef by giving Hammonasset Point a berth of over 0.8 mile and steering for Tuxis Island on any course between **304°** true and **315°** true. **From westward** a **56°** true course for Tuxis Island will lead westward of Madison and Charles Reefs; note that Charles Reef buoy is at the south end of the reef. Anchor about 0.3 mile southward of Tuxis Island and the same distance northward of Madison Reef in 20 to 24 feet (6.1 to 7.3 m.).

For a distance of 1 mile eastward of Tuxis Island, foul ground extends off a greatest distance of 0.4 mile from shore. The outer rock has 2 feet (0.6 m.) over it, with 18 to 20 feet (5.5 to 6.1 m.) around it, and lies 0.5 mile 106° true from Tuxis Island.

Tuxis Island * is high and rocky. There is foul ground and little depth between the island and the shore. Rocks, bare at low water, lie 200 to 600 yards eastward of the island.

A steel bulkhead, the top of which is awash at high water, extends from shore to a high bare ledge about 300 yards east-northeastward of Tuxis Island. A cluster of rocks, bare at low water, sometimes marked by a stake and flag, lies 300 yards east-southeastward of the ledge. A bare rock lies 100 yards westward of Tuxis Island and a rock, bare at low water, lies midway between the island and the shore.

Madison, a town on the railroad, has two landings; the easterly one is out of repair and not used; the westerly landing, lying northwestward of Tuxis Island, has about 5 feet (1.5 m.) at its end, and a few motorboats moor in the cove on its north side. A rock, bare

*Lat. 41°16′.0, Long. 72°36′.1 : Charts 216, 1212.

at low water and usually marked by a small spindle, lies 100 yards eastward of the landing. A beach club building, with a small stone landing, is located northward of Tuxis Island. There is a church with a prominent tower and gilded dome in Madison 0.8 mile 356° true from Tuxis Island.

Guilford Harbor (chart 217), lying northward of Falkner Island Lighthouse, is frequented only by small craft. Boats of 6-foot (1.8 m.) draft at high water can be taken up **East River** to the railroad bridge, which has a clearance of 4 feet (1.2 m.) above high water. **Sluice Creek** enters East River 0.3 mile above Guilford Point at the entrance; at high water boats of 6-foot (1.8 m.) draft can be taken a short distance up Sluice Creek to the landing, from which a road leads to Guilford. The mouth of East River up to Sluice Creek is filled by flats, between which there is a narrow channel with a depth of about 2 feet (0.6 m.) on the bar at low water. At high water boats of about 4-foot (1.2 m.) draft can be taken up **West River** above the railroad bridge to Guilford; the railroad bridge is about 6 feet (1.8 m.) above high water.

Half Acre Rock, which just shows at high water, and **Lobster Rock** are the most easily identified of those off the entrance of Guilford Harbor. Scattered rocks, some bare at low water and others with 7 to 16 feet (2.1 to 4.9 m.) over them, extend about 1 mile eastward from Half Acre Rock; the easternmost lie about 0.4 mile northward and northwestward of **Charles Reef.**

There is a bare rock, locally known as Outer White Top, which lies 200 yards east-southeast of Lobster Rock, and several rocks bare at low water northward. The large reef northwestward of Indian Reef has numerous rocks bare at half tide. There are two bare rocks on the reef extending southward from Mulberry Point; eastward of the bare rocks there are numerous rocks bare at half tide.

The highest part of **Indian Reef,** near its northeast end is covered at high water; and near the north end of the reef are rocks which are covered at half tide. The balance of Indian Reef consists of sunken rocks with little depth over them, and the reef is marked off its south side by a buoy. An area of broken ground, on which the least depths found are 15 to 18 feet (4.6 to 5.5 m.), extends about 0.5 mile southeastward and southward from Indian Reef.

An unmarked rock with 6 feet (1.8 m.) over it lies nearly 0.4 mile west-southwestward of Indian Reef and 0.5 mile southeastward of **Vineyard Point,** the southeasterly point of the peninsula of Sachem Head.

Two groups of rocks, locally known as **The Failings** are important dangers in the harbor. The southward group are awash at low water and marked on the eastern end by a buoy; the northwestward group are covered at high water. A rock, locally known as **Riding Rock,** bare at low water lies 400 yards northeastward of The Failings buoy.

There are numerous stakes and fish traps in this area.

Directions, Guilford Harbor.—The entrance of Guilford Harbor is much obstructed by rocks, between which there are two buoyed channels. The channel westward of Indian Reef is unfit for a stranger.

The better entrance is from the southeastward on a **319°** true course passing eastward of the lighted bell buoy at a distance of about 200

feet and northeastward of the buoy on the 6-foot (1.8 m.) reef (locally known as **Netties Reef**) 500 yards northeastward, at a distance of about 450 feet. When the buoy on the east end of The Failings bears east steer 350° true for the landing at Guilford Point or follow the staked channel into East River. Strangers should proceed with caution and obtain local information before proceeding to the landing.

Falkner Island, marked by Falkner Island Lighthouse, is nearly 0.2 mile long; and from it a reef, mostly bare at low water, extends 0.4 mile northward and is marked at its end by a lighted bell buoy. A bank, with depths of 3 to 4 fathoms (5.5 to 7.3 m.) not closely developed, extends 1.5 miles eastward from Falkner Island to **Kimberley Reef.** The latter is an area of broken ground with a least depth of 12 feet (3.7 m.), and is marked by a buoy. The bottom is generally hard and very broken between Falkner and Goose Islands. A shoal on which the least depth found is 10 feet (3.0 m.) extends 300 yards westward from the south end of Falkner Island.

Falkner Island Lighthouse * is a white, octagonal tower attached to a dwelling. The light is 94 feet (28.7 m.) high and visible 16 miles. The fog signal is an air diaphragm horn.

Goose Island, locally known as **Green Top,** is low and grassy, and there are small bare islets just northward and 300 yards southward of it. A lighted bell buoy about 600 yards southward of Goose Island marks the south end of the reef.

A rock, locally known as **Three Quarters Rock,** is bare at low water and lies 0.3 mile eastward of Goose Island.

Reefs, partly bare at low water, extend 0.5 mile northeastward from Goose Island. From the end of these reefs a narrow reef, on the other part of which depths of 14 feet (4.3 m.) have been reported, extends 0.5 mile north-northwestward, its north end lying 1.1 miles 308° true from Falkner Island Lighthouse; it should be avoided by vessels. A bank, locally known as **Middle Ground,** with depths of 4 to 5 fathoms (7 to 9 m.), not closely developed, extends west-northwestward from Goose Island to the end of the broken ground extending southwestward from Sachem Head.

Jefferson Rock, covered at high water, lies at the entrance of the foul bight on the south side of **Sachem Head.** Numerous rocks lie southeastward of Jefferson Rock. The southeasterly one, lying 600 yards east-southeastward of Jefferson Rock is bare at low water and is marked by a buoy; **Hatch Rock,** lying 300 yards south-southwestward of Jefferson Rock, is covered at half tide.

A buoy marks the edge of the shoal water 300 yards southward of the rock.

Two bare rocks lie off the south point of Sachem Head. Rocks bare at low water extend 100 yards southward and 250 yards westward from the bare rocks, and the west end of the reef is marked by a buoy.

These aids are placed to assist local motor boats in approaching Sachem Head Harbor from eastward. There is a prominent flagstaff on the southwest point of Sachem Head.

Chimney Corner Reef is a rocky broken area off the south side of Sachem Head; the least depth found on the reef is 9 feet (2.7 m.)

*Lat. 41°12′.7, Long. 72°39′.2: Charts 216, 217, 1212.

at a point 600 yards southward of the southernmost point of Sachem Head. The bottom is rocky and very broken for a distance of 1 mile southwestward from Chimney Corner Reef; the least depths found are 19 to 23 feet (5.8 to 7 m.), but the area has not been closely developed.

Goose Rocks are two principal rocks; the northeasterly one is a bare rock, and the southwesterly one is covered at high water. Broken ground extends in a southeasterly direction from Goose Rocks toward Chimney Corner Reef; the depths of 4 to 13 feet (1.2 to 4.0 m.) have been found on it for a distance of 600 yards from the rocks. **Goose Rocks Shoal,** a rocky broken area, extends 0.3 mile southwestward from Goose Rocks, has a width of 250 yards, a least depth of 2 feet (0.6 m.), and is marked at its south end by a bell buoy. Care should be taken not to round the buoy too closely, in order to insure clearing the west end of the reef.

Sachem Head Harbor (chart 217) is an anchorage for small craft on the southwest side of Sachem Head. The Harbor is 0.3 mile long, about 0.1 mile wide, has depths of 6 to 10 feet (1.8 to 3.0 m.) in its lower half, and is sheltered except from westerly winds. The island forming the south point at the entrance is connected with the shore by a bridge, and there is a yacht clubhouse on the island. From the north point of the island a breakwater which shows above water extends 100 yards in a northwesterly direction. A rock covered at half tide lies 50 yards off the southeast side of the harbor, just northward of the opening on that side, and 350 yards above the end of the breakwater.

The approach to Sachem Head Harbor for small craft from eastward is along the south side of the rocks making off from the south side of Sachem Head (see the description of Jefferson Rock preceding). Approaching eastward of Goose Rocks give the rocks a berth of over 300 yards. The approach from westward is clear between Goose Rocks and the buoy off the south end of Leetes Rocks.

Joshua Point, the west end of Sachem Head, is marked by a rocky islet on its west side. Just northward of the islet a stone jetty with a bulkhead on its north side extends about 100 yards in a northwesterly direction from the shore. The bulkhead is in bad repair, but launches can anchor in the angle near the shore where the depth is about 4½ feet (1.4 m.).

Joshua Cove is little used, but affords good anchorage in its entrance for small vessels in northerly or easterly winds, in 6 to 10 feet (1.8 to 3.0 m.), soft bottom. The approach from southwestward is clear between Goose Rocks and the buoy off the south end of Leetes Rocks.

Two short jetties have been built at the entrance to **Little Harbor** to protect a private landing with a depth of 2 feet (0.6 m.) at the end.

Leetes Rocks, lying midway between Sachem Head and the north end of The Thimbles, are two rocks, bare at low water, and an area of broken ground around them. A rock with 3 feet (0.9 m.) over it lies nearly 400 yards eastward of the northeast rock. A rock with 9 feet (2.7 m.) over it lies 200 yards southward of the southwest rock, and is marked on its south side by a buoy.

Leetes Island Quarry is a prominent feature on the south side of **Hoadley Point;** there are ruins of an old dock with a depth of

about 7 feet (2.1 m.), on the north side of the cove eastward of the point. A straight channel about 50 feet wide has been dredged into the cove and to the wharf, between the northeast end of Narrows Island and the islet eastward. This channel is no longer used and was reported to have a depth of about 4 feet (1.2 m.). There are rocks bare at low water eastward of the channel and northward of the islet.

Thimble Island Harbor (chart 217) is a well-sheltered anchorage for small vessels and small craft between Pot and Money Islands on the east and High Island and West Crib on the west. Although open southwestward, the sea from that direction loses much of its force before reaching the anchorage. A rock, with 3 feet (0.9 m.) over it and marked by a buoy, lies 80 yards off the east side of High Island, just above its south end. The anchorage for small vessels is near midchannel, between this rock and the north end of Pot Island, in 13 to 18 feet (4 to 5.5 m.), soft bottom. Small craft of 6 feet (1.8 m.) or less draft anchor between West Crib and Money Island. The anchorage is easy of access by the best entrance between Outer Island and Inner Reef. Approaching from westward, pass southward of Negro Heads buoy, steer about 75° true for the south end of Outer Island, and pass northward of Northwest and Wheaton Reefs buoys and southward of Inner Reef buoy.

The following are the principal outlying dangers off and westward of The Thimbles:

East Reef, Wheaton Reef, and **Browns Reef** show at a good low water, and are parts of a broken area about 0.4 mile in diameter, which lies 0.5 to 0.8 mile southwestward of Outer Island. The reefs are marked at the north and east sides by unlighted buoys and on the south side by a lighted bell buoy.

The lighted buoy is removed if endangered by ice; a nun buoy is on station throughout the year. **Northwest Reef,** a rock with 7 feet (2.1 m.) over it, lies 0.3 mile westward of Wheaton Reef and is marked by a buoy.

Inner Reef, bare in places at low water, is 200 yards long in a northeast direction, and is marked at its southwest end by a buoy. A rock with not over 12 feet (3.7 m.) over it, probably less, lies 300 yards northwestward of the buoy. A rock with 8 feet (2.4 m.) over it lies 0.4 mile west-northwestward of Inner Reef, in line between it and Hookers Rock, and is marked by a buoy which is lighted from May 1 to November 1.

Hookers Rock, bare at low water, is marked at its southeast end by a buoy. A rock with 10 feet (3.0 m.) over it lies about 300 yards west of the buoy.

Gangway Rock, with 5 feet (1.5 m.) over it, lies 0.4 mile southwestward of Hookers Rock buoy, a little southward of a line joining it and Negro Heads buoy.

Negro Heads is described on page 227.

Branford Reef, lying 1.8 miles from the north shore of the Sound and 5 miles eastward of New Haven entrance, is marked by **Branford Reef Light,*** a red skeleton tower and tank house on a granite base. The light is 30 feet (9.1 m.) high and visible about 7 miles. There is little depth for a distance of 150 yards northward and

*Lat. 41°13'.3, Long. 72°48'.4: Charts 217, 1212.

southward from the light; depths of 16 feet (4.9 m.) or less extend 450 yards northward and 250 yards southward from the light.

The Thimbles and the shore westward are occupied by summer residences, and the waters are much frequented in summer by motorboats and other small pleasure craft. The water area from The Thimbles to the entrance of Branford Harbor is occupied by numerous islands, ledges, and rocks, and it is not suitable for anything but small craft. There are many oyster stakes and since they do not mark definite channels caution should be used to avoid fouling them.

Caution is also advised when anchoring to avoid pipe lines and cables in this area. In the absence of local knowledge, chart 217 is the best guide; strangers should proceed with caution, having in mind the possible existence of uncharted rocks in so broken an area. Gasoline and motorboat supplies are generally obtained at Stony Creek, Pine Orchard, or Branford.

Outer Island is the outermost of The Thimbles. A bare rock lies 100 yards southeastward of it. There is a boat landing protected by a stone jetty on the northeast side. An unmarked rock, bare at lowest tides, lies 200 yards eastward of Outer Island.

Horse Island, the next northeastward of Outer Island, has two outlying bare rocks off its southeasterly side. The ends of the ledges surrounding the northeast rock are bare at low water.

Old Cobble Rocks is a long reef, nearly all bare at a good low water, near the middle of which is a large boulder awash at high water. The southwest end of the reef is marked by a buoy, which is at the east side of the entrance of a channel for small craft leading northward between Pot and Money Islands.

Pot Island has a number of houses. An old hotel building on the island is used for fresh air housing for children. There is a landing on the west side in the cut. A ledge makes out from the northern end of Pot Island toward Money Island, and in going through this passage keep close to Money Island.

High Island has several buildings; a rock bare at low water lies close to its southwest end, and there is a bare rock, **Red Point Rocks,** 300 yards southwestward of the island. A rock bare at low water lies near the end of the ledge, extending 150 yards northeastward from the bare rock.

Dick Rocks and the rock 150 yards southwestward of it are bare at half tide, and are marked at the west end by a buoy. Foul ground extends southeastward from these rocks, and **Goshen Rock,** with 3 feet (0.9 m.) over it, lies 200 yards southeastward of them.

A rock, bare at half tide, lies 50 yards east-southeastward of the northeast end of **West Crib.** From the rock, foul ground extends northeastward and joins the shoal which extends 80 yards east-southeastward from **East Crib.** This shoal is marked on its northeast side by a buoy, at the junction of the deep channel along the north side of East Crib and **Davis Island** with that leading southwestward through Thimble Island Harbor.

Money Island is thickly settled. The channel along its southeast side is not closely developed.

Prudden Island is marked by a small shack. There are bare ledges on its northwest side and 200 yards east-southeastward of it. The island northeastward of Prudden Island is marked by a house and flagstaff.

Hen Island is marked by a small summer house. A ledge extends 90 yards southward and a rock, bare at low water, lies 90 yards southeastward of the island.

Wayland Island is marked by red buildings and a red pavilion at its south end. Between Wayland Island and the two buoys eastward is the entrance of two of the deeper and clearer channels which lead through The Thimbles from eastward. One channel passes between Davis Island and the large bare rock, Beers Island, northeastward, then southward of **Dogfish Island** (marked by a white house), and then northward of East Crib; or, passing eastward of the buoy eastward of East Crib, a channel good for a depth of about 6 feet (1.8 m.) leads southwestward through Thimble Island Harbor. The other channel passes eastward of the buoy eastward of Davis Island and joins the channel described in the second paragraph following.

A bare rock, **Northford Rock,** lies 75 yards eastward of **Smith Island,** and there is a rock bare at low water between them. A bare rock, Cat Island, lies 150 yards southward of Smith Island; a rock bare at extreme low water lies 175 yards west-southwestward of Cat Island. These rocks are marked on the south side by a buoy.

A high, bare, rocky islet lies off the southwest end of **Narrows Island.** Lying 200 and 400 yards west-southwestward of the rocky islet are two rocks which are covered at three-quarters flood and are marked by private spindles. Between these two rocks is the entrance of a channel which leads between Smith Island and the bare rock off the south side of **Bear Island,** then between **Mermaid Rock** (bare at low water) and the rocks bare at half tide off the southwest end of Bear Island, then northeastward of Beers Island northeastward of Davis Island, then westward of a red buoy, and then around the north end of **Cut-in-two Island.** The red buoy eastward of Cut-in-two Island marks a rock bare at low water, northeastward of which there is a bare rock. This channel then leads southward of the grassy islet lying 200 yards southward of **Flying Point** * (marked by a sea wall). A rock bare at low water lies 150 yards west-northwestward of the islet at the western end of the foul ground extending 75 yards northward of the islet. The two rocks off Flying Point show above water. The ledge extending 100 yards westward from the point just north of Flying Point is sometimes marked at the outer end by a spindle and cage. A wreck lies about halfway between the shore and the end of this reef.

Stony Creek, a village on the railroad, extends southward to Flying Point. The boat landing, which has about 3 feet (0.9 m.) at low water, is on the point northeastward of **Frisbie Island.** Gasoline and other supplies can be had there. The principal danger in the approach is the shelving ledge, largely bare at low water, making off from the next point southward of the landing. A channel 6 feet (1.8 m.) deep has been dredged to the boat landing, but is subject to shoaling and is little used.

Governor Island is thickly settled. There is a bare rock off its northeast end. Rocks fill the bight on its south side, the southerly rock lying 175 yards from the island, being bare at low water. Small craft anchor eastward of the island.

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*Lat. 41°15′.5, Long. 72°45′.1: Charts 217, 1212.

Potato Island is low and is marked by a large house. Bare rocks extend 150 yards northeastward from it, and there is a rock bare at low water close to its southwest end.

Rogers Island, known locally as **Yoncomis Island,** is marked by a prominent red-roofed house. There is a landing with a depth of 4 feet (1.2 m.) on the northeast side, and a small breakwater about 75 yards northwestward of the landing. About 175 yards northeastward of the landing is a spindle marking a rock. Cedar Island is a bare rocky islet off its southeast side, and midway between the islet and the southwest end of Potato Island there is a rock, which shows at lowest tides. The rocks westward of Rogers Island are bare at half tide; those southwestward show at all times. The southern limit of the rocks lying from 0.1 to 0.4 mile westward and southwestward from this island is marked by a buoy which is lighted from May 1 to November 1.

Between the rocks westward of Rogers Island and Blackstone Rocks, a channel about 75 feet wide and 10 feet (3.0 m.) deep, has been dredged northeastward to a quarry wharf. A small turning basin, marked by piles, lies eastward of the wharf. The depth at the wharf is about 8 feet (2.4 m.), but it is subject to shoaling from crushed stone which is loaded on barges.

Blackstone Rocks are a chain of islets and ledges extending about 1 mile southwestward from Brown Point. The most prominent are a rock lying 400 yards southward, a prominent white-topped rock lying nearly 0.5 mile south-southwestward, and the two high, bare rocks of Middle Rock lying over 0.8 mile south-southwestward of Brown Point. Bare rocks lie 100 yards west-northwestward and 200 yards north-northeastward of the white-topped rock, and most of the other rocks are covered at half tide. There are, however, sunken rocks around and westward of the group, and great care is required to insure safety. The eastern limit of the rocks extending 0.3 mile eastward from Middle Rock and locally known as **Pork Rocks,** is marked by a buoy on the east side.

Pine Orchard is a summer resort extending northward and westward of Brown Point. Northeastward of the point is a yacht basin 800 feet long and 300 feet wide, and dredged to a depth of 6 to 7 feet (1.8 to 2.1 m.).

The entrance channels, dredged to 7 feet (2.1 m.) permit passage either northward or southward of **St. Helena Island,** an island which lies 200 yards eastward of Brown Point. Gasoline and fresh water is available at the yacht club landing where there is a depth of 7 feet (2.1 m.).

A breakwater, extending eastward from Brown point, is marked at its end by a light.

A sea wall extends westward from **Brown Point,** and the shore is thickly settled. A rock bare at half tide lies 600 yards westward of Brown Point and 300 yards from shore; a rock with 4 feet (1.2 m.) over it lies in mid-channel northward of the rock.

Two rocks, bare at low water, lie 0.4 mile northeastward of **Haycock Point** and 300 yards from shore off the middle of a bight forming **Hotchkiss Grove Beach.**

There are other rocks eastward and westward of it which lie closer to shore. A bare rock lies 200 yards southeastward of Haycock Point; northward of this rock are numerous rocks bare at low water.

Rocks bare at half tide lie off the southeast side and southwest end of **Green Island.** A rock bare at low water lies 0.3 mile southeastward of Green Island. There are numerous sunken rocks, as shown on the chart. The large ledge lying 200 yards from the shore westward of Green Island is covered at high water.

Foot Rocks show above water, but there are also some that cover around them.

Spectacle Island, the outer one off the southeast side of Indian Neck, has some grass on top. **Negro Heads,** a reef bare in one place at low water, extends 0.6 mile southward from the island and is marked at its south end by a buoy. In addition to sunken rocks, rocks bare at low water lie about 200 yards northward, westward, and southwestward of Spectacle Island. **Moon Rock,** bare at low water, lies 0.2 mile southwestward of Spectacle Island.

Sumac Island is marked by a prominent house. There is foul ground between the island and the rock bare at low water between it and Spectacle Island. A rock with 4 feet (1.2 m.) over it lies 200 yards southwestward of Sumac Island.

Sedge Island and **Squaw Rocks** are low and grassy. There is a narrow channel with a depth of about 5 feet (1.5 m.) between them.

Clam Island is settled, and there is a boat landing on its northwest side. Entering between the bare rocks off the southwest end of Clam Island and Jeffrey Rock, motorboats can enter **Maltby Cove,** favoring the northwest side of Clam Island. There is a marine railway capable of hauling out craft up to lengths of 40 feet and a draft of 6 feet (1.8 m.). Light repairs to hull and motors can be obtained. Boat storage is also available.

The northwest side of the cove is foul, the principal danger being a rock bare at low water lying near the middle northwestward of Clam Island; the range of the bare rock northward of Jeffrey Rock and the middle of Taunton Rock leads close to it.

Jeffrey Point,* the eastern point at the entrance of Branford Harbor, has a bare rock close to its western end, and three bare rocks, the southernmost called **Jeffrey Rock,** extending 300 yards southward from the point.

Branford Harbor (chart 217), 4 miles eastward of New Haven Harbor entrance, is a shallow cove between Jeffrey Point and Johnson Point. Vessels up to 10-foot (3.0 m.) draft can select anchorage in the harbor southward of the Mermaids in 10 to 14 feet (3.0 to 4.3 m.); protected against all but southerly and southwesterly winds. Boats up to 5-foot (1.5 m.) draft can select a well-sheltered anchorage in the upper part of the harbor above the Mermaids. The dangers in the approach and entrance of Branford Harbor either show above water or are marked by buoys.

Little Mermaid (showing but little above high water) and **Big Mermaid** (a high rock marked by a privately maintained light from June 1 to October 30) lie near the middle of the harbor, and there are two bare rocks near the head of the harbor. A rock, bare at low water and usually marked by stakes, lies about 100 feet north-northeastward of the north end of **Lovers Island,** and the same distance off the hotel boat landing; the latter has a depth of 2½ feet (0.8 m.) at its end.

*Lat. 41°15′.0, Long. 72°49′.1 : Charts 217, 1212.

Branford River, a narrow and crooked stream, has been improved by dredging a channel 100 feet wide and 9 feet (2.7 m.) deep through the shoals at the entrance and another channel of the same dimensions between the upper and lower wharves at **Branford.** Between these two improved channels, the river is naturally deep. As determined in 1938, the controlling depth was 9 feet (2.7 m.) through the outer harbor to upper wharf at Branford and 5 to 8 feet (1.5 to 2.4 m.) along the wharf.

There is a small repair yard on the Branford River with a marine railway capable of hauling out small craft up to lengths of 50 feet and a draft of 6 feet (1.8 m.). Light repairs to both hull and motors can be obtained and there are facilities for storage.

Coal, gasoline, Diesel oil, and boat supplies can be obtained at Branford. The principal commerce is in coal, iron, and foundry supplies, carried in barges and small steamers of 8½ to 10 feet (2.5 to 3.0 m.) draft. There is a depth of about 11 feet (3.3 m.) at the iron works wharf and 6 feet (1.8 m.) at the coal and lumber wharf 0.3 mile farther down. At the upper end of the iron works the river is crossed by a bridge, which is practically the head of navigation. The bridge has a horizontal clearance of 53 feet and a vertical clearance of 4 feet (1.2 m.) at mean high water.

Boats, without masts, of about 3-foot (0.9 m.) draft can go over 1 mile above the bridge and through the railroad trestle. There are boat landings, with about 3 feet (0.9 m.) alongside, on the east side of **Branford Point,** where gasoline and launch supplies can be obtained. There is an electric road from Branford to New Haven.

Directions, Branford Harbor.—From eastward, pass southward of Negro Heads buoy, steer about **306°** true heading for Taunton Rock, and enter the harbor between the latter and Jeffrey Rock; or, a **333°** true course with Branford Reef Light astern will lead into the harbor between Jeffrey Rock and Taunton Rock. From westward, pass southward and over 100 yards eastward of Cow and Calf lighted bell buoy, steer **44°** true and enter the harbor between Blyn and Taunton Rocks.

Local craft pass northwestward of Cow and Calf shoal and pass midway between Johnson Point and Blyn Rock. When abeam of the point a course is laid for the light on Big Mermaid.

From Branford Harbor the dredged channel to Branford River leads between the **Mermaids.** Passing 125 yards southeastward of **Lovers Island,** and steering for the light on Big Mermaid, leads in the first section of the dredged channel. The middle of the next section of the dredged channel then leads 100 feet southeastward of **Big Mermaid light** and 125 feet southeastward of the end of the stone pier at Branford Point. Above this point there are no aids, and strangers should either take it on a rising tide, using the chart, or employ some one with local knowledge. There are some stakes on the shoals in places. At low water the channel above Branford Point is defined by the bare shoals on each side.

Bird Rock, with 5 feet (1.5 m.) over it, is marked on its southwest side by a buoy.

Johnson Point, the western point at the entrance of Branford Harbor, has a rock with a depth of 2 feet (0.6 m.) at mean low water about 100 yards off its south side. A small yacht basin has been

dredged on the southwest side of the point and is well protected in all but southerly winds.

Blyn Rock, a small rock which is covered at a good high water, lies midway between Johnson Point and Taunton Rock. It is marked on the north and south sides by buoys.

Taunton Rock is a large, low, bare rock near the middle of the entrance of Branford Harbor.

Five Foot Rock is marked on its south side by a buoy.

Cow and Calf are two boulders close together; the western one is covered at high water and the other is bare at low water. Broken ground, on which the least depth found is 11 feet (3.4 m.), extends 400 yards northwestward from Cow and Calf. A lighted bell buoy marks the south side of the rocks.

Gull Rocks lie on the eastern side of the entrance of the cove westward of Johnson Point. From the islets in the north half of the group, rocks, some sunken, extend 300 yards southward and 600 yards south-southwestward. At the northwest end of the cove there is a boat landing with a depth of about 2 feet (0.6 m.) alongside. Lying about 350 yards off **Short Beach** and 200 yards from the west side of the cove there is a rock, bare at half tide, which is marked at its southwest end by a private spindle.

Green Island, lying about 250 yards from shore at the northeast side of the cove is low and has a few trees.

There is a small repair yard and marine railway at the northwest side of the cove capable of hauling out small craft up to lengths of 40 feet and a draft of 4.5 feet (1.4 m.). Gasoline is available at the wharf which has depths of only 2 feet (0.6 m.) at low water. A limited amount of ship chandlery can be obtained.

Farm River Cut, a bight on the west side of the cove is a good anchorage for small craft, but is very small. There are depths of 4 to 5 feet (1.2 to 1.5 m.) with mud bottom and protected from all winds except easterly. **Old Clump** is a bare rock.

East Haven River has been improved by dredging a channel 6 feet (1.8 m.) deep for a distance of 1.3 miles above the entrance to an old quarry, just westward of which is a dike, which forms the head of navigation. A bar has formed across this channel at its entrance and has a controlling depth of about 3 feet (0.9 m.) at low water. A drawbridge, with an opening 45 feet wide, and a vertical clearance of 4.7 feet (1.4 m.) at mean high water, crosses the river about 0.8 mile above its mouth. There is little navigation on the river and the drawbridge is closed. The channel is only about 20 feet wide in places.

Darrow Rocks, on the east side of East Haven River entrance show above water, and the westernmost rocky knoll is marked by a flagstaff. A ledge, bare at low water, lies 200 yards south of the flagstaff. Lying about 700 yards south-southeastward of the flagstaff there is a ledge with 5 feet (1.5 m.) over it. The ledge is unmarked and caution is recommended to avoid it.

Stony Islet is low, bare, and surrounded by ledges, bare at low water to a distance of about 100 yards. A large reef, locally known as **East Indies Rocks,** covered at half tide, lies 300 to 450 yards eastward of Stony Islet. A small ledge, bare at low water, lies midway between the reef and the south side of **Mansfield Point.** The

latter and the shore westward are thickly settled, and have communication by electric road with New Haven.

Lying 400 yards north-northwestward of Stony Islet there is a partly bare ledge. Extending westward from this ledge and Stony Islet to the entrance of New Haven Harbor, there is an area of foul ground, which extends about 0.5 mile from shore. There are numerous rocks, bare at low water in this area and it should be avoided even by motor boats. **Round Rock** * is bare at low water and is surrounded by sunken ledges. It is marked by a red buoy, placed at the southern end of the 12-foot (3.7 m.) curve, nearly 0.7 mile from shore. Depths of 20 feet (6 m.) or less, broken and irregular bottom, extend 0.4 mile southeastward and southward from the buoy.

Townshend Ledge, marked by a lighted gong buoy at the south end, lies 2 miles from shore and about 2.6 miles, 256° true from Branford Reef Light. The least depth on the ledge is 18 feet (5.5 m.) and this is marked by a buoy.

Dumping grounds.—A lighted buoy, maintained by the city of New Haven, has been established about 5.4 miles, 150° true from New Haven Lighthouse to mark the corner of the dumping grounds.

NEW HAVEN HARBOR

(CHART 218)

New Haven Harbor is commercially one of the most important harbors in Long Island Sound and is an important harbor of refuge for vessels of less than 24-foot (7.3 m.) draft. It is about 67 miles from New York, 174 miles from Boston via the Cape Cod Canal, and 162 miles from Nantucket Shoals Lightship. It comprises all of the tidewater lying northward of the breakwaters constructed across the mouth of the bay, including the navigable portions of the West, Mill, and Quinnipiac Rivers. It is about 2 miles wide and shoals gradually from depths of 27 feet (8.2 m.) in the vicinity of the west breakwater to depths of 4 to 10 feet (1.2 to 3.0 m.) in Morris Cove. The inner harbor consisting of the portion northward of Sandy Point and Fort Hale is for the most part shallow, except where depths have been increased by dredging.

The main entrance channel, between Luddington Rock breakwater and the east breakwater, is about 400 feet wide and leads northward to Tomlinson Bridge at New Haven. Anchorage basins with depths of 20, 16, and 15 feet (6.1, 4.9, and 4.6 m.) have been dredged on the sides of the channel above Fort Hale (see descriptions under "Anchorage" following). In 1939 the main channel had a controlling depth of 25 feet (7.6 m.) to nearly Tomlinson Bridge. The river channels are described under separate heads. The depths at the principal wharves range from 12 to 27 feet (3.7 to 8.2 m.). The city wharf has a depth of 10 feet (3.0 m.) at its southeast end; the other sides of the wharf are shoal. Canal Wharf is in ruins. Depths alongside the wharves in Quinnipiac River approximate closely the depths in the adjacent channel. The wharves along Mill River have depths of 8 to 18 feet (2.4 to 5.5 m.). Depths along the West Haven wharves, bordering on the 12-foot (3.7 m.) channel,

* Lat. 41°14'.1, Long. 72°53'.0: Charts 218, 1212.

vary from 5 to 12 feet (1.5 to 3.7 m.). The deepest draft of vessels going up to the city is 28 feet (8.5 m.) at high water.

From the 15-foot (4.6 m.) anchorage a channel 100 feet wide has been dredged toward Brewery Street, the southwest edge of the channel lying 130 feet off the northeast side of Canal Wharf, which is now in ruins.

Shoals bare at low water lie on both sides of this channel in places, between which are channels leading to some of the wharves as shown on the chart. The upper end of the channel is marked by piles on the southwest side. The wharves bordering on this channel have depths of 8 to 10 feet (2.4 to 3 m.) at their ends and sides, with the exception of the city wharf, which nearly bares at its southwest end at low water.

Landings are not recommended at this wharf as it is in poor condition.

Dredged channels on the east shore, about 400 yards and 1 mile to the southward of Tomlinson Bridge, lead from the main channel to an oil wharf and to a coke wharf, respectively.

The controlling depth in the channel to the oil dock in 1939 was about 28 feet (8.5 m.) and 26 feet (7.9 m.) to the coke wharf.

The passage eastward of the east breakwater has boulder patches and is very broken, but can be used by small craft of less than 6-foot (1.8 m.) draft, taking care, however, to avoid the foul ground along the northeast side of the passage. This passage has been buoyed and can be navigated with the aid of the chart. Local vessels of as much as 10 to 12 feet (3 to 3.7 m.) draft, use the passage at high water. Avoid **Quixes Ledge,** which extends about 200 yards southeastward from the eastern end of the breakwater, pass about 100 yards eastward of the breakwater. The principal danger inside the breakwater is the reef marked at its end by a buoy, extending 300 yards southwestward from **Lighthouse Point** (marked by a prominent unused, white, lighthouse tower). **Adams Fall,** a rock with 5 feet (1.5 m.) over it and marked on its southwest side by a buoy, lies 0.4 mile west-southwestward of Lighthouse Point.

New Haven is an important manufacturing city at the head of the harbor and is the chief commercial port of Connecticut. The port has a large carrying trade.

The **prominent objects** are Southwest Ledge Lighthouse and New Haven Light, the Soldiers and Sailors Monument on East Rock, the Union New Haven Trust Building (gilded dome on top) which shows up to the right of a large square building and the aero beacon, about 0.8 mile northeastward of Fort Hale, which shows up very well at night.

East Rock is a hill with bluff sides over 300 feet high, and is marked by a high monument, which shows well above the sky line and is prominent from the Sound.

Southwest Ledge Lighthouse,* on the west end of East Breakwater, is a white, octagonal house on a brown, cylindrical pier.

The light is 54 feet (16.5 m.) high and visible 12 miles.

The fog signal is an air diaphragm horn.

East Breakwater extends 3,450 feet in an east-northeasterly direction from Southwest Ledge Lighthouse to Quixes Ledge.

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* Lat. 41°14'.1, Long. 72°54'.8: Charts 218, 1212.

Luddington Rock Breakwater is 4,450 feet long in a west-southwesterly direction. Its easterly end lies about 0.5 mile southwestward of Southwest Ledge Lighthouse, and is marked by a light 29 feet (8.8 m.) high and exhibited from a black skeleton tower with a white tank house on a black square base.

The westerly end of the breakwater is marked by a light 29 feet (8.8 m.) high and exhibited from a red skeleton tower with a white tank house on a red square base.

The depths northward of the eastern half of the breakwater are 14 to 18 feet (4.3 to 5.5 m.), bottom generally hard.

West Breakwater is 4,200 feet long in a northwesterly direction.

New Haven Light, just inside of the east end of the west breakwater, is a black skeleton tower. The light is 49 feet (15.0 m.) high and visible 13 miles. The west end of the west breakwater is marked by a light 26 feet (7.9 m.) high and exhibited from a red skeleton tower with a white tank house on a red square base.

Anchorage in 18 to 28 feet (5.5 to 8.5 m.), bottom generally soft, can be had inside West Breakwater and the westerly half of Luddington Rock Breakwater and vessels of as much as 24 feet (7.3 m.) draft can anchor with swinging room. There is a clear entrance with a depth of about 24 feet (7.3 m.) between the breakwaters and another with somewhat greater depth westward of West Breakwater. (See Anchorages, page 234.)

Morris Cove, on the east side of New Haven Harbor between Lighthouse Point and Fort Hale, is much used by yachts during the summer. A yacht club is located near the southern end of the cove. The dangers for vessels of less than 8-foot (2.4 m.) draft will be avoided by giving the eastern shore of the cove a berth of 0.3 mile, and vessels up to 12-foot (3.7 m.) draft can select anchorage off the cove and eastward of the dredged channel. The bottom is generally soft. A rock with 2 feet (0.6 m.) over it, about 100 yards from shore, and about 0.3 mile southwestward of the yacht club landing, is marked by a private red buoy. **Black Rock,** bare at lowest tide, lies 200 yards from shore at the north end of the cove; there is little depth between it and the shore northeastward.

West River, between New Haven and **West Haven,** has been improved by dredging a channel 100 feet wide with increased width at the bends and along the wharves at West Haven, for a distance of 1.3 miles to Kimberly Avenue bascule bridge thence 75 feet in width for a further distance of 0.5 mile to a fixed railroad bridge. The bascule bridge has a horizontal clearance of 45 feet and a vertical clearance of about 7 feet (2.1 m.) above mean high water when the bridge is closed. The fixed bridge has a horizontal clearance of 23 feet and a vertical clearance of 5 feet (1.5 m.) at mean high water. In 1938, the controlling depth was 13 feet (4.0 m.) to nearly the railroad bridge and 10 to 12 feet (3.0 to 3.7 m.) to the head of navigation about 1 mile above it.

For bridge regulations see page 236.

The entrance channel from the vicinity of the anchorage area on the west side of the main channel is well marked by buoys and lighted aids and leads westwardly to a wharf on City Point, then southwestwardly along the outer wharves on the point, until halfway across the river, and then curves westward and northward, passing about 50 feet off the outer wharves at West Haven. The channel

is buoyed to the wharves at West Haven. The flats on both sides are largely bare at low water and covered with oyster stakes. The depths at the wharves at West Haven and the outer wharves at City Point range from 4 to 12 feet (1.2 to 3.7 m.).

Mill River has been improved by dredging a channel 200 feet wide for a distance of 0.4 mile above Tomlinson Bridge to the junction of the two branches above Chapel Street Bridge, thence to Grand Avenue, a distance of about 0.3 mile, 100 feet wide in the east branch and generally 125 feet wide in the west branch. This channel is subject to shoaling.

In 1939, the controlling depth to the heads of the branches was 11 feet (3.4 m.) at mean low water.

The point of the shoal lying between the dredged channels leading to Mill and Quinnipiac Rivers is unmarked. Northward of Tomlinson Bridge, the channel leads for the draw openings in Chapel Street Bridge. The depths at the wharves range from 10 to 15 feet (3 to 4.6 m.) in the eastern channel and 8 to 11 feet (2.4 to 3.4 m.) in the western one.

Tomlinson Bridge, at the head of the main harbor, and the mouth of Mill and Quinnipiac Rivers, has a double bascule draw with an opening 125 feet wide and vertical clearances of 4 to 12 feet (1.2 to 3.7 m.) above mean high water when closed, the maximum clearance being at the center.

The Chapel Street Bridge, about 0.3 mile north of the Tomlinson Bridge, is a center pier swing which provides two openings, both of which are about 71 feet wide. The vertical clearance when the bridge is closed is 7 feet (2.1 m.) above mean high water.

For bridge regulations see page 236.

The bridges crossing Mill River at and above Grand Avenue are fixed spans, with a least horizontal clearance of 20 feet and least vertical clearance of 4.5 feet (1.4 m.) at high water. Small unmasted boats go as far as the bridge at State Street, 0.5 mile above Grand Avenue, the channel depth to which is about 3 feet (0.9 m.) at low water. At high water motor boats up to 4 feet (1.2 m.) draft can go about 2 miles above Grand Avenue to the dam at Whitneyville.

Quinnipiac River extending easterly and northerly through the city from the Tomlinson Bridge, where it has a common mouth with Mill River and the inner harbor has been improved by dredging a channel 200 feet wide for a distance of 1.1 miles above Tomlinson Bridge to Grand Avenue Bridge. In 1939, there was a controlling depth of 16 feet (4.9 m.) to the bridge at Grand Avenue. Above Grand Avenue the controlling depth is only 2 feet (0.6 m.).

Two drawbridges cross the river within its improved limits. The Ferry Street Bridge, 0.6 mile above the Tomlinson Bridge, is of the bascule type and provides a clear opening of 101 feet wide and a vertical clearance of 19.5 feet (5.9 m.) above mean high water when closed. The Grand Avenue Bridge, 0.5 mile further upstream, is a center pier swing which provides two openings, each of which has a horizontal clearance of 70 feet. The vertical clearance is 9.5 feet (2.9 m.) at mean high water when the bridge is closed.

For bridge regulations see page 236.

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Above Grand Avenue are several fixed bridges and railroad trestles with small clearances, limiting the use of the river to small unmasted boats.

After passing the Tomlinson Bridge haul slowly east for the wire mill wharf, until about 150 feet off, then turn for the Ferry Street Bridge. Then stay in mid-channel and head for the west opening of the Grand Avenue Bridge. (Between Ferry Street Bridge and Grand Avenue Bridge there is an old channel near the Ford Brothers wharf and a shoal area exists between the old and the new channels. Vessels should be on the lookout for this shoal.)

Pilotage.—All inward- and outward-bound foreign vessels drawing 9 feet (2.7 m.) or over are subject to the payment of pilotage if spoken. Under other conditions pilotage is optional. The usual place of boarding is off Southwest Ledge Light or behind the breakwaters.

For pilotage rates, see Port and Terminal Charges published by the Corps of Engineers, United States Army. For sale by the Superintendent of Documents, Washington, D. C.

Towage.—Steam vessels usually proceed to the harbor without assistance.

Towboats are used by sailing vessels, and can always be had by making signal (ensign in the rigging); few vessels entering for anchorage take a towboat. Arrangements for the use of towboats can be made by commercial radio through the Western Union or Postal Telegraph companies. Charges for towing, pumping, and watering are in accordance with a schedule fixed by the local towboat company, whose offices are on the Wyatt Dock.

Immigration Service.—There are no officials of this service stationed at New Haven. The necessary officers can be secured from Hartford, Conn., through the local customs office.

Customs Service.—The customs office is in the Federal Building, on Church Street opposite the Central Green. Unlimited facilities for bonded storage are provided.

Quarantine.—There is no quarantine station but medical inspection is made by an acting assistant surgeon of the United States Public Health Service.

Hospitals.—The city of New Haven has numerous public and private hospitals and sanatoriums. The Grace Hospital, 1418 Chapel Street, is the designated contract hospital. Sick or injured seamen may apply for treatment under the seamen's act, to the acting assistant surgeon of the Public Health Service.

For relief station, see Appendix.

Anchorage.—The anchorage inside West Breakwater and the southwest half of Luddington Rock Breakwater is available for vessels of as much as 22-foot (6.7 m.) draft. Vessels can anchor on either side of the dredged channel from just inside the breakwaters up to Fort Hale, the depths ranging from 12 to 20 feet (3.7 to 6.1 m.). Morris Cove affords good anchorage, and is used by yachts, but is rought in westerly winds.

An anchorage basin, with a depth of 18 feet (5.5 m.), in 1939, has been dredged on the east side of the channel from the bell buoy abreast Fort Hale to the buoy 0.8 mile above. The total width of the channel and basin is 1,000 feet. This anchorage is generally used for an emergency only.

An anchorage basin, with a depth of 16 to 19 feet (4.9 to 5.8 m.), in 1939, has been dredged on the west side of the channel below Long Wharf.* The total width of the channel and basin is 1,200 feet. This anchorage is frequently used. The area northward of the east breakwater is obstructed by ledges and is not available for anchorage except northward of the lighthouse, where the depth is 18 to 20 feet (5.5 to 6.1 m.), bottom soft in places.

An anchorage basin much used by small craft and scows is the area eastward of Canal Wharf, on the northwest side of the channel, where there are depths of 11 to 18 feet (3.4 to 5.5 m.). There is a public landing at the northwest side of this anchorage.

There are no special regulations prescribing the limits within which vessels must anchor, except that the dredged channel must be left clear. The harbor is under the immediate supervision of the harbor master, who gives his attention to the berthing of vessels, when necessary, in order to keep a clear channel for the steamers.

The harbor master has charge of the berthing and anchoring of vessels. Harbor regulations are not strictly defined. The harbor master's headquarters are at the Wyatt Dock, just below Tomlinson Bridge.

Tides.—The mean rise and fall of tides is about 6 feet. Extreme tides have been recorded as reaching more than 2½ feet below the plane of mean low water and more than 8 feet above the same datum.

Currents.—In the entrance channel, between the breakwaters, slacks before flood and ebb, respectively, occur about ¾ hour after New London low water and 1½ hours after New London high water. The average velocity of the current at strength is about 1¼ knots. The strength of flood and ebb, respectively, occur about 2½ hours before high water and low water at New London. The flood sets 320° true and the ebb in the opposite direction.

In the draw of Tomlinson Bridge slack water before flood and ebb, respectively, occur about 2¼ hours after low water and high water at New London. The strength of flood occurs about 1 hour before high water at New London and has an average velocity of about 1¼ knots. The strength of ebb occurs about 1 hour before low water at New London and has an average velocity of about 1¼ knots which is increased somewhat by freshets. The flood current sets easterly just southward of the bridge.

Ice generally obstructs navigation to some extent for sailing vessels from December to March, sometimes extending to the mouth of the harbor. Steamers can generally enter and depart, except in severe winters, when the ice is exceptionally thick. During severe winters the occumulation 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 passage of sailing vessels without the assistance of towboats. Except in extraordinarily severe weather, however, steamers can always enter and leave the harbor without much difficulty. 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. See p. 196.

Prevailing winds.—The prevailing winds are south and southwesterly in the summer months and northerly during the remainder

* Lat. 41°17'.6, Long. 72°55'.0: Charts 218, 1212.

of the year. The heaviest gales are from the northeast and the southeast.

Storm warnings are displayed at the customhouse, New Haven, and near the old light tower at the entrance to the harbor.

Bridge regulations have been prescribed by the Secretary of War governing the opening of the Tomlinson Bridge, Chapel Street Bridge across the Mill River, Ferry Street Bridge across the Quinnipiac River, Grand Avenue Bridge across the Quinnipiac River, Kimberly Avenue Bridge across the West River, as follows:

1. The signals for opening the draws of the above-named bridges shall be given by blasts of a horn or steam whistle as follows: For Tomlinson Bridge, 2 short blasts; for Chapel Street Bridge, 3 short blasts; for Ferry Street Bridge, 1 short blast; for Grand Avenue Bridge, 1 long blast; for Kimberly Avenue Bridge, 3 short blasts.

2. *Visual signals.*—To be used in conjunction with sound signals when conditions are such that sound signals cannot be heard.

A white flag by day, and a white light by night swung in full circles at arm's length in full sight of the bridge and facing the draw.

3. Acknowledging signals by the bridge operator.

(*a*) *Sound signals.*—Draw to be opened immediately; same as call signal.

Draw cannot be opened immediately, or, if open, must be closed immediately: Two long blasts of a horn or whistle, to be repeated at regular intervals until acknowledged by the vessel.

(*b*) *Visual signals.*—Draw to be opened immediately; A white flag by day or a green light at night swung up and down vertically a number of times in full sight of the vessel.

Draw cannot be opened immediately, or, if open, must be closed immediately: A red flag by day, a red light by night, swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

4. *Acknowledging signals by vessel.*—Vessels or other water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or, if open, must be closed immediately, shall acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day and a red light by night.

5. Except as hereinafter provided, the draws of the above-named bridges shall be immediately opened, upon the prescribed signal, at all times during the day or night, for the passage of foreign vessels and "vessels of the United States," as defined in section 4311 of the Revised Statutes. *Exceptions:* Closed periods when the draws need not be opened are authorized as follows:

Between 7:30 a. m. and 8:00 a. m.
Between 12:00 m. and 12:15 p. m.
Between 12:45 p. m. and 1:00 p. m., and
Between 5:00 p. m. and 5:30 p. m.

Directions, New Haven Harbor, from westward.—(See Table No. 4 p. 45 for Directions from Throgs Neck.) With Eatons Point Lighted Bell Buoy bearing 180° true at a distance of 0.2 mile, steer 68° true for 13.6 miles passing northward of Stratford Shoal Lighthouse at a distance of 1.8 miles when abeam. Then steer 50° true for 12 miles to a position with Southwest Ledge Lighthouse bearing 0° true, distant 1 mile.

From eastward.—It is safer for large vessels to pass southward of Branford Reef and Townshend Ledge. Passing 1 mile or more southward of Falkner Island Lighthouse a 270° true course will lead well southward of Townshend Ledge. When Southwest Ledge Lighthouse bears anything northward of 312° true, the course can be changed for the entrance.

Or, passing 0.5 mile southward of Branford Reef Light, a 274° true course for New Haven Lighthouse * will lead 0.3 mile northward

* Lat. 41°13'.3, Long. 72°56'.5: Charts 218, 1212.

of Townshend Ledge. Round Rock and the shoals, with less than 12 feet (3.7 m.), eastward of the entrance will be avoided by keeping Southwest Ledge Lighthouse bearing anything northward of 284° true.

The outermost 18 foot (5.5 m.) shoal just west of the harbor entrance is marked by a buoy on the south side of the shoal. A lighted bell buoy marks the west side of the entrance to the channel.

Shoals with depths of 16 to 18 feet (4.9 to 5.5 m.) extend over 0.5 mile southeastward from Luddington Rock Breakwater. The range of the old light tower on Lighthouse Point open eastward of Southwest Ledge Lighthouse leads eastward of these shoals. The deepest water in the main entrance will be carried by approaching Southwest Ledge Lighthouse on any bearing between 0° true and 312° true and passing about 200 yards westward of the lighthouse.

Entrance to New Haven.—From a position about 100 yards eastward of the lighted bell buoy about 0.5 mile southward of Southwest Ledge Lighthouse steer **166°** true and then follow the well marked channel to the wharves at the head of the harbor.

Dockage.—At the city wharf maximum rates for dockage are fixed by city ordinance.

Wharfage and Storage.—At the city wharf, rates for wharfage including storage at sole risk of the owners, are fixed by city ordinance.

Rates at private wharves open to the public are by agreement.

Supplies.—Coal, water, provisions, and ship chandler's stores can be obtained. Water can be had from towboats and at some of the wharves. Gasoline, water, and ice can also be obtained at the yacht club landing and through the towboat office.

Coal Bunkering.—Bunkering facilities at all but one wharf are limited to coaling towboats and other medium-size craft. There are wharf facilities for bunkering large steamers but there is practically no demand for such service. Pennsylvania and West Virginia coals are obtainable, the prices ranging with the quality, quantity, and market rate. Bunkering by lighters to vessels in the stream is by arrangement. Trimming in bunkers, if required, is charged for at labor rates agreed upon.

Oil Bunkering.—Terminals are maintained at New Haven by the major oil companies; fuel oil and diesel oil in the usual commercial grades are available. There is a normal storage supply of about 100,000 barrels of bunker "c" fuel oil and 7,000–9,000 of other grades. Barges are available for bunkering in the stream.

Repairs to wooden hulls and machinery of steamers can be made at New Haven. The largest marine railway (at West Haven) has a capacity of about 400 tons and is capable of hauling out vessels up to lengths of 110 feet with drafts up to 14 feet (4.3 m.). All major repairs may be obtained. There are several smaller railways on the Quinnipiac River with a capacity of about 100 tons which can accommodate craft up to lengths of 75 feet and a draft of 7 feet (2.1 m.).

Communication.—New Haven has good facilities for communication, both by railroad and bus. There are also frequent sailings of freight boats to New York.

Chapter 11.—LONG ISLAND SOUND, NEW HAVEN TO THROGS NECK

NEW HAVEN TO BRIDGEPORT

From New Haven to Bridgeport the shore is, in general, low with few off-lying dangers. There are few protected anchorages, but the Wepawang and Housatonic Rivers are available as harbors of refuge for small craft with local knowledge.

Savin Rock, a part of West Haven, is a summer resort on the northwest shore of New Haven Harbor. Boats of about 5-foot (1.5 m.) draft run from the landings at Savin Rock across the harbor to the landings at the summer resort northeastward of Lighthouse Point. A roller coaster is very prominent at Savin Rock.

Woodmont is a post office and summer settlement on **Merwin Point,** 2 miles west-northwestward of New Haven Light.* The shore is rocky at Woodmont, and there are two large bare rocks and much foul ground in the bight westward of the point.

Pond Point, 3.7 miles southwestward of New Haven Light, has a rocky shoal, with little depth over the greater part of it, extending 600 yards southward, which is marked at its south end by a buoy. Lying 0.5 mile northeastward of the point is a large, yellow residence with a lawn in front of it, and there is a prominent white mast on the point.

The beach eastward of Pond Point is known as **Point Beach.** A resort also called **Pond Point** is situated about 0.6 mile west-northwestward of Point Beach.

Welchs Point, 1 mile westward of Pond Point, is on the east side at the entrance of Milford Harbor. A reef extends 600 yards southward from the point, and is marked at its south end by a buoy.

Milford Harbor (chart 219) is a bight between Welchs Point and Charles Island, about 5 miles westward of New Haven Light and nearly 4 miles northeastward of Stratford Point Lighthouse. The bight affords anchorage in 6 to 15 feet (1.8 to 4.6 m.), sheltered from all but southerly and southeasterly winds. The entrance is clear between the buoy southward of Welchs Point and the buoy eastward of Charles Island. The shoaling is gradual and the lead is a good guide on the northwest side of the cove; the western side of Welchs Point and the reefs around Charles Island and between it and the shore should be approached with caution, as the shoaling is abrupt. The mean rise and fall of tides is about 6½ feet.

Wepawaug River, on the north side of Milford Harbor, has been improved by dredging a channel 100 feet wide and 10 feet (3.0 m.) deep from the entrance to Merwin Wharf. A small anchorage basin with depths of 5 to 10 feet (1.5 to 3.0 m.) has been dredged on the east side of the channel from 100 feet northward of Long Jetty to

*Lat. 41°13'.3, Long. 72°56'.5: Charts 218, 1212.

Merwin Wharf, and another basin with a depth of 10 feet (3.0 m.) has been dredged on the southwest side of the channel opposite Merwin Wharf.

In July 1939 the dredged channel was continued from Merwin Wharf to about 400 feet above the town wharf and had a controlling depth of 8 feet (2.4 m.). An anchorage area with a depth of 8 feet (2.4 m.) extends along the west side of the channel for a distance of about 1,200 feet above Merwin Wharf.

Long Jetty, which shows at high water, extends in a westerly direction from the eastern side at the entrance of the river, and is marked at its end by a light which lies 120 feet eastward of the dredged channel. **Burns Point Jetty,** partly bare at half tide, extends southward from the western point at the entrance; it lies about 75 feet westward of the dredged channel. There is a yacht club on the north side of Burns Point, with a float landing.

Caution is recommended to avoid striking the south end of Burns Point jetty. It is marked by a buoy off its end and is covered to a depth of about 2 feet (0.6 m.) of water.

The entrance channel to Wepawaug River is well marked by buoys to Merwin Wharf, above this point small craft should have no difficulty by using the lead and the chart as a guide.

Merwin Wharf, on the east side just above Burns Point, has depths of 7 to 10 feet (2.1 to 3.0 m.) alongside. Vessels of 12 feet (3.7 m.) draft can be taken to the wharf at high water, but the usual draft is not more than 8 feet (2.4 m.). The principal trade is in oysters. Gasoline, fresh water, and some coal can be obtained. Towboats can be had from New Haven or Bridgeport, but are seldom used. A local pilot can be had from Merwin Wharf or the yacht club, if necessary.

Charles Island, on the southwest side at the entrance of Milford Harbor, is low and partly covered with scrubby trees. There are several houses on it and a prominent white house is on its south end. A white pole is in the center of the island. It lies 0.5 mile from the shore northwestward, with which it is connected by a bar, bare at low water. A buoy marks the end of a shoal, which extends 250 yards east-northeastward from the island. **Charles Island Rocks** is the name given to the rocky shoal which extends 0.4 mile southward from the island; the south end of the shoal is marked by a lighted bell buoy. There is good anchorage in 10 to 16 feet (3.0 to 4.9 m.) northward of Charles Island, sheltered from southerly to southwesterly winds.

Silver Beach, Myrtle Beach, Walnut Beach, Laurel Beach, and **Cedar Beach** are summer resorts on the beach between Milford Harbor and Housatonic River. Walnut Beach is a post office.

Housatonic River is described under a separate heading.

Stratford Point Lighthouse * is a white, conical tower with a brown band midway of its height. The light is 52 feet (15.8 m.) high and visible 13 miles. The fog signal is an air diaphragm horn.

Stratford Point, on the western side of the entrance to Housatonic River, is marked on the south side by a lighthouse. The shoals, which extend southward toward Stratford Shoal (Middle Ground) Lighthouse from the shore westward of Stratford Point Lighthouse,

*Lat. 41°09'.1, Long. 73°06'.2: Charts 219, 220, 1212, 1213.

consist of narrow ridges of hard sand with deeper water between, and are occupied by oyster beds, marked by stakes. Depths of 12 feet (3.7 m.) or less extend 1 mile from shore, and are marked at the south end by a gong buoy, which lies about 1.5 miles southwestward of Stratford Point Lighthouse.

Directions, approaching Bridgeport.—The shoals, with depths of 12 feet (3.7 m.) or less, will be avoided by keeping Stratford Point Lighthouse bearing northward of **34°** true and Bridgeport Harbor Lighthouse bearing northward of **304°** true. Lumps, with 16 to 18 feet (4.9 to 5.5 m.), extend 0.9 mile southward and 1 mile southwestward of the gong buoy and are marked by a lighted bell buoy. These will be avoided by keeping Penfield Reef Lighthouse bearing northward of **273°** true while Stratford Point Lighthouse bears between **40°** true, and **11°** true, and by passing southward of the lighted bell buoy. The 5-fathom (9.1 m.) curve at the south end of the shoals lies 3.4 miles from shore and 2.2 miles northward of Stratford Shoal Lighthouse.

Vessels of less than 10 feet (3.0 m.) draft trading between Housatonic River and Bridgeport having local knowledge, generally pass 0.3 mile south of Stratford Point Lighthouse, follow the beach at a distance of 0.3 to 0.4 mile until westward of Point No Point, having passed inside the 9-foot bank off that point, and then head to pass about 0.5 mile outside of the jetties off Bridgeport Harbor until in the dredged channel to that harbor.

Stratford Shoal Middle Ground, with depths of 4½ to 16 feet (1.4 to 4.9 m.), extends about 0.4 mile northward and southward from the lighthouse marking it. The south point of the shoal is marked by a lighted gong buoy. Another red buoy, about 225 yards southeastward of the lighthouse, marks a pinnacle rock with 10 feet (3.0 m.) over it. Shoal spots, with 14 to 15 feet (4.3 to 4.6 m.), extend 0.8 mile northeastward and northward from the lighthouse. The north end of the shoal is marked by a black buoy, placed in a depth of 6 fathoms (11.0 m.), about 1 mile northward of the lighthouse.

Stratford Shoal (Middle Ground) Lighthouse is a gray granite, octagonal tower, projecting from a house, on a pier. The light is 60 feet (18.3 m.) high and visible 13 miles. The fog signal is an air siren.

A radiobeacon is operated at the lighthouse which is synchronized with the sound signals for use in distance finding.

For light characteristics and fog signals, see Light List, North Atlantic Coast.

HOUSATONIC RIVER

(CHART 219)

The river is marked on the west side of its entrance by Stratford Point Lighthouse. The river has been improved by dredging a channel 7 feet (2.1 m.) deep with a width of 200 feet across the bar at the entrance and 100 feet on the bars in the river, to the head of navigation at the wharves at the towns of Derby and Shelton.

The Housatonic River rises in the Berkshire Hills of western Massachusetts and flows 130 miles southerly through Massachusetts and Connecticut and empties into Long Island Sound. In the vicinity of Derby, Conn., it is joined by the Naugatuck River, which is its

principal tributary. From its entrance in the vicinity of Stratford Point the Housatonic River is navigable to a point about 1 mile above Shelton, Conn., where it is closed by a power dam. The head of navigation, however, is practically at the wharves at the towns of Derby and Shelton, a distance of 11.5 miles above the entrance.

The controlling depths in June 1939, were 7 feet (2.1 m.) from the entrance to the vicinity of Mill Bar, thence 6 feet (1.8 m.) to Drews Bar and 5 feet (1.5 m.) to Shelton. The bars above the railroad bridge at Devon were to be dredged to 7½ feet (2.3 m.) in 1939.

At high water a draft of 11 feet (3.3 m.) can be taken up the river to the oil company's wharf about 0.5 mile above the railroad bridge, and 9 feet (2.7 m.) to Derby and Shelton. The river is closed by a power dam at a point about 1 mile above Shelton. Small vessels can anchor in the river abreast Stratford, where the channel has an available width of about 500 feet.

On the east side of the entrance a breakwater has been built out from **Milford Point** across the bar, and is marked at its south end by a flashing red light. The outer section of the breakwater shows at high water, while the inner section, extending in to Milford Point, is covered at three-quarters flood.

Housatonic River Light No. 1, established in the former position of Stratford beacon, is the most southerly of four lights along the west side of the river channel. It is a black, square, pyramidal tower on white tank house with gray granite base.

Stratford is a town on the west bank of the river, 2.3 miles above the entrance. The principal wharf has a depth of about 9 feet (2.7 m.) at its end. Coal and gasoline can be obtained. There is a boat yard with several marine railways the largest of which has a capacity of 500 tons and capable of hauling out vessels up to lengths of 100 feet with a draft of 12 feet (3.7 m.). There are two yacht clubs on the west side of the river.

At **Devon,** on the east bank about 1 mile above Stratford there are two bridges which cross the river. Local small craft anchor near the west bank of the river just north of the highway bridge in depths of water up to 12 feet (3.7 m.). Gasoline, lubricants and yachting supplies may be obtained. There is also a chart agency here.

Shelton, a town on the western bank of the river, and connected with **Derby** by two bridges, has many important manufactories. There are depths of 5 to 7 feet (1.5 to 2.1 m.) at low water at the wharves at Derby and Shelton. Gasoline, provisions, and some motor boat supplies can be obtained at Derby. Communication is by busses with Bridgeport.

Pilots and **towboats** can be obtained at Bridgeport.

Tides.—The time of tide becomes later and the range diminishes in progressing up the river. The tide at Stratford occurs about ¾ hour later and at Pecks Mill about 1 hour later than at Willets Point. At Shelton high water is about 1½ hours later and low water about 2½ hours later, respectively, than at Willets Point. The mean rise and fall of the tide varies from about 6½ feet at the entrance to about 5½ feet at Stratford and 5 feet at Shelton.

The river water is fresh above **Oronoque Bar** (0.5 mile above Fowler Island) and above **Mill Bar** on the ebb.

Currents.—Between Milford Point and **Crimbo Point** slack water before the flood occurs about 3¼ hours after low water at New

London. The strength of flood occurs about the time of high water at New London and sets 300° true with an average velocity of about 2½ knots. Slack water before ebb occurs about 2¾ hours after high water at New London. The strength of ebb occurs about ¾ hour before the time of low water at New London and sets 130° true with an average velocity of about 2½ knots.

Just south of the draw of the railroad bridge above Devon, slack before flood occurs about 3½ hours after low water at New London. The strength of flood occurs about ½ hour after high water at New London and has an average velocity of about 1 knot. Slack before ebb occurs about 3 hours after high water at New London. Strength of ebb occurs about ½ hour before low water at New London and has an average velocity of about 1½ knots.

Freshets.—Spring freshets at Shelton rise to 10 feet or more above mean high tide.

When the river is high and during freshets the ebb current will be increased and the flood current diminished. Elsewhere in the river the tidal currents have less velocity, but are strong throughout, decreasing, however, toward the head of navigation. At the entrance, near the end of the breakwater, there is a strong westerly set on the flood. In the openings of the bridge above Stratford the flood current has some easterly set, while the ebb sets fair with the openings.

Ice closes the river above Stratford during the winter, and sometimes extends to the entrance.

Bridges.—Two bascule bridges cross the river. The first, lying 1 mile above Stratford, has an opening 125 feet wide and a vertical clearance of 32.3 feet (9.8 m.) above high water; the second, or railroad bridge, lying 0.3 mile farther up, has an opening 81 feet wide and a vertical clearance of 19.6 feet (6.0 m.) above high water.

About 3 miles above Stratford a new high-level bridge of the Merritt Parkway and William Cross Highway is being constructed across the river. When completed (June 1940) the bridge will have a horizontal opening of about 150 feet and a vertical clearance of 85 feet (25.9 m.) above mean high water.

Bridge Regulations.—The following regulations apply to the highway bridge and the railroad bridge.

1. The draw of the highway bridge shall be immediately opened at any hour of the day or night for the passage of foreign vessels and "vessels of the United States," as defined by section 4311, Revised Statutes (46 U.S.C. 251), upon a signal given by one long and one short blast of a horn or steam whistle. The draw of the railroad bridge shall be opened upon a signal given by one long and two short blasts of a horn or steam whistle.

2. The draw shall, when the above-described signal is given, be opened as soon as practicable for all other vessels which cannot pass the closed bridge, but in no case shall the delay be over 20 minutes.

3. In case the bridge cannot be immediately opened when the signal is given, a red flag or ball by day or a red light by night shall be conspicuously displayed.

4. Signals for the opening of the draw shall be answered by a whistle or Klaxon horn on the bridge with the same signal when the operation of opening is commenced, or by a series of not less than four short sharp blasts each of not more than one second duration, when the bridge cannot be promptly opened.

5. When a train scheduled to pass beyond the bridge without stop has passed the last station nearest the bridge and is in motion toward the bridge, the bridge shall be opened for the above-named vessel as soon as the approaching train has been brought to a stop at the drawbridge signal.

Directions, Housatonic River.—The channel is narrow and crooked, with little depth on either side, and across the bars in the river the channels are dredged cuts 100 feet wide. Moreover, the tidal currents are strong, especially in the lower part of the river, and strangers are advised to take a pilot. Small craft, without a pilot, should proceed with caution and preferably on a rising tide.

Passing about 200 feet southwestward of the perpendicularly striped bell buoy at the entrance, steer **306°** true following the red buoys at a distance of 75 to 100 feet, until Housatonic River Light No. 1 is about abeam. On this course, during a flood tide, care must be used to avoid being set on the shoals on the west side by the strong westerly currents.

The channel is well marked by buoys and lighted aids to Stratford and by steering mid-channel courses no difficulty should be encountered. Above Stratford, chart 219 is the best guide. Buoys have been established to mark the channels across the bars.

BRIDGEPORT HARBOR

(CHART 220)

Bridgeport Harbor is on the north side of Long Island Sound, north-northwestward of Stratford Shoal Lighthouse and about 52 miles from New York. The harbor consists of two widely separated units, the main harbor and its branches serving the east and central portions of the city, and Black Rock Harbor with its tributaries serving the western portion. Black Rock and Cedar Creek will be described under a separate heading.

Bridgeport East Breakwater Light is a light on a red skeleton tower with a white tank house on the end of the east breakwater at the entrance of the harbor.

Bridgeport Harbor Lighthouse,* a white structure on piles, lies 200 feet westward of the dredged channel and 500 feet inside the ends of the breakwaters at the entrance. The light is 53 feet (16.2 m.) above the water and is visible about 9 miles. The fog signal is a bell. The remains of an old structure having a depth of ½ foot (0.2 m.) over them are about 80 yards 13° true from the lighthouse. The buoy marking the remains is eastward of the obstruction.

A 25-foot (7.6 m.) channel, 300 feet wide leads through the southwestern part to the Poquonock River. In June 1939, there was a controlling depth of 25 feet (7.6 m.) as far as Stratford Avenue Bridge.

Bridgeport Breakwater Lighthouse, a black, conical tower on pier, is at the end of the breakwater making off from Tongue Point to the edge of the channel. The fog signal is a bell.

Outer beacon is a black barrel on a steel pipe and lies 0.4 mile northward of Bridgeport Harbor Lighthouse and 160 yards westward of the dredged channel.

Bridgeport is one of the important manufacturing cities of Connecticut.

The outer harbor.—The outer harbor is protected by two converging breakwaters between which the entrance channel 300 feet wide and 25 feet (7.6 m.) deep, leads from deep water in Long

*Lat. 41°09'.4, Long. 73°10'.8; Charts 220, 1213.

Island Sound. Adjacent to the entrance channel, near its head, is a 25-foot (7.6 m.) anchorage basin. (See Anchorages, p. 245.) The balance of the outer harbor area consists of broad and shallow sand flats.

The inner harbor.—The inner harbor, about 1 mile long and from 500 to 1,500 feet wide, extends from Tongue Point to the Stratford Avenue Bridge across the Poquonock River.

The prominent objects, besides the lighthouses, are the group of four smokestacks of the United Illuminating Co. at Steel Point, the towers of the high-voltage line crossing at the railroad bridge, a tall slender church spire and a gas tank at the southwestern part of town. At night a large red neon sign of the City Lumber Co. shows up well, on the east side of the channel northeastward of Tongue Point, and the rays of the aero beacon, about 1.5 miles northwestward of Stratford Point, can be seen from offshore.

Poquonock River has been improved by dredging a channel 18 feet (5.5 m.) deep for a distance of 0.9 mile above the Stratford Avenue Bridge to a point about 500 feet below Berkshire Avenue, the head of navigation.

The deepest draft of vessels going up Poquonock River above the bridges is about 17 feet (5.2 m.). The depths alongside the railroad wharf and city dock (foot of Wall Street just below the first bridge) are 18 to 20 feet (5.5 to 6.1 m.). There are depths of 10 to 15 feet (3 to 4.6 m.) at some of the wharves in Poquonock River, but there is little depth at others.

The channel in Poquonock River is easily followed by small craft with the aid of the chart, but a towboat is needed by vessels to assist in making the sharp bends. For clearances of bridges crossing the river see page 246.

Yellow Mill Channel has been improved by dredging a channel 18 feet (5.5 m.) deep to the upper wharf, above which it decreases to 5 feet (1.5 m.) at the head. The entrance is on the northeast side of the harbor 0.3 mile above Tongue Point and is marked on its west side by a buoy. Below the bridge the wharves extend out to the eastern edge of the channel. The coal wharf has a depth of 15 feet (4.6 m.) and the oil dock on the west side above the coal wharf 8 feet (2.4 m.). The flats on both sides of the channel are largely bare at low water.

For clearances of bridge crossing at Stratford Avenue see Bridges, page 246.

Johnson Creek entrance lies eastward of Bridgeport Breakwater Lighthouse and at the northeast corner of the 25-foot (7.6 m.) anchorage basin. It is under improvement to maintain a channel 12 feet (3.7 m.) deep and 125 to 175 feet wide to the first bend above the drawbridge; thence 9 feet (2.7 m.) deep and 175 to 100 feet wide to a point 350 yards below the dam at the head of navigation.

For clearances of bridges see page 247.

Vessels require local knowledge to follow the best water, but small craft proceeding with care can use the channel, as follows:

Pass midway between the channel buoys at the entrance, steer for the center pier of the draw, pass through, and then keep in line with the center pier until abreast the shipyard wharf. Then make the bend, keeping about 100 feet off the row of piles at the shipyard, and then follow the wharves at a distance of 75 feet. Pass

about 100 feet off the yacht club landing, exercise care in making the turn, and then steer mid-channel courses.

A channel 80 feet or more wide and 10 feet (3.0 m.) deep has been dredged on the north side of **Tongue Point** to the wharf on the south side of the slip and the coal hoist on the north side; there is a depth of 6 to 12 feet (1.8 to 3.7 m.) at the wharf and hoist. The channel has shoaled, and in 1939 had a depth of 5 to 7 feet (1.5 to 2.1 m.). **To enter,** open slightly the face of the wharf on the south side, pass about 75 feet off the bulkhead on the south side of the entrance, about the same distance off the lower end of the wharf, and then cross to the coal hoist. There is a prominent yellow chimney at the factory on Tongue Point.

On the eastern side of the harbor 0.3 mile northward of Bridgeport Breakwater Lighthouse is the entrance of a dredged channel from 50 to 70 feet wide and 6 to 7 feet (1.8 to 2.1 m.) deep, which has been dredged to the power plant on the east side of the harbor.

Pilotage.—All inward and outward bound foreign vessels drawing 9 feet (2.7 m.) or more of water are subject to the payment of pilotage if spoken by a pilot before entering the port. For others, pilotage is optional.

A pilot can be obtained from the towboats and the usual place of boarding is outside of Bridgeport Harbor Lighthouse. Inward and outward rates are the same and apply throughout the year.

Towboats can always be had by making signal. The towboat office is located on the west side of the channel, adjacent to the Stratford Avenue Bridge.

Immigration Service.—There are no officials of the Immigration Service stationed at the port, but they can be obtained from Hartford through the local ship agent.

Customs.—The customhouse is in the Federal Building at the corner of Middle, Golden Hill, and Water Streets. There are facilities for bonded storage in two local warehouses.

Vessels may enter the harbor at Bridgeport at any time. They may clear between the hours of 9 a. m. and 5 p. m. Clearances are effected by agents and are granted by the marine department, Customs Service.

Quarantine.—Vessels arriving from a foreign port, other than from Canada, anchor outside the breakwaters where they are boarded for inspection.

Hospitals.—Bridgeport has several public hospitals and numerous private hospitals and sanatoriums. Bridgeport Hospital is a United States contract hospital. Contagious cases are sent to Englewood Hospital which is the city hospital of Bridgeport. There is a relief station of the United States Public Health Service at Bridgeport. (See Appendix.) Release from quarantine is made by a United States Public Health Service doctor obtained from New York by the local ship agent.

Anchorage basins have been dredged on the northeast side of the entrance channel in the outer harbor and on both sides of the channel in the inner harbor. The 25-foot (7.6 m.) anchorage basin on the southeast side of the channel opposite Tongue Point Breakwater has a width of 800 feet, and is the best anchorage for large vessels.

The 12-foot (3.7 m.) anchorage basin on the northeast side of the channel between the entrance to Yellow Mill Channel and Steel Point

has a width of about 200 feet and depths of 8 to 12 feet (2.4 to 3.7 m.). At the upper end of the inner harbor there is an anchorage which is generally used by small craft. It is situated on the east side of the channel adjacent to and southeastward of the Stratford Avenue Bridge. The controlling depths in this area are 12 to 25 feet (3.7 to 7.6 m.)

On the west side of the harbor extending northwestward from Tongue Point there is an 18-foot (5.5 m.) anchorage basin the controlling depths of which are 13 to 18 feet (4.0 to 5.5 m.).

Vessels sometimes anchor off the entrance of Bridgeport Harbor for shelter in strong northerly winds; the holding ground is good, and the lead a good guide.

Harbor Master.—The control of the port is vested in the harbor master who is appointed by the State of Connecticut. Harbor regulations may be obtained at his office.

Tides.—The mean tidal range is 6.8 feet. Extreme tides, due to wind and other causes, have been recorded 3 feet below the mean low water plane and 10 feet above the same datum.

Currents.—In the entrance channel, between the breakwaters, slack waters before flood and ebb, respectively, occur about 2 hours after low water and high water at New London. The strengths of flood and ebb, respectively, occur about 1½ hours before high water and low water at New London. The average velocity at strength is about ¾ knot; the flood sets 340° true and the ebb 175° true. In general, throughout the harbor, the currents run true with the channels.

Storm warnings are displayed from a prominent flagstaff at Seaside Park, western entrance of Bridgeport Harbor.

Prevailing winds.—The prevailing winds are southwesterly in summer and northwesterly in winter.

Ice does not, as a rule, interfere seriously with navigation; the steamers keep the channel open in the main harbor to the railroad bridge over Poquonock River. The tributaries of the harbor are closed at times.

In Bridgeport Harbor winds from north to northwest clear the harbor of drift ice, and those from southeast through south to southwest force the ice into the harbor from the Sound. The outer buoys are apt to be carried out of position by heavy ice during severe winters.

Bridges.—There are no bridges across the outer harbor, but there are numerous spans crossing the tributaries of the inner harbor. Distances above high water are vertical clearances when the bridges are in a closed position.

The Popuonock River has 5 bridges of the bascule type.

Stratford Avenue Bridge, with an opening 135 feet wide and 7.6 feet (2.3 m.) above high water, the **railroad bridge,** with an opening 70 feet wide and 18.1 feet (5.5 m.) above high water (the overhead wires at the bridge are 160 feet (49 m.) above high water); **Congress Street Bridge,** with an opening 67 feet wide and 8.1 feet (2.5 m.) above high water; **East Washington Avenue Bridge,** with an opening 69 feet wide and 4.8 feet (1.5 m.) above high water; **Grand Street Bridge,** with an opening 71 feet wide and 13.2 feet (4.0 m.) above high water.

The Yellow Mill Channel has a bascule type bridge* crossing at Stratford Avenue with an opening 82.5 feet wide and 11.5 feet (3.5 m.) above high water.

Johnson Creek has a swing draw span crossing near the mouth which is known as the **Pleasure Beach Highway Bridge.** It has openings of 70 feet and 65 feet on the north and south side, respectively, and is 7.3 feet (2.2 m.) above high water.

Bridge regulations have been prescribed by the Secretary of War to govern the opening of the drawbridges across Poquonock River, Yellow Mill Channel, and Johnson Creek, as follows:

(a) The signals for opening the draws of the above-named bridges shall be given by blasts of a horn or steam whistle as follows: Stratford Avenue Highway Bridge, 1 long and 1 short blast. Railroad bridge, 3 short blasts. Congress Street Highway Bridge, 4 short blasts, East Washington Avenue Bridge, 1 long and 2 short blasts. Grand Street Highway Bridge, 1 long and 3 short blasts. Yellow Mill highway Bridge, 1 long and 1 short blast. Pleasure Beach Highway Bridge, 1 long and 1 short blast. In case the draw of any bridge cannot be immediately opened when the signals are given, a red flag or ball by day and a red light by night shall be conspicuously displayed on the bridge.

(b) Except as hereinafter provided, the draws of the above-named bridges shall be immediately opened, upon the prescribed signal, at all times during the day or night, for the passage of foreign vessels and "vessels of the United States," as defined in section 4311 of the Revised Statutes, and for any other vessels or water craft which cannot pass the closed bridges the said draws shall be opened at such time within 20 minutes after the prescribed signal from the vessel or craft as in the judgment of the bridge tender will cause the least interference with the land traffic over the bridge.

Exceptions.—Closed periods when the draws of the highway bridges over the Poquonock River and the Yellow Mill Channel need not be opened:

(1) For vessels of any class:
6:45 a. m. to 7:15 a. m.
7:45 a. m. to 8:15 a. m.

(2) Opened only for the passage of power-driven vessels, other than yachts and pleasure craft, 50 feet or over in length or 25 tons or over net register:
11:45 a. m. to 1:15 p. m.

(3) For vessels of any class, except when an emergency condition exists, such emergency to be decided mutually by the Superintendent of Bridges, or his authorized representative, and navigation interests involved, and is provisionally defined as the passage of boats that are unavoidably compelled to pass through the bridges during the period due to urgency of service or condition of tide:
4:00 p. m. to 5:30 p. m.

(4) Pleasure Beach highway bridge for vessels of any class:
10:30 p. m. to 11:00 p. m.
11:15 p. m. to 11:45 p. m.

(5) Delay in opening the draw of the New York, New Haven & Hartford Railroad bridge for not more than 7 minutes after the giving of signal, is authorized when a passenger or mail train is actually ready to pass over the bridge.

Directions, Bridgeport Harbor from eastward.—Approaching around Stratford Point note the description of the shoals off the point in connection with the coast from New Haven to Bridgeport. Small vessels generally make the gong buoy, which lies about 1 mile from shore and 1.5 miles southwestward of Stratford Point Lighthouse. Passing over 300 yards southward and southwestward of this buoy, a 293° true course for about 2.7 miles will lead in a least depth of about 15 feet (4.6 m.) to the entrance of the harbor southward of

*Lat. 41°10'.6, Long. 73°10'.6: Charts 220, 1213.

lighted bell buoy No. 6, or a 270° true course for 2.8 miles will lead to the lighted gong buoy at the entrance of the 25 foot (7.6 m.) dredged channel.

From westward.—Passing about 0.5 mile southeastward of Penfield Reef Lighthouse, a 46° true course for about 1.7 miles will lead to the lighted gong buoy at the entrance of the 25 foot (7.6 m.) dredged channel.

The course through the middle of the dredged channel is 13° true passing through 120 yards eastward of Bridgeport Harbor Lighthouse and 200 yards eastward of Bridgeport Breakwater Lighthouse (on end of Tongue Point Breakwater). With the aid of the lighthouses and buoys there should be no trouble in clear weather in following the axis of the dredged channel. There is little depth on either side of the dredged entrance channel inside of the breakwaters.

From a position 200 yards northeastward of Tongue Point (Bridgeport Breakwater Light), the 25-foot (7.6 m.) channel extends 317° true for about 0.5 mile along the southwest part of the lower reach of the Poquonock River, then 337° true for about 0.3 mile.

Dockage.—Dockage is charged at the railroad wharf, the city wharf and the Cilco Terminal on the basis of registered tonnage. At other wharves the rates are by agreement.

Wharfage.—The rate for wharfage at the city wharf is arranged by the harbor master. At the other wharves the rates are by agreement.

Lighterage.—There is no free lighterage service at Bridgeport. Lighters may be obtained at the port or from nearby ports. Rates depend upon the location, nature, and extent of the services rendered, based usually on a daily rate for the plant used.

Storage.—There are several warehouses available for both cold storage and general storage.

Supplies.—Coal, water, provisions, and ship chandler's stores can be obtained. Water can be had through hose at the city dock or from towboats which act as water boats.

Coal Bunkering.—Facilities for coal bunkering are limited and for the most part are confined to the coaling of towboats or vessels of similar size and draft.

Oil Bunkering.—Fuel oil may be obtained at a wharf on the east bank of Yellow Mill Channel, where there is a depth of about 18 feet (5.5 m.) for a berthing space of about 200 feet. Approximately 5,000 barrels of each grade, namely No. 2, No. 4, and No. 5, are kept in stock and delivery is made through 8-inch pipe lines.

Repairs to vessels and machinery of steamers can be made at Bridgeport, where there are several marine railways; the largest, on Johnson Creek, has a length of 140 feet and a capacity of about 500 tons, draft 12 feet (3.7 m.) forward and 16 feet (4.9 m.) aft. Welding, forging, and general machining can be done by numerous shops scattered throughout the city.

Commerce.—The water-borne freight traffic at Bridgeport is large the principal cargoes consisting of coal, petroleum products, lumber, and scrap iron.

Communication.—There are excellent means of communication both by railroad and busses to New York and Boston as well as other cities along the coast and the interior. Steamers make regular trips to Port Jefferson throughout the year.

BRIDGEPORT TO NORWALK ISLANDS

Black Rock Harbor (Chart 220) lies 2 miles westward of the entrance of Bridgeport Harbor and is well marked by Black Rock and Penfield Reef Lighthouses on the north and south sides of the entrance. **Anchorage** exposed only to southeasterly winds, can be selected in the entrance northeastward of Fairfield Bar in 18 to 22 feet (5.5 to 6.7 m.). The lead is a good guide, except in the vicinity of the easterly part of Fairfield Bar and the reef on the north side of the entrance. The depths on either side of the dredged channel westward of Fayerweather Island are 6 to 8 feet (1.8 to 2.4 m.), and small craft of less than 6-foot (1.8 m.) draft can select anchorage as far up as the yacht club.

Black Rock Harbor and the creeks at its head are the approach by water to the large manufactories in the western part of Bridgeport. A channel 200 feet wide and 17 feet (5.2 m.) deep has been dredged from the harbor to **Cedar Creek,** thence the same depth and 150 feet wide to the branches, and the same depth and 100 feet wide in the branches. There are depths of 10 to 15 feet (3 to 4.6 m.) at some of the wharves. The channel is marked by buoys, and there are sometimes bush stakes on the shoal flats on each side of the channel.

At high water vessels of 20-foot (6.1 m.) draft can go to the heads of the two branches of Cedar Creek but they will lie aground at low water.

Pilots.—See under Bridgeport Harbor.

Tides.—The mean rise and fall of tides is about 7 feet.

The channel in **Burr Creek** has a width of 50 feet and a controlling depth of only 2 feet (0.6 m.). It is little used and the upper reaches are being filled in by the city of Bridgeport. The flats at the entrance, between Burr Creek and Cedar Creek are mostly bare at low water.

Ice.—During some part of each winter Black Rock Harbor and its tributaries are usually closed by ice.

Fayerweather Island, on the eastern side of the entrance, is marked at its south end by a white tower of a former lighthouse. A breakwater and a seawall connect its northern part with the shore eastward. **Point Rock Shoal,** which shoals abruptly, extends 0.3 mile southward from the south end of the island, and is marked at its south end by **Black Rock Harbor light,*** a red skeleton tower with a white tank house. A buoy marking the extremity of the shoal and the eastern side of the entrance to the dredged channel lies about 100 yards southwest of the light. There is little depth for a distance of 400 yards from the island, and thence it shelves off to 18 feet (5.5 m.) at the buoy.

There is a yacht club on the northwest side of the harbor eastward of Grover Hill where there is an anchorage for small craft in depths of 5 to 8 feet (1.5 to 2.4 m.) between the dredged channel and the yacht club landing. An old stone landing which shows near low water extends 150 yards from the shore just northward of the landing.

Gasoline, oil, and fresh water may be obtained at the head of the harbor where there is a depth of 4 feet (1.2 m.) at the end of the wharf at mean low water.

*Lat. 41°08'.2, Long. 73°13'.1: Charts 220, 1213.

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Directions, Black Rock Harbor—From eastward.—Approaching around Stratford Point, note the description of the shoals off the point in connection with the coast from New Haven to Bridgeport. Small vessels generally make the gong buoy which lies about 1 mile from shore and 1.5 miles southwestward of Stratford Point Lighthouse. Passing southward of this buoy, a 273° true course for 4.2 miles will lead to the entrance at the buoy southwestward of Black Rock Light.

From Bridgeport.—When abeam of the lighted bell buoy 0.5 mile southward of Bridgeport Harbor Lighthouse vessels of not too great draft may steer a course of 244° true which will lead southward of the buoy off the entrance to the dredged channel in Black Rock Harbor.

From westward.—Pass 0.4 mile or more southeastward of Penfield Reef Lighthouse and 0.3 mile or more eastward of Black Rock beacon; or if approaching from south of Penfield Reef keeping Black Rock Light bearing westward of 348° true will lead 0.2 mile or more eastward of Black Rock beacon. When Penfield Reef Lighthouse bears 237° true the course can be shaped to pass westward of the buoy southwestward of Black Rock Light.

The dredged channel in Black Rock Harbor is well buoyed and with chart 220 as a guide, strangers should encounter no difficulty.

A shoal off the point separating the two branches at the head of **Cedar Creek** must be carefully avoided. To enter the east branch, pass about 100 feet off the wharf on the southeast side below the entrance and head up the middle of the branch. To enter the west branch, pass 100 feet off the wharves on the northwest side below the entrance and 75 feet off the wharves on the southeast side of the branch.

Fairfield Bar, forming the southwest side of Black Rock Harbor, is well bare at low water out to **The Cows,** a distance of nearly 1 mile; and a shoal with little depth extends 0.3 mile eastward from The Cows to **The Little Cows,** which are awash at low water. The easterly point of the reefs, lying nearly 0.3 mile southward of the northeast point of the shoal near The Little Cows, is marked by **Black Rock Beacon,** a red pyramidal iron frame with two truncated pyramids, top to top.

Penfield Reef, on which are rocks bare at low water, extends 0.3 mile southward from The Cows to Penfield Reef Lighthouse; the 18-foot (5.5 m.) curve lies 250 yards southeastward of the lighthouse, and the lighthouse should not be approached closer, even by small craft.

Penfield Reef Lighthouse* is a white tower on a granite dwelling on pier. The light is 51 feet (15.5 m.) high and visible 12 miles. The fog signal is a reed horn. It has been reported that this light has been confused with red advertising signs in Black Rock and that the light is at times difficult to pick up.

Flat Island, lying nearly 2 miles westward of Penfield Reef Lighthouse, is covered at high water, and is the highest part of a reef, partly bare at low water and with little depth over any part of it, which extends over 0.4 mile southward from **Pine Creek Point.** A lighted bell buoy marking the end of the shoal lies about 300 yards southward of Flat Island and over 0.5 mile southward of the point.

* Lat. 41°07'.0, Long. 73°13'.3; Charts 220, 1213.

Southport Harbor (chart 220) is the entrance of **Mill River** at the head of the bight over 1 mile northwestward of Flat Island. It has been improved by dredging a channel to the wharves at Southport. In 1936, the controlling depths were nearly 11 feet (3.4 m.) (not full width) up to the Golf Club Wharf and 8 feet (2.4 m.) in the basin to inside the breakwater, and about 7 feet (2.1 m.) to the upper wharves. Depths in the harbor vary from 7 to 20 feet (2.1 to 6.1 m.) and over. The entrance is marked by two lights, the outer one lying on the bar 500 feet inside the 6-foot (1.8 m.) curve and 175 feet westward of the middle of the dredged channel, and the inner one on the end of the breakwater which extends in a southwesterly direction from the eastern point at the entrance of the river. The channel is well marked by buoys to the vicinity of the breakwater. Caution is recommended to avoid oyster stakes in the area southward and southeastward of the entrance to the harbor. There is a depth of 9 feet (2.7 m.) at the yacht club landing and about 4 feet (1.2 m.) at the public landing on the west side of the harbor.

Southport is a village on the north side of Mill River. Gasoline, hardware, and other supplies can be obtained, and there is a marine railway where vessels up to 35 feet in length and 3-foot (0.9 m.) draft can be hauled out. The deepest draft of vessels entering is 11 feet (3.4 m.). A **towboat** can be obtained at Bridgeport. **Ice** closes the river at times during the winter.

Tides.—The mean rise and fall of tides is about 7 feet.

Directions, Southport Harbor.—Head for the breakwater light on course 352° true passing midway between the black and red buoys and 75 yards eastward of the outer light. When past black can buoy No. 5, haul to westward and round the breakwater light at a distance of about 75 yards, passing also to westward of red nun buoy No. 8. Pass 150 feet northwestward of the angle of the breakwater, then steer mid-channel courses to southeastward of **White Rock** and then favor slightly the west side of the narrow entrance. Then head for the brick buildings at the wharf, and then pass 100 feet off the wharves. Strangers should proceed with caution.

Frost Point, 1 mile westward of Southport entrance, is marked by two large residences and piers on its southeast side. A reef, partly bare at low water, extends about 0.4 mile southward from the point. A windmill which is a conspicuous landmark is situated about 0.3 mile northewestward of the point.

Sherwood Point is marked by a bare boulder on the reef which extends about 250 yards off the point. A rocky patch on which the least depth found is 12 feet (3.7 m.) lies 0.8 to 1 mile southward of Sherwood Point. There are numerous oyster stakes between Frost and Sherwood Points.

Westport Harbor (Chart 221).—Saugatuck River, or Westport Harbor, lies 6 miles westward of Penfield Reef Lighthouse and northward of Cockenoe Island. Anchorage exposed to southeasterly winds can be had in the entrance in 12 to 22 feet (3.7 to 6.7 m.), 0.3 to 0.4 mile southward of **Cedar Point*** (marked by a short breakwater) at the east side of the entrance. Anchorage for small craft, sheltered from all winds, can be had 75 to 100 yards off the beach westward of Bluff Point (north end of Seymour Point). The channel in Saugatuck

*Lat. 41°06'.1, Long. 73°21'.2: Charts 221, 1213.

River is narrow and crooked and there are few aids. Vessels suffer damage at times by striking projecting ledges or boulders and should therefore proceed with caution and preferably on a rising tide.

The channel is good for a depth of about 6 feet (1.8 m.) at low water to **Judy Point,** then 3 feet (0.9 m.) across the bar, and then 4 feet (1.2 m.) to Saugatuck. Above this point the channel was improved to obtain a width of 60 feet and depth of 4 feet (1.2 m.) to Westport, but shoaling has occurred and the depth is about 3½ feet (1.1 m.) to the lower wharves at Westport and 1 foot (0.3 m.) to the upper wharves.

A channel 100 feet wide and 7 feet (2.1 m.) deep has been dredged to a private bulkheaded basin about 200 feet wide and 10 feet (3.0 m.) deep, on the east side of the river. The entrance, southward of **Kitts Island** (low and grassy), is marked by private buoys. On the west side of the basin is a prominent concrete tower and a boathouse.

Another privately dredged channel, with a controlling depth of 7 feet (2.1 m.) leads to a basin in the bight to the westward of **Compo Beach.**

The entrance is about 550 yards west of Cedar Point and is marked by privately maintained range beacons for an entering course of about 18° true. There is a yacht club here which has landings and mooring facilities in the basin. Gasoline and fresh water is available at the landing.

Saugatuck, a village in the town of Westport, is situated about 2.5 miles above the entrance. Gasoline, coal, and other supplies are obtainable. There are depths of about 6 feet (1.8 m.) at the principal wharves.

Westport, a town at the head of navigation, is about 1 mile above Saugatuck.

Bridges.—The lower, or railroad, bridge at Saugatuck has a bascule opening 57 feet wide and 13 feet (4.0 m.) above high water. The overhead wires at the bridge are 135 feet (41 m.) above high water. The upper, or highway, bridge at Saugatuck is a center pier draw with openings 54 feet wide, the east opening only being used.

The fixed highway bridge at Westport has an opening 50 feet wide and is 1.5 feet (0.5 m.) above high water.

Bridge regulations prescribed for the railroad bridge require that the draw shall be immediately opened at any time between 5 a. m. and 9 p. m. upon a signal of three short blasts (each of about two seconds' duration) of a horn or steam whistle; except when a train scheduled to pass beyond the bridge without stop has passed the last station nearest the bridge and is in motion toward the bridge, the bridge shall be opened for the vessel as soon as the approaching train has been brought to a stop at the drawbridge signal. In case the bridge cannot be immediately opened when the signal is given, a red flag or ball by day or a red light by night shall be conspicuously displayed. Signals for the opening of the draw shall be answered by a whistle or horn on the bridge with three short blasts when the opening is commenced or by not less than four short, sharp blasts, each of not more than one second duration, when the bridge cannot be promptly opened.

For small unlicensed craft which cannot pass the closed bridge the draw will be opened as soon as practicable, but in no case shall the delay be over 20 minutes.

Towboats can be had at Bridgeport and are employed by vessels.

Tides.—The mean rise and fall of the tides is about 7.1 feet. Freshets do not affect appreciably the height of the water in the navigable part of the river.

Ice forms in winter the whole length of the river to its mouth.

Directions, Westport Harbor—From eastward.—From the lighted bell buoy southward of Flat Island a 260° true course for 4.2 miles will lead to the lighted entrance buoy 0.3 mile southward of Cedar Point.

From westward.—Pass southward of the Norwalk Islands and southeastward of the lighted bell buoy located about 0.5 mile southward of Georges Rock. Round the eastern end of the shoals and steer a northerly course to pass at a distance of about 0.3 mile eastward of the black buoy lying about 200 yards northeastward of Georges Rock. When east of this buoy steer 322° true for a distance of about 0.5 mile heading for Compo Hill. When Georges Rock black buoy bears 180° true at a distance of about 0.4 mile, steer 289° true which will lead midway between the red and the black entrance buoys southwestward of Cedar Point.

When entering the river steer mid-channel courses between the buoys following the curve of the channel westward and then southward to the west side of **Bluff Point.** The channel then follows the southwest and west bank, as shown on the chart, to the large bare rock near **Judy Point.** Above this point sometimes there are stakes on the south side of the lower end and north side of the upper end of the channel at the crossover. The channel then follows the east bank to the lower bridge, the west bank to the second bridge, and then through the east opening.

The west edge of the channel is then about on the line of the center pier of the draw for a little over 100 yards, and then heads for a white house on the east bank above. From a small landing on the east bank the channel crosses to the west bank abreast the tannery, then near the middle until the river widens, and then follows the west bank, keeping out of the bights, to the lower wharves at Westport.

NORWALK ISLANDS

(CHART 221)

Norwalk Islands are a group of islands, rocks, and shoals which extend from 1 to nearly 2 miles off the north shore of Long Island Sound and have a length of 6 miles from Georges Rock to Greens Ledge Lighthouse. Cockenoe Island Harbor and Sheffield Island Harbor, good at low water for vessels of about 9- and 12-foot (2.7 to 3.7 m.) draft, respectively, are available anchorages, and are the approaches to Norwalk River. These anchorages are marked by Peck Ledge and Greens Ledge Lighthouses and are easily made. The bottom is very irregular around the islands and rocks in the Norwalk Islands; and, although the area is well surveyed, vessels should, as a measure of safety, avoid all broken ground and proceed with caution when crossing shoal areas. This area is also covered with a

mass of oyster stakes and spars, which sometimes tow under or break off, and small vessels, especially, should be on the lookout for them at all times.

Cockenoe Island, at the eastern end of Norwalk Islands, is marked on its south side by two knolls, the rest of the island being low and level. A bar, dry in places at low water but with general depths of 1 to 2 feet (0.3 to 0.6 m.), connects the island with the north shore at Seymour Point.

Cockenoe Shoal is an extensive and dangerous area which extends 1.3 miles eastward and east-southeastward and 0.6 mile southward from Cockenoe Island. The least depths found are shown on the chart, but the entire area is exceedingly broken with boulders and should be avoided by strangers, even in small craft. About 0.5 mile eastward of the northern end of Cockenoe Island, rocks bare about 3 feet (0.9 m.) at low water, near the outer end of Cockenoe Reef.

Georges Rock,* awash at lowest tides, is at the eastern end of the shoal, and is marked off its northeast side by a buoy. A lighted bell buoy marks the southeast end of the shoal. Vessels rounding the eastern end of Cockenoe Shoal should give the buoys a good berth.

Channel Rock, with 1½ feet (0.5 m.) over it, lies 400 yards southwestward of Cockenoe Island and is marked by a buoy placed 250 yards southwestward of the rock.

Peck Ledge Lighthouse, on the west side at the entrance of Cockenoe Island Harbor, is a white conical tower, middle part brown, on a black cylindrical pier. The light is 61 feet (18.6 m.) high and visible about 9 miles.

Cockenoe Island Harbor lies westward of Cockenoe Island, and is marked by Peck Ledge Lighthouse. It has an anchorage for vessels of less than 9-foot (2.7 m.) draft, and is also an entrance from eastward to Norwalk River. The best anchorage for vessels is in the deeper part of the harbor, depths 12 to 25 feet (3.7 to 7.6 m.), lying northward and northwestward of the lighthouse. Vessels should proceed with caution at low water when crossing the shoal as 12 to 15 feet (3.7 to 4.6 m.) depths are southward and westward of Channel Rock buoy.

Directions, Cockenoe Island Harbor.—From eastward pass southward of Cockenoe Shoal lighted bell buoy, steer 254° true until Peck Ledge Lighthouse bears northward of 285° true, then steer for the lighthouse until up with Channel Rock buoy, and then pass eastward and northward of the lighthouse at a distance of 200 to 300 yards and around the buoy located north of Peck Ledge.

From westward give the edge of the shoals a good berth until Peck Ledge Lighthouse bears westward of 348° true and then steer 0° true and pass 400 yards eastward of the lighthouse and midway between Channel Rock buoy and Peck Ledge bell buoy. When abeam of Channel Rock buoy proceed as described in the first paragraph of these directions.

The following islands and rocks are on the northwest side of Cockenoe Island Harbor: **Sprite Island** is high and has some trees. **Calfpasture Island** has several houses and a few trees. The island eastward of Calfpasture Island is low and covered with boulders.

*Lat. 41°05'.0, Long. 73°19'.7: Charts 221, 1213.

Sheep Rocks are covered at half tide. **East White Rock** is a high, white rock. **Grassy Hammock Rocks** are bare at half tide; the rock at the south end of the group is awash at high water, and is marked by **Grassy Hammock Light.**

Goose Island and **Grassy Island** are low. The rest of the Norwalk Islands are hilly and are partly settled. **Chimon Island** is marked by a windmill and water tank. **Copps Island** has a prominent survey signal. **Sheffield Island,** the westernmost of the Norwalk Islands, is marked by an unused lighthouse tower (granite building). There is a boat landing on the north side of Sheffield Island.

Great Reef, lying 0.3 mile southward of the western end of Sheffield Island, bares 4 feet (1.2 m.) at low water and is marked by an iron pipe which protrudes about 6 feet (1.8 m.) above the surface at high water. It is also marked by a buoy about 350 yards southwestward of the reef.

Hiding Rocks, Old Baldy, and **Old Pelt,** lying northwestward of Great Reef, are bare at low water.

Greens Ledge is a rock and sand ridge extending from Sheffield Island to Greens Ledge Lighthouse. There is little depth and rocks bare at low water in places for a distance of nearly 0.3 mile from the island, and thence to the lighthouse there is a depth of about 7 feet (2.1 m.) on the ledge. Depths of 10 to 15 feet (3 to 4.6 m.) extend about 400 yards westward and southwestward from the lighthouse, and this part of the ledge is marked at its southwest end by a red buoy. A rocky ledge, on which the least depth found is 21 feet (6.4 m.), extends 0.8 mile west-southwestward from the lighthouse. Another rocky ledge, with a least depth of 20 feet (6.1 m.), is located about 0.4 mile south-southeastward from the lighthouse.

Greens Ledge Lighthouse is a conical tower, lower half brown, upper half white, on a black cylindrical pier. The light is 62 feet (18.9 m.) high and visible 13 miles. The fog signal is a reed horn.

Budd Reef, locally known as Slausons Reef, is a small ledge with a least depth of 24 feet (7.3 m.), lies 0.9 mile south-southeastward of Greens Ledge Lighthouse. The bottom is very broken on the south side of Greens Ledge, and deep-draft vessels should pass southward of Budd Reef and the ledge with a least found depth of 22 feet (6.7 m.) lying 0.9 mile south-southwestward of Copp Island.

A reef, known locally as **Cable and Anchor Reef,** covers an area about 0.4 mile in diameter, and is located about 2 miles southeastward of Greens Ledge Lighthouse. The least depths found are 25 feet (7.6 m.).

Sheffield Island Harbor, also known as **Norwalk Harbor,** is formed by the western Norwalk Islands. It is frequently used in the fall and winter, and by tows. The depths of the anchorage northwestward of Sheffield Island range from 12 to 16 feet (3.7 to 4.9 m.). The directions from westward for Norwalk River lead through the harbor. The shoal flats on the north side of the harbor have rocks and boulders in places. The edge of the shoals on the north side of the harbor south and southwestward of Tavern Island are buoyed.

Tavern Island has a number of houses. **Little Tavern Island** is bare. There is a rock, covered at half tide lying about 250 yards northeastward of Little Tavern Island. Westward of the island

there is a bare rock. A shoal with 2½ feet (0.8 m.) over it extends 250 yards southwestward of Tavern Island and is marked by a horizontally banded buoy on the south side of the shoal. **Yellow Rock,** bare at low water, lies about midway between the southwest end of Tavern Island and the wharf at Wilson Point.

Cedar Hammock Island has a house on it. There is a prominent pole on the south end of the island and a private landing on its northeast side.

The following are objects near the channel leading from Sheffield Island Harbor to Norwalk River: **White Rock*** shows above high water. **White Rock Reef Light,** northward of White Rock, is located in a depth of about 9 feet (2.7 m.) on the southeast edge of the channel. **Long Beach Light** is on the west side of the channel, which passes between it and Long Beach Island. **Round Beach Light** is on the east side of the channel at the entrance of Norwalk River, and lies 300 yards westward of **Round Beach Island.** The latter is a grassy shoal covered at high water.

NORWALK RIVER

(CHART 221)

Norwalk River is on the north side of Long Island Sound northward of Norwalk Islands, and is important commercially. The river has been improved by dredging a channel 150 feet wide to South Norwalk, where the channel width is 250 feet along the wharves, and then 100 feet wide to Norwalk. The principal entrance to the river is from westward, through Sheffield Island Harbor, from which there is a straight dredged channel 200 feet wide extending to the mouth of the river. In 1939 the controlling depth up to Gregory Point was 12 feet (3.7 m.), thence 12 feet (3.7 m.) to Washington Street bridge, South Norwalk, and then 10 feet (3.0 m.) to Norwalk. The entrance from eastward, through Cockenoe Island Harbor, is good for a depth of about 6 feet (1.8 m.) at low water.

Gregory Point, marked by a clubhouse and wharf, is on the east side of Norwalk River 0.5 mile above the entrance.

At **Harborview,** on the west side of the river abreast Gregory Point, is a shallow creek, crossed by a bascule bridge with an opening 26 feet wide and a vertical clearance of 6 feet (1.8 m.) above mean high water when the bridge is closed.

South Norwalk is an important commercial and manufacturing city on the west bank of Norwalk River about 1.5 miles above its mouth. The depths at the wharves below the bridges range from about 5 to 12 feet (1.5 to 3.7 m.).

East Norwalk, opposite South Norwalk, is reached through a channel dredged 75 feet wide and 6 feet (1.8 m.) deep, which is used mainly by small pleasure craft. Fitch Point Light marks the entrance of the channel at the junction with the main channel leading to South Norwalk. The upper section of the channel is marked on both sides by stakes, to which small craft moor. The yacht club is at the head of navigation.

Norwalk is a city on both banks of Norwalk River at the head of navigation 1.5 miles above South Norwalk. There is a depth of

*Lat. 41°04'.1, Long. 73°24'.5: Charts 221, 1213.

about 10 feet (3.0 m.) at the wharves. The bulk of the tonnage is carried in drafts of from 9 to 12 feet (2.7 to 3.7 m.). The channel from South Norwalk to Norwalk is winding, with extensive flats on both sides, and requires local knowledge, even at low water, to follow it.

Pilotage.—All inbound and outbound foreign vessels drawing 9 feet (2.7 m.) or over are subject to the payment of pilotage if spoken by a pilot before entering the port. Otherwise, pilotage is optional. The usual place of boarding is off Greens Ledge Light.

Towage.—There are no local towboats operating at this port. Towboats can be obtained from City Island, N. Y., or from Bridgeport, Conn., and rates are by agreement.

Immigration, Customs, Quarantine.—Norwalk is included in the Bridgeport customs district, but is not a port of entry. Immigration, customs, and quarantine services are performed at Bridgeport unless special permission to proceed to Norwalk has been given by the proper authorities.

Hospitals.—There are two public hospitals and several private sanatoriums but there is no contract hospital for the treatment of seamen.

Anchorages.—Sheffield Island and Cockenoe Island Harbors are largely used for anchorage. Small craft frequently anchor on the east side of the channel south of Gregory Point.

An anchorage basin 10 feet (3.0 m.) deep has been dredged on the east side of the river channel opposite **Fitch Point.** In 1939, the controlling depths in the anchorage were from 9 to 11 feet (2.7 to 3.4 m.).

There are local regulations providing penalties for exceeding a moderate speed or for dumping in the harbor.

Tides.—The mean range of tide is 7.1 feet. Extreme tides due to wind and other causes have been recorded 4 feet below the mean low water plane and 10 feet above the same datum.

Currents.—The tidal currents in Long Island Sound off Norwalk have an average velocity of about 1 knot. The currents through the entrances have the same, if not greater, strength than in the sound. The currents in the harbor follow the direction of the channel, the ebb current being somewhat stronger than the flood.

Ice.—The channel up to South Norwalk is navigable throughout the year. The harbor and river above South Norwalk are covered with ice during a part of the winter. A channel is ordinarily kept open up to the highway bridge, but the East Norwalk Channel and the channel in the river are usually closed for about 6 weeks each season.

Bridges.—Two bridges cross the river at South Norwalk, both of which are equipped with draw spans. The lower one, the Washington Street Bridge, has a double-leaf bascule draw with a horizontal opening 70 feet wide and a vertical clearance 8.3 feet (2.5 m.) at mean high water when the bridge is closed. The railroad bridge about 400 feet upstream is a swing draw with openings of 55 feet and 58 feet on the west and east side, respectively, and a vertical clearance of 16.2 feet (4.9 m.) at mean high water when the bridge is closed. The overhead wires at the railroad bridge are about 170 feet (51.8 m.) above mean high water.

Bridge Regulations.—The draw shall be opened promptly when the signal, hereinafter prescribed for the opening of the draw, is re-

ceived from an approaching vessel or other water craft which cannot pass under the closed draw except as hereinafter provided.

Call signals for opening of draw:

Sound signals: Highway Bridge, three short blasts of horn or whistle.

Railroad bridge, one long and two short blasts of horn or whistle.

Except that for vessels drawing at the time 14 feet and more the above signals shall be followed by one long blast of horn or whistle.

Visual signals: To be used in conjunction with sound signals when conditions are such that sound signals cannot be heard.

A white flag by day, and a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

Acknowledging signals:

By bridge operator—sound signals: Draw to be opened immediately: Same as call signal.

Draw cannot be opened immediately, or if open, must be closed immediately: Two long blasts of a horn or whistle, to be repeated at regular intervals until acknowledged by the vessel.

Visual signals: Draw to be opened immediately: A white flag by day or a green light at night swung up and down vertically a number of times in full sight of the vessel.

Draw cannot be opened immediately, or if open, must be closed immediately: A red flag by day, a red light by night, swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

By the vessel: Vessels or other water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or if open must be closed immediately, shall acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day and a red light by night.

Exceptions.—The highway bridge: Closed periods when the draw need not be opened except for vessels drawing at the time more than 14 feet of water:

Between 7:15 a. m. and 8:20 a. m.,
Between 11:50 a. m. and 12:15 p. m.,
Between 12:45 p. m. and 1:00 p. m., and
Between 4:15 p. m. and 5:15 p. m.

The railroad bridge: Closed periods when the draw need not be opened:

When signal for opening the bridge is given between the hours of 7:00 a. m. and 9:00 a. m., or between 4:00 p. m. and 6:00 p. m. and low tide is predicted in the tide tables published by the United States Coast and Geodetic Survey to occur within 1 hour before or after the time when such signal is given, the opening of the bridge may be delayed not to exceed 20 minutes from the time such signal is given: *Provided, however,* That when a train scheduled to pass beyond the bridge without stop has passed the last station nearest the bridge and is in motion toward the bridge, the bridge need not be opened until the approaching train has been brought to a stop.

Directions, Norwalk River—From eastward.—The entrance from Cockenoe Island Harbor is good for vessels of about 5 feet (1.5 m.) draft at low water. Follow the directions for **Cockenoe Island Harbor** and pass eastward and northward of **Peck Ledge Lighthouse*** at a distance of 200 to 300 yards, around black buoy No. 3; then steer westward to a position 125 yards southward of Grassy Hammock Light, and follow the buoys marking the channel to the dredged channel southwestward of Round Beach Light. When nearly abreast the light haul to the northward and pass 250 to 300 feet westward of the light.

From westward.—The entrance from Sheffield Island Harbor is good for a depth of 10 feet (3.0 m.) at low water, and is well marked by lights and buoys.

Passing southward of Execution Rocks Lighthouse a 53° true course will lead clear of danger for Greens Ledge Lighthouse, pass-

*Lat. 41°04'.6, Long. 73°22'.2; Charts 221, 1213.

ing 0.3 mile southward of The Cows lighted bell buoy. Proceed with **caution** when crossing the rocky ridge, on which the least depth found is 21 feet (6.4 m.), extending 0.8 mile west-southwestward from Greens Ledge Lighthouse, and pass over 0.3 mile westward and 200 yards northward of Greens Ledge Lighthouse. Then bring the lighthouse astern on a 50° true course, which will lead to a position 100 yards southeastward of the buoy lying 300 yards southeast of Tavern Island.

Then steer 33° true through the dredged channel to a position off Round Beach Light.

Round Beach Light to South Norwalk.—When about 300 feet southwestward of the light, haul northward and then northwestward, following the channel buoys and passing about 150 feet off the wharf at Gregory Point. When up to channel buoy above Gregory Pt., steer 323° true and continue until off the wharves at South Norwalk.

Dockage.—At such wharves as are open to the public the charges are determined by agreement. There are no fixed published charges.

Piers, Wharves, and Docks.—There are about 14 commercial wharves in the upper section of the main harbor.

There are six wharves in Norwalk River above the highway bridge at South Norwalk.

Lighterage.—There is no free lighterage service at Norwalk. Lighters may be obtained from nearby ports. The rates depend upon the location, nature, and extent of the services to be rendered and are based usually upon a daily rate for the plant employed.

Storage Warehouses.—No warehouses for public storage of ship's cargo are available at the port.

Supplies.—Coal and water can be had at the wharves of South Norwalk and Norwalk. Provisions, gasoline, and other supplies can be obtained.

Coal Bunkering.—Bunkering facilities at Norwalk are limited to coaling towboats and other craft of moderate size. The normal supply of bunker coal is not large. The principal source of supply is the Pennsylvania fields. As bunkering is rarely done, there are no mechanical facilities provided for delivery. Prices vary with the quality and the current market rates. Rates for trimming in bunkers and for delivery in the stream are by agreement.

Oil Bunkering.—There are only minor facilities for fuel-oil bunkering at Norwalk. Boats usually obtain it by tank-truck delivery at some oil-receiving wharf.

Repairs.—There is a small boat yard at South Norwalk which has a marine railway capable of hauling out crafts up to 60 feet in length and a draft of 5 feet (1.5 m.). Repairs to hull and machinery can be made.

Commerce.—The water-borne traffic at Norwalk consists almost wholly of coastwise trade, the principal items of commerce being coal, sand, and stone, petroleum products, and oyster shells.

Communication.—There is good railroad communication and bus service.

NORWALK RIVER TO STAMFORD

Wilson Point, on the north shore of Sheffield Island Harbor, has an old coal and oil receiving wharf, which was no longer maintained

in 1939. There is a depth of 11 to 16 feet (3.4 to 4.9 m.) in a channel 60 feet wide, obtained by dredging, alongside the wharf for a distance of 420 feet from its end. A least depth of 10 feet (3.0 m.) leads to the wharf from 100 yards westward of the buoy lying 400 yards southeastward of Noroton Point.

Between Wilson Point and the northern part of Noroton Point there is good **anchorage** for small craft in depths of 3 to 6 feet (0.9 to 1.8 m.).

Noroton Point is occupied by a summer settlement and is marked by two flagpoles and a prominent house with red cupola. About 300 yards northward of the point are the ruins of a pier. **Pine Point,** just westward of Noroton Point, has a wharf with a depth of about 15 feet (4.6 m.) at its end, where excursion steamers from New York land in the summertime. There is a large amusement park to the westward of Pine Point. A shoal with depths of 8 to 12 feet (2.4 to 3.7 m.) extends about 0.3 mile from the shore westward of Noroton Point. The bottom is broken and there are boulders in places, and small vessels crossing the shoal should proceed with caution.

Ballast Reef, almost bare at low water, extends 300 yards off **Roton Point.** At the southeast end of the reef there is a detached boulder which bares at high water. The reef is marked off its southwest side by a station buoy and a lighted buoy which is maintained from May 15 to October 15.

Fivemile River (chart 221) is a narrow inlet, the entrance to which lies 351° true from Greens Ledge Lighthouse. It is about 1 mile long, from 100 to 300 yards wide, and shallow except in the dredged channel.

The channel which has a width of 100 feet has a controlling depth of 9 feet (2.7 m.) from the entrance to opposite **Tokeneke Creek,** thence 8½ feet (2.6 m.) to the head of the improvement about 0.7 mile northward of **Butler Island.** Along the wharves the depth diminishes from 6 to 3 feet (1.8 to 0.9 m.). In the northerly bend of the river the channel shoals gradually and is partly bare at low water. The river is used mostly by oyster boats. The mean rise and fall of tides is about 7 feet.

Directions.—Small craft can enter Fivemile River by the following directions: Approaching from eastward, give the shore westward of Noroton Point a berth of over 250 yards and pass southward of Ballast Reef lighted buoy. From westward, avoid the rock with 2 feet (0.6 m.) over it, lying 0.4 mile 204° true off the western point at the entrance.

A buoy marks the northwest end of the rock, and another buoy marks the southeast end of the rock.

From the entrance buoys steer 1° true for about 0.3 mile until approaching the buoy at the first turn in the channel. Pass 75 feet westward of the buoy and steer 22° true, passing 75 feet off the first wharf and to a position 120 feet off the oil company's wharf. From abreast the latter steer 9° true, heading 50 feet outside the oyster company's wharf. Proceed with caution and favor the east side of the channel.

Rowayton, a village on Fivemile River, has railroad and electric railroad communication. Coal, gasoline, and water can be obtained. There is a depth of about 4 feet (1.2 m.) at the coal wharf and oyster company's wharf and less at the others.

There is a small boat yard with a marine railway capable of hauling out small craft up to a length of 45 feet and a draft of 6 feet (1.8 m.). Light repairs can be obtained.

Scott Cove has its entrance westward of **Fish Islands** and about 1 mile 290° true from **Greens Ledge Lighthouse.*** The bottom in the cove and approach is very broken, and it is suitable only for launches or small craft. Proceed with caution when crossing the broken ground which extends 0.3 mile off the entrance of the cove. In the cove the channel favors the west side. The two reefs near the middle of the lower part of the cove are bare at low water, and the other reefs shown on the chart show, or are awash, at high water. The channel into the small cove on the west side of the entrance of Scott Cove has been dredged to 9 feet (2.7 m.) and follows the north side closely to an anchorage with the same depth, favoring the north side. The bare rock off the south side of the entrance is marked by a private spindle from which a light is sometimes shown.

Long Neck Point, locally known as **Collanders Point,** has numerous summer residences. There are a number of boat landings on both sides of the point. Shoals extend about 0.3 mile off the point.

The bight between Long Neck Point and Shippan Point has numerous reefs and boulders, and the bottom is exceedingly broken, necessitating caution in navigation. It is the approach to several shallow coves, none of which are important commercially.

Darien River is a small, shallow stream on the west side of Long Neck Point. There is a depth of about 2 to 5 feet (0.6 to 1.5 m.) in the approach to **The Gut** at the entrance. The best route is via the buoyed channel along the west side of Long Neck Point, taking care to avoid the rocks, bare at low water, which extend nearly 200 yards from shore between the two piers lying 600 yards above the south end of Long Neck Point. Above The Gut the river is practically dry at low water but at high water a draft of 6 feet (1.8 m.) can be taken a distance of 0.6 mile to the lower dam. The higher rocks of the group on the west side of the approach show above water. The rock at the northeast end of the group is bare at low water. A rock which shows at lowest tides lies a little westward of midway between the southerly bare rock of the group and the southerly pier on the west side of Long Neck Point. It is marked by a lighted buoy maintained from May 1 to November 1 and by a black buoy throughout the year. The buoys are placed eastward of the rock.

Cove Harbor is a small dredged basin, no longer maintained, lying about 1 mile west-northwestward of Long Neck Point. The basin has a depth of about 5 feet (1.5 m.), and the bar across the entrance is practically bare at low water. There are several rocky areas in the approach to the harbor, and local knowledge is needed for the approach and entrance.

Smith Reef is two rocks, bare at half tide and marked at the south end by a buoy lying 0.9 mile southwestward of Long Neck Point. **Bold Rock,** bare at half tide, is at the east end of the rocky ridge extending northward from Smith Rock. From Bold Rock the rocky ridge with depths of 4 feet (1.2 m.) or less extends 0.3 mile 316° true. There are numerous oyster stakes on this ridge.

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*Lat. 41°02'.5, Long. 73°26'.7: Charts 221, 1213.

A large group of rocks, locally known as **Cove Rocks,** awash at high water, lies 0.7 mile northwestward of the south end of Smith Rock and are marked on the southwest side by a buoy.

Westcott Cove, lying at the northeast side of Shippan Point, may be entered by shallow-draft vessels. A small, well-protected yacht anchorage with a **shipyard** and marine railway for small craft lies at the head of the cove on the west side. The marine railway is capable of hauling out small craft up to lengths of 80 feet and a draft of 10 feet (3.0 m.).

The controlling depth across the bar, at the southwest corner of Westcott Cove, is 4 feet (1.2 m.) at mean low water, thence 6 feet (1.8 m.) to the yacht basin at the northwest corner of the cove.

One mile eastward of Shippan Point is a rocky patch with a least depth of 8 feet (2.4 m.).

Directions, Westcott Cove.—Pass about 100 yards eastward and northward of the lighted buoy marking a 4-foot (1.2 m.) spot situated about 0.3 mile east-southeast of the breakwater on the south side of Westcott Cove; then steer **300°** true passing close southward of the lighted buoy off the breakwater, the latter being marked by a red light; continue on this course and pass close southward of the red buoy lying about 500 yards northwestward of the breakwater.

Caution should be used as shoal water exists south of the course after passing the breakwater.

When about 50 yards past the buoy head northward for the fixed red light at the south end of the breakwater at the northern end of the cove. Pass 150 feet westward of the light and continue up the center of the dredged channel to the basin. (The west side of the dredged channel is sometimes marked with iron posts to warn the bathers along the beach of the deeper water.)

STAMFORD HARBOR

(CHART 221)

Stamford Harbor, located on the north side of Long Island Sound, is about 33 miles east of New York. The harbor consists of a bay lying north of a line from Shippan Point on the east through Stamford Lighthouse, to the west shore north of Greenwich Point. The harbor is shoal and the approach is obstructed to a large extent by ledges and rocks. The entrance to the harbor is between Stamford Lighthouse and Shippan Point and is marked by buoys and a lighted range.

Shippan Point, the eastern point at the entrance of Stamford Harbor, is marked by a prominent residence with a red tile roof, visible from the southward and eastward, and is surrounded by rocks which show at low water.

Stamford Harbor Lighthouse* is located on **Harbor Ledge** on the west side at the entrance of Stamford Harbor. The lighthouse is a white, conical tower on a red pier.

The light is 57 feet (17.4 m.) high and is visible about 12 miles. The fog signal is an air diaphragm horn. Broken ground surrounds the light to a distance of 300 yards, and is marked off its southeast edge by a gong buoy.

* Lat. 41°00'.8, Long. 73°32'.6: Charts 221, 222, 1213.

Stamford is a manufacturing city on the peninsula lying between East and West Branches. The chimney and tank at the gas plant are prominent objects.

The entrance channel has been dredged to a width of 200 feet from the 12-foot (3.7 m.) curve in the outer harbor to the junction of the East and West Branches in the inner harbor. In 1939 there was a controlling depth of 13 feet (4.0 m.). The removal of several rocky shoals in the channel was in progress. The channel is well marked by buoys.

Stamford Harbor Front Range Light, a black skeleton tower with a white tank house on a black base, is situated at the junction of the East and West Branches.

Stamford Harbor Rear Range Light, a red skeleton tower with a white tank house on a red base, is situated on the south end of **Pine Island** and forms an entrance range the bearing of which is 358° true. **East Branch** has been improved by dredging a channel 100 feet wide and 12 feet (3.7 m.) deep to the head of navigation at the railroad. In 1939 there was a controlling depth of 12 feet (3.7 m.) to the head of navigation. The deepest draft taken to the wharves is about 16 feet (4.9 m.) at high water. The depths at the principal wharves range from about 6 to 10 feet (1.8 to 3.0 m.). Small vessels of less than about 8-foot (2.4 m.) draft should have no difficulty in going up to the wharves, but strangers should proceed with caution.

West Branch, in the entrance to **Rippowam River,** has been improved by dredging a channel 100 feet wide and an anchorage basin 200 feet wide at the head of the branch. The bottom of the channel is rocky. In 1939 the controlling depths were 13 feet (4.0 m.) over isolated rocky shoals to the anchorage basin 15 feet (4.6 m.) except for rocky outcrops in the anchorage. The removal of the rocky shoals and rocky outcrops was in progress. The lower end of the anchorage basin is 400 feet above **White Rock;** the latter is 100 feet westward of the dredged channel and shows above high water. The head of navigation is at a dam at Oliver Street Bridge, 450 feet above the head of the anchorage basin. The depths at the principal wharves range from 5 to 8 feet (1.5 to 2.4 m.).

Pilots.—There is a local pilot who is employed by the deeper-draft vessels entering the harbor.

Pilotage.—Pilotage is compulsory for foreign vessels drawing 9 feet or more. Pilots board vessels off Stamford Light at the harbor entrance. Inward and outward rates are the same and apply throughout the year.

Towage.—There is no regular towing service available at Stamford. Tugs may be obtained from Bridgeport or from City Island. Rates for this service are fixed by agreement at the time of charter.

Immigration, Customs, Quarantine.—Stamford is in the Bridgeport customs district, but is not a port of entry. Immigration, customs, and quarantine services are performed at Bridgeport unless special arrangements have been made with the proper officials.

Dangers.—Forked Rock is covered at high water. Buoys mark the westerly edge of these rocks and the sides of the channel in Stamford Harbor. **The Cows** are a cluster of rocks, almost bare at a good low water, which are marked off the south end by a lighted bell buoy lying 0.9 mile southward of Shippan Point. Sunken rocks, with 14

feet (4.3 m.) or less over them, extend 0.8 mile southeastward from Shippan Point.

Highwater Rock is awash at high water, and rocks bare at low water extend 0.3 mile southward from it to a point 350 yards northeastward of Stamford Harbor Lighthouse.

Grass Island is low and rocky. There is very little water between the island and the channel and it practically bares at low water.

Flint Rocks, westward of the junction of the East and West Branches are marked by a light on a black skeleton tower with a black tank house on black base.

Anchorage.—A vessel of less than 10-foot (3 m.) draft can anchor just westward of the line of the Stamford Harbor range lights, with Highwater Rock bearing 259° true, distant 350 yards, in 13 feet (4 m.). Deeper draft vessels should anchor more to the southward in depths of 16 feet (4.9 m.). Small craft can anchor off the yacht club and southward or southeastward of Rhode Island Rocks red buoy, where the depths are 5 to 7 feet (1.5 to 2.1 m.). All of the anchorages in the outer harbor are exposed to southerly and southwesterly winds.

The **harbor master** has charge of the berthing and anchoring of vessels. No dumping in the harbor is allowed.

Tides.—The mean rise and fall of tides is about 7¼ feet.

Currents.—Currents in the harbor have little velocity and usually set fair with the channel.

Prevailing winds.—Prevailing winds are from the south and southwest in the summer and from northeast to northwest during the winter season.

Ice.—The channel in the East Branch is usually navigable throughout the year. In the West Branch the channel is closed by ice for about 6 weeks in most years. Ice forms in the harbor each winter and extends usually as far as the lighthouse. The channels are kept open as far as practicable by passing traffic.

Directions, Stamford Harbor—From eastward.—Passing 0.5 mile or more southward of Norwalk Islands a 245° true course will lead southward of The Cows lighted bell buoy off Shippan Point. Passing 100 yards westward of the buoy a 323° true course will lead westward of the red buoys on the east side of the entrance.

From westward.—Passing southward of Execution Rocks Lighthouse a 48° true course will lead to the entrance. Or passing 300 yards southward of the red buoy off Greenwich Point a 51° true course will lead southward of the black gong buoy off Stamford Harbor Lighthouse.

To enter.—Passing east-southeastward of Stamford Harbor Lighthouse, about midway between the channel buoys at the entrance, the course up the harbor is 358° true with Stamford Harbor range lights in line ahead. The range favors the west side of the channel and does not show plainly until eastward of Stamford Harbor Lighthouse.

East Branch.—Pass 70 feet eastward of Stamford Harbor range front light and steer for Stamford Harbor Light No. 3 (black structure). When about 200 yards below the latter light and abreast a small island steer to pass 50 feet eastward of Light No. 3. Then steer in mid-channel, and pass 65 feet westward of Stamford Harbor Light No. 2, and continue in mid-channel.

Caution is recommended when making the turn abreast the small island to avoid a rock eastward of the channel line. This rock is

nearly awash at high water and although outside of the channel limits might be hit if the turn was made too soon. The west side of the channel should be favored in this vicinity.

West Branch.—Pass 75 feet southwestward of the horizontally banded buoy southward of Stamford Harbor range front light and steer for the north end of the wall at **Cook Point,** and then steer mid-channel courses passing eastward of the black buoys at a distance of about 50 feet. Pass at a distance of 80 feet off the wharves on the east bank abreast **White Rock,** and follow the wharves at this distance until 400 feet above the rock.

Dockage and Wharfage.—Charges at wharves open to the public are determined by agreement. There are no published charges.

Piers, Wharves, and Docks.—There are 14 commercial wharves along the **East Branch.** They are in general of the bulkhead and apron type and are all privately owned. Three are used exclusively for the owners' business and seven are open to the public upon agreement and payment of charges. A spur track from the New York, New Haven & Hartford Railroad serves the properties on the west side of the stream and leads to the upper wharves on the east side.

In the **West Branch** section of the harbor there are 11 wharves of the same general type as those in the East Branch. All are privately owned and used in connection with the owner's or operator's business. One is open to the public at the convenience of the owner.

Storage.—Aside from the wharves of the local coal and lumber dealers and of the various manufacturing plants, there is little area available for storage of bulk freight.

There are no warehouses available for the storage of ship's cargo.

Supplies.—Coal and water can be had at the wharves at Stamford. Provisions, gasoline, and other supplies can be obtained.

Coal Bunkering.—There are several companies with facilities for bunkering coal located in both the East and West Branches. The normal amount of supply of coal is about 1,200 tons and the rate of delivery is from 45 to 90 tons depending upon the facilities of handling at the various companies.

Oil Bunkering.—Bunker fuel oil and diesel oil is available in several grades with a normal supply of about 4,000 barrels of each grade. There are no facilities for bunkering in the stream.

Repairs.—There are shipyards in both the East and West Branches with facilities for hauling out small craft and vessels from 45 to 150 tons. The largest railway can accommodate vessels up to 125 feet in length with a draft of 12 feet (3.7 m.). There are good facilities for making repairs to both wooden and steel hulls and to boilers, dynamos, and machinery.

Commerce.—The water-borne commerce consists mainly of coastwise traffic, comprising coal, sand and gravel, and petroleum products.

Communication.—A ferry runs to Oyster Bay in the summer and freight steamers make occasional trips to New York from the steamboat wharf on East Branch. Stamford is on the line of the New York, New Haven & Hartford Railroad. There is also good bus service.

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CAPTAIN HARBOR

(CHART 222)

Captain Harbor is on the north shore of Long Island Sound, northward of Great and Little Captain Islands and the reefs between them, and affords shelter from all winds. The harbor is entered for shelter by vessels drawing 12 feet (3.7 m.) or less. The depths at the anchorage in the deeper part of the harbor, about 0.5 mile northward of Great and Little Captain Islands, are 15 to 30 feet (4.6 to 9.1 m.). Vessels of less than 7-foot (2.1 m.) draft anchor on the flats. The bottom is soft, but the entire harbor and entrances are characterized by boulders, and strangers should proceed with caution, especially on the flats and other shoal areas which are not thoroughly developed.

The eastern entrance to Captain Harbor, between Flat Neck Point and Little Captain Island, is the clearer and better one for strangers. The western entrance, northwestward of Great Captain Island, is also easy of access, but the broken ground in this entrance requires caution on the part of vessels using it.

Greenwich Point,* lying 1.5 miles westward of Stamford Harbor Lighthouse, is characterized by a low, grassy hill. Reefs extend 0.3 mile southeastward from Greenwich Point. **Woolsey Rock,** near the easterly end of the reefs, is bare at low water.

A buoy southeastward of Woolsey Rock at a distance of about 200 yards marks the southeast end of the foul ground and also the eastern end of South Reef. A buoy is placed nearly 0.5 mile southward of Greenwich Point and marks the south end of the broken ground off the point.

Flat Neck Point, the western end of Greenwich Point, is wooded and forms the easterly side of the easterly entrance to Captain Harbor. A reef of bare and sunken rocks extends nearly 0.3 mile southwestward and westward from Flat Neck Point, and is marked at its southwest end by a buoy. About 400 yards northwestward of the point the boiler of a wreck shows above high water.

A spot with 15 feet (4.6 m.) over it lies on the northeast side of the channel nearly 0.3 mile northeastward of the spindle on Hen and Chickens.

Greenwich Cove opens into Captain Harbor from eastward, northward of Flat Neck Point. It is of no commercial importance, and is frequented only by small craft. **Cove Rock,** awash at mean low water, is marked by a buoy, and **Finch Rock** (depth 2 feet (0.6 m.) lie in the entrance. **Inner Cove Rock,** inside the cove, awash at low water, is marked by a buoy. The post village of **Old Greenwich,** formerly called **Sound Beach,** is on Greenwich Cove.

Coscob Harbor, on the northeast side of Captain Harbor, has a channel depth of about 7 feet (2.1 m.) for a distance of 1 mile above the entrance to the railroad bridge at **Coscob** and **Riverside.** A channel 100 feet wide and a controlling depth of 3 feet (0.9 m.) deep has been dredged in **Mianus River** for a distance of 1,300 feet above the bridge. For a distance of 0.5 mile above the improved channel to the head of navigation at **Mianus** the river has a narrow, somewhat crooked channel, with a least depth of about 1 foot (0.3 m.) at low water, which follows generally the edge of the marsh on the west

*Lat. 41°00'.1, Long. 73°34'.3; Charts 222, 1213.

side of the river. The deepest draft taken to the power plant below the railroad bridge is 12 feet (3.7 m.) and to Mianus 7 feet (2.1 m.). There is good anchorage for vessels of less than 7-foot (2.1 m.) draft in the channel below the yacht clubs.

The Riverside Yacht Club is prominent on the east side of Coscob Harbor 0.5 mile above the entrance. There is a large power plant on the west side, with a small boat yard just south of it, just below the bridge. The marine railway is capable of hauling out small craft up to lengths of 50 feet and a draft of 6 feet (1.8 m.). Repairs to both hull and motors can be obtained.

The railroad bridge has an opening 67 feet wide and is 20 feet (6.1 m.) above high water. The overhead wires at the bridge are 110 feet (33 m.) above high water. There is a wharf and plant for the construction of launches and motors and a marine railway for small craft at the head of the improved channel above the bridge. The marine railway at this plant can accommodate vessels up to lengths of 100 feet and a draft of 10 feet (3.0 m.).

The **channel** of **Coscob Harbor** is easily followed as far as the yacht club, the principal dangers either showing above water or being marked. Passing on either side of Hitchcock Rock buoy, the channel leads between buoy No. 2 west of **Bluff Island** and the buoy off Pecks Rock, then between Diving Island and buoy No. 3 east of Saw Island, then 200 to 300 feet eastward of Goose Island, and then about 200 feet westward of the buoy off Sunken Rock and the landing at the yacht club. Above this point the channel is narrow. It leads about 300 feet from the east bank, heading for a barn in range with the middle of a span of the bridge until 350 yards below the bridge, and then leads for the lift opening.

The following are rocks in Coscob Harbor: The rock on the east side of the entrance westward of Bluff Islet is partly bare at high water and is marked to the northwestward by a buoy. A rock with 3 feet (0.9 m.) over it lies 175 yards southward of it. **Salt Rock** is covered at half tide. **Ring Rock** is covered at high water. **Diving Island** is a mass of rugged bare rocks; the passage 200 yards eastward of it has a controlling depth of about 6 feet (1.8 m.) for a width of about 250 feet.

Hitchcock Rock, awash at mean low water, is marked by a lighted buoy. **Pecks Rock,** bare at low water, is marked by a black buoy. Rocks bare at mean low water, and marked by two private spindles, lie on the west side of the channel 100 yards southeastward of **Saw Island;** the latter is marked by a house and sea wall and private stone wharf. A sunken ledge lies 100 yards off the east side of the point northward of **Goose Island. Sunken Rock,** covered at half tide, is marked by a buoy, and has a private spindle on it.

Newfoundland Reef is a small patch with 4 feet (1.2 m.) over it lying in the northeast part of Captain Harbor, 600 yards southward of the outer bare rock at the entrance of Coscob Harbor. It is marked on the south side by a lighted buoy.

Red Rock, bare at half tide, lies 0.3 mile southeastward of Tweed Island. It is marked on its south side by a buoy.

Horse Island,* marked by a stone house and small stone wharf, is connected to the mainland by a causeway.

*Lat. 41°00'.8, Long. 73°36'.3: Charts 222, 1218.

Tweed Island, also called **Finch Island,** has a sea wall on its southern side and lies on the south side of **Indian Cove.**

Indian Harbor, formerly charted as **Chimney Corner** is a narrow inlet on the north side of Captain Harbor. A channel, with a least depth of about 7 feet (2.1 m.) passes about 200 feet westward of Tweed Island on a 25° true course, and follows the west bank to the bulkhead on the west side of the cove 300 yards above the entrance. Small craft can anchor in the channel just above this point, favoring the bulkhead. A narrow, crooked channel, nearly dry at low water, leads to the head of navigation, 0.8 mile above the entrance, as shown on the chart. There is a prominent, large, white residence, with red roof and adjacent white clock tower, on the point separating Smith Cove and Indian Harbor.

Smith Cove, formerly charted as **Indian Harbor** is an open bight with a depth of about 4 feet (1.2 m.) in the entrance and shoaling northward. Rocks extend nearly 200 feet from the shores at the entrance. A rock covered at high water lies in the middle 300 yards above the entrance; nearly 100 yards below this rock there is a rock covered at half tide eastward of mid-harbor, and another bare at low water westward.

Depths of 6 feet (1.8 m.) or less extend 250 yards southward from the point separating Smith Cove and Greenwich Harbor. Bare ledges extend 200 feet southeastward of the point. Sunken rocks lying 100 and 250 yards southward of the point are marked by buoys. The yacht club, on the end of the point, usually maintains lights on a flagstaff during the summer. There is a depth of about 5 feet (1.5 m.) at mean low water at the landing of the yacht club.

Greenwich Harbor (chart 222) lies on the north side of Captain Harbor and northeastward of Field Point. The harbor has been improved by dredging a straight channel 130 feet wide and 12 feet (3.7 m.) deep to the yacht club on the east point at the entrance; and thence 100 feet wide and 10 feet (3.0 m.) deep to within 500 feet of the causeway at the head, where the channel is widened to form a turning basin. This channel passes 250 feet eastward of the landing on the east side of Round Island and then follows the wharves. A natural range for the axis of the channel is the east end of a large red brick building, north of the railroad tracks, showing between a spire and a cupola, favoring the latter. The deepest draft of vessels entering the harbor is 15 feet (4.6 m.). Surveys in May 1940 showed a controlling depth of 12 feet (3.7 m.) at mean low water in the improved channel.

Greenwich is a town on the railroad, the wharves being on the point on the east side of Greenwich Harbor. Coal, water, gasoline, and other supplies can be obtained. A gasoline and oil barge is sometimes anchored at the east side of the entrance to the harbor, in the summer.

There is a boat yard on the east side of the harbor with facilities for constructing and repairing wooden hulls and for making extensive repairs to machinery. There are three railways, the largest of which has a capacity of about 300 tons and is capable of hauling out craft up to a length of 125 feet. Boat storage is available. Fresh water and ship chandlery supplies can be obtained at the boat yard, where there is a depth of 8 feet (2.4 m.) alongside the dock at mean low water.

A ferry operates from the town landing, at the head of the harbor, to Little Captain Island during the summer.

Field Point, northward of Great Captain Island Lighthouse, is occupied by private estates. About 0.3 mile northeastward of Field Point is a prominent white building with a red tile roof and six white chimneys.

Byram Harbor is a bight. frequented only by small craft, at the northwest end of Captain Harbor northward of **Calf Islands. Wilson Head,** which shows at low water, is in the middle of the entrance of the bight, and is marked by a buoy on its east side. From eastward of Wilson Head a channel 50 feet wide and 6 feet (1.8 m.) deep has been dredged by private parties to the head of the bight, where there is an anchorage basin with a depth of 4 feet (1.2 m.). The entrance to Byram Harbor from eastward is between **Otter Rocks** and **Bowers Island.** The former are covered at high water, are marked by a lighted buoy on the southwest side, and should be given a berth of 100 yards; the latter is marked by a clump of trees, and from it a reef extends 200 yards north-northwestward, being marked at its end by a buoy. A rocky ledge makes out from the point 300 yards northwestward of Otter Rocks and is marked at its southwest end by a buoy.

Entering Byram Harbor from southwestward, southward of **Huckleberry Islands,** there is a narrow channel used by launches between the northwest one of the Calf Islands and the two nearest rocks, sometimes marked by private spindles, northwestward. The rocks lying 90 yards off the southwest end of Huckleberry Islands are bare at low water. **Little Ross Rock** shows 2 feet (0.6 m.) at high water, and **Great Ross Rock** is a rocky islet with some grass. The ledge lying 350 yards southwestward of Great Ross Rock is bare at low water. **Grassy Rocks** are covered at high water. The four large ledges lying northwestward and westward of Grassy Rocks generally show at low water.

Jones Rocks, partly bare at high water, are at the southeast end of the foul ground which extends over 0.2 mile southeastward from the south end of Calf Islands. The southeast end of the rocks is marked by **Jones Rocks Light,** a black skeleton tower with a white tank house on a black base and is on the north side of the channel leading into Captain Harbor from westward.

Cormorant Reef lies northward of Great Captain Island, and part of it is bare at high water. A buoy is placed northwestward of the main part of the reef and close to a rock which is bare at about half tide.

Great Captain Island is 0.4 mile long, and is marked near its southeast end by Great Captain Island Lighthouse. There is a summer resort and landing on the island. The island is fringed with reefs. A red buoy is placed 600 yards southwestward of the island to mark the reef making off from that end. A rocky, broken area, on which the least depth found is 12 feet (3.7 m.), extends 0.4 mile westward from the island. The passage between Great and Little Captain Islands is foul and is not recommended for use by strangers without local knowledge. There is a channel about 150 yards wide with a controlling depth of 8 feet (2.4 m.) which may be used by passing midway between the islands on a course of 333° true heading for the south end of Field Point.

Great Captain Island Lighthouse* is a white tower on the south gable of a granite dwelling. The light is 73 feet (22.3 m.) high and visible 14 miles. The fog signal is an air diaphragm horn.

Little Captain Island, locally known as **Island Beach,** is two islands connected by reefs. There is a summer resort and landing on the island. **Little Captain Island East Reef** is an area of boulders and broken ground which extends 0.4 mile eastward and northeastward from the island. It is marked at its eastern end by a lighted bell buoy. **Hen and Chickens** is a group of these rocks and boulders lying 600 yards northeastward of Little Captain Island, and is marked by a spindle.

Tides.—The mean rise and fall of tides is about 7¼ feet. The tidal **currents** have little velocity in the harbor except in the channel between Jones Rocks and Cormorant Reef, where the estimated velocity is about 1 knot.

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 and Great Captain Islands.

Directions, Captain Harbor, from eastward.—Passing southward of The Cows lighted bell buoy off Shippan Point, steer for Great Captain Island Lighthouse on any bearing westward of 255° true, which will lead southward of the red buoy off Greenwich Point. From a position about 100 yards southward of this buoy a course of 270° true for about 1 mile will lead 250 yards southward of the red buoy southwestward of Flat Neck Point. Then steer 298° true until 0.3 mile north of Hen and Chickens beacon. Or, if approaching the entrance from a southeasterly direction steer 298° true passing eastward of the lighted bell buoy eastward of Little Captain Island at a distance of about 250 yards and continuing on this course until 0.3 mile north of Hen and Chickens beacon.

From the position northward of Hen and Chickens beacon steer 250° true heading for the south end of Calf Island and select anchorage in the Harbor; or enter the dredged channel into Greenwich Harbor on a course of 354° true when south of the red buoy marking the channel entrance. (See also Greenwich Harbor, p. 268.)

From westward.—A course for Great Captain Island Lighthouse on any bearing northward of 46° true will lead clear of dangers. A 14° true course for Jones Rocks Light will lead 450 yards southeastward of Bluefish Shoal buoy and 350 yards southeastward of Four-foot Rocks buoy. Proceed with caution when crossing the broken, rocky area, on which the least depth found is 12 feet (3.7 m.), extending 0.4 mile westward from the western end of Great Captain Island. Pass 100 yards southeastward of Jones Rocks Light, the same distance northwestward and over 100 yards northward of the buoy northwestward of Cormorant Reef and steer 70° true in the harbor.

CAPTAIN HARBOR TO THROGS NECK

Port Chester Harbor (chart 222), lying 1 mile westward of Great Captain Island, is the entrance to Byram River, which leads to the town of Port Chester.

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*Lat. 40°58′.9, Long. 73°37′.4; Charts 222, 1213.

In 1938, the controlling depths at mean low water were: 12 feet (3.7 m.) for a width of 150 feet from Long Island Sound to Byram Point, just below Fox Island; 10 feet (3.0 m.) for a width of 100 feet to the turning basin at Port Chester, except for several minor isolated shoals which had a depth of 9½ feet (2.9 m.); 10 feet (3.0 m.) in the turning basin; 9 feet (2.7 m.) to 3 feet (0.9 m.) for a width of 150 feet to 80 feet to about 250 feet below Mill Street; and 1 foot (0.3 m.) for a width of 80 feet to Mill Street the head of navigation.

Port Chester Harbor is protected by a breakwater, which is marked at its south end by **Port Chester Light,** a red skeleton tower with a white tank house. The controlling depth in the anchorage basin, near the breakwater, on the east side of the channel, was 12 feet (3.7 m.) in September 1938. Small craft can anchor in the harbor southwestward of Port Chester Channel Light, where there is a small area with depths of 6 to 7 feet (1.8 to 2.1 m.).

Byram River has a length of 1 mile to Mill Street Bridge, a width of 100 to 300 feet, and is rocky. **Port Chester** is an important town with railroad communication.

Supplies and repairs.—Coal, water, gasoline, and supplies can be obtained, and there are facilities for hauling out small vessels up to 4-foot (1.2 m.) draft. The principal items of commerce are building material, coal, ashes, fuel oil, and petroleum products, carried in vessels of from 5 to 14 foot (1.5 to 4.3 m.) draft.

Barges drawing 12 feet (3.7 m.) discharge oil cargoes at a terminal at Fox Point where there is a depth of 14 feet (4.3 m.) alongside the wharf.

Tide.—The mean rise and fall of the tide is 7.3 feet.

Directions, Port Chester Harbor.—The approach to Port Chester is obstructed by rocks, but is not difficult with the aid of the chart. From southwestward it is safer to pass eastward of Bluefish Shoal bell buoy. **Fourfoot Rocks** may be passed on either side, remembering that the buoy is at the south end of the rocks. Entering the harbor pass westward of Great Captain Rocks, eastward of Manursing Island Reef, 150 feet southward of Port Chester Light (on end of breakwater), and 75 feet eastward of Port Chester Channel Light and 75 feet westward of the red buoy. The channel then curves northeastward into the river; a rock, covered at half tide, lies on the north side of the channel just westward of the entrance of the river. The channel in Byram River is fairly well defined at low water, but requires local knowledge for the best water; strangers should take it on a rising tide and proceed with caution.

Local boats entering Port Chester harbor at night use the range of Port Chester Light (on south eand of breakwater) and Port Chester Channel Light. The range should be kept slightly open to the southwestward to assure passing Fourfoot Rocks and the southwest end of Great Captain Rocks at a safe distance.

Channel Rock, bare at low water, lies 250 yards eastward of Port Chester Light, and there is foul ground between.

Manursing Island Reef, the outer part bare at low water, extends 200 yards from the shore, and is marked at its end by a buoy, which lies 200 yards southeastward of Port Chester Light.

Great Captain Rocks, lying 0.3 mile southeastward of Port Chester Light, are three principal rocks, which are covered at high water. The southwesterly rock has a red buoy on its south side. Rocks partly

bare at low water extend nearly 100 yards northwestward from the buoy.

Broken ground and numerous rocks fringe the shore southwestward of Great Captain Island. There are several summer settlements on the south of **Manursing Island** and **Peningo Neck.**

Glover Reef is marked at its southeast end by a buoy.

Transport Rock is a part of several ledges, which lie 0.3 mile off the south side of Manursing Island, and are partly bare at high water. Two sunken rocks lying southwestward of these ledges are marked by buoys; between the buoys there is a channel for small craft leading to **Rye Beach.** A sunken reef with 6 to 14 feet (1.8 to 4.3 m.) over it lies 600 yards southeastward of these ledges and 0.4 to 0.6 mile southward of the south end of Manursing Island. A lighted buoy, maintained from April 1 to December 15 is about 200 yards south of this reef.

Playland, a recreational center at Rye Beach, has two prominent **twin towers** at the entrance to the park which are conspicuous from a southeasterly direction. Westward and close to the north breakwater there is an excellent boat landing which is marked by lights. There are depths of about 12 feet (3.7 m.) at mean low water at the landing. A breakwater extends eastward from the south end of Rye Beach and is marked at the east end by a flashing light. Between the boat landing and the south breakwater the area is reserved for bathing purposes and for the most part is blocked off by a wooden boom to prevent boats from entering. Bus service is available with connections at Rye for New York City and points along the Connecticut shore.

Forlies Rocks are the outer part of the partially bare rocks and ledges which extend 600 yards from shore at the south end of Rye Beach. A buoy is on the south side of Forlies Rocks.

Forbes Rocks, partly bare at low water, has a reef with depths of 7 to 11 feet (2.1 to 3.4 m.) extending 250 yards to the southward and eastward. There is a buoy at the eastern end of the reef.

A channel good for a depth of 9 feet (2.7 m.) and marked by buoys, leads southward of Forlies Rocks to the wharf at **Oakland Beach.** Another channel with a least depth of 9 feet (2.7 m.) leads southward from this wharf to the sound, passing about 100 yards off the shore and about 25 yards southward of the red buoy which is about 250 yards to the northeast of the north end of **Pine Island.** There are depths of about 9 feet (2.7 m.) at mean low water at the landing at Oakland Wharf.

Porgy Shoal,* 0.5 mile east-northeastward of **Parsonage Point,** has a least found depth of 5 feet (1.5 m.) and is marked on its southeast side by a lighted buoy with a station buoy alongside. The lighted buoy is removed from station from December 15 to April 1 of each year when it is endangered by ice.

Scotch Caps are three rocky islets lying 0.3 mile southwestward from **Milton Point.** They lie on the northwest side of the extensive reefs which extend 0.9 mile in a southwesterly direction from Milton Point. The southwesterly end of the reefs is marked by a lighted buoy and a nun marker which lie nearly 0.6 mile south-southwestward of Scotch Caps. The lighted buoy is removed during the winter.

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*Lat. 40°57′.0, Long. 73°40′.6: Charts 222. 1213.

The entire area of the reef lying northward and northeastward of the lighted buoy is exceedingly broken, and should be avoided even by small craft in the absence of local knowledge; 300 yards southwestward of the lighted buoy is an obstruction with 12 feet (3.7 m.) over it.

Milton Harbor, between Peningo Neck and Hen Island, is used as a summer anchorage by small pleasure craft, and is exposed only to southwesterly winds. The depth in the harbor shoals gradually from 8 feet (2.4 m.) between Scotch Caps and the southwest end of Hen Island to 6 feet (1.8 m.) abreast of Milton Point, and then decreases gradually northeastward. There is foul ground on the northwest side of the harbor near **Hen Island;** otherwise the principal danger in the harbor is a rock, bare at low water and marked on its southeast side by a buoy, lying a little northward of midway between Milton Point and the northeast end of Hen Island. The best entrance is between the buoys off the entrance, lying 0.4 mile southwestward of Scotch Caps.

The yacht club maintains range lights from May 15 to September 15 to mark the entrance channel between the buoys. This range is not charted but local information may be obtained from the yacht club.

The boat landing at the yacht club near the southwest end of Milton Point has a depth of 4 feet (1.2 m.) at mean low water. Near the clubhouse there is a prominent white flagstaff from which lights are exhibited from sunset to sunrise during the summer months.

At high water small craft can go for a considerable distance up the narrow part of Mill Creek, which is crossed at its lower end by two fixed highway bridges, 26 feet wide and 4 feet (1.2 m.) above mean high water.

West Rock, southwestward of Scotch Caps, is marked by a beacon which is maintained during the summer by the yacht club at Milton Point.

Mamaroneck Harbor (chart 222), lying 3.5 miles 16° true from Execution Rocks Lighthouse, is an open bight between Hen Island and Delancey Point. It is exposed to southerly winds, but affords shelter against northerly winds, the depths in the outer harbor ranging from 7 to 12 feet (2.1 to 3.7 m.). The important dangers are buoyed. The rocks at Mamaroneck Harbor rise abruptly, and some of them are bare at low water. Vessels should proceed with caution when inside the 5-fathom (9 m.) curve. After reaching Outer Steamboat Rock the new County Disposal Building is very prominent. It is a red brick building and has a large glass tower.

The controlling depth at mean low water in the approach channel to the East Basin and West Basin, situated to the northeast and southwest, respectively, of **Harbor Island,** is 10 feet (3.0 m.) for a width of 100 feet from the outer harbor to **Orienta Point,** thence 10 feet (3.0 m.) for a width of 80 feet to 55 feet to the head of navigation and in the anchorage area in the East Basin. The connecting channel between the main channel and the West Basin had a controlling depth in June 1939 of 6 feet (1.8 m.) for a width of 80 feet to the head of navigation including the anchorage area.

The East Basin cannot be recommended to strangers as an anchorage, as it is usually completely filled with moorings of local craft. There are moorings in the West Basin which are maintained by the

town for which there is a nominal charge. There is a public landing at West Basin.

The **harbor master** can usually be found at the float landing on the west side of the channel, just north of Harbor Island. **Harbor regulations** have been established and copies can be obtained from him.

A speed limit of 6 miles per hour is enforced within the limits of the inner harbor and channels.

Tides.—The mean rise and fall of tides is about 7¼ feet.

Directions, Mamaroneck Harbor.—Approaching from eastward, pass southward and 100 yards or more westward of Scotch Caps lighted buoy, taking care to avoid the obstruction with 12 feet (3.7 m.) over it, lying 300 yards southwestward of the buoy, and steer about 321° true for the western end of the large building on the eastern side of the entrance of the inner harbor, which will lead to Outer Steamboat Rock buoy.

Approaching from westward.—An 18° true course, with Execution Rocks Lighthouse astern, will lead 200 yards southeastward of the black buoy off Delancey Point. Anchor according to draft southward of the line joining the buoys marking **Turkey** and **Outer Steamboat Rocks.**

From Larchmont pass 100 yards southward of the breakwater, steer 62° true to a position 200 yards eastward of the southern black buoy off Delancey Point, and then steer 18° true and select anchorage according to draft in the harbor.

The approach channels to East Basin and West Basin are well marked by buoys and with the chart as a guide no particular difficulty should be encountered.

Supplies of all kinds are available is Mamaroneck.

Repairs.—There is a boat yard in the approach to West Basin which has a marine railway with a capacity of about 50 tons. It can accommodate craft up to lengths of 60 feet and a draft of 6½ feet (2.0 m.). The boat yard has facilities for boat storage as well as repairs to both hull and machinery. Gasoline and fresh water are available at the boat-yard wharf, which has a depth of 6 feet (1.8 m.) at the end.

The water-borne commerce consists wholly of coastwise trade the principal items of which are building material, coal and petroleum products, which are carried in vessels or barges from 6- to 12-foot (1.8 to 3.7 m.) draft.

Mamaroneck has railroad communication with New York. A small gasoline boat runs to Hen Island in the summer.

Black Tom shows above water, and there is a rock bare at low water southwestward of it. The large ledge which extends toward Black Tom from **Delancey Point** shows above water; there is a boat landing inside the ledge. A rock with 9 feet (2.7 m.) over it, lies about 0.3 mile eastward of Delancey Point, and is marked by a buoy. Delancey Point is marked on its south side by an observation pier. A reef extends 0.3 mile southward from the pier, and is marked at its south end by a buoy. A rock with 12 feet (3.7 m.) over it lies about 100 yards west of the buoy.

A breakwater, which shows at high water extends 1,410 feet south-southeastward from **Edgewater Point,** on the eastern side of the

entrance of Larchmont Harbor. **Larchmont Harbor Light,*** a red skeleton tower with a white tank house, is on the south end of the breakwater. The passage between the north end of the breakwater and the point is blocked by rocks, which are bare at low water. There is a rock with 9 feet (2.7 m.) over it about 300 yards northeastward of the light.

Larchmont Harbor (chart 222) lies between Edgewater Point and **Umbrella Point,** and northward of Execution Rocks Lighthouse. The harbor is the headquarters of the Larchmount Yacht Club. The depths at the anchorage for small vessels in the harbor range from about 12 feet (3.7 m.) in the entrance to 6 feet (1.8 m.) near Rock Island. In summer the harbor is full of mooring buoys for small yachts. The rocks on the west side are marked, while unmarked shoals extend 200 yards from the eastern shore. The anchorage for larger vessels is westward of the breakwater.

The private lights in Larchmont Harbor are maintained by the yacht club from about May 10 to September 10 of each year, as follows: **Umbrella Rock,** marked by a black spindle and green light, lies 250 yards eastward of Umbrella Point, and may be passed on either side; a few rocks of a breakwater, which was started on Umbrella Rock, are awash at high water. Umbrella Rock is marked on the south side by a buoy.

North Ledge is near the western shore southeastward of the yacht club. The south end is bare at half tide, and is marked by a red spindle with round target and red light. The north end is bare at low water, and is marked by a black spindle with a round target and green light. The principal landing at which there is a depth of 4 feet (1.2 m.) is on the southeast side of the yacht club and is lighted until midnight.

South Ledge, near the western shore is unmarked, the north end of the ledge is bare at half tide and the south end is bare at low water.

The back landing, northward of the yacht club is no longer lighted. There is a spindle with a black disc target which marks the northeast side of a ledge just southward of the landing. A light is exhibited from the yacht club flagpole from June 1 to October 1.

The entrance of Larchmont Harbor is on either side of Hen and Chickens. The easterly entrance is about 300 yards wide, with a depth of about 18 feet (5.5 m.), between the 15-foot (4.6 m.) spot lying 100 yards south-southwestward of the end of the breakwater and the unmarked rocky spots off the northeast end of Hen and Chickens.

Hen and Chickens, a reef bare at low water in places near the middle, lies off the entrance of Larchmont Harbor. The area with depths less than 18 feet (5.5 m.) is marked by four buoys—at its northeastern end by a lighted bell buoy, at its northern and western extremities by red buoys, and at its southern end by a red buoy which is lighted from May 1 to October 30. **Dauntless Rock** (depth 8 feet (2.4 m.)), marked by a black buoy, and other rocky spots, with 14 to 15 feet (4.3 to 4.6 m.), lie off the northeast end of Hen and Chickens, and extend 300 yards northward from the lighted buoy and the same distance eastward from the black buoy at the north end of the reef.

There is a rock with 13 feet (4.0 m.) over it about 250 yards north; a rock with 13 feet (4.0 m.) 450 yards east, and another rock with

*Lat. 40°55'.1, Long. 73°43'.9: Charts 222, 1213.

16 feet (4.9 m.) about 0.4 mile northeastward of the red buoy at the south end of Hen and Chickens.

Directions.—From eastward, passing 300 yards southward of Scotch Caps lighted buoy, a 253° true course will lead the same distance southward of Larchmont Harbor Light, on the end of the breakwater, and will lead about 200 yards south of the obstruction with 12 feet (3.7 m.) over it, about 300 yards southwestward of Scotch Caps lighted buoy and about 100 yards south of the rock, with 15 feet (4.6 m.) over it, which lies 0.7 mile eastward of Larchmont Harbor Light. From southwestward, passing southeastward of the bell buoy off the south end of Hart Island, a 23° true course will lead westward of the buoys marking Execution Rocks and eastward of the buoy marking the south end of Hen and Chickens and eastward of the rock with 13 feet (4.0 m.) over it, lying 450 yards eastward of this buoy. In the westerly entrance of Larchmont Harbor, northwestward of Hen and Chickens, the dangers are buoyed, and the entrance is easy of access with the aid of the chart.

Horseshoe Harbor, which has a prominent gray building at its head, is a small cove just westward of Larchmont Harbor. It is used as a launch anchorage, for which there are a number of float landings. The deeper water in the entrance favors the eastern side; the northwest side of the cove is bare at low water. A rock, bare at low water and marked by a private spindle with can, lies 60 yards off the south side of the point on the west side at the entrance.

Premium Point, marked by a prominent residence, is on the northeast side at the entrance of Echo Bay. **Spindle Rock,** lying 100 yards southwestward of Premium Point, is covered at high water, and is marked at its southwest end by a buoy. The passage between Spindle Rock and Premium Point is practically blocked by rocks. There is a rock bare at low water at the northeast end of Spindle Rock.

Between Umbrella Point and Premium Point, a reef with depths of 2 to 13 feet (0.6 to 4 m.), extends for 0.3 mile from shore and is marked by a buoy.

Bailey Rock, bare at half tide, is near the end of a reef which extends about 200 yards off the point of **Davenport Neck,** on the southwest side at the entrance of Echo Bay. The rock is marked off its eastern side by a lighted buoy.

Hicks Ledge,* lying about 0.4 mile southeasterly of Premium Point, has a depth of 6 feet (1.8 m.) over it at mean low water. It is marked on both the east side and the west side by buoys.

Echo Bay (chart 222) is a small bay lying 2 miles northwestward of Execution Rocks Lighthouse, its entrance lying between Spindle Rock and Bailey Rock. The bay is an anchorage for small craft, and is generally fully occupied during the summer. The depths at the anchorage range from 4 to 15 feet (1.2 to 4.6 m.), and launches can anchor in the shallow cove on the northeast side of the harbor, entering between Harrison Islands and the rocky, grassy islet off the northwest side of **Echo Island.** Vessels frequently anchor between the entrance of Echo Bay and Hicks Ledge, in depths of 20 to 24 feet (6.1 to 7.3 m.). On the northwest side of Echo Bay a

*Lat. 40°54'.2, Long. 73°45'.2; Charts 222, 1213.

dredged channel 100 feet wide and 9 feet (2.7 m.) deep, marked by buoys, leads to the wharf at **Beaufort Point** and to a turning basin.

Northward from the turning basin the depths are shoal and there are extensive mud flats which are bare at low water. Southwesterly of the turning basin the depths vary from 9 feet (2.7 m.) to 2 feet (0.6 m.) at the head of navigation.

New Rochelle, a town on the western shore of Echo Bay, has railroad communication. Coal, water, gasoline, and other supplies can be obtained. A city ordinance stipulates that gasoline may be loaded from tank wagons before 8 o'clock in the morning. A masonry wharf, forming the northeast side of Beaufort Point, is municipally controlled and affords about 130 feet of berthing space. The city maintains a police patrol boat which usually docks at Beaufort Point. There are several marine railways, the largest for boats 60 feet long, 4 feet (1.2 m.) draft forward, and 6 feet (1.8 m.) aft. The principal items of commerce are building material, coal, and petroleum products, carried in vessels of 6 to 8 feet (1.8 to 2.4 m.) draft.

On the point midway between Beaufort Point and **Duck Point** is a prominent flagstaff, which shows a private green light which is maintained by the city during the summer. This light, on range with the lighted buoy at Bailey Rock, leads between Hicks Ledge and Middle Ground into Echo Bay.

Storm warnings are displayed at New Rochelle.

Just southwestward of Echo Bay there is a stone pier, marked by a private light, which protects a private boat landing on its southwest side. The end of the ledge making out from the shore just southward of the pier is marked by a private spindle.

Pine Island is rocky and covered with brush, and there are two houses on it. There is a small private landing on the west side of the island. Two bare rocks lie 200 yards southwestward of Pine Island. Southwestward of the rocks there is a long, bare ledge, the southwest end of which is marked by two private spindles. Southward of these spindles are two rocks, sometimes marked by private spindles and cages; the southwesterly rock is bare at low water and the easterly one bare at half tide. Between these rocks and the spindle northward is a channel used by small craft between Echo Bay and Glen Island. A red buoy marks the south end of the reef making out from these rocks and there is a clear channel between this buoy and the black one northward of Davids Island.

Middle Ground is a large boulder reef, near the middle of which there are a few boulders which show at high water. The north end of the reef is marked by a buoy. **Emerald Rock** (depth 9 feet (2.7 m.)), off the western end of Middle Ground, is marked by a buoy. Detached sunken rocks lie off the south end of Middle Ground and are marked at the south end by a lighted buoy which lies 200 yards northward of Huckleberry Island.

Davids Island is occupied by numerous buildings of Fort Slocum and is a United States Government reservation. The high, square, red-brick chimney on the south end of the island is prominent in the western end of the sound. The principal landings, at the western end of the island, have a depth of 12 feet (3.7 m.) at the ends, but there are rocks with 8 feet (2.4 m.) over them in the approaches.

Reefs partly bare at low water and marked at the north end by a lighted buoy extend 350 yards northward from Davids Island.

Davids Island is surrounded on its east and south sides by a foul area of islands and rocks, the passages between which should not be used by strangers, even in small craft. **Huckleberry Island,** at the eastern end of the group, is wooded. **Pea Island** and **Little Pea Island,** southeastward of Davids Island, are grass-covered, and there are rocks bare at low water southeastward at Pea Island. **Middle Reef,** 0.5 mile southward of Davids Island, has some boulders which show at high water. **Lower Green Flats,** between Little Pea Island and Middle Reef, is a boulder patch partly bare at the lowest tides. The channel between these reefs should not be attempted without local knowledge.

East and **South Nonations** are rocks bare at half tide between Middle Reef and Hart Island. South Nonations is marked on its south side by a lighted bell buoy.

New Rochelle Harbor is a narrow channel between Davenport Neck, Glen Island, and the mainland, and lies off the southerly part of the town of New Rochelle. It has been improved by dredging a channel 120 feet wide and 8 feet (2.4 m.) deep from the deep-water channel between Glen Island and Davenport Neck through New Rochelle Creek up to a point about 300 feet below the dam at the head of navigation in the vicinity of Leland Avenue. The water terminals, eight in number, are located mainly along the shore of this improvement. There is a boat landing at the southwest end of Davenport Neck; just off the landing there is a rock bare at low water. A landing cannot be made at low water.

There is a small boat yard on the east side of the harbor with a marine railway capable of hauling out small craft up to a length of 40 feet and a draft of 6 feet (1.8 m.). Light repairs can be obtained. Gasoline and oil are available.

At the public landing there is a depth of 3 feet (0.9 m.) at mean low water. Two privately owned wharves are open to the public. The majority of vessels using this harbor draw from 6 to 8 feet (1.8 to 2.4 m.) draft.

Anchorage is not recommended in the harbor because of congestion.

Anchorage is prohibited in the eastern and southern approaches to New Rochelle Harbor.

New Rochelle Harbor can be approached from northeastward between Middle Ground and Pine Island. (See the description of Pine Island preceding.) The easterly approach is between Huckleberry Island and the lighted buoy 200 yards northward, then between the buoy northward of Davids Island and the buoy marking the southwesterly rock northeastward, then about 100 feet north of Spindle Rock black buoy, the same distance southward of Harbor Rock buoy, and then about midway between the wharf at the southwest end of Davenport Neck and the northeast point of Glen Island. **Spindle Rock,** bare at three-quarters ebb, is marked on its south side by a red buoy and on its north side by a black buoy. **Spindle Rock Beacon,** white wooden cage on iron spindle, is maintained on the rock from April 1 to December 1 by the Huguenot Yacht Club. A rock with 6 feet (1.8 m.) over it lies midway between Spindle Rock and the bare rock lying 125 yards northeastward of Aunt Phebe Rock.

The approach to New Rochelle Harbor from southwestward is through City Island Harbor, passing eastward of Rat Island and the buoy marking the rocks eastward of Chimney Sweeps; the channel then leads westward of Machaux Rock lighted bell buoy, then between Davids Islands and Goose Island, and then between Aunt Phebe Rock light and Corning Rock buoy. Strangers should proceed with caution when crossing the shoals, on which the general depths are 8 to 12 feet (2.4 to 3.7 m.) lying between Machaux Rock and Goose Island. There is also a clear channel between the lighted bell buoy marking South Nonations and the reef extending northwestward from the north end of Hart Island.

Communication.—A Government ferry runs to Fort Slocum, on Davids Island, throughout the year. There is railroad and bus service at New Rochelle, with connections to New York.

Aunt Phebe Rock,* bare at half tide, is marked by a light and fog bell. The channel is westward of the light, and is marked on its west side by **Corning Rock** buoy (black), which lies about midway between the light and the wall surrounding Goose Island. Southeastward of Corning Rock buoy the channel is but little over 200 feet wide, between the buoy and a reef, bare at low water, making off from Davids Island.

Goose Island is located between Davids Island and Glen Island. Westward and southward of Goose Island there are several bare rocks. A rock breakwater nearly surrounds the Island.

R. R. Stevens Rock, awash at mean low water, lies about 350 yards southward of Goose Island and is marked by a buoy.

Glen Island is a public park which is used as a pleasure resort. A sand beach, protected by two jetties, is situated at the southeast end of the Island.

The channel on the northwest side of Glen Island is much used as an anchorage by small pleasure craft, and is used extensively by small craft bound to the club on **Travers Island.** The channel has a controlling depth of about 7 feet (2.1 m.) at mean low water. A bascule bridge connects Glen Island with **Neptune Island.** The horizontal clearance is 59 feet, and the vertical clearance (when closed) is 13 feet (4.0 m.) above high water.

Machaux Rock is bare at low water and marked on its southwest side by a lighted bell buoy lying nearly 300 yards southwestward of it. There is also a rock, which is unmarked and covered at half tide, about midway between Machaux Rock and the South end of Davids Island.

Twin Island is connected to **Hunter Island** by a causeway.

An islet with a few trees and two bare rocks lie 200 and 400 yards, respectively, northeastward of Twin Island. Rocks, bare at low water, lie 100 yards southeastward of the bare rocks and 175 yards southeastward of the islet. Rocks, bare at low water, extend about 80 yards southward of Twin Island. Two bare boulders lie 70 yards off the southwest end of Twin Island. Lying 175 yards southward of the boulders there is a rock, which is bare at half tide.

There have been extensive improvements in the vicinity of Hunter Island and **Rodman Neck** which change the entire character of the shoreline and channels. A channel with a controlling depth of 7 feet (2.1 m.) has been dredged from the vicinity of the south end of Glen

*Lat. 40°53'.1, Long. 73°46'.5 : Charts 222, 223, 1213.

Island through the shallow water on the west side of Hunter to a basin which has controlling depths of 10 to 15 feet (3.0 to 4.6 m.).

Orchard Beach, a park developed by the State of New York, is situated on the filled area lying between Hunter Island and Rodman Neck. The inshore water areas westward of the black buoy northwest of Chimney Sweeps are obstructed by numerous rocks awash at various stages of the tide and should not be used without local knowledge. A bathing pavilion and flagstaff are prominent landmarks.

Chimney Sweeps, two prominent bare rocks, with a small yellow house on the inshore one, lie 300 yards northeastward of High Island; the passage between the island and the rocks should be used with caution. A rock, bare at low water, lies 50 yards southward of the southeasterly rock, and another lies close to its north side. Rocks with 5 to 6 feet (1.5 to 1.8 m.) over them lie 275 yards east-southeastward of the Chimney Sweeps, and are marked on the northeast side by a buoy.

High Island is wooded and lies 200 yards northeastward of the north end of City Island, to which it is connected by a fixed footbridge with a horizontal clearance of 33 feet and a vertical clearance of 11 feet (3.4 m.) above high water in the center. There is foul ground between the islands.

Rat Island is a high bare rock, marked by a shed, lying 600 yards off the easterly side of City Island and the same distance south-southeastward of High Island. **Green Flats** is a boulder reef, the higher parts awash at high water; which extends 350 yards northwestward and westward from Rat Island.

The Blauzes,* partly bare at high water, are a part of the reef which extends 600 yards northwestward from the north end of Hart Island.

Rocks awash at low water lie off the north end of Hart Island and are marked by a buoy. A rock with a depth of 18 feet (5.5 m.) lies nearly in mid-channel between this buoy and the lighted bell buoy at the southwest end of South Nonations. A shoal area extends about 200 yards eastward of the east side of the island, and is marked by a black buoy.

Hart Island, nearly 1 mile long, is occupied by the buildings of one of the prison institutions of the city of New York. There is a high buff-brick chimney near the middle of the southeast side of the island. A red bell buoy and a light mark the end of the reef which extends nearly 200 yards southeastward from the south end of the island.

Hart Island Light, a red skeleton tower with a white tank house, is 39 feet (11.9 m.) high and visible about 9 miles. The fog signal is two gongs sounding alternately.

Caution.—Care should be taken to avoid the 9-foot (2.7 m.) obstruction and the wreck with 13 feet (4 m.) over it which lie 550 yards and 650 yards, respectively, westward of Hart Island Light.

The channel between City Island and Rodman Neck is used extensively as an anchorage by small pleasure craft during the summer. There are boat clubs and railways for small craft on the northwest side of City Island, and gasoline and other supplies can be obtained. The shores are generally fringed with boulders and should

*Lat. 40°51'.7, Long. 73°46'.5: Charts 223, 1218.

be approached with caution. The north shores of High Island and City Island northeastward of the bridge are very foul, and boats should avoid the shoals with depths less than 12 feet (3.7 m.) on that side.

The **bridge** joining the north end of City Island to Rodman Neck is a center-pier draw, with openings 53 feet wide and 12 feet above mean high water when closed.

CITY ISLAND HARBOR

(CHART 223)

This harbor, also called **Hart Island Roads,** lies between Hart Island and City Island, and is well sheltered from easterly and westerly winds. It is an important anchorage for coasting vessels in the western end of Long Island Sound. Besides serving as a harbor of refuge, it is often used by vessels desiring pilots or towboats, or waiting for orders.

City Island, situated on the northeast side of Eastchester Bay is narrow and is over 1 mile in length. It is thickly settled and has a commercialized appearance. The west side of the island is residential and has numerous summer homes. The east side is highly industrialized with several shipyards and establishments connected with marine activities.

Pilots.—City Island is one of the headquarters for East River (Hell Gate) and Sound pilots.

A **reporting station,** maintained and operated by the pilots, is located near the south end of City Island, from which passing vessels are reported at the Maritime Exchange, New York City, and to the Associated Press.

The usual **anchorage** for deep-draft vessels is southeastward of City Island, southward of a line joining the south ends of Hart and City Islands. When anchoring, avoid **Deep Reef,** which is a small rocky patch, with about 4½ fathoms (8.2 m.) over it and 9 to 13 fathoms (16 to 24 m.) around it, lying 450 yards eastward of the end of the wharf at the south end of City Island. 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 at the south end of City Island in range with a dark church spire in Westchester.

Vessels of less than 14 feet (4.3 m.) draft anchor anywhere southward of a line drawn from the north end of Hart Island to Town Dock on City Island except as noted below. **Town Dock** is the large wharf 0.6 mile above the south end of City Island. Submarine water pipes and cables cross from just above Town Dock, City Island, to the wharf on Hart Island, a little over 0.4 mile above its south end; vessels should be careful not to anchor in that locality. The western shore of Hart Island and the wharves on City Island should be given a berth of about 150 yards.

Tides.—The mean rise and fall of the tides is about 7¼ feet.

Ice.—In the winter, drift ice sometimes interferes with navigation to the extent that sailing vessels are obliged to take a towboat.

Supplies.—Coal, gasoline, and supplies of all kinds can be had at City Island. Water is piped to some of the wharves, and can also be had from towboats and water boats.

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During the summer months gasoline and oil can be obtained from barges anchored in the roads just west of the south end of Hart Island.

Repairs to vessels and the machinery of steamers can be made at City Island. The largest railway is 85 feet long, draft 12 feet forward and 17 feet aft, and has a capacity of about 500 tons. There are also facilities for building and for the storage of yachts.

Communication.—Access can be had to the subway system of New York City by taking a bus at City Island. A municipal ferry operates to Hart Island throughout the year.

Measured mile.—Markers for a measured statute mile (5,280 feet) course, established by the New York Sun, are located just west of Belden Point wharf. The other end of the course is on Hart Island, near the light.

EASTCHESTER BAY

(CHART 223)

Eastchester Bay lies between City Island and Throgs Neck and has general depths of 7 to 10 feet (2.1 to 3 m.). The shores of the bay are fringed with boulders, and, together with all shoals, should be approached with caution. In addition, there are indications of scattered boulders in the bay, and it is advisable to proceed with caution, especially where the depth is not more than 3 feet (0.9 m.) greater than the draft.

At the head of the bay there is a buoyed channel which follows the eastern shore to the mouth of the **Hutchinson River.** When examined in 1939, the controlling depth was 8 feet (2.4 m.) for a width of 60 to 150 feet from Eastchester Bay to the mouth of the river, thence 5 feet (1.5 m.) for a width of 50 to 150 feet to the head of the improvement near Eastchester.

Eastchester has some trade in building material, coal, fuel oil, and petroleum products, carried in vessels of 5 to 10 foot (1.5 to 3 m.) draft.

Bridges.—The following bascule bridges cross the Hutchinson River; Pelham Bridge, at the entrance, has an opening 60 feet wide and 19½ feet (5.9 m.) above high water; the railroad bridge, 700 feet above Pelham Bridge, has an opening 68½ feet wide and 15 feet (4.6 m.) above high water; Post Road Bridge, 1.8 miles above Pelham Bridge, has an opening 100 feet wide and 13 feet (4 m.) above high water; Fulton Avenue Bridge, 2.2 miles above Pelham Bridge, has an opening 70 feet wide and 13 feet (4 m.) above high water. The vertical clearances are for the bridges when closed.

Following are the regulations governing the operation of these bridges:

(*b*) Drawbridges shall be opened promptly at all times during the day or night when the signal hereinafter prescribed for the opening of the draw is received from an approaching vessel or other water craft which cannot pass under the closed draw.

(*c*) Signals.

Call signals for opening of draw.

Sound signals: United States Government or Departments of City of New York vessels: Four distinct blasts of a whistle, horn, or megaphone, or four loud and distinct strokes of a bell.

For all other vessels: Three distinct blasts of a whistle, horn, or megaphone, or three loud and distinct strokes of a bell sounded within a reasonable hearing distance of the bridge.

Visual signals: To be used in conjunction with sound signals when conditions are such that sound signals may not be heard.

A white flag by day, a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

Acknowledging signals.

By bridge operator—sound signals: Draw to be opened immediately. Same as call signal.

Draw cannot be opened immediately, or, if open, must be closed immediately: Two long distinct blasts of a whistle, horn, or megaphone, or two loud and distinct strokes of a bell, to be repeated at regulated intervals until acknowledged by the vessel.

Visual signals: To be used in conjunction with sound signals when conditions are such that sound signals cannot be heard.

Draw to be opened immediately: A white flag by day or green light at night swung up and down vertically a number of times in full sight of the vessel.

Draw cannot be opened immediately, or, if open, must be closed immediately: A red flag by day, a red light by night, swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

By the vessel: Vessels o rother water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or, if open, must be closed immediately, shall acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day or a red light by night.

(*d*) Trains, automobiles, trucks, and other vehicles, vessels or other water craft, shall not be stopped or manipulated in a manner hindering or delaying the operation of these drawbridges, but all passage over drawspans or through draw openings shall be so as to expedite both land and water traffic.

(*e*) Copies of these regulations shall be conspicuously posted on both the upstream and downstream sides of the bridges in such manner that they can be easily read at any time.

Big Tom,* bare at low water and marked by a red buoy on its south side, lies 600 yards 247° true from the south end of City Island. Other rocks show around it at extreme low tides, and the rock should be given a berth of over 200 yards. Boulders with a least depth of 2 feet (0.6 m.) lie 130 yards, 85° true, from Big Tom. A lighted buoy marks the easterly extension of this reef and a red buoy the westerly extension of it.

Cuban Ledge is covered at half tide and is marked by a lighted buoy on the southwest side. The entrance channel through Eastchester Bay passes close to the northeast side and the buoys marking this channel may be used as a guide for passing the ledge.

A yacht club is located on the northwest shore of the bight into which Weir Creek discharges. A ledge of rocks 300 yards northeast of the clubhouse is marked by a buoy. Boats should not anchor close to this buoy.

Southwestward of **Locust Point** there is a small cove, the entrance of which is marked by private beacons. There are rocks which are bare at low water on the north side of the approach and a depth of about 12 feet (3.7 m.) through the entrance. Within the cove depths range from 22 feet (6.7 m.) at the south end to about 9 feet (2.7 m.) at the north end. There is a small boat yard at the head of the cove with a marine railway capable of hauling out small craft up to lengths of 50 feet and a draft of 6 feet (1.8 m.). Light repairs can be obtained and there are facilities for storage. A limited amount of supplies are available. Gasoline can be obtained at the wharf where there is a depth of about 8 feet (2.4 m.) at mean low water.

Tides.—The mean rise and fall of tide is about 7 feet.

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*Lat. 40°50'.1, Lon. 73°47'.4; Charts 223, 1213.

Chapter 12.—NORTH COAST OF LONG ISLAND TO THROGS NECK

ORIENT POINT TO PORT JEFFERSON

(CHART 1212)

From Orient Point to Horton Point* the shore is generally bluff and rocky. The 10-fathom (18.3 m.) curve lies from 0.3 to 0.8 mile from shore, and the shoaling is generally abrupt. The outlying dangers are Orient Shoal and the rocky patch northward of Horton Point. The **prominent features** are Browns Hills, the white church spire at Orient, the Coast Guard station at Rocky Point, a prominent standpipe in the northwest part of Greenport, and Horton Point Light.

Several rocky shoals, including **Orient Shoal,** with a least depth of 7 feet (2.1 m.), lie off the shore in the vicinity of **Rocky Point;** the chart is the guide for avoiding them. The north end of Orient Shoal is marked by a buoy.

Horton Point Light, on the summit of the bluff at Horton Point, is a black skeleton tower with a white tank house. The light is 103 feet (31.4 m.) high and visible about 16 miles.

The tower of the former lighthouse is close by and southwestward of the present light.

A rocky shoal, with a least found depth of 28 feet (8.5 m.), lies 1.6 miles north-northeastward of **Horton Point.** The shoal is a ridge having an east-northeast and west-southwest direction, and the shoaling is abrupt on its northwest and southeast sides.

From Horton Point to Old Field Point the shore is a line of high bluffs, especially westward of Mattituck. The shore is fringed with shoals, which extend off a greatest distance of 1.5 miles and rise abruptly from the deep water of the sound. There are generally boulders near the shore on the shoals, which extend off 0.5 mile in places.

Goldsmith Inlet, 2.2 miles southwestward of Horton Point Light, is dry at low water, and generally has a depth of about 3 feet (0.9 m.) at high water. It is closed at times by northwest winds, but is dug out by clam diggers every spring. There are rocks bare at low water and with about 2½ feet (0.7 m.) over them at high water in the entrance at the old mill. The tidal currents are strong in the entrance. The depths inside the entrance are 8 to 10 feet (2.4 to 3 m.) at low water.

A shoal with little depth in places fills the bight between Horton Point and **Duck Pond Point,** and extends off a greatest distance of nearly 1 mile abreast Goldsmith Inlet. The bluffs begin about 1 mile westward of Goldsmith Inlet and reach their greatest elevation just eastward of Duck Pond Point; there is a grassy valley, forming

*Lat. 41°09′.7, Long. 72°14′.0; Charts 298, 1211, 1212.

a break in the bluffs, just westward of the point. There are boulders, bare at low water, on the shoals which fringe the shore between Duck Pond Point and Mattituck Inlet.

Mattituck Inlet (chart 299) lies 6.7 miles west-southwestward of Horton Point Light. The entrance is between two short jetties, and is also marked by a long break in the bluffs at the inlet. The outer end of the west jetty is marked by a light.

Examinations of the channels to April 1939, gave a controlling depth of 7 feet (2.1 m.) for a width of 100 feet at the entrance except for a shoal at the inner end of the east jetty which decreases the channel width at this point to about 55 feet. In the river there was a controlling depth of 7 feet (2.1 m.) for a width of 80 feet to the bridge at **Waterville,** locally known as the village of Mattituck Inlet. In July 1938, the controlling depth from Waterville to Long Creek was 2½ feet (0.8 m.), thence 1 foot (0.3 m.) to the village of Mattituck.

The sides of the channel are sandy and although shoaling is liable to occur at the entrance, the inlet can be entered by strangers without great danger.

The **tidal currents** have an estimated velocity of about 3 knots at strength in the narrow parts of the entrance of Mattituck Inlet and 5 knots at the site of the old dam at the drawbridge; slack water occurs possibly one hour after the time of high and low water. There is a bad sea in the entrance, with northerly and westerly winds. The mean rise and fall of the **tides** is about 4½ feet at the entrance. The inlet is rarely closed by ice.

The drawbridge is about 6 feet (1.8 m.) above high water and has an opening about 57 feet wide on the west side of the center pier; the east opening is blocked. There is a private landing on the west bank just below the drawbridge; fresh water and a small quantity of gasoline can be obtained.

There is a small boat yard at **Waterville** with a marine railway which has a capacity of about 22 tons and is capable of hauling out small craft up to lengths of 45 feet and a draft of 4 feet (1.2 m.). Light repairs can be obtained and there are facilities for boat storage. There is a depth of 4 feet (1.2 m.) at the landing. Telephone service is available at the boat yard.

The towers of the electric power transmission lines crossing Mattituck Creek at Waterville are conspicuous landmarks.

Mattituck is a village on the railroad. Repairs can be had for motors. Provisions, ice, gasoline, and hard coal can be obtained. The commerce consists chiefly of shellfish and garden products carried in vessels of about 4 foot (1.2 m.) draft.

Between Mattituck Inlet and Port Jefferson the shore is fringed with rocks and shoals extending in places 1.5 miles from shore. The outer ends of the shoals are marked by black buoys.

Horse in Bank are white patches in the brush-covered bluff at **Friar Head.** There are a few houses on the beach at the nose. This feature is at the western end of **Roanoke Point Shoal,** and 14 miles westward of Horton Point Light.

At **Fresh Pond Landing,** 2.3 miles westward of Friars Head, there is a considerable break in the bluffs. There are a few houses and a prominent water tank in the valley.

Wading River, at the western end of **Herod Point Shoal,** has a reported depth of about 5 feet (1.5 m.) at high water. The valley of the river forms a broad break in the high bluffs.

Tuttles White Bank is a high, white bluff, 0.6 mile westward of Wading River.

A group of tall radio towers at **Rocky Point,** about midway between Herod Point and Port Jefferson, is an excellent landmark and can be seen well offshore when other distinguishing objects are not visible.

Mount Sinai Harbor is marked by a low break, nearly 1 mile long in the beach, and is a prominent feature. The entrance is marked by two jetties about 310 feet long and 180 yards apart. A clear channel 64 yards wide and 8 feet (2.4 m.) clear depth has been dredged into the harbor. Sand and gravel companies have been dredging in the harbor. The harbor, except where dredging operations have been going on, bares at low water. There is a light on the north end of the east breakwater.

Mount Misery* is a hill 180 feet (55 m.) high lying between Mount Sinai Harbor and Port Jefferson. It slopes off gradually toward the Sound, where there are bluffs about 60 feet (18.2 m.) high.

In 1939 there were extensive operations by sand and gravel companies who were digging into the bluffs, and the resulting sand banks were conspicuous.

PORT JEFERSON HARBOR

(CHART 361)

Port Jefferson is on the south shore of Long Island Sound, eastward of Old Field Point. The entrance is between two converging jetties and the harbor is under improvement to secure a channel through the entrance 300 feet wide and 16 feet (4.9 m.) deep. The controlling depth in the entrance in April 1937 was 14½ feet (4.4 m.). There is a light and fog signal on the east jetty and other lights, one on the end of the west jetty and one on the point on the west side at the inner end of the entrance. There are shoals with little depth on both sides of the channel from the entrance to the lighted bell buoy inside the entrance. The harbor is easily entered by powered vessels. The deepest draft of vessels entering is about 18 feet (5.5 m.) at high water.

A shoal with depths of 6 to 8 feet (1.8 to 2.4 m.) over it extends 500 yards north of the lighted bell buoy. The north end of this shoal was formerly **Barrel Island.** A sunken scow on the south side of that part of the shoal that formed Barrel Island has a depth of about 4 feet (1.2 m.) over it at mean low water.

The harbor is 1.5 miles long and has a clear width of about 0.5 mile in its widest part; the depths are 10 to 12 feet (3 to 3.7 m.) for a distance of 0.5 mile from the head, and thence 20 to 30 feet (6 to 9 m.) nearly to the lighted bell buoy inside the entrance. There are depths of 10 feet (3 m.) at the outer end of Bayles's Wharf and the wharf of the Standard Oil Co. At the outer part of the steamboat wharf there are depths of 7 to 12 feet (2.1 to 3.7 m.).

Port Jefferson is a town at the southern end of the harbor. The **prominent objects** are the standpipe on the hill and the oil tanks at the southeastern end of the harbor.

*Lat. 40°57'.5, Long. 73°03'.5: Charts 361, 1212.

Range for swinging ship.—The light on the east breakwater and the black standpipe back of Port Jefferson afford an excellent range for swinging ship. The true bearing is 142°45′.3.

Conscience Bay is entered through a long, narrow channel at the northwest end of the harbor. The bay and entrance have a depth of 1 to 2 feet (0.3 to 0.6 m.) at low water.

Sand and gravel companies are dredging in the channel. Strangers should obtain local information before entering.

Setauket Harbor, on the western side of Port Jefferson Harbor, has a narrow, crooked channel, with a least depth of about 2 feet. The entrance from Port Jefferson is buoyed and usually stakes mark the best water in the harbor, leading to the village of **Setauket,** on the south shore of Setauket Harbor, about 1 mile above the entrance.

Tides.—The mean range of the tides is about 6½ feet.

Currents.—In the channel just south of the jetties, slack waters before flood and ebb, respectively, occur about 2½ hours after low water and high water at New London. The strengths of flood and ebb, respectively, occur about ¼ hour before high water and 1 hour before low water at New London. The average velocity at strength was about 2¼ knots, but this has become considerably less as a result of the dredging of the sand and gravel companies in this vicinity. The flood sets about 150° true and the ebb in an opposite direction. Vessels at anchor in the central portion of the harbor swing with the wind.

Ice forms over the entire harbor and interrupts navigation in very cold weather, but does not endanger the shipping in the harbor.

Supplies.—Coal, gasoline, and supplies of all kinds can be obtained. Water can be had at the principal wharves.

There is a chart agency of the United States Coast and Geodetic Survey near the water front.

Repairs.—There is a shipyard at the head of the harbor with marine railways. The largest one has a capacity of about 900 tons and is capable of hauling out vessels up to lengths of 160 feet and a draft of 12 feet (3.7 m.). All major repairs can be obtained. There are also facilities for laying up yachts during the winter.

The principal industry at Port Jefferson is the dredging and shipping of sand and gravel. In addition, there is ship-repair work. shellfishing and the distribution of petroleum products, which are brought to the port in vessels of 6 to 18 feet (1.8 to 5.5 m.) draft.

Communication.—Port Jefferson has railroad communication, and steamers make regular trips from Bridgeport during 8 months of the year. A bus line affords communication across the island to Patchogue, Riverhead, and Greenport.

Directions, Port Jefferson Harbor, From New Haven.—From the main entrance of New Haven Harbor between Southwest Ledge Lighthouse and Luddington Rock Breakwater, a 210° true course for 17 miles will lead to a position off the entrance of Port Jefferson Harbor westward of Mount Misery Shoal.

From Bridgeport.—From the entrance of Bridgeport Harbor, a 159° true course for 11 miles will lead to the bell buoy at the entrance of Port Jefferson Harbor.

Or, a 176° true course with Stratford Shoal (Middle Ground) Lighthouse astern will lead for the entrance of Port Jefferson Harbor.

The tidal current in the Sound should be considered in shaping the course across it. (See "Currents, Long Island Sound" on p. 193.)

Approaching from westward, give Old Field Point Light a berth of 0.5 mile and steer for the bell buoy on course **109°** true to avoid the rocky shoal with 17 feet (5.2 m.) over it, which is about 0.4 mile to the northeastward of Old Field Point Light.

Mount Misery Shoal, the principal danger in the approach to Port Jefferson, will be avoided by keeping Old Field Point Light bearing southward of 248° true. The range of the light on the east jetty and the light on the west side of the entrance inside the jetties, bearing 172° true, leads clear westward of Mount Misery Shoal.

Pass about 300 yards westward of the bell buoy at the entrance of Port Jefferson Harbor, and steer **152°** true heading for the lighted bell buoy inside the harbor. Pass through the narrow entrance between the jetties into the harbor and when the inner entrance light is abeam change course slightly to pass 100 feet to westward of lighted bell buoy. After passing this buoy steer **136°** true up middle of harbor. Good anchorage in from 10 to 12 feet (3 to 3.7 m.) can be had for a distance of 0.5 mile from the head. The lighted bell buoy inside the entrance cannot be seen over the breakwater at low tide by small vessels approaching this harbor.

PORT JEFFERSON TO EATONS NECK

CHART 1213

Old Field Point* is a low bluff, on the summit of which is a light. Bowlders extend a short distance off the point and the lighthouse should be given a berth of about 0.3 mile, even by small craft. There is a gong buoy 500 yards northward of the point.

Old Field Point Light is a black skeleton tower with a white tank house. The light is 74 feet (22.6 m.) high and visible 14 miles. The former lighthouse tower attached to a dwelling is southwestward of the light.

Crane Neck Point, 2 miles westward of Old Field Point, is a bare bluff about 90 feet (27 m.) high, and is covered on top with brush Trees extend a little ways back from the bluff.

Smithtown Bay is a broad, open bight on the south side of the Sound and extends about 7 miles westward from Crane Neck Point. Rocky shoals extend 1 mile in places from the shore, the water shoaling abruptly from 7 fathoms (13 m.) in places. A good summer anchorage in 5 to 8 fathoms (9 to 15 m.), sheltered from easterly winds, is found about 1 mile southward of Crane Neck Point.

Stony Brook Harbor is a shallow bay in the southeastern part of Smithtown Bay. The channel is over a bar which extends 0.8 mile off the entrance; it has a least depth of about 3 feet (0.9 m.) just outside the entrance.

On the east side of the harbor, 0.5 mile inside the entrance, there is a steel bulkhead wharf at the village of **Stony Brook.** The railroad station is about 1 mile from the wharf. Only small craft enter the harbor; the greatest draft is about 6 feet (1.8 m.) at high water.

Caution is necessary when approaching the entrance of the channel into Stony Brook. The depths shoal abruptly from about 8 fathoms

*Lat. 40°58'.6, Long. 73°07'.1 ; Charts 361, 1212, 1213.

(14.6 m.) to about 20 feet (6.1 m.) in the vicinity of the black buoy and to depths of about 6 feet (1.8 m.) immediately inshore from it.

In 1939, the channel was about 300 yards eastward of the buoy and during the summer it is marked by lighted aids and beacons which are maintained by the town of Brookhaven. When the buoys are in place steer a mid-channel course between them, favoring the east shore. From the buoy the channel trends east-southeastward for 0.3 mile, and then curves gradually southward to the west side of the spit on the east side of the entrance. The channel then leads in mid-channel northeastward of the first islet, passes close to the east side of the northeast end of the islet, and then follows the east bank to the wharf.

The harbor is not recommended to strangers without local knowledge regarding the currents and numerous shoals. The estimated velocity of the tidal currents in the narrowest part of the entrance is about 5 knots.

There are depths of about 3 feet (0.9 m.) alongside the bulkhead at the landing. Southwestward of the landing there is a yacht club with depths of about 4 feet (1.2 m.) at the end of the wharf and in the mooring basin. Gasoline and fresh water are available at the yacht club and a limited amount of small-boat supplies may be obtained at the village of Stony Brook.

There is a high bluff between Stony Brook Harbor and Nissequogue River, another between the latter and **Sunken Meadow Creek,** and bluffs in places between the latter and Northport Bay.

Nissequogue River is a shallow, crooked stream, the mouth of which is about 4 miles westward of Stony Brook. There are rocks and shoals, bare at low water, on the bar outside the entrance, through which there is a narrow channel, with a depth of about 1 foot (0.3 m.) at low water. About 0.5 mile southwestward of the mouth of the river is a State hospital, a prominent group of buildings with green roofs and two large red-brick chimneys; there is a standpipe farther westward. The railroad station is **Kings Park.**

About 2.8 miles southeastward of Eatons Neck Lighthouse, a sand and gravel company has dredges working into the high bank and a small bight has been formed. At the east side of the entrance to the bight there is a stone jetty about 350 yards long and there is a privately maintained flashing green light on a pile at the end of the jetty. The channel into the bight is marked by stakes.

Eatons Neck is a prominent, wooded head, with elevations of 100 feet (30 m.) or more, and marked at its north end by the lighthouse.

Eatons Neck Lighthouse is a white, stone tower with attached dwelling at the north end of the high land of Eatons Neck. The light is 144 feet (43.9 m.) high and visible 18 miles. The fog signal is an air siren.

The northwest end of the neck is a spit in the form of a hook. The hook and a submerged spit extending from it, enclose a harbor adjacent to the neck, having depths of 7 to 25 feet (2.1 to 7.6 m.). This harbor is entered through a dredged cut between two small riprap jetties, about 0.5 mile southwestward of the lighthouse. The jetties are covered at half-tide. The channel between the jetties has been buoyed. It had a depth of about 8 feet (2.4 m.) in 1939. Great care should be taken in entering, as the channel is very narrow.

A general shoal area, consisting of three sections separated by channels, extends northward from Eatons Neck for a distance of 2.6 miles. For a distance of 0.3 mile from shore the area is foul with boulders and of little depth. Beyond this area the bottom is broken by a series of rocky ridges, extending in a northerly direction with a least depth of 7 feet (2.1 m.) 1,400 yards northward from the lighthouse. The general depth over these ridges ranges from 10 feet (3 m.) to 15 feet (4.6 m.), and their northerly limit is marked by a buoy which lies 1 mile northward of the lighthouse. A rocky patch with 16 to 24 feet (4.9 to 7.3 m.) over it lies 1.5 to 1.8 miles north-northwestward of the lighthouse; the 16-foot (4.9 m.) spot is marked by a horizontally banded buoy. The outer part of the general shoal is a rocky ridge, approximately 1 mile in length, and is marked at its northern end by a lighted bell buoy, 2.8 miles northward of Eatons Neck Lighthouse. This ridge has a least depth of 16 feet (4.9 m.) 300 yards south of the buoy.

HUNTINGTON BAY

CHART 224

This bay, on the south shore of Long Island Sound just westward of Eatons Neck, is an excellent anchorage for large vessels, protected against all but northerly winds. The bay is about 2.5 miles long in a southerly direction and 1 mile wide abreast West Beach. The depths in the bay range from 4¾ to 6 fathoms (8.5 to 11 m.) until 1.5 miles from its southern end, and anchorage can be selected according to draft and direction of wind. An obstruction, with 23 feet (7.0 m.) over it, is about 0.8 mile southwestward of Eatons Neck Lighthouse.*

It is marked on the west side by a lighted bell buoy. Farther in there are depths of 20 feet (6.1 m.) or less in places as shown on the chart, the 18-foot (5.5 m.) curve extending 0.3 mile from the east shore, 0.4 mile from the west shore, and 0.8 mile from the south shore. **Anchorage** with shelter from northwesterly winds can be had for small vessels at the southwesterly end of Huntington Bay, 0.4 mile northeastward of Lloyd Harbor Lighthouse and the same distance eastward of the unused light tower on East Beach, in 3 to 6 fathoms (5.5 to 11.0 m.) The arms of the bay are secure harbors, Northport Bay being generally used by vessels.

Lloyd Harbor Lighthouse is on the outer part of a boulder reef lying between the entrance of Lloyd Harbor and the channel leading into Huntington Harbor. The lighthouse is a square tower attached to a dwelling on a pier.

Currents.—In Huntington Bay the currents are weak, the average velocity at strength of current off East Fort Point being about ½ knot. At the entrance to Northport Harbor, the strength of flood occurs about 1¼ hours before high water at New London, and the strength of ebb about ¾ hour before low water at New London. The average velocity at strength is about 1½ knots. Slack waters before flood and ebb, respectively, occur about 2 hours after low water and high water at New London.

Tides.—The mean rise and fall of the tide is about 7¼ feet.

*Lat. 40°57'.2, Long. 73°23'.8; Charts 224, 1213.

Directions, Huntington Bay, from eastward.—Note the description preceding of the shoals northward of Eatons Neck. After passing between or around these shoals from a position northwestward of Eatons Neck the course up the bay is about 181° true favoring the eastern shore, but giving it a berth of over 0.3 mile.

Or, from the Sound, a 169° true course, with Greens Ledge Lighthouse astern, will lead into Huntington Bay.

From westward.—A course for Eatons Neck Lighthouse on any bearing southward of 96° true, will lead northward of the shoals off Lloyd Point. Passing 0.3 mile northward of the lighted bell buoy off Lloyd Point, a **116°** true course will lead to the entrance, giving the shore a berth of 0.7 mile. When Lloyd Harbor Lighthouse bears 196° true, a **170°** true course will lead up the middle of the bay.

West Beach, which extends more than halfway across the entrance of Northport Bay was formerly occupied by the large plant of a sand and gravel company which has been abandoned. The dredged channel extending from the southward in to the beach is no longer maintained.

Duck Island Harbor is a shallow cove on the north side of Northport Bay westward of **Duck Island Bluff,** which is the southwest one of two wooded knolls. There are depths of 7 to 9 feet (2.1 to 2.7 m.) in the entrance, and 1 to 3 feet (0.3 to 0.9 m.) in the upper part of the harbor. A spit, with 4 feet (1.2 m.) on its outer part extends east-southeastward nearly across the entrance from **Winkle Point.*** The south side of Duck Island Bluff should be given a berth of about 300 yards to avoid shoal water and inshore rocks which extend southward from it.

Northport Bay is a large bay opening from the southeast end of Huntington Bay. The western part of Northport Bay has a good anchorage in 3¼ to 8 fathoms (6.1 to 14.6 m.), and the eastern part in 8 to 11 feet (2.4 to 3.4 m.). A shoal spot, with 13 feet (4.0 m.) over it, and an obstruction, with 11 feet (3.4 m.) over it, lie 400 yards northwestward and 750 yards north-northwestward, respectively, from the lighted buoy marking the entrance from Huntington Bay. This entrance is through a narrow, buoyed channel having a depth of 19 feet (5.8 m.). The course through the middle of the narrow entrance to Northport Bay is 68° true.

Caution is recommended for vessels drawing 10 feet (3.0 m.) or more to avoid the 12-foot (3.7 m.) curve on the south side of this channel when 250 yards northeastward of the southern entrance point.

From the inner black buoy a **51°** true course will lead well northward of the lighted buoy, which marks the shoal extending 0.4 mile northward from Little Neck Point.

A sodium light (yellowish orange in color), maintained at the public landing by the town of Northport, is a conspicuous leading mark at night for vessels going to the wharves at Northport. After rounding the lighted red buoy a course of **137°** true, heading for the sodium light, will lead through the best water, which has a least depth of about 9 feet (2.7 m.) at mean low water.

*Lat. 40°55′.4, Long. 73°23′.4: Charts 224, 1213.

There is a summer resort on **Asharoken Beach,** at the northeast end of Northport Bay, and a number of private boat landings at which the depth is about 3 feet (0.9 m.).

On the north side of **Bluff Point** there is an extensive sand and gravel pit which is conspicuous from a northwesterly direction.

Northport Harbor, at the southeast end of Northport Bay, has a depth of 10 feet (3.0 m.) in the entrance, shoaling gradually to between 7 and 8 feet (2.1 and 2.4 m.) abreast the wharves at Northport. Vessels select **anchorage** according to draft; the bottom is soft. During severe winters **ice** has been known to close the harbor for about two months.

Northport is a village with railroad communication on the eastern shore of Northport Harbor. The white chimney of the light plant is very prominent. The depths at the principal wharves are 6 to 8 feet (1.8 to 2.4 m.). The greatest draft that can be taken to Northport is 14 feet (4.3 m.) at high water. There is a prominent tower about 1 mile inland and 2 miles eastward of Northport Bay. There is also a prominent tank just northward of the town of Northport.

Supplies.—Coal, gasoline, water, ice, and other supplies can be obtained. During the summer, gasoline and lubricants can be obtained from a barge anchored in the harbor.

Repairs.—There is a boat yard at Northport with a marine railway which has a capacity of about 50 tons and capable of hauling out craft up to lengths of 70 feet and a draft of 10 feet (3.0 m.). There is a depth of 10 feet (3.0 m.) alongside the yard wharf. Gasoline, water, and a limited amount of ship chandlery supplies can be obtained at the yard.

Centerport Harbor is a shoal bight in the south shore of Northport Bay just eastward of the entrance. A narrow, crooked channel, with a depth of about 3 feet (0.9 m.), leads to the village of **Centerport.** This channel leads a little eastward of mid-harbor in approaching the bare spit, which extends nearly across the bay, follows the north side of the spit at a distance of about 200 feet, curves around the southwest end of the spit, then follows its south side northeastward, and then trends southward somewhat eastward of mid-harbor. The tidal currents through the narrow channel at the end of the spit have an estimated velocity of 3 knots at strength. The harbor is little used except by pulling boats and small motorboats.

Huntington Harbor, at the southwest end of Huntington Bay, has been improved by dredging a channel 100 feet wide and 8 feet (2.4 m.) deep through the entrance and through the harbor to a turning basin of the same depth and 200 feet wide at the Old Town Dock. This channel is subject to shoaling on the bar at the entrance, and in 1938 there was a controlling depth of 8 feet (2.4 m.) over this bar and in the main channel; 7½ feet (2.3 m.) in the turning basin, thence 5 feet (1.5 m.) to the head of the improvement. In the anchorage area, southwestward of the turning basin, the controlling depth at mean low water was 5 feet (1.5 m.). The entrance is difficult on account of the narrow channel, the boulder reef which forms its western side and extends out to Lloyd Harbor Lighthouse, and the strong tidal **currents** which have an estimated velocity of 2 knots or more at strength. In the absence of local knowledge, only small craft should attempt the entrance and should proceed wth caution.

Huntington is a village at the head of the harbor. There is a depth of 6 feet (1.8 m.) at the light plant wharf and 6 feet (1.8 m.) at the oil company's wharf.

About 400 yards northward of the light plant wharf is the entrance of a narrow channel, with a controlling depth of about 3 feet (0.9 m.), which leads to the coal and lumber wharves on the west side of the harbor. The north end of the wharf is shoal.

At the yacht club landing there was a depth of 5 feet (1.5 m.) at mean low water in 1939. Gasoline and water can be obtained at this landing. Yachts may anchor off the landing, but must keep clear of the channel.

Directions, Huntington Harbor.*—Passing about 150 feet westward of the black buoy off the entrance, and 500 feet southeastward of Lloyd Harbor Lighthouse, steer to pass about 160 feet eastward of the nun buoys heading for the light west of **Sandy Point.** Pass closer to the light than to Sandy Point and head to clear the lighted buoy inside the harbor to the lighted black buoy. The channel is buoyed as far as the yacht club landing; beyond this it is unmarked but the channel is easily distinguished. Caution is recommended to avoid the 5-foot (1.5 m.) and 6-foot (1.8 m.) spots lying on the northeast and southwest sides of the channel, respectively, about 700 yards southward of Sandy Point. Local information and the chart are the best guides.

Supplies.—Coal, water, gasoline, and a limited amount of ship chandlery supplies can be obtained.

Repairs.—There are four boat yards on the east side of the harbor with facilities for building and repairing wooden hulls. The largest yard has four marine railways capable of hauling out vessels up to lengths of 125 feet and a draft of 8 feet (2.4 m.). Boat storage is available and mooring facilities can be obtained by agreement.

Communication.—There is bus service at Huntington, but railroad connections must be made at a point about 1.5 miles south of the town.

Lloyd Harbor extends westward from Huntington Bay nearly to Oyster Bay, from which it is separated by a narrow strip of beach at high water. Vessels of less than 7-foot (2.1 m.) draft can anchor just inside the entrance, where the depths are 7 to 11 feet (2.1 to 3.4 m.). The narrow part of the harbor extending westward has a narrow, crooked channel, with a least depth of about 3 feet (0.9 m.) to a point about 0.7 mile from its head.

East Beach, extending halfway across the entrance, is marked near its south end by an unused lighthouse tower. The eastern shore of East Beach should be given a berth of 700 yards until the unused lighthouse bears 271° true, and then enter on a 256° true course, passing 250 yards southward of the unused lighthouse, and between the channel buoys. Three buoys mark the entrance channel south of East Beach.

OYSTER BAY

(CHART 224)

This bay is on the south side of Long Island Sound, about 5 miles westward of Eatons Neck Lighthouse, the entrance lying between

*Lat. 40°54', Long. 73°26' : Charts 224, 1213.

Lloyd Neck and Centre Island Point. The entrance and harbor are characterized by extensive shoals, boulder reefs, and broken ground making off from the shores, and vessels should proceed with caution if obliged to approach or cross shoal areas. The bay south of Cold Spring Harbor Lighthouse is a secure harbor, and is available for vessels of less than about 18-foot (5.5 m.) draft.

Lloyd Neck, between Huntington and Oyster Bays, is high and wooded, and has a high yellow bluff on its north side 0.8 mile eastward of Lloyd Point. Numerous patches of bowlders having a least depth of from 5 feet (1.5 m.) to 8 feet (2.4 m.) extend 0.5 mile offshore from **East Fort Point** to Lloyd Point. Small craft in skirting this shore should keep well outside the line of nun buoys.

Lloyd Point,* the north end of Lloyd Neck, is a low spit. A rocky shoal extends 0.5 mile north-northeastward from Lloyd Point. A lighted bell buoy lying about 1 mile northward of Lloyd Point marks the northern limit of the 30-foot (9.1 m.) curve in this vicinity. The lighted buoy is replaced by a bell buoy if it is endangered by ice.

Morris Rock, with a least depth of 2 feet (0.6 m.), lies 0.4 mile eastward of Lloyd Point and 600 yards from shore. It is marked by a black buoy which also marks the southerly limit of a foul area extending from 400 yards northwestward to 400 yards eastward of the rock. This area contains several boulder patches with least depths of 6 to 8 feet (1.8 to 2.4 m.), and its northerly limit is marked by a red buoy.

About 0.6 mile southwestward of Lloyd Point there are two small jetties between which is the entrance to a pond with various depths which has been dredged into the spit by a sand and gravel company.

The jetties are covered to a depth of about 2 feet (0.6 m.) at mean low water. Private buoys mark the channel to the entrance. Local yachtsmen report a depth of about 10 feet (3.0 m.) through the narrow entrance. The harbor, locally known as Sand City, may be entered by steering a midchannel course between the buoys, and it is used to a considerable extent by local boats as an anchorage. There are reported depths of 6 to 75 feet (1.8 to 22.9 m.), with good holding ground. In 1939 the workings had been abandoned.

Centre Island Point is a small bluff, on the summit of which there is a large, prominent house.

Centre Island Reef is a dangerous boulder reef, which extends 0.9 mile northward from Centre Island; there is a small 21-foot (6.4 m.) rocky patch at the north end of the reef. Depths of 6 to 18 feet (1.8 to 5.5 m.) extend about 1 mile northward of Centre Island Point and the area is marked at the northern end by a bell buoy.

A wreck with a depth of at least 17 feet (5.2 m.) over it lies 350 yards southeastward of the buoy.

The reef is covered by the red sector of Cold Spring Harbor Lighthouse. Strangers without local knowledge should keep outside of the red sector.

A shoal, with 5 to 9 feet (1.5 to 2.7 m.) over it, extends eastward from the northern part of Centre Island nearly across Oyster Bay, and is marked near its eastern end by Cold Spring Harbor Lighthouse.

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*Lat. 40°56'.7, Long. 73°29'.2: Charts 224, 1218.

Small craft, with local knowledge, cross the shoal at a distance of about 700 yards westward of the lighthouse, but strangers should not attempt it.

A buoy lying about midway between Centre Island and Cold Spring Harbor lighthouse marks a 5-foot (1.5 m.) spot and the southern limit of the shoal in this vicinity.

Cold Spring Harbor Lighthouse* is a white, square, pyramidal tower on a black cylindrical pier.

The light is 37 feet (11.3 m.) high and visible about 12 miles. A red light is exhibited between the bearings (from seaward) of 39° to 125° true. This sector covers the shoal water off Center Island. The fog signal is a bell.

Cold Spring Harbor, the south end of Oyster Bay, extends about 2.3 miles southward of Cooper Bluff. The Catholic seminary, on the hill of **West Neck,** on the east side of the harbor is prominent. The harbor is free from dangers if the shores be given a berth of about 600 yards, the depths being 15 to 18 feet (4.6 to 5.5 m.) to near its head. There is a depth of 10 feet (3.0 m.) 0.8 mile eastward of Cooper Bluff and 450 yards from the eastern shore and a depth of 11 feet (3.4 m.) near the southern part of the harbor, 800 yards northward of the clock tower. **Cold Spring Harbor** is a village on the eastern shore, near the head of the harbor. There is a depth of 20 feet (6.1 m.) at the oil wharf. Gasoline, oil, and water can be obtained. This is the only wharf used, outside of some small private landings. Dredging was done along the wharf and there is much shoaler water about 150 yards to the westward. The railroad station is about 3 miles from the wharf.

There is a yacht club at the village of Cold Spring Harbor which has depths of about 7½ feet (2.3 m.) at the landing. Shoal water extends about 200 yards from shore for a distance of nearly 500 yards northward of the yacht club landing. The western limit of this shoal area, which is very abrupt during the summer, is marked by spar buoys privately maintained.

Cooper Bluff is a prominent bluff at the northeast end of Cove Neck. A boulder reef extends 0.3 mile northward from **Cove Point,** the northwest end of Cove Neck, and is marked at its north end by a lighted buoy. The entrance of Oyster Bay Harbor is nearly 400 yards wide between this buoy and Plum Point.

Plum Point is marked at its south end by a small stone tower, and there are boat landings on the southwest side of the point. There is a prominent yacht club and landing about 0.3 mile west of Plum Point. There are depths of about 9 feet (2.7 m.) at the yacht club landing.

Oyster Bay Harbor is a long, crooked arm on the western side of Oyster Bay. A channel, with a depth of over 30 feet (9.1 m.), leads into the harbor to Moses Point, and good anchorage can be selected; one of the best is southward of Moses Point. Above this point the channel is narrow, and is not suitable for vessels of a greater draft than about 10 feet (3 m.), for which there is good anchorage in the channel between **Moses Point** and **Soper Point,** and northwestward of the latter. Vessels of less than 7-foot (2.1 m.) draft can

*Lat. 40°54′.8, Long. 73°29′.6: Charts 224, 1213.

anchor in the bight between Cove Neck and the wharf at Oyster Bay, and also in the large bight on the northwest side of **Center Island.**

Oyster Bay is a village with railroad communication on the south shore of Oyster Bay Harbor. A ferry runs to Stamford during the summer. There is a depth of about 8 feet (2.4 m.) to the steamboat wharf and 6 feet (1.8 m.) along its east and west sides. Stand in to the wharf on the line of its west side. About 60 feet eastward of the steamboat wharf is a dolphin. Bare spots show at low water eastward of the dolphin and in coming alongside, on the east side of the wharf, head between the dolphin and the wharf and keep close to the latter. Parallel to, and about 200 feet off the west side of the wharf is a row of sunken barges. Private stakes mark the west side of the channel on the west side of the wharf. Coal, gasoline, ice, and other supplies can be obtained.

About 650 feet westward of the wharf is a dredged channel, with a depth of about 4 feet (1.2 m.), leading into a slip having a number of private landings at the head, called the **Park Basin.** A range of two private red lights leads into the channel.

There is an oil-receiving wharf about 150 yards southeastward of the steamboat wharf. A channel was dredged between the ends of these wharves which provides a depth of 8 feet (2.4 m.) at the end of the former. Gasoline, oil, and water are available at the steamboat wharf.

Two rocks, lying near the shore of Centre Island northwestward of Soper Point, are bare at low water. About 300 yards north-northwestward there is a rock with 4 feet (1.2 m.) over it at mean low water. Northward of this rock at a distance of about 150 yards there is a sunken rock. None of these rocks are marked and caution is recommended. There are extensive oyster beds which are privately owned and marked by stakes.

Mill Neck Creek,* at the northwest end of Oyster Bay Harbor, has a channel depth of about 3 feet (0.9 m.) for a distance of nearly 1 mile above the drawbridge at the entrance and is much used by launches. The drawbridge, a double-leaf bascule, has a horizontal opening of 75 feet and a vertical clearance, at the center, of 10½ feet (3.2 m.) above high water when the bridge is closed. Westward of the drawbridge, about 200 feet, there is a submerged gas main crossing. There is a depth of about 5 feet (1.5 m.) over the main at mean low water.

After passing through the draw give the south shore inside the bridge a berth of about 100 yards and follow this for about 500 yards to avoid a bar covered with mussels, then favor the north shore when approaching the narrow part 0.5 mile above the bridge, and then keep near the middle. There are generally numerous stakes on the shoals in the creek. **Bayville** is the post office on **Oak Neck,** on the north side of the creek.

There is a small boat yard on **Oak Neck Creek** with a marine railway capable of hauling out small craft up to lengths of 56 feet and a draft of 7 feet (2.1 m.). Boats entering the creek do so at high water as the creek is practically bare at low water. Gasoline, oil, and a limited amount of ship chandlery supplies are available.

Storm warnings are displayed at the yacht club on Plum Point.

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*Lat. 40°54', Long. 73°33'.5: Charts 224, 1213.

Ice.—During severe winters ice has been known to extend the whole length of the bay during a part of January and February.

Tides.—The mean rise and fall of the tides is about 7¼ feet.

Currents.—About 0.3 mile north of Cold Spring Harbor Lighthouse the velocity at strength is about ½ knot; about 0.3 mile north of Cove Point it is about ¾ knot, the strengths of flood and ebb, respectively, occurring about ¾ hour before high water and 1¼ hours before low water at New London.

Directions, Oyster Bay.—Approaching **from eastward,** deep-draft vessels should pass 1 mile or more northward of Lloyd Point and avoid the 22-foot (6.7 m.) sounding shown on the chart, which lies about 0.3 mile southwestward of the lighted bell buoy northward of Lloyd Neck. Approaching **from westward,** pass 0.5 mile northward of the black buoy marking Centre Island Reef. Heading for Cold Spring Harbor Lighthouse on any course between **140°** true and **130°** true will lead in the deepest water between Northwest Bluff and Center Island Reef.

The principal channel is eastward of Cold Spring Harbor Lighthouse and is good for a depth of over 30 feet (9.1 m.). To go through this channel, pass about 250 yards northeastward of the lighthouse and then round the end of the shoal, passing about 350 yards eastward of the lighthouse.

In shaping the course for Oyster Bay Harbor, avoid a boulder reef, marked by a buoy, which extends 250 yards off the east side of Plum Point, and enter the harbor between the point and the lighted buoy marking the boulder reef making off from Cove Point.

Shoals with 10 to 12 feet (3.0 to 3.7 m.) on them extend 250 yards in places from shore in the bight of Centre Island for a distance of 0.5 mile southwestward of Plum Point. The best water will be carried by passing about 100 yards northwestward of the lighted buoy off Cove Point and heading to pass about 100 yards southeastward of the red buoy off Moses Point.

The deepest water then leads along the south end of Centre Island, passing about 100 yards southward of the buoy off Moses Point and keeping about 200 yards off the beach until close to Sopers Point, which may be approached more closely. When past this point a northwest course is good into the harbor.

OYSTER BAY TO WILLETS POINT

Centre Island Point and Reef are described with Oyster Bay preceding.

Pine Island Park, between Centre Island Point and Oak Neck Point, is settled with summer cottages.

Oak Neck Point* is marked by a number of large residences. A stone jetty to protect a private boat landing extends a short distance from the shore just westward of the point. A shoal strewn with bowlders extends 0.3 mile from the shore for part of the distance between Oak Neck Point and Matinicock Point. A black buoy is maintained about 0.5 mile off Oak Neck Point to mark the end of the shoal.

*Lat. 40°54'.9, Long. 73°34'.0: Charts 222, 224, 1213.

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Just eastward of **Peacock Point** is **Frost Creek,** which has been improved by dredging a channel about 40 feet wide and 8 feet (2.4 m.) deep to a private estate. The channel at the entrance is well defined with the water below half tide, and is marked on both sides by private spindles and by stakes on the east side of the channel; it is protected by a stone jetty which extends a short distance from the shore about 150 feet eastward of the dredged channel. A stone jetty to protect a private boat landing extends a short distance westward from Peacock Point.

Matinicock Point is marked on its western side by a stone pier. A shoal extends about 600 yards off the point, and is marked at its end by a lighted bell buoy with a can buoy alongside. The lighted bell buoy is removed from December 15 to April 1 of each year.

Hempstead Harbor (chart 223) is 4 miles wide at the entrance between Matinicock Point and Prospect Point. It is free from dangers if the shores be given a berth of 0.3 mile, and is much used by vessels seeking shelter in any but strong northerly winds, affording excellent anchorage with good holding ground. Vessels can anchor in any part of the harbor according to draft and direction of the wind. A good anchorage for vessels drawing less than 20 feet (6.1 m.) is just inside of a line from Mott Point to the breakwater, and small vessels can anchor behind the breakwater. There are several villages on the eastern shore, and large sand and gravel plants on the western shore above and below Bar Beach.

Weeks Point is marked by a short breakwater which protects a private boat landing. A buoy is maintained about 0.2 mile off the point. Nearly 0.5 mile southward of Weeks Point is the entrance to a basin protecting a private wharf which has a depth of 8 feet (2.4 m.) at the end. The basin shoals to the head and there are rocks bare at low water near the northern end.

Directions.—Passing northward and westward of the lighted bell buoy off Matinicock Point, a **213°** true course will lead 200 yards northwestward of the black buoy off Weeks Point, and then a **184°** true course will lead westward of the light on the end of the breakwater. Passing 900 yards northward of the bell buoy off Prospect Point, a **116°** true course will lead for the light on the end of the breakwater, and pass northward of the obstructions with 23 and 19 feet (7 and 5.8 m.) over them, located about 0.6 mile northward and 1.5 miles eastward, respectively, of Prospect Point. When northward of Mott Point bell buoy, at a distance of about 700 yards, steer **150°** true for about 1 mile and select anchorage. Or, if proceeding to Glenwood Landing, steer **158°** true and pass westward of Bar Beach Light.

Glen Cove is a village with railroad communication on Glencove Creek, about 1 mile back from the eastern shore of the bay. There is also bus service from Glen Cove to the towns along the shore. The breakwater has been built to 4 feet (1.2 m.) above high water, extends 1,564 feet west-southwestward from Glencove Landing and is marked at its end by a light. The anchorage behind the breakwater is known as **Glencove Harbor,** the depths ranging from 18 to 22 feet (5.5 to 6.7 m.) behind its outer half and 7 to 9 feet (2.1 to 2.7 m.) nearer shore. The New York Yacht Club has a float landing just south of the breakwater. An oil barge is anchored on the south side

of the breakwater, near shore, during the summer, and gasoline and oil can be obtained.

Glencove Creek, lying 0.6 mile southward of **Glencove Breakwater,** has been improved by a dredged channel 100 feet wide from **Mosquito Cove** to the head of navigation at Glen Cove, a distance of about 1 mile. In 1937, the controlling depth was 8 feet (2.4 m.), but not for the full width of the channel. Buoys mark the entrance of the channel.

Sea Cliff is a village on the steep hill on the south side of Glencove Creek. Water can be obtained by water boat. From Sea Cliff to the northerly wharves at Glenwood Landing a shoal extends 300 yards from the eastern shore and is marked by a buoy and a light.

Bar Beach Light, about 500 yards north of the east point of Bar Beach is a black skeleton about 26 feet (7.9 m.) high marking the southwest limit of the shoal water.

Glenwood Landing is a village on the eastern shore, abreast Bar Beach. The four stacks at the lighting plant are prominent. Gasoline, fresh water, ice, and supplies can be obtained. The wharves at Glenwood Landing have depths of about 8 feet (2.4 m.) at mean low water. There are several marine railways; the largest can accommodate a vessel up to 125 feet in length, with a draft of 10 feet (3.0 m.) and has a capacity of 150 tons. Range lights, which are privately maintained, lead to the wharves of various sand and gravel companies who operate plants located on the western shore, south of Bar Beach.

Roslyn is a village on the railroad at the head of the harbor.

The **head of Hempstead Harbor** above Bar Beach is occupied by extensive flats, and the narrow channels require local knowledge. From the entrance at Bar Beach a channel with a controlling depth of 6 feet (1.8 m.) and a width of 100 feet as determined in 1939, extends for a distance of 1.2 miles upstream; thence 40 to 80 feet wide to Roslyn town wharf and thence with decreasing widths of 50 to 30 feet to the head of navigation at the dam at Willow Avenue. This channel is well marked by buoys.

Tides.—The mean rise and fall of tides is about 7¼ feet.

Currents.—In the channel west of the breakwater the velocity is small, being about ¼ knot at strength. At Bar Beach the tidal currents have an average velocity of about 1¾ knots at strength through the narrow channel. Slacks before flood and ebb, respectively, occur about 2 hours after low water and high water at New London.

In severe winters ice has been known to close navigation about six weeks during January and February.

The principal items of commerce are sand and gravel and fuel oil. There is also trade in coal, ashes, and building material. The usual draft of vessels engaged in this commerce is from 3 to 12 feet (0.9 to 3.7 m.).

From **Mott Point** to Prospect Point there are bluffs in places. A shoal, with boulders, extends 0.2 mile from shore between the points, and also for a short distance southward of Mott Point.

Buoys mark the limits of the shoal eastward and northeastward of Mott Point, the latter being a bell buoy which lies about 300 yards eastward of Picket Rock. This rock has a depth of about 2 feet (0.6 m.) at mean low water and lies about 350 yards from shore.

Prospect Point, marked by prominent houses on the bluff, has a rocky shoal making out nearly 0.4 mile northward from it. The shoal rises abruptly from a depth of 10 fathoms (18.2 m.) to 16 feet (4.9 m.), and has boulders. **Old Hen,** a boulder bare at low water, lies 400 yards from shore. The north end of the shoal is marked by a bell buoy, which lies 0.8 mile eastward of Execution Rocks Lighthouse. About 400 yards eastward of the buoy are rocky patches with depths of 17 feet (5.2 m.) and 18 feet (5.5 m.). There is 23 feet (7.0 m.) on an obstruction about 600 yards 55° true from the buoy. There is a rocky patch, with 11 feet (3.4 m.) over it, about 0.6 mile eastward of Prospect Point which is marked by a buoy. About 400 yards northward of the buoy there is a boulder patch with a depth of 24 feet (7.3 m.).

Execution Rocks are marked by Execution Rocks Lighthouse, and the rocks with depths of 18 feet (5.5 m.) or less extend 0.6 mile northward, 300 yards southward, and 600 yards southwestward from the lighthouse. The rocks and shoals are marked by three buoys one located off the north end, another about 300 yards northeastward of the lighthouse and one off the southwest end. Rocks, with 8 to 9 feet (2.4 to 2.7 m.) over them, extend about 400 feet southward from the lighthouse. A rocky patch, with 13 feet (4 m.) over it is located about 425 yards south of the black buoy on the north end of the shoal.

Execution Rocks Lighthouse * is a white stone tower, with a brown band about midway of its height, attached to a granite dwelling. The light is 55 feet (16.8 m.) high and visible 13 miles. A red sector from 34° to 70° true, from seaward, covers the shoals to southwestward. The fog signal is an air siren. A radiobeacon is operated at the lighthouse which is synchronized with the fog signal for distance finding.

Sands Point is marked by a light about 300 yards northwest of the point. A boulder reef extends 600 yards off the point and is marked by a buoy. The boulders show at low water for a distance of about 300 yards from shore. The old lighthouse (stone tower) and a white residence, with spire on top, are prominent objects at this point.

Sands Point Light, a black skeleton tower with a white tank house, is 49 feet (14.9 m.) high and visible about 9 miles.

Barker Point is a high bluff on the northeast side of the entrance of Manhasset Bay. **Gangway Rock,** marked by a light, is at the northwesterly end of a broken line of rocks and shoal water, which extends 0.6 mile northwestward from Barker Point.

Gangway Rock Light, a black skeleton tower with a white tank house, is 47 feet high and visible about 11 miles.

Success Rock, awash at low water and marked by a spindle, is one of this broken line of rocks.

Manhasset Bay is nearly 1 mile wide between Barker Point and Hewlett Point, and over 3 miles long. It affords excellent shelter for vessels of about 12-foot (3.7 m.) or less draft, and is much frequented by yachts in the summer. The principal items of commerce are sand and gravel, building material, coal, and fuel oil carried in vessels of 6 to 12 feet (1.8 to 3.7 m.) draft. The depths in the outer part of the bay range from about 12 to 16 feet (3.7 to 4.9 m.), and about 8 to 12 feet (2.4 to 3.7 m.) in the inner part inside Plum

*Lat. 40°52'.7, Long. 73°44'.3: Charts 222, 1213.

Point. At the extreme south end of the bay the general depths are shoal with extensive mud flats, a controlling depth of 2 feet (0.6 m.) at mean low water can be taken through a natural channel to almost the head of the bay.

Anchorage in the bay may be selected according to draft, but the usual places are eastward of Plum Point in depths of 6 to 10 feet (1.8 to 3.0 m.) of water and off the water front of Port Washington in depths ranging from 8 to 12 feet (2.4 to 3.7 m.). The bottom is soft and affords good holding ground.

Tides.—The mean rise and fall of the tides is about 7¼ feet.

Storm warnings are displayed at Port Washington.

Plum Point, marked by a clubhouse and a prominent flagstaff, is a low spit extending southward from the eastern shore about 1 mile southward of Barker Point. There is a lighted buoy about 150 yards southwestward of the point. The bight eastward of Plum Point is shoal. A black channel buoy is located about 0.3 mile southeastward of the point and about 100 yards east of an 11 foot (3.4 m.) spot.

Port Washington is a village, with railroad communication, on the south side of a shoal bight about 1 mile southeastward of Plum Point. A channel, with depths of 6 to 8 feet (1.8 to 2.4 m.) and marked at its entrance by buoys, leads along the east side of the bight thence northwardly past the town wharf to the north end of the bight northeast of Tom Point. Depths at the wharves range from 5 to 7 feet (1.5 to 2.1 m.).

Supplies.—Ship chandlery supplies, gasoline, water and ice are available. During the summer, barges anchored in the bay can also supply fuels and lubricants. There is a chart agency at Port Washington.

Repairs.—There is a boat yard at Port Washington with a marine railway, the capacity of which is about 50 tons. It can haul out vessels up to lengths of 100 feet with a draft of 9 feet (2.7 m.).

A boulder reef, largely bare at low water and marked by a buoy, extends over 300 yards northward from **Hewlett Point,** on the west side at the entrance of Manhasset Bay.

Stepping Stones is a dangerous boulder reef, which extends about 0.8 mile in a northwesterly direction from the shore and is marked near its end by Stepping Stones Lighthouse. There are three rocks which show at low water southeastward of the lighthouse, and little depth at other places as shown on the chart. Vessels should not approach the lighthouse closer than 250 yards on the northwest side.

Stepping Stones Lighthouse is a red-brick dwelling on a granite pier, with a white horizontal band on the southwest side of the pier. The light is 46 feet (14 m.) high and visible for 12 miles. The fog signal is a bell.

Little Neck Bay is nearly 1 mile wide eastward of Willets Point, and about 2 miles long. The shores of the bay are generally settled, and there are numerous private boat landings. The depths are about 9 feet (2.7 m.) in the entrance, 6 feet (1.8 m.) about halfway to its head, and thence shoaling gradually. There are boulders in places close to shore. A much used boat anchorage is in the cove on the east side 1 mile southward of **Elm Point,** the depths being 5 to 7 feet (1.5 to 2.1 m.) and beach sandy. An oil barge is anchored here in

the summer and gasoline and oil can be obtained. The two branches forming the head of the bay are nearly bare at low water.

The creek at the head of the south branch, known as Alley Creek, is crossed by two bridges as follows: Railroad bridge, swing draw, 40 feet wide and 3 feet (0.9 m.) above mean high water when closed; fixed highway bridge, 37 feet wide and 9.9 feet (3 m.) above mean high water, 0.2 and 0.3 mile, respectively, above the mouth.

Chapter 13.—SOUTH COAST OF LONG ISLAND

OUTSIDE COAST

The south coast of Long Island has a general 247° true trend for 68.5 miles from Montauk Point to Fire Island Inlet, and thence trends about 263° true for a little over 35 miles to the western end of Coney Island and the northern point at the entrance to the Lower Bay of New York. It is a clean shore, and may be safely approached as close as 1 mile, with not less than 5 fathoms (9 m.) anywhere between Montauk Point and Rockaway Inlet, except off Fire Island Inlet and the inlets westward, where the shore should be given a berth of at least 1.5 miles. When viewed from seaward it presents but few characteristic features. It is composed of a series of sand hillocks backed by low, dark woods. Montauk Point and lighthouse are described on page 166.

About 14 miles westward of Montauk Point and 0.5 mile back from the beach is the village of **Amagansett,** and 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. **Southampton** is 27 miles westward of Montauk and 1.5 miles eastward of Shinnecock Bay.

Shinnecock, Moriches, Great South, and Hempstead Bays lie inside of the beach along the south coast of Long Island and form an inside route for boats of 4-foot (1.2 m.) draft. (See the description following.) In 1939 there were three main inlets from sea to these bays used by boats—Fire Island Inlet, Jones Inlet, and East Rockaway Inlet. These inlets are subject to frequent and extensive changes, and although buoyed should not be used in the absence of local knowledge.

Two small inlets, namely **Shinnecock Bay Inlet** and **Moriches Inlet** which broke through in 1938 and 1931, respectively, are used by small boats for entrance to these bays instead of the main entrances.

In the vicinity of Napeague, there are prominent radio towers which are lighted at night by three sets of red lights placed in a vertical line at intervals of about 100 feet (30.4 m.).

Radio direction-finder stations are located at **Amagansett** and at **Fire Island.*** The latter is the master station of the New York Entrance group. For further details see page 345, and publication H. O. 205.

Shinnecock Light, a red skeleton tower 67 feet (20.4 m.) and visible about 14 miles, is situated on the west side of Shinnecock Inlet.

Shinnecock Bay beacon is the old Shinnecock Bay Lighthouse. It is a red brick tower on Ponquogue Point, about the middle of

*Lat. 40°37′.9, Long. 73°13′.0: Charts 578, 1214, 1215, 1108.

the north side of Shinnecock Bay and 1 mile back from the beach.

Fire Island Lighthouse is a black and white horizontally banded tower. The light is 167 feet (50.9 m.) above the water and visible 19 miles. The naval radio direction-finder station is near the lighthouse. The wreck of a derrick barge with a mast lies in 66 feet (20.1 m.) of water about 2.5 miles 150½° true from Fire Island Lighthouse. Vessels should keep clear of this position.

Fire Island Lightship, moored in a depth of 16 fathoms (29 m.) 9.4 miles 172° true of Fire Island Lighthouse, has a red hull with "Fire Island" on each side, two black masts, and a black, circular gallery under the lens lantern at head of each. The light (on fore masthead) is 57 feet (17.4 m.) above the water and visible 12 miles. If this light is inoperative, a light will be shown from the main masthead. A fixed white riding light is exhibited on the bow, 22 feet (6.7 m.) high. The fog signal is an air diaphone. If the diaphone is disabled a bell will be struck by hand. A submarine bell is also operated. A radio beacon is syncronized with the fog signal for distance finding. The radio station receives messages of importance relative to maintenance of aids to navigation and matters of emergency. For light characteristics, fog signals, and other details see Light List, North Atlantic Coast.

The following summer **resorts** are on the beach and are **prominent** from offshore: Point o'Woods and Ocean Beach, lying 4 and 3 miles, respectively, eastward of Fire Island Lighthouse; Oakbeach, Tobay Beach, Long Beach, Far Rockaway, and Rockaway Beach, lying 3.5, 11.5, 21, 25, and 27 miles, respectively, westward of Fire Island Lighthouse; and Coney Island.

Numerous hotel cupolas, standpipes, watertanks, towers, and chimneys are prominent in this area. The locations of the most important ones are shown on the chart.

INLAND WATERS

(CHARTS 578 AND 579)

Shinnecock, Moriches, Great South, and Hempstead Bays form an inside route for boats of 4-foot (1.2 m.) draft from Peconic Bay to East Rockaway Inlet. Masted boats are limited to a height of less than 20 feet (6.1 m.) above the water by the fixed bridges over Shinnecock Canal. Westward of East Rockaway Inlet, boats must at present pass outside to reach Jamaica Bay or New York Harbor.

Shinnecock Canal connects Great Peconic Bay and Shinnecock Bay. It is partly a dredged cut and is protected at the northern entrance by two jetties. A light is maintained on the north end of the east jetty. The canal and dredged cuts through the bays to Great South Bay are owned and maintained by Suffolk County of New York. The cuts between the bays leading to Great South Bay were dredged to a depth of 6 feet (1.8 m.) and a width of 100 feet. Shoaling has occurred in some of these cuts and at the Great Peconic Bay buoyed entrance to the canal, and in 1939 the controlling depth from Great Peconic Bay to Great South Bay was 4 feet (1.2 m.). The canal is crossed by two fixed bridges, with spans for the full width of the canal and an overhead clearance of 20 feet (6.1 m.). A lock is maintained north of the two bridges crossing the canal. The dimensions of the lock are 26¾ by 100 feet with a depth

over the sills of 4½ feet (1.3 m.). The gates are opened to allow the current to set south through the canal and are closed to prevent the water from Shinnecock Bay flowing back into Great Peconic Bay. Boats can always go through, as the gates will be opened when necessary.

The signal for opening the lock is three blasts of the boat's whistle or horn.

Slack water in the pond near the northern end of the canal occurs at about half tide in Great Peconic Bay. The currents have considerable velocity, averaging about 1.5 knots, but sometimes are much higher on a strong ebb current, with swirls in the contracted part of the channel, at the lock.

On the east side of the canal, just south of the jetties, there is a **boat basin** the depth in which was about 7 feet (2.1 m.) in 1939. Near the railroad bridge gasoline and oil are available; boats tie up at the bulkhead.

On the west side of the canal, north of the railroad bridge, there is a small **boat yard** with marine railways, the capacity of which are about 20 tons and capable of hauling out small craft up to lengths of 55 feet and a draft of 5½ feet (1.7 m.). Gasoline, oil, ice, and fresh water may be obtained. There are facilities for mooring at the boat-yard dock which has depths of 12 feet (3.7 m.) along its entire face. Telephone service is available and fixtures on the dock permit connections for obtaining electric current.

Shinnecock Bay (chart 578), about 8 miles long, can be entered by boats of 4-foot (1.2 m.) draft.

The channel through Shinnecock Bay is well lighted and buoyed. The chart is the best guide.

Depths of about 3 feet (0.9 m.) can be taken into the small coves on the northeast side and east end of the bay. An inlet, which was formed as a result of the 1938 hurricane, was reported in 1939 to have depths of 8 to 26 feet (2.4 to 7.9 m.) through the cut, but a controlling depth of only 4 feet (1.2 m.) in the approach from the ocean. As this inlet is subject to changes and is not buoyed, local information should be obtained before using it.

Hampton Bays, a station on the Long Island Railroad, just west of the canal, is the nearest post office. **Canoe Place,*** the settlement at the canal, has gasoline and some supplies. There are several small boat landings in the canal and it is quite a small-boat center.

Ponquogue Point, low and sandy, is marked by a prominent old light tower and a steel water tank. A highway bridge, with a bascule span, crosses the bay at this point. It has an opening 50 feet wide and a vertical clearance of 13.9 feet (4.2 m.) at mean high water when closed.

Pine Neck, 2.3 miles westward of Ponquogue Point, is low, flat, and sandy. The shoal extends southeastward from **Pine Neck Point.** About 0.5 mile east of Pine Neck, a 2½-foot (0.8 m.) channel, marked by stakes, leads to **Tiana Beach,** a small summer resort, on the south side of Shinnecock Bay.

Weesuck Creek, on the north side near the western end of Shinnecock Bay, has been improved by a dredged channel 80 feet wide and in 1939 had a controlling depth of 6 feet (1.8 m.) to head of navi-

*Lat. 40°53'.2, Long. 72°30'.1: Charts 299, 578, 1212, 1214.

gation. There are two boat yards with marine railways capable of hauling out boats up to lengths of 50 feet and a draft of 6 feet (1.8 m.). There are facilities for boat storage and mooring. Gasoline, lubricants, fresh water, and ship chandlery supplies are available. The post office is East Quogue.

Quogue Canal, connecting Shinnecock Bay with Quantuck Bay, has been dredged to a depth of 4 feet (1.2 m.) for a width of 100 feet. In 1939 there was a depth of about 5 feet (1.5 m.) in the canal. The canal is crossed by a center pier swing bridge with a minimum horizontal clearance of 23 feet and a vertical clearance of 7.6 feet (2.3 m.) above high water when closed. A new bascule type bridge is being constructed 300 yards westward of this bridge which is to have a horizontal clearance of about 50 feet and a vertical clearance of about 15 feet (4.6 m.) above high water.

Quantuck Bay is crossed by the dredged channel which is marked. It was 5 feet (1.5 m.) deep in December 1939 and joins Quogue Canal and Quantuck Canal. **Quantuck Creek,** at the head of the bay, is crossed by a fixed bridge which is the head of navigation except for small pulling boats.

Quantuck Canal, connecting Quantuck Bay and Moriches Bay, has been dredged to a depth of 6 feet (1.8 m.) for a width of 100 feet. In 1939 there was a depth of about 6 feet (1.8 m.) in the canal. The canal is crossed by two drawbridges; a bascule bridge, at the western entrance to Quantuck Bay, having an opening 50 feet wide and a vertical clearance of 14 feet (4.3 m.) above mean high water when closed and a bascule bridge at **Potunk Point,** having an opening 50 feet wide and a vertical clearance of 14 feet (4.3 m.) above mean high water when closed.

About 300 yards northeastward of the bridge at Potunk Point is a dredged channel leading to a yacht basin at **Westhampton Beach.** The channel is along the west bank in the bight, and is marked by stakes with arrow markers. There is a private flashing green light on the east bank, atop a red piling, at the entrance to the dredged cut that leads up to Main Street in Westhampton Beach. A 5-foot (1.5 m.) depth can be carried to the yacht basin, just before reaching the Stevens Lane Bridge. This is a fixed bridge with a vertical clearance of about 7 feet (2.1 m.) above mean high water. A depth of 4 feet (1.2 m.) can be carried from the bridge to Main Street. Fresh water, gasoline, and supplies can be obtained, and engine repairs can be had.

Moriches Bay (chart 578), about 8 miles long, is crossed by the inside waterway leading from Shinnecock Canal to Great South Bay. The eastern and western entrances to the bay are being dredged in 1940 where necessary to a depth of 6 feet (1.8 m.). These dredged cuts are marked by buoys. The general depths in the bay range from 5 to 7 feet (1.5 to 2.1 m.), but the southern part of the bay is shoal.

Speonk Point, near the eastern end of Moriches Bay, on the north shore, is marked by a long, narrow boat landing which is in ruins, and a prominent flagstaff. About 0.5 mile westward there is a small basin used by local craft; the entrance is between two short jetties. There are depths of about 5 feet (1.5 m.) in the basin.

Seatuck Cove, north side of Moriches Bay, has a depth of 3½ feet (1.1 m.) to the landing at **Eastport,** on the point which separates the two creeks at its head. About 0.2 mile southward of the landing a shoal extends from the east side and is sometimes marked by a stake.

Hart Cove, westward of Seatuck Cove, has general depths of 4 to 5 feet (1.2 to 1.5 m.). On the west side of the cove there is a boat yard with marine railways capable of hauling out small craft up to lengths of 50 feet and a draft of 3½ feet (1.1 m.). Gasoline, lubricants, and fresh water may be obtained. There are depths of 3½ feet (1.1 m.) alongside the small wharf. Boat storage is available.

Tuthill Cove, locally known as **West Cove,** on the north side of Moriches Bay, 1.5 miles westward of Seatuck Cove, has depths of 2 to 4 feet (0.4 to 1.2 m.). **East Moriches** is on its north side, and gasoline and small repairs can be had. **Tuthill Point** is on the west side of the entrance to the cove.

Moriches Inlet* provides an entrance into Moriches Bay for small craft. It had a controlling depth of about 4 feet (1.2 m.) in November 1939, but this is subject to sudden change. It is frequently examined and the latest information given in the weekly Notice to Mariners. It is unsafe to enter without local knowledge. Local fishermen using the inlet usually maintain small barrel buoys during the summer to mark the channel. A wreck lies on the east side of the entrance channel which is nearly covered at high water.

Orchard Neck Creek, is extensively used by local small craft as a mooring basin. In 1939 there was a depth of 3 feet (0.9 m.) to the head of navigation. A light marks the end of the jetty on the west side of the entrance.

Senix Creek, north side of the west end of Moriches Bay eastward of Forge River, has a narrow entrance, with a depth of 3 feet (0.9 m.) between bulkheads, and the depth throughout the creek is about 2 feet (0.6 m.).

A light is maintained on the south end of the bulkhead on the west side of the entrance. There are several small boat yards with marine railways capable of hauling out small craft up to lengths of 50 feet and a draft of 3½ feet (1.1 m.). Gasoline, lubricants, and fresh water can be obtained, and there are facilities for boat storage.

Forge River has a channel depth of about 4 feet (1.2 m.) in the lower half and 3 feet (0.9 m.) nearly to the railroad bridge at the head of navigation.

The **channel between Moriches Bay and Bellport Bay** has been dredged where necessary to obtain a depth of 6 feet (1.8 m.) for a width of 100 feet. The controlling depth in 1939 was 4 feet (1.2 m.). About 0.3 mile eastward of **Smith Point** there are several piles which are marked by buoys. Caution is recommended in this vicinity.

Bellport Bay is shoal in its southern part, but has depths of 5 to 7 feet (1.5 to 2.1 m.) in the northern part. The channel in the eastern end of the bay leading to Moriches Bay is marked.

Carmans River has a depth of 3 feet (0.9 m.) for nearly 1 mile above the entrance to the landing at **Brookhaven,** above which the river is shoal and crooked. Sometimes there is a bush stake on each of the shoals making off from the points at the entrance. Entering

*Lat. 40°46′, Long. 72°45′: Charts 578, 1214.

in midriver between these stakes, favor the west side for a distance of 0.5 mile and then follow midriver.

Long Point is at the west side of the entrance.

There is a boat yard on the west side about 0.6 mile north of Long Point, with a marine railway capable of hauling out small craft up to lengths of 45 feet and a draft of 3½ feet (1.1 m.). Gasoline, oil, and fresh water are available. A limited amount of shipchandlery supplies can be obtained. There are facilities for boat storage.

Fireplace Creek, about 0.6 mile east of Bellport, has a small boat yard with a marine railway capable of hauling out small craft up to lengths of 55 feet and a draft of 4½ feet (1.4 m.). Gasoline, water, and boat storage can be obtained.

Bellport, a town on the north side of Bellport Bay, has a wharf with 5 feet (1.5 m.) at its end. The deepest draft taken to the wharf is about 5½ feet (1.7 m.) at high water. The approach is clear. Coal, provisions, and motor-boat supplies can be obtained, and repairs to gas engines can be made. A ferry runs across the bay in a southeasterly direction and through a slough between the shoals to **Old Inlet,** on Great South Beach. The slough is marked with stakes and private lights in the summer.

Great South Bay (chart 578) can be entered at low water by boats of about 8-foot (2.4 m.) draft through Fire Island Inlet, 4-foot (1.2 m.) draft from Great Peconic Bay, and 8-foot (2.4 m.) draft from westward through Hempstead Bay. The southeast and southwest portions of the bay are shoal. The central portion has, for the most part, depths ranging from 7 to 12 feet (2.1 to 3.7 m.). The channels through the bay are well buoyed and lighted.

Fire Island Inlet* is one of the important inlets on the south coast of Long Island and affords a direct entrance to Great South Bay. The inlet is used extensively by fishermen and pleasure craft during the summer months. For many years the inlet has been moving westward at a fairly uniform rate and because of the constant shifting of the channel the buoys which mark it are not shown on the chart.

South of the entrance, at a distance of about 2.5 miles, the approach is marked by a light buoy and a whistle buoy, the latter lying about 0.2 mile inshore from the former. About 0.8 mile south of the entrance a vertical striped bell buoy is a guide to the buoyed channel leading westward of Democrat Point.

Strangers should not attempt to enter before obtaining local knowledge or obtaining a pilot. Local fishermen can usually be contacted for this purpose, or, failing this, the information or a pilot can be obtained by signalling the Coast Guard station.

In heavy weather the entrance is obstructed by breakers which form across the entire inlet.

The New York district of the United States Coast Guard reports a controlling depth in the inlet of 14 feet (4.3 m.) in December 1939. These depths change monthly, but are seldom less than 8 feet (2.4 m.).

State Boat Channel (Charts 578, 579).—A boat channel has been dredged from inside Fire Island Inlet westward through Captree Island and the marsh lands north of Jones Beach Island and through Hempstead Bay to a junction with Reynolds Channel about 1 mile west of Jones Inlet. This State Boat Channel, in conjunction with

*Lat. 40°38′, Long. 73°18′: Charts 578, 1215.

Reynolds Channel along the north side of Long Beach Island, provides a protected inside route between Great South Bay and East Rockaway Inlet. In 1939 the controlling depth was about 8 feet (2.4 m.).

Rules and regulations for the guidance of traffic, using the channel system, have been issued by the Long Island State Park Commission and copies may be obtained from them at Babylon, New York. The regulations referred to above limit the speed of craft using the channel to 12 miles per hour and 4 miles per hour in bathing areas.

The State Boat Channel does not cross the open water immediately inside Jones Inlet but follows channels passing to either side of Meadow Island and thence about the north side of the island to the westward of Meadows Island into Reynolds Channel.

The State Boat Channel is crossed by the highway bridges of causeways which connect Jones Beach State Park and Long Beach with the mainland of Long Island.

On the **Wantagh Causeway,** extending southward from Wantagh, there is a fixed bridge at the south end and a drawbridge at the north end of Green Island. The route about the north end of the island is marked and frequently there are shoals through the turn about the northeast corner of the island. In 1934, there was a 6-foot (1.8 m.) shoal in this passage although depths of 8 to 10 feet (2.4 to 3.0 m.) could be taken through with local knowledge.

On the **Meadowbrook Causeway,** about 1 mile eastward of Jones Inlet, there is a drawbridge over the through channel along Jones Beach State Park.

On the **Long Beach Loop,** connecting Meadowbrook Causeway with Long Beach, there is a fixed bridge on the east side of Meadow Island and a drawbridge on the west side of the island. The channel about the east and north side of Meadow Island is deep and well marked while the channel about the south and west side had a controlling depth of about 7 feet (2.1 m.) in 1934. The Long Beach Loop crosses Reynolds Channel on a fixed bridge about one mile west of Jones Inlet.

The horizontal and vertical clearances at mean high water of the above bridges are given below:

WANTAGH CAUSEWAY BRIDGES

Goose Creek drawbridge, north end of Green Island. Horizontal clearance 76 feet; vertical clearance (closed) 20 feet (6.1 m.).

Sloop Channel fixed bridge, south end of Green Island. Horizontal clearance 29 feet; vertical clearance 14 feet (5.2 m.).

MEADOWBROOK CAUSEWAY BRIDGE

Sloop Channel drawbridge, about one mile east Jones Inlet. Horizontal clearance 75 feet; vertical clearance (closed) 27 feet (8.2 m.).

LONG BEACH LOOP BRIDGES

Long Creek drawbridge, west side of Meadow Island. Horizontal clearance 75 feet; vertical clearance (closed) 26 feet (7.9 m.).

Swift Creek fixed bridge, east side of Meadow Island. Horizontal clearance 29 feet; vertical clearance 20 feet (6.1 m.).

Reynolds Channel fixed bridge, about one mile west Jones Inlet. Horizontal clearance 29 feet; vertical clearance 20 feet (6.1 m.).

There are several connecting channels leading into the State Boat Channel. From opposite the north point of Oak Island, 6 to 7 feet (1.8 to 2.1 m.) can be carried to the deeper portion of Great South Bay, southeast of Babylon. A channel with 9 feet (2.7 m.) leads west of Gilgo Island to Amityville Creek. Two miles further west a shallow channel connects with South Oyster Bay. West of the Meadowbrook Causeway, channels with 12 to 14 feet (3.7 to 4.3 m.) lead to Freeport. At the east end of the canal at Captree Island there is a turning basin and a wharf at which there are depths of about 10 feet (3.0 m.).

The **currents** in Fire Island Inlet after crossing the bar have a velocity at strength of about 2½ knots and are influenced greatly by the force and direction of the wind. In the bay the currents have little velocity except in the narrow channels between the shoals and within a radius of 3 miles from the lighthouse, where at times their estimated velocity is 1 to 1½ knots.

Inside of Fire Island Beach the channels are fairly stable. From the inlet the channel with good depth leads eastward inside the beach past Fire Island Lighthouse, from which several channels lead between the shoals to the north side of Great South Bay.

East Channel is buoyed and is good for a depth of 8 feet (2.4 m.). From between Fire Island Lighthouse and Fire Islands the channel trends northeastward to Fire Islands, then eastward along the beach to Point o' Woods, then northward to northeastward, to the buoyed channel through Great South Bay. Chart No. 578 is the best guide.

Range Channel, lying close to westward of East Channel, is marked by buoys and beacons and is good for a depth of about 7 feet (2.1 m.).

West Channel is buoyed and is good for a depth of 7 or 8 feet (2.1 or 2.4 m.), which is found in Great South Bay at the north end of the channel. From close westward of Fire Islands the channel trends about 338° true for 1 mile, and then about 321° true.

The lighted buoys in East, Range, and West Channels are maintained on station from April 1 to December 1.

Dickerson Channel, which branches off in a northwesterly direction from West Channel, is buoyed and is good for a depth of about 5 feet (1.5 m.), which occurs at the crossover from West Channel to Dickerson Channel.

There have been **numerous changes** in the buoyage in East Channel, West Channel, North Channel, and Range Channel. These buoys are changed in position with changes in the channel. The latest editions of charts for this area are the best guides.

Snakehill Channel is a natural channel marked by stakes during the summer. About 3-foot (0.9 m.) draft can be carried through. There are numerous shacks with landings built on the flats on the west side of the channel and bait is handled on a large scale for the extensive fishing in Great South Bay.

Point o' Woods, Ocean Beach, and **Saltaire,** are summer resorts 4, 3, and 1 miles, respectively, eastward of Fire Island Lighthouse. Landings extend from them to deep water on East Channel, Great South Bay, and boats make regular trips to Bayshore. Gasoline and provisions can be obtained.

Cherry Grove is a summer resort on Great South Beach 6.5 miles eastward of Fire Island Lighthouse. A boat landing extends to a depth of 4½ feet (1.3 m.) in Great South Bay, and to it boats make regular trips from Sayville.

Patchogue Creek, on the north side of Great South Bay, has a buoyed approach channel 100 feet wide and a controlling depth, when examined in 1937, of 8 feet (2.4 m.), which could be taken to the head of navigation about 0.8 mile above the entrance. The west side of the entrance is protected by a breakwater, the south end of which is marked by a light on a black skeleton tower 25 feet (7.6 m.) high. The east side is protected by bulkheading and a short jetty extending southward from it. A light, maintained by the town, is near the inshore end of the jetty and about 15 feet (4.6 m.) high. When entering steer midchannel courses.

There are several **boat yards** on Patchogue Creek, all of which have marine railways and facilities for making major repairs. The largest marine railway in Great South Bay is located here and has a capacity of 300 tons and capable of hauling out vessels up to lengths of 140 feet and a draft of 14 feet (4.3 m.). Gasoline, fresh water, ship chandlery supplies, mooring, and boat storage are available.

Patchogue,* the principal town on Great South Bay, is important as a distributing point for most of the major oil companies. There is a large oil terminal on the west side of Patchogue with depths of 30 feet (9.1 m.) along the face of the wharf. Elsewhere the depths at the wharves vary from 3 to 9 feet (0.9 to 2.7 m.). There is a yacht club near the entrance of the creek.

Brown Creek, on the north side of Great South Bay, 3 miles westward of Patchogue, has been improved by building two short jetties at the entrance out to a depth of about 4 feet (1.2 m.).

The west jetty is marked at the south end by a light on a black skeleton steel tower and the east jetty by a beacon.

The controlling depth in the approach channel is about 6 feet (1.8 m.) and a depth of 3 feet (0.9 m.) for a width of 80 feet can be taken up the creek for about 1,600 yards from the highway bridge. Above this point a depth of 1 foot (0.3 m.) can be taken to the head of navigation at the highway. Two lights on the bulkhead on the west side of the mouth of the river form a range for the entrance; these are maintained by the town. When entering, keep midway between the jetties and follow a mid-channel course up the creek.

At Green Harbor, about 1 mile west of Brown Creek at **Sayville,** there is a boat yard with a marine railway which has a capacity of about 50 tons and capable of hauling out small craft up to lengths of 45 feet and a draft of 5½ feet (1.7 m.). There are facilities for obtaining gasoline and water at the wharf which has depths of about 4½ feet (1.4 m.) at the end.

Westward of the entrance to Green Harbor are several wharves which are extensively used by the local oyster industry. Gasoline, water, and ice can be obtained here.

Connetquot River, locally known as **Great River,** on the north side of Great South Bay, 3 miles westward of Brown Creek, has a depth of 2½ feet (0.8 m.) for 2 miles above the entrance, to the railroad. When entering the river the east bank must be favored

*Lat. 40°45', Long. 73°01': 578, 1214.

to avoid stumps of trees and other obstructions. There is a prominent residence, with clock tower, on the north side of the entrance.

There is a small boat yard on the east bank of the river about 1 mile from the entrance. There are facilities for hauling out small craft up to lengths of 35 feet and a draft of 3 feet (0.9 m.). Gasoline, lubricants, and fresh water are available. On the opposite shore there is a public landing with depths of 3 feet (0.9 m.) at the end of the wharf.

Great River is also the name of a village on the west side of the river by the same name.

On the north shore of Great South Bay, in the vicinity of **Nicoll Point,** the area is known as **Heckscher State Park.** Westward of Nicoll Point, there are several small creeks which have been dredged to various depths by private interests.

Great Cove is on the north side of Great South Bay, has depths of 4 to 8 feet (1.2 to 2.4 m.).

Orowoc Creek, which enters the northeast part of Great Cove, leads to the boat basin and wharves at the town of **Islip** and has a controlling depth of about 5 feet (1.5 m.). The channel is sometimes marked by privately maintained buoys and stakes. A light, which is maintained during the summer by the town, marks the west edge of a 3-foot (0.9 m.) shoal on the east side of the channel near the entrance of the creek.

There is a **boat yard** with marine railways capable of hauling out small craft up to lengths of 60 feet and a draft of 6 feet (1.8 m.). Repairs to both hull and machinery can be obtained. Gasoline, lubricants, fresh water, and ship chandlery supplies are available. There are facilities for mooring and boat storage. There is a depth of 6 feet (1.8 m.) alongside the wharf at the yard. Several large fish-packing establishments are situated on the creek.

Bay Shore is a town on the northwest shore of Great Cove and is a large fishing center. A standpipe and a large gas tank are prominent. The town landing, situated near the entrance of Penataquit Creek, has a depth of 5 feet (1.5 m.) at its end. From here boats run to Ocean Beach. During the summer boats also run to Point o' Woods, Saltaire, and other beach points.

A cable for electric power crosses Great South Bay from Bayshore in a general south southeast direction from the entrance of Penataquit Creek following the east side of West Channel to the north shore of Great South Beach in the vicinity of the point northeastward of the village of Saltaire.

Anchorage should be avoided in the vicinity of this cable.

Penataquit Creek, forming a well protected boat basin at Bayshore, has several boat yards with marine railways, the largest of which is capable of hauling out craft up to lengths of 80 feet and a draft of 8 feet (2.4 m.). Repairs to both hull and machinery can be obtained. There are facilities for mooring and boat storage and supplies of all kinds are available.

Watchogue Creek, locally known as West Creek, also has several boat yards. The largest marine railway on this creek is capable of hauling out vessels up to lengths of 100 feet and a draft of 6 feet (1.8 m.). Repairs of all kinds can be made, including sail loft and machine shop work. There is a depth of 6 feet (1.8 m.) alongside the bulkhead landing where gasoline, lubricants, fresh water, and

ship chandlery supplies may be obtained. There is also a chart agency here.

A yacht basin with a depth of about 6 feet (1.8 m.) has been dredged at **Bright Waters,*** on the southwest side of the town. There is also a yacht club here.

Babylon is a town near the north shore of Great South Bay. A water tank is very prominent. The public landing is 0.3 mile northward of Sampawam Point and at the mouth of Sampawam Creek, and has 4 feet (1.2 m.) at its end. Approaching around Sampawam Point give the point a berth of over 0.3 mile when southeastward of it and head for the wharf on a northwesterly course. Provisions, coal, supplies of all kinds, and engine repairs are obtainable. Water can be had at the landing. There are marine railways for small craft on Sampawam Creek, the largest of which is capable of hauling out boats up to lengths of 63 feet and a draft of 4 feet (1.2 m.). All of the boat yards are equipped for making repairs to both hull and motors. There are facilities for mooring and boat storage.

Sampawam Creek, just northward of the wharf, has been dredged to reclaim adjacent lands, and is bulkheaded on its west side. It is used as an anchorage by small craft and has a depth of about 5 feet (1.5 m.) through the entrance and greater depths inside. Boats also anchor between the public landing and Sampawam Point. This anchorage becomes choppy during easterly or southeasterly winds.

Carll River, westward of Sampawam Point, has been dredged to reclaim land near it; and a channel with a depth of about 3 feet (0.9 m.), which has been cleared of grass, leads in a northwesterly direction from the entrance and into the creek. A yacht club is located near the east side of the entrance.

West Babylon Creek, locally known as **Mud Creek,** about 1 mile westward of Sampawam Point, has been dredged by private interests to reclaim land near it, and several creeks to the westward have been improved in a similar manner.

Oakbeach is primarily a summer resort and fishing village situated on the north side of Fire Island Inlet. There is a marked channel leading north northwestward to Babylon which is a branch of the State Boat Channel. In 1939 it was reported that the controlling depth was 6 feet (1.8 m.). During the summer a light, which is locally maintained, marks the northern end of the channel. There is a small boat yard with a marine railway at Seganic Thatch which is capable of hauling out small craft up to lengths of 40 feet and a draft 4 feet (1.2 m.). There is a depth of about 4 feet (1.2 m.) alongside the bulkhead wharf where gasoline and oil may be obtained. Westward of Oakbeach, **Cedar Island Beach** and **Gilgo Beach** form part of the Long Island State Park System.

Neguntatogue Creek, southward of the town of **Lindenhurst,** was reported in 1939 to have a controlling depth of 4 feet (1.2 m.). There are several small boat yards on the creek with marine railways capable of hauling out small craft up to lengths of 50 feet and a draft of 4 feet (1.2 m.). Gasoline, lubricants, fresh water, and ship chandlery supplies can be obtained. Near the head of the creek

*Lat. 40°42′.4, Long. 72°15′.0: Chart 578.

there are several large landings from which local boats leave for fishing excursions.

Great Neck Creek, on the north shore and on the eastern side of **Strongs Point,** has been dredged to 25 feet (7.6 m.). There is a yacht basin on the creek where gasoline, supplies, and repairs may be obtained. At the head of the creek there is a fresh-water lake.

Amityville Creek, on the north side of the west end of Great South Bay, has a depth of about 8 feet (2.4 m.).

There are several boat yards with marine railways on the creek, the largest is capable of hauling out small craft up to lengths of 65 feet and a draft of 6 feet (1.8 m.). Gasoline, oil, and yachting supplies are available.

Amityville is a small town on the north shore of Great South Bay at its western end. A channel with a controlling depth of about 9 feet (2.7 m.) leads southward from Amityville Creek and joins the State Boat Channel in the vicinity westward of Gilgo Beach. This channel is considered a branch of the State Boat Channel and is marked by lights and posts which are maintained by the Long Island State Park Commission.

Clocks Creek, between Amityville Creek and Carman Creek, has been dredged to a depth of 4 feet (1.2 m.).

Repairs can be obtained at several boat yards, the largest railway being able to accommodate small craft up to lengths of 30 feet and a draft of 4 feet (1.2 m.).

Carman Creek is used by boats of 3-foot (0.9 m.) draft or less on a favorable tide.

There is a yacht club near the east side of the entrance. **Unqua Point** is marked by a prominent yacht club and flagstaff.

Biltmore Shores, on the north side of South Oyster Bay, has a yacht basin connected with the State Boat Channel by a narrow winding channel. Buoys mark the connecting channel from the vicinity 0.5 mile westward of Squaw Island to the point of land 1.2 miles northward of Squaw Island. From this point to Biltmore Shores the channel lies close to the shore. The connecting channel is good for 4 feet (1.2 m.).

A newly dredged channel with a controlling depth of 9 feet (2.7 m.) leads from the yacht basin southward and then westward to the vicinity of the entrance of Seaford Creek where it joins a channel leading to the State Boat Channel.

South Oyster Bay, lying between Great South Bay and the broken body of water known as Hempstead Bay, is shoal over its greater part. A channel marked by stakes, and good for a draft of about 4 feet (1.2 m.) at high water, extends through the bay. The through traffic uses the State Boat Channel and connecting lanes, on the south side of the bay.

Hempstead Bay (chart 579) is the name applied to the numerous sloughs which lie inside the beach from the west end of Great South Bay to Far Rockaway. The sloughs of Hempstead Bay are subject to large changes in the vicinity of the inlets and where dredging is done to reclaim land.

Jones Inlet* was reported by the United States Coast Guard to have a controlling depth of 10 feet (3.0 m.) in November 1939 in

*Lat. 40°35′, Long. 73°34′: Charts 579, 1215

buoyed channel, but this is subject to frequent extensive changes. The inlet is characterized by very strong currents and shoal sand bars lying off the entrance.

It is used by boats which go eastward by the inside route to Great South Bay and northward through Long Creek and a dredged channel to Millburn and Freeport. A lighted buoy and a bell buoy are located in about 6 fathoms (11 m.) of water off the entrance. Channel buoys mark the best water over the bar and into the entrance, but due to frequent changes in location they are not charted. These buoys sometimes tow under with the strong current. Strangers should employ local fishermen or a man from the Coast Guard station to act as pilot.

A wreck, consisting of large pieces of iron, bares ½ foot (0.2 m.) at low water, lies about 1 mile westward of Jones Inlet on the inshore edge of the outer bar. It is usually marked by a small spherical buoy.

This inlet is the principal entrance from the sea to **Freeport, Millburn, Parsonage Cove, High Hill Beach, Short Beach Coast Guard Station, Merrick, Seaford, Bellmore, Wantagh,** and **South Oyster Bay.**

Freeport and **Millburn** are towns on the north shore of Baldwin Bay. There are many small marine railways here, the largest being capable of hauling out vessels up to 100 feet in length and 6-foot (1.8-m.) draft. Gasoline and supplies of all kinds can be obtained.

Anchorage Regulations have been prescribed for **Randall Bay,** the northeast arm of Baldwin Bay, at Freeport and are as follows:

No vessel shall anchor north of an east-and-west line located 400 feet south of the bulkhead in front of the Casino at the north end of the bay, nor within 90 feet of the line of mean low water in any part of the bay south of the line above mentioned.

A copy of these regulations may be obtained at the office of the United States Army Engineers at New York City.

A depth of 6 feet (1.8 m.) can be carried at high water to Freeport through **Long Creek.** There is a depth of 6 feet (1.8 m.) in the dredged slip on the east side of **Baldwin Bay. Millburn Creek,** leading to Baldwin from the northwest side of Baldwin Bay, is dredged to a depth of 6 feet (1.8 m.). These channels are marked by barrel buoys, maintained locally, during the summer.

A channel leading along the north side of **Middle Bay** from Baldwin Bay to **Parsonage Cove** was dredged to a depth of 8½ feet (2.6 m.) in 1939.

East Rockaway can be reached by small craft of 5-foot (1.5 m.) draft at high water through **Broad Channel** and **East Rockaway Channel.** These channels are marked by buoys, maintained locally, during the summer. Gasoline and other supplies can be obtained here and there is a marine railway for small vessels.

Jones Beach is a State park and is under the jurisdiction of the Long Island State Park Commission, with headquarters at Babylon. The high brown tower at the beach is a very prominent feature. About 0.5 mile northeastward of the tower is **Zachs Bay,** a dredged basin with depths of 6 to 37 feet (1.8 to 11.2 m.) with access to the State Boat Channel. The west end is reserved for bathing and water craft are prohibited by law from entering.

Reynolds Channel extends westward from Jones Inlet to East Rockaway Inlet and is the main thoroughfare of the Inland Waterway between the inlets. It is crossed by three drawbridges and a fixed span bridge. The fixed span bridge, about 0.9 mile westward from **Point Lookout** has a horizontal clearance of 29 feet and a vertical clearance of 20.9 feet (6.4 m.). A bascule highway bridge and an end pier swing railroad bridge crosses the channel on the south side of **Island Park.** The former has a horizontal clearance of 100 feet and a vertical clearance of 7.8 feet (2.4 m.). The latter has a horizontal clearance of 41 feet and practically no vertical clearance, it being only 3½ feet (1.1 m.). A bascule highway bridge crosses the channel from the vicinity of Bannister Creek to Atlantic Beach; it has a horizontal clearance of 100 feet and a vertical clearance of 7.8 feet (2.4 m.). All vertical clearances are referred to mean high water with the bridge in a closed position.

For whistle signals for the opening of the drawbridges see page —.

Strong **currents** exist in the western portion of Reynolds Channel and caution must be exercised when approaching the drawbridges, particularly with a fair current, to give the signal for opening the draw sufficiently in advance to allow the bridge to be cleared of traffic and the draw opened before arrival at the bridge. The channel is marked by buoys throughout the year. Lighted buoys are maintained from May 1 to November 1.

The approach to **East Rockaway Inlet*** from seaward is marked by a lighted buoy and a bell buoy lying about 0.6 mile and 0.3 mile, respectively, southwestward from the south end of the east jetty. The south end of the jetty is marked by a light on a red skeleton steel tower and a gong buoy. Due to frequent changes of the entrance channel the buoys marking it are not charted. Strangers should not enter before obtaining the latest information regarding the existing conditions. In November 1939 the controlling depth was about 11 feet (3.3 m.).

This inlet is the principal entrance from the sea to the southeast part of **Far Rockaway, Atlantic Beach, Lawrence, Long Beach, Bay Park, Oceanside, East Rockaway, Island Park, and Lido Beach.**

Atlantic Beach is a new development on the neck of land on the east side of East Rockaway Inlet. The Nautilus Beach Club, a brown structure, with a cylindrical tower atop, is a very prominent feature and is visible from a considerable distance offshore. Westward of the highway bridge there are facilities for mooring; gasoline, diesel oil, fresh water, and other supplies can be obtained.

Measured mile.—Markers for a measured statute mile (5,280 feet) course, established by the New York Sun, are located in Reynolds Channel, about a mile east of the Atlantic Beach Bridge; from the Lawrence Beach Club property to the city of Long Beach bathing beach at the foot of Minnesota Avenue. The course (eastward) is 95° true.

Long Beach is an important settlement and seaside resort on the outer beach east of East Rockaway Inlet.

Bannister Creek, about 1 mile eastward of East Rockaway Inlet, has depths of about 4 feet (1.2 m.) on the bar at the entrance. A

*Lat. 40°35′.5, Long. 73°45′.7: Charts 542, 579, 1215.

channel with depths of about 6 feet (1.8 m.) leads to the yacht basin. There is a small boat yard with a marine railway capable of hauling out small craft up to lengths of 45 feet and a draft of 4 feet (1.2 m.). There are facilities for boat storage and gasoline, lubricants, fresh water, and diesel oil can be obtained.

Lawrence is a settlement and resort on the mainland, at the entrance of East Rockaway Inlet, and has communication with Long Beach by private ferry.

Broad Channel, branching north from Reynolds Channel at Hicks Beach, has a least depth of 4 feet (1.2 m.), and is buoyed by local interests during the summer.

Woodsburg Channel (the first opening to the westward after entering Broad Channel) has a depth of 4 feet (1.2 m.) to Hewlett on the north shore of **Brosewere Bay** and to **Woodmere** on **Woodmere Channel.** The channel is buoyed, by local interests, to Brosewere Bay during the summer.

Nums Creek branches out of Broad Channel northwest of Cedar Island. It has a depth of 4 feet (1.2 m.) to the north side of **Hewlett Bay,** where it has two branches, one of which is **Macy Channel,** which gives access to **Hewlett** and **Hewlett Point.** Macy Channel has been dredged to over 9 feet (2.7 m.). The other channel which branches out of Nums Creek runs along the north shore of Hewlett Bay and has a depth of 6 feet (1.8 m.) at low water to **Bay Park,** where a dredged canal, bulkheaded on both sides and the inshore end, extends 0.4 mile inland, with a depth of about 6 feet (1.8 m.) at low water. A footbridge near the south end of the canal has a clearance of 12 feet (3.7 m.) at high water.

East Rockaway Channel, which is another branch of Broad Channel, has a depth of 4 feet (1.2 m.) at low water. Boats of this draft have access to **Oceanside** and **East Rockaway** through this channel, which is buoyed by local interests during the summer.

Hog Island Channel, with a controlling depth of about 9 feet (2.7), extends along the northwest side of Island Park (formerly **Barnum Island**) and branches near the north end of **Simmons Hassock** to join Reynolds Channel near the southwest end of Island Park. Eastward of **East Meadow Island** an unmarked channel continues northward with a controlling depth of 5 feet (1.5 m.) where it joins East Rockaway Channel.

Tides.—At the north entrance to Shinnecock Canal, in Great Peconic Bay, the tide has a mean range of about 2½ feet; in Shinnecock Bay and Moriches Bay, too small to be of any practical importance; Bellport Bay and Great South Bay as far west as Amityville, except at the inlets, about ¾ foot; Fire Island Inlet, on bar, about 3½ feet; in the inlet near **Democrat Point** about 2½ feet; in Hempstead Bay, at the inlets, about 4 feet, diminishing toward points in the bay remote from the inlets.

High water at Babylon is about 3¾ hours, at Bellport 4½ hours, after high water on the bar at Fire Island Inlet, or 3 and 4 hours, respectively, after high water at Sandy Hook.

Currents.—The currents have considerable velocity in the vicinity of the inlets, in the sloughs in Hempstead Bay, and in Shinnecock Canal; elsewhere they are generally weak.

The tidal currents in Great South Bay are reported to meet in the vicinity of Strongs Point, about 4 miles westward of Babylon.

Between Jones and East Rockaway Inlets the currents meet at the east entrance of the canal leading west from Cinder Creek.

Winds affect the water level to a marked degree, and may amount to as much as 2 feet above or below the normal in some localities. In Moriches Bay storm tides of 3 feet are reported. Easterly winds decrease the depth in Shinnecock Bay and increase it in Moriches Bay.

Ice.—These waters are sometimes closed to navigation by ice during January and February, and at times from December to March.

Supplies and gasoline can be obtained at all of the towns and at many of the smaller places, as mentioned in the description preceding or the directions following.

Repairs.—There are marine railways for small craft at Patchogue, Sayville, Bayshore, Babylon, Amityville, Freeport, and East Rockaway. There are small machine shops or garages at many places, in addition to the towns, where repairs to gas engines can be made.

Communication.—The Long Island Railroad affords communication to all of the towns on the north side of Shinnecock, Moriches, Great South, and Hempstead Bays, and to Long Beach, Far Rockaway, and Rockaway Beach. There are telegraph and telephone facilities at these places.

DIRECTIONS, INSIDE ROUTE, SOUTH COAST OF LONG ISLAND, EAST ROCKAWAY INLET TO GREAT PECONIC BAY

The route leads through Hempstead, South Oyster, Great South, Moriches, Quantuck, and Shinnecock Bays and the natural channels and dredged canals connecting them and then through Shinnecock Canal.

The main and secondary recommended routes through these waters are indicated on charts 578 and 579 by full and by dashed red lines, respectively, and are marked by beacons, buoys, and lights. Additional beacons and lights are maintained during the summer by the State of New York and by local interests.

The entrance channel in the various inlets; namely, East Rockaway, Jones, Fire Island, Moriches, and Shinnecock are subject to considerable and frequent changes and should not be entered before obtaining the latest information for the present existing conditions. The buoys for these channels do not appear on the chart, but are shifted as required to indicate the best available water in the inlets.

In Hempstead Bay several channels branch out from the main east-west channel, and lead to the principal towns. These channels are marked during the summer with red or black barrels and stakes, maintained locally.

Between Hempstead Bay and Great South Bay the main route follows the State Boat Channel, which has been constructed by the Long Island State Park Commission. (See State Boat Channel, p. 308.) It leads from the vicinity of Jones Inlet eastward by various dredged natural channels, and dredged cuts to Great South Bay in the vicinity of **Captree Island*** near Fire Island Inlet.

From Fire Island Inlet to Patchogue Bay there are Government-maintained lights and buoys marking several channels leading to the deeper water.

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*Lat. 40°39′, Long. 73°16′ : Charts 578, 1215.

The underwater extensions of many of the points on the north shore are composed of gravel, and such localities should be approached with caution.

During heavy weather there is a short, choppy sea in Great South Bay which is uncomfortable to small craft, and even dangerous to open boats.

Masted boats are limited to a height of less than 20 feet (6 m.) above the water by the fixed bridges over Shinnecock Canal.

East Rockaway Inlet to Jones Inlet.—From the lighted buoy at the entrance to East Rockaway Inlet, head for and follow the mid-channel buoys. (The latter are not charted, as they are changed frequently due to the shifting bar.) From the last channel buoy favor the north shore, to avoid the shoal off the point, until about 0.3 mile west of the Long Beach Coast Guard Station, then head for the center of the drawbridge, which extends from the mouth of Bannister Creek to Atlantic Beach. The whistle for the draw is three long blasts.

Strong **currents** exist in this vicinity and caution is necessary. (See cautionary note under Reynolds Channel regarding giving signal for opening of drawbridges, p. 316.

The channel then favors the south shore to the two drawbridges at Wreck Lead. The signal for the west or railroad bridge is 3 long blasts and for the east bridge (highway) 3 long and 1 short blast. (At night this bridge is marked by a red light at each center pier and by two red lights in the center of the opening.)

(For bridge clearances see bridges, Reynolds Channel, p. 316.)

Eastward of the bridges the channel trends gradually to about 75 yards off the south side of **East Channel Island** and passes through a dredged cut near the southern part of **Ingraham Hassock.** Follow the south bank of Reynolds Channel, being guided by the navigational aids to the east end of **Middle Island.**

After passing about 500 yards eastward of the east end of Middle Island turn sharply northward passing between **Long Meadow Island** and **Alder Island,** the latter being marked by the **Long Beach Loop Causeway,** and follow the trend of the shore of Alder Island (also the general trend of the causeway) until northward of the north end of Meadow Island. Caution is necessary to avoid the shoal extending northward off this point. After rounding the point pass under the fixed span and follow the east shore of Meadow Island southward to the main channel at Jones Beach. The horizontal clearance of the fixed span is 29 feet and the vertical clearance 20 feet (6.1 m.) at mean high water. There are alternate routes on the south and east sides of Alder Island and south of Meadow Island which can be used by shallow draft boats. Local information should be obtained before any attempt is made to use them.

Jones Inlet to Great South Bay.—From the lighted and bell buoys at the entrance to Jones Inlet, head for and follow the mid-channel buoys. The latter are not charted, as they are changed frequently due to the shifting bar.

See general remarks at the beginning of these directions, page 318, and detailed information of Jones Inlet, page 314.)

In 1939 the entrance channel at Jones Inlet favored the shore of Point Lookout. The controlling depth was 10 feet (3.0 m.). The markers in the State Boat Channel northward and eastward of Tobay

Beach, between Jones Inlet and Fire Island Inlet, are piles painted black with caps painted white with aluminum arrows pointing to deep water.

When proceeding to Great South Bay enter the State Boat Channel and follow the general trend of the shore along the north side of **Jones Beach State Park** after passing through the drawbridge of the Meadowbrook Causeway (see p. 309 for clearances) until eastward of **Snipe Island.** Pass eastward of Snipe Island on a northerly course and pass through the drawbridge at the north end of **Green Island.** (See p. 309 for clearances.) The channel trends east-northeastward for a distance of about 400 yards eastward of the drawbridge and then turns sharply southward, continuing along the east side of Green Island, and thence southeastward to the entrance of the dredged cut in the vicinity of the east entrance to Zachs Bay.

A fixed bridge connects Green Island with Tobay Beach and has a horizontal clearance of 29 feet and a vertical clearance of 14 feet (4.3 m.) at mean high water. Vessels that can clear this bridge may use this route.

Great South Bay to Moriches Bay.—(For Fire Island Inlet channels into Great South Bay see p. 308.) From the east entrance to Zachs Bay continue through the dredged cut in a general east-northeasterly direction for a distance of about 10 miles to the northeast end of **Oak Island** near Fire Island Inlet. At this point the channel divides. One channel continues eastward through Captree Island to joint the main channel leading eastward from Fire Island Inlet in the vicinity of about 0.5 mile southeast of the end of the State Boat Channel. The other branch leads northwestward from Oak Island for a distance of about 1.3 miles, where depths of 6 to 9 feet (1.8 to 2.7 m.) can be followed eastward along the north side of Great South Bay.

When southeastward of **Conklin Point** steer northeastward for about 1.5 miles and cross **Great Cove** on easterly courses and pass 0.5 mile southward of **Nicoll Point.**

Entering the main channel leading from Fire Island Inlet, follow the buoyed channel, passing southward of **Farm Shoals, West Fire Island,** and **East Fire Island** to the vicinity of Ocean Beach and enter East Channel. East Channel is well marked and trends in a northerly and then northeasterly direction and joins the above-mentioned channel following the north side of Great South Bay about 1.5 miles eastward of Nicoll Point.

From a position 1.1 miles south of **Green Point*** and 2 miles east of Nicoll Point, steer 70° true and pass 0.7 mile south of Blue Point.

An oyster reef, with depth less than 6 feet (1.8 m.) and which shoals abruptly extends about 0.5 mile off **Blue Point,** and is marked at its south end by a lighted buoy, maintained from April 1 to December 1. Pass southward of this buoy.

Between Blue Point and **Tuthill Point** in Moriches Bay the channel is marked.

Moriches Bay to Great Peconic Bay.—Starting at **Speonk Point** (low and grassy near the eastern end of Moriches Bay), the channel

*Lat. 40°43′.1, Long. 73°06′.3: Charts 578, 1214.

from there to the entrance to Shinnecock Canal in Shinnecock Bay is also marked.

The following are the bridges between Moriches Bay and Great Peconic Bay: Two drawbridges across Quantuck Canal, two drawbridges across Quogue Canal, a drawbridge across Shinnecock Bay at Ponquogue Point, and two fixed bridges across Shinnecock Canal. The signal for the bridges is three long blasts. For clearances of the bridges see detailed description under the above headings.

After passing the bridges in Shinnecock Canal, keep in mid-channel and pass through the tide lock. Favor the eastern bank of the dredged cut and pass midway between the jetties, and continue on this course out to deep water in Great Peconic Bay.

JAMAICA BAY

(CHART 542)

Rockaway Inlet, the entrance of Jamaica Bay, lies between Rockaway Beach on the east and south, and **Plumb** and **Barren Islands** on the north. The inlet is obstructed by a shifting bar.

The **Entrance Channel** extends southwestward from Rockaway Point to westward of the jetty and is marked by buoys, some of which are lighted. Near the outer end the jetty is marked by a light on a red skeleton steel tower about 30 feet (9.1 m.) high. A bell buoy marks the extreme south end.

The seaward approach to the entrance channel is marked by a lighted gong buoy about 0.7 mile southward from the jetty and a gong buoy about 500 yards southwestward of the south end of the jetty.

A shoal with depths of 9 to 17 feet (2.7 to 5.2 m.) extends in a general north-northwest direction from about 700 yards west of the jetty light.

In 1938 the controlling depth at mean low water was 20 feet (6.1 m.) for a width of 600 to 1,800 feet from the entrance to Barren Island, thence 29 feet (8.8 m.) for a width varying from 400 to 1,000 feet to Canarsie.

Dredging operations were in progress in 1939 on a channel leading through the north part of Jamaica Bay from the vicinity of Canarsie to the north end of Pumpkin Patch Channel. The controlling depth in this dredged channel was about 14 feet (4.3 m.) in 1939.

Tides.—The mean rise and fall of the tide at Rockaway Inlet is about 5 feet.

Currents.—At a point in the entrance channel northwest of Rockaway Point the flood strength sets eastward and the ebb strength southwestward with an average velocity of about 2¼ knots. The ebb strength has a higher velocity than the flood and it has been locally reported to be as much as 3½ knots.

Currents in midchannel south of Barren Island set along the channel with a maximum velocity under normal conditions of about 2 knots.

Currents in midchannel off the southeast point of Barren Island set along the channel with a maximum velocity under normal conditions of about 1½ knots.

Jamaica Bay is formed by numerous marshy islands and shoals with narrow channels between. The shoals and channels, especially

those nearest Rockaway Inlet, are subject to change, and the shoaling is generally abrupt on the sides of the channel.

The **Marine Parkway Bridge** crosses the inlet at the entrance to Jamaica Bay with a vertical lift span near the center. The main fixed spans have a horizontal clearance of over 500 feet and a vertical clearance of 50 feet (15.2 m.) at mean high water. The lift span has a vertical clearance of 55 feet (16.8 m.) when in a lowered position and 152 feet (46.4 m.) when in a raised position. A fog signal (electric siren) is situated near the center of the bridge.

The main channels are well marked and with the chart as a guide, vessels should have no trouble in proceeding through Beach Channel, Big Fishkill Channel, or Island Channel. Other channels require local knowledge.

Island Channel from south of the southeast point of Barren Island to Canarsie has been dredged to an effective depth of 29 feet (8.8 m.). The channel is marked by lighted and unlighted buoys and may be navigated at night.

The dredging projects in the immediate vicinity of Canarsie have resulted in the formation of two anchorages, one east and one west of the reinforced concrete pier at Canarsie. The pier is about 380 feet along its southeast side and about 580 feet along its southwest and northeast sides. A maximum current of about ½ knot under normal conditions sets along the southeast side of the pier.

Floyd Bennett Airport is situated on **Barren Island** on the west side of Island Channel. The United States Coast Guard maintains an air base here.

Mill Basin,* northward of Barren Island, on the west side of Jamaica Bay, has been improved by dredging a channel 18 feet (5.5 m.) deep from the main channel to the wharves on the northwest side of Mill Basin.

A double leaf bascule bridge of the **Belt Parkway** was under construction in 1939 and crosses the west end of the approach channel. When completed it will have a horizontal clearance of about 131 feet and a vertical clearance of about 35 feet (10.7 m.) above mean high water when the bridge is closed.

The basin is extensively developed and is used mostly by tankers with drafts up to 17 feet (5.2 m.) which go to an oil terminal and refinery near the north end of the basin.

There are several boat yards on **East Mill Basin** with marine railways, the largest of which has a capacity of about 150 tons and can haul out vessels up to a length of 90 feet and a draft of 14 feet (4.3 m.). All major repairs can be obtained and boat storage is available.

There are several yacht clubs located here.

Bergen Beach is a summer resort lying 1 mile southwestward of Canarsie. It has communication by electric road, and gasoline can be obtained.

Canarsie, a town and summer resort on the northwest shore of the bay, is a part of New York City, with which it has communication by electric roads.

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*Lat. 40°38'.2, Long. 73°54'.5: Charts 542–1215.

Paerdegat Basin, between Bergen Beach and Canarsie, has been formed by dredging out Bedford Creek. The channel was 16 feet (4.9 m.) deep and 300 feet wide in 1939.

Branching east of Island Channel, **Big Fishkill Channel** and **Pumpkin Patch Channel** have an effective depth of 6 feet (1.8 m.) which may be carried to the east end of the dredged channel extending eastward from Canarsie. A channel also leads through the drawbridge to **Shellbank Basin** at **Howard Beach.**

A bascule drawbridge crosses the entrance to Shellbank Basin which has a horizontal clearance of 40 feet and a vertical clearance of 10 feet (3.0 m.) above mean high water when the bridge is closed. See page —, for regulations governing the operation of this bridge. There is a small boat yard with a marine railway in Shellbank Basin.

Beach Channel, on the north side of Rockaway Beach, has a least depth of 17 feet (5.2 m.) from the entrance channel to the highway bridge, and 11 feet (3.4 m.) to the wharves near the railroad bridge. The channel is well marked by buoys.

Grassy Bay.—A dredged cut 20 to 40 feet wide and with an effective depth of 6 feet (1.8 m.) now connects with deep water of Grassy Bay shown on chart 542 with an anchorage at the mouth of Bergen Creek. A west branch of this dredged cut with 5½ feet (1.7 m.) leads to an anchorage east of the railroad trestle at the mouth of the canals at **Hamilton Beach.**

Hawtree Creek is used by local small boats as a mooring and anchorage basin. A bascule drawbridge crosses the entrance. The horizontal clearance of the opening is 40 feet and the vertical clearance is 10 feet (3.0 m.) at mean high water when the bridge is closed. See page 324, for regulations governing the operation of this bridge.

Rockaway Beach is a popular summer resort on the beach forming the south side of Jamaica Bay. It has communication with New York by busses, electric trains, and excursion steamers. Coal, gasoline, provisions, and some boat supplies can be obtained here, and there is a marine railway capable of hauling out vessels up to 110 feet in length and a draft of 8 feet (2.4 m.) aft and 5 feet (1.5 m.) forward.

There is a large oil terminal at **Inwood*** on the east side of **Head of Bay.** Tow boats and barges having a draft of 9½ feet (2.9 m.) are taken to the terminal wharves at high water. Local information is necessary for any draft over 5 feet (1.5 m.).

Currents.—The highway fill across Jamaica Bay has caused very strong currents in the vicinity of the bridge openings and vessels should proceed with caution. At Beach Channel Highway Bridge the currents have an average velocity at strength of about 2 knots under normal conditions. Swirls and eddies were noted on both sides of the bridge.

Bridges.—The bascule highway bridges of the Jamaica Bay Boulevard have the following clearances: At North Channel, the horizontal clearance is 102 feet and the vertical clearance is 26 feet (7.9 m.) at mean high water when the bridge is closed. At Beach Channel, the horizontal clearance is 100 feet and the vertical clearance is 21.5 feet (6.6 m.) at mean high water when the bridge is closed. The

*Lat. 40°37′, Long. 73°45′: Charts 542, 579, 1215.

railroad bridge crossing Broad Channel and Beach Channel have center-pier openings 50 feet wide and a vertical clearance of 3 feet (0.9 m.) at mean high water when the bridge is closed. Bridges across Shellbank Basin and Hawtree Creek are described under their respective headings.

Bridge Regulations.—The more important of the bridge regulations for this locality are given in the following text. Complete copies of the regulations for each bridge are posted on both the upstream and downstream side of each of the bridges.

The following bridge regulations apply to the bridges crossing Jamaica Bay: Beach Channel, Broad Channel, North Channel Bridge at Jamaica Bay Boulevard; Hawtree Basin Bridge and Shellbank Basin Bridge at Nolins Avenue, Howard Beach.

(*a*) On Sundays, holidays and during the night hours between 6:00 p. m. and 6:00 a. m., the draw shall not be required to open to vessels: *Provided*, That the draw shall be opened promptly at all times to vessels owned, controlled, or employed by the United States Government or by the departments of the city of New York when operators are present, and when operators are not required to be present the draw shall be opened, for such vessels, with the least possible delay upon receipt of verbal or written notice.

(*b*) Whenever vessels unable to pass under the closed bridge, other than those enumerated in paragraph (*a*), desire to pass through the draw, on Sundays, holidays, or during the night hours between 6:00 p. m. and 6:00 a. m., at least 24 hours' advance notice of the time the opening is required shall be given, by telephone or otherwise, to the authorized representative of the owner or agency controlling the bridge.

(*c*) *Signals.*—Call signals for opening of draw:

Sound signal: United States Government or departments of city of New York vessels: Four distinct blasts of a whistle, horn, or megaphone, or four loud and distinct strokes of a bell.

For all other vessels: Three distinct blasts of a whistle, horn, or megaphone, or three loud and distinct strokes of a bell sounded within a reasonable hearing distance of the bridge.

Visual signal: To be used in conjunction with sound signals when conditions are such that sound signals may not be heard.

A white flag by day, a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

Acknowledging signals:

By bridge operator—Sound signals: Draw to be opened immediately: Same as call signal.

Draw cannot be opened immediately, or if open must be closed immediately: Two long distinct blasts of a whistle, horn, or megaphone or by two loud and distinct strokes of a bell, to be repeated at regular intervals until acknowledged by the vessel.

Visual signals: Draw to be opened immediately: A white flag by day or a green light at night swung up and down vertically a number of times in full sight of the vessel.

Draw cannot be opened immediately, or if open must be closed immediately: A red flag by day, a red light by night swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

By the vessel: Vessels or other water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or if open must be closed immediately, will acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day or a red light by night.

(*d*) When two or more vessels are approaching to pass the drawbridge from opposite directions, the person in charge of each vessel shall signal for the opening of the draw as prescribed herein. The vessel running with the current shall have the right of way. At slack tide the vessel running in ebb current direction shall have the right of way. The bridge operator shall reply as hereinbefore prescribed. (See paragraph (*e*).)

(*e*) When vessels are approaching the bridge span or draw from the same direction each vessel shall signal independently for the opening of the draw and

shall be navigated in accordance with the pilot rules applicable to the waterway governing such vessels.

Broad Channel, Jamaica Bay, N. Y.; bridge of Long Island Railroad.

(*a*) The draw shall be opened promptly upon signal for the passage of all vessels unable to pass under the closed bridge, at any hour of the day or night except during the periods from 7 a. m. to 9 a. m. and from 5 p. m. to 7 p. m.

(*b*) Whenever a vessel unable to pass under the closed bridge approaches it the signal of a desire for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel. This signal shall be repeated at intervals until it is answered from the bridge. Upon receiving the signal from the vessel, the tender or operator of the bridge, in case the draw can be opened immediately, shall reply by three blasts of a whistle or horn. In case of accident to the machinery or other contingency necessitating delay in opening the draw, the signal from the vessel shall be answered by the tender or operator of the bridge by two blasts of a whistle or horn.

Beach Channel, Jamaica Bay, N. Y., bridge (highway) at Jamaica Bay Boulevard.

(*a*) On Sundays and holidays from May 15 to September 15, inclusive, each year, the draw shall not be required to open to vessels between the hours of 12 noon and 9 p. m.: *Provided,* That during the period from 2 hours before to 1 hour after the time of predicted high tide for the locality, the bridge shall be opened promptly upon proper signal for the passage of vessels unable to pass under the bridge: *Provided further,* That the draw shall be opened promptly at all times to vessels owned, controlled, or employed by the United States Government or by the departments of the city of New York.

(*b*) For the purpose of these regulations, high tide shall be deemed to occur 35 minutes later than the time of high tide for Sandy Hook as given in the tide tables for the United States, published by the United States Department of Commerce, United States Coast and Geodetic Survey.

(*c*) *Signals.*—Call signals for opening of draw.

Sound signal: United States Government or departments of city of New York vessels: Four distinct blasts of a whistle, horn, or megaphone, or four loud and distinct strokes of a bell.

For all other vessels: Three distinct blasts of a whistle, horn, or megaphone, or three loud and distinct strokes of a bell sounded within a reasonable hearing distance of the bridge.

Visual signal: To be used in conjunction with sound signals when conditions are such that sound signals may not be heard.

A white flag by day, a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

Acknowledging signals:

By bridge operator—Sound signals: Draw to be opened immediately: Same as call signals.

Draw cannot be opened immediately, or if open must be closed immediately: Two long distinct blasts of a whistle, horn, or megaphone, or by two loud and distinct strokes of a bell, to be repeated at regular intervals until acknowledged by the vessel.

Visual signals: Draw to be opened immediately: A white flag by day or a green light at night swung up and down vertically a number of times in full sight of the vessel.

Draw cannot be opened immediately or if open must be closed immediately: A red flag by day, a red light by night swung to and fro horizontally in full sight of the vessel, to be repeated until acknowledged by the vessel.

By the vessel: Vessels or other water craft having signaled for the opening of the draw and having received a signal that the draw cannot be opened immediately, or if open must be closed immediately, will acknowledge said signal by one long blast followed by a short blast, or by swinging to and fro horizontally a red flag by day or a red light by night.

Tides.—The mean rise and fall of tides is about 5 feet.

Ice closes navigation during January and February in severe winters.

Cables.—Cable areas in the vicinity of Rockaway Inlet are shown on chart 542.

Sheepshead Bay,* on the north side of the eastern end of Coney Island, is frequented by numerous small craft and launches. An entrance channel 29 feet (8.8 m.) deep has been dredged around the eastern point of Manhattan Beach and into the bay.

In 1939 the controlling depth in the approach channel was about 16 feet (4.9 m.) at mean low water. Shoal areas extending into the bay from the north shore are marked by buoys.

There is a small, unmarked shoal with a depth of 6 feet (1.8 m.) over it extending northward into the channel from the south side of the entrance. This shoal can be passed by craft of much greater draft with local information. An outfall sewer extends southward along the east side of the approach channel and is marked by buoys, some of which are lighted.

There is also a light on the southeast point of filled ground at Manhattan Beach. Anchorage regulations are given in those for the port of New York. Obtain from United States engineer and see large-scale charts. Gasoline and small-boat supplies of all kinds can be obtained here, and there is a marine railway for small craft which can haul out boats up to lengths of 65 feet and a draft of 5½ feet (1.7 m.).

There is communication with New York by electric train and with Rockaway Point by ferry.

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* Lat. 40°35′, Long. 73°56′: Charts 542, 369, 1215.

Chapter 14.—APPROACHES TO NEW YORK

EAST RIVER

(CHARTS 223, 226, AND 369)

East River is the name given to the tidal strait about 14 miles long and 600 to 4,000 feet wide, connecting Hudson River and the Upper Bay at the Battery, New York City, with Long Island Sound at Throgs Neck, New York City, and separating Long Island from the mainland. The stretch between Blackwells (Welfare) Island and Negro Point is known as Hell Gate. The Harlem River joins the East River at Wards Island in Hell Gate; and is also connected by Little Hell Gate between Wards and Randalls Islands. From the Battery to Port Morris, a distance of about 10 miles, both shores are occupied by wharves, practically continuous, except where shoals or currents prevent access.

Depths.—The project for the improvement of East River provides for channels of the following dimensions: From deep water in the upper New York Bay to the Brooklyn Navy Yard, 40 feet (12.2 m.) deep and 1,000 feet wide; thence to Throgs Neck, 35 feet (10.7 m.) deep with widths varying from about 550 feet to 1,000 feet, according to locality; east of Blackwells Island up to English Place, Long Island City, 30 feet (9.1 m.) deep and varying in width from 500 feet to 900 feet, with widening in the approach from the main channel; between South Brother Island and Lawrence Point, 20 feet (6.1 m.) deep and 300 feet wide, with widening in the approach from the main channel; and also the removal of many rocks and reefs to varying depths.

In June 1939 it was reported by the United States Army Engineers that the controlling mean low-water depth in the East River was 40 feet (12.2 m.) for the full channel width from deep water in the Upper Bay to the Brooklyn Navy Yard, except for a small section opposite the Battery where the width is limited to 400 feet and at Corlears Reef where it is limited to 900 feet. From the Navy Yard through the West Channel at Blackwells Island and Hell Gate to Throgs Neck at Long Island Sound, the controlling mean low-water depth is 35 feet (10.7 m.) for widths varying from 550 to 1,000 feet. In the section of the East Channel at Blackwells Island included in the existing project it is 28 feet (8.5 m.) from off Newton Creek to English Place (Forty-third Drive), Long Island City, and continuing through the natural channel of navigable width to deep water off the north end of Blackwells Island it is 24 feet (7.3 m.). The controlling depth in the channel between South Brother Island and Lawrence Point is 20 feet (6.1 m.) for a width of 300 feet.

Caution.—Dredging and blasting operations are continuously in progress removing the rocks and reefs in East River to the project depths. Mariners are requested to use all precautions against foul-

ing the plants on this work. Buoys are usually placed to mark the areas of blasted rock, and their locations and descriptions are published in the weekly Notices to Mariners. Regulations for the navigation of East River in the vicinity of improvement operations are prescribed by the Secretary of War and copies of these regulations can be obtained from the Army Engineers, 39 Whitehall Street, New York City.

Pilotage is compulsory for foreign vessels and vessels under register navigating the channel of **Hell Gate** which shall be spoken. A number of the Hell Gate pilots have their headquarters at City Island. Pilots come off in small boats from Sands Point, City Island, and the Battery in response to signal.

For rates of pilotage and other information see publications, "Port and Terminal Charges at United States Ports," or "The Port of New York," Port Series No. 20, Part I, which are prepared by the Corps of Engineers, United States Army. (See Publications, p. 25.)

Towboats will be found in the vicinity of City Island and in East River. Vessels intending to take a towboat should do so before going westward of Rikers Island.

Reporting Station.—Vessels are reported at the Maritime Exchange, New York City, from City Island.

Anchorages in East River.—For the defined limits of the anchorages see large-scale charts.

Currents.—See Currents, Long Island Sound, page 193.

Storm warnings are displayed at Throgs Neck and Whitehall Building (New York).

Bridges.—Seven bridges cross the river between the Battery and Throgs Neck. The minimum vertical clearances available at mean high water follow:

Bronx-Whitestone Bridge	135.0 feet (41.1 m.)
Hell Gate Bridge	134.5 feet (40.9 m.)
Triborough Bridge	138.3 feet (42.2 m.)
Queensboro Bridge, East span	133.5 feet (40.6 m.)
Queensboro Bridge, West span	131.5 feet (40.0 m.)
Williamsburg Bridge	135.6 feet (41.3 m.)
Manhattan Bridge	133.9 feet (40.8 m.)
Brooklyn Bridge	127.2 feet (38.7 m.)

Throgs Neck, on the north shore at the eastern entrance of East River, is marked by a lighthouse and a wharf at its south end. **Storm warnings** are displayed at Throgs Neck. A shoal extends 200 yards south-southeastward from Throgs Neck, and is marked by a bell buoy which should be given a berth of over 50 yards.

Excessive speed while passing this point endangers workmen on the docks. Regulations regarding excessive speed in restricted channels should be observed.

Throgs Neck Lighthouse* is a red skeleton tower, white tank house in base on southeast end of Throgs Neck. The fog signal is a bell.

Fort Schuyler, located at Throgs Neck, is now used as a base for a nautical school operated by the United States Maritime Commission. Vessels used for training purposes tie up at a large wharf on the southwest side of the Neck.

*Lat. 40°48'.3, Long. 73°47'.5 : Charts 223, 1213.

Hammond Flats, between Throgs Neck and Old Ferry Point, is an anchorage for all classes of vessels in 5 fathoms (9 m.) or more, with good holding ground. Toward Old Ferry Point the water deepens abruptly. There is a 17-foot (5.2 m.) spot about 0.6 mile east-northeastward of Old Ferry Point, about 600 yards from the north shore. The water shoals abruptly close inshore from 18 to 4 or 5 feet (5.5 to 1.2 or 1.5 m.).

Willets Point, on the south shore at the eastern entrance of **East River,** is marked by **Fort Totten,** the granite walls of which are prominent.

There is communication by electric road to New York City. There are two wharves on its west side. A channel with a depth of 13 feet (4 m.) has been dredged to the wharves.

Daily tidal predictions for **Willets Point** are given in the tide tables published annually by the Coast and Geodetic Survey.

Little Bay, westward of Willets Point, is used as an anchorage basin by local small craft. There are depths of 6 to 10 feet (1.8 to 3.0 m.) but the inshore areas were being filled in 1939 to provide for a new highway development of the Cross Island Parkway.

Beechhurst, a residential section on the west side of the bay, is extensively developed. The water front is occupied by private small boat landings.

Whitestone is a town on the south shore eastward of Whitestone Point. There is communication by bus to the railroad and to nearby towns. Coal, water, and other supplies can be obtained. The depths at the principal wharves range from about 16 to 24 feet (4.9 to 7.3 m.).

The water front is extensively developed and there are several boat yards with marine railways capable of hauling out small craft up to lengths of 65 feet and a draft of 5 feet (1.5 m.). Gasoline, oil. fresh water, and a limited amount of ship chandlery supplies are available.

Whitestone Point is a small wooded bluff marked by a light.

Whitestone Point Light is a black skeleton tower with a white tank house situated about 75 yards from shore. The fog signal is a bell.

Off Whitestone, good anchorage in 18 feet to 8 fathoms (5.5 to 15 m.) is found eastward of the point. There are no dangers, but the water shoals abruptly close inshore. An obstruction, with 26 feet (7.9 m.) over it, lies about 0.5 mile eastward of Whitestone Point Light. Avoid Whitestone Point, which makes off rocky northward to the light and is shoal on its western side.

The **Bronx-Whitestone Bridge,** which is of the suspension type, has recently been completed and furnishes a highway connection across East River between Old Ferry Point on the Bronx side to the vicinity of Whitestone Point on the Long Island side. The unobstructed clearance between piers is approximately 2,250 feet with a vertical clearance for full width of waterway of 126 feet (38.4 m.) at mean high water. The minimum clearance at mean high water for the 1,000-foot channel is 135 feet (41.2 m.). At night red lights are exhibited at the top of the towers.

Powell Cove, 0.7 mile westward of Whitestone Point, has general depths of 3 to 4 feet (0.9 to 1.2 m.) and less near the shore. A wharf, which is in ruins, makes off in a northwesterly direction from the

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eastern point at the entrance and it is marked off the end by a black buoy. There are rocks on the north side close to the piling.

Tallman Island is located on the west side of the entrance to Powell Cove. It is marked by prominent tanks of the city sewage disposal plant. Westward of the point there is a shipyard with a drydock which has a capacity of about 1,000 tons, a length of 240 feet, a width of 35 feet and a depth over the keel blocks of about 14 feet (4.3 m.). All major repairs can be obtained. Gasoline and fresh water are available.

Old Ferry Point is located on the north side of East River on the east side of the entrance to Westchester Creek.

It is marked by the approaches to the **Bronx-Whitestone Bridge.** Northeastward from Old Ferry Point is a shallow bight with depths ranging from 3 to 5 feet (0.9 to 1.5 m.) on the east side. There is a small boat yard with a marine railway capable of hauling out small craft up to lengths of 30 feet and a draft of 4 feet (1.2 m.). Repairs to both hull and motor can be obtained. There is a yacht club close southward of the boat yard. Many local small craft anchor off the yacht club landing.

Westchester Creek (chart 223) has its entrance in the shoal bight on the north side of East River, between Old Ferry and Clason Points. The project for the improvement of the creek provides for a channel 12 feet (3.7 m.) deep and 100 feet wide through the estuary; thence the same depth and 80 to 60 feet wide to East Tremont Avenue (Fort Schuyler Road) the head of navigation, a total distance of about 2.6 miles; and for two turning basins, one near the upper end of the channel and one near Unionport Bridge.

When examined in 1938, the controlling depth at mean low water from the entrance in East River was 12 feet (3.7 m.) for a width of 100 feet to a distance 0.4 mile upstream, except a small shoal adjacent to the channel line which had a least depth of 11½ feet (3.5 m.), thence 12 feet (3.7 m.) for a width of 80 feet to a distance of 1 mile upstream from the entrance, thence 12 feet (3.7 m.) for a width of 60 feet to East Tremont Avenue, except for scattered shoals with a least depth of 9.8 feet (3.0 m.) adjacent to the channel line in the vicinity of Waterbury Avenue. In the turning basin near East Tremont Avenue the controlling depth was 11 feet (3.4 m.) and in the turning basin near the Unionport Bridge it was 12 feet (3.7 m.).

The channel is buoyed from East River to the entrance of the narrow part of the creek. **Unionport Bridge** has a bascule span, 60 feet wide and with a vertical clearance of 14 feet (4.3 m.) at mean high water when closed. The mean rise and fall of tide is about 7 feet.

Unionport and **Westchester** have some commerce in building material, coal, and gasoline, carried in vessels of 6 to 12 feet (1.8 to 3.7 m.) draft. Small-boat supplies of all kinds can be obtained. An oil barge is anchored during the summer just east of the entrance channel to the creek, westward of Old Ferry Point, and gasoline and oil can be obtained.

Pugsley Creek joins Westchester Creek at **Castle Hill Point.**

From the point a crooked channel marked by stakes during the summer, leads up Pugsley Creek to the head of navigation, at a sewer crossing, about 0.3 mile above Castle Hill Point.

Strangers should not enter without local information.

Clason Point* is a large amusement resort. The city wharf, at the southeast end of the point eastward of the discontinued ferry slip, has a depth of about 12 feet (3.7 m.) at its end. The oil company's wharf extends out to a depth of about 20 feet (6 m.). Water, gasoline, oils, and motor boat supplies can be obtained. Many small boats anchor on the flats on the west side of the point.

There is a small boat yard on the south side of the point with a marine railway which can accommodate small craft up to lengths of 50 feet and a draft of 5 feet (1.5 m.). Minor repairs can be obtained although it is principally used for boat storage. Street car service is available with connections to New York.

Bronx River (charts 226 and 1213) has its entrance at the head of the shoal bight on the north side of East River between Clason Point and Hunts Point.

When examined in February to June 1937, the controlling mean low water depth was 10 feet (3.0 m.) from East River to a point 700 feet south of the Westchester Avenue Bridge: thence to the Westchester Avenue Bridge, decreasing from 9 to 5 feet (2.7 to 1.5 m.) just south of the bridge. When examined in May 1934, the controlling mean low water depth in the channel excavated under the previous project was 5 feet (1.5 m.) for a width of 50 to 30 feet from the Westchester Avenue Bridge to a point about 300 feet above the New York, New Haven & Hartford Railroad bridge; thence to about 500 feet below the dye works near the head of the projected improvement the depth gradually reduced to zero. Above this to the head of improvement the bottom is exposed at mean low water and rises to an extreme height of about 4.5 feet (1.4 m.) above mean low water just below the dam.

The river is crossed by five bridges as follows:

Bridges over Bronx River

Name or location	Type	Clearances		
		Horizontal	Vertical	
		Feet	*Feet*	*Meters*
Eastern Boulevard (Ludlow Avenue)	Bascule	70	27.5	8.4
Westchester Avenue (highway)	Bascule	60	17.2	5.2
Westchester Avenue (I. R. T.)	Fixed	60	61	18.6
Railroad bridge (600 feet above Westchester Avenue).	Bascule	69½	8.2	2.4
East One Hundred and Seventy-fourth Street	Fixed	(1)	30.8	9.4

[1] Channel unobstructed.

NOTE.—The vertical clearances are given for mean high water, and for the drawbridges when closed. There are no special regulations for the above bridges. The usual signal of 3 blasts of the whistle should be used.

Tides.—The mean rise and fall of tide is about 7 feet at the entrance and 6 feet at the head of navigation.

The principal items of commerce are building material, fuel oil, and coal, carried in vessels of 6 to 14 foot (1.8 to 4.3 m.) draft.

*Lat. 40°48'.3, Long. 73°51'.0: Charts 226, 1213.

Hunts Point is marked by a light and fog signal on a red skeleton day mark on a white tank house.

A dredged channel, marked by buoys, leads to the wharf of the Consolidated Gas Co. It had a controlling depth of 25 feet (7.6 m.) when examined in 1933. Local small craft anchor on the flats east of the channel in depths ranging from 9 to 17 feet (2.7 to 5.2 m.).

College Point Reef, with 6 feet (1.8 m.) over it, lies about 400 yards north-northeastward of the north end of College Point, and is marked by a black bell buoy, and a flashing light.

College Point * is a town on the south side of East River and east side of Flushing Bay, and has communication by electric road with Flushing and New York. The principal wharves at the west end of College Point have depths of about 8 to 10 feet (2.4 to 3 m.). The shoal bight on the northwest side of the town is used as an anchorage by motorboats; there is a boat yard for repairing hulls and motors on the south side of the bight; the largest marine railway is 60 feet long, draft 4 feet (1.2 m.) forward and 6 feet (1.8 m.) aft, and capacity 25 tons.

Tides.—The mean rise and fall of tide at College Point is 7 feet.

Flushing Bay (chart 226) lies southwestward of College Point and eastward of the La Guardia Airport. A dredged channel, which is buoyed, leads through the bay from the main channel northwest of College Point to the entrance of Flushing Creek.

The controlling mean low water depth was 12 feet (3.7 m.) in the main channel through the bay to the mouth of the creek, except for a shoal 1,500 feet long opposite the easterly side of the La Guardia Airport, where the depth was 10 feet (3.0 m.) when examined in May 1939; thence 10 feet (3.0 m.) in Flushing Creek to the Northern Boulevard Bridge, when examined in July 1938; thence 8 feet (2.4 m.) to Main Street Bridge when examined in September 1936; 11 feet (3.4 m.) in the branch channel and 8 feet (2.4 m.) in the anchorage area when examined in May 1939; and 12 feet (3.7 m.) in the maneuvering area when examined in March 1939.

The controlling depth in the channel along the west shore of the bay was 6 feet (1.8 m.) for the portion of the channel dredged by the city of New York from the municipal boat basin at the south end of the bay to the La Guardia Airport; thence 5 feet (1.5 m.) above mean low water to the boat basin at Jackson Creek.

For the most part, Flushing Bay has depths ranging from 3 to 8 feet (0.9 to 2.4 m.). Eastward of the dredged channel and in the vicinity of College Point the depths are slightly deeper, ranging from 3 to 14 feet (0.9 to 4.3 m.). Local small craft anchor south of College Point in depths of 4 to 8 feet (1.2 to 2.4 m.).

A **wreck** which shows at high water lies about 450 yards northwestward from the light marking the north end of the dike (covered at high water) which extends for a distance of about 0.6 mile along the west side of the south end of the dredged channel. The dike is marked by beacons and a light at each end.

*Lat. 40°47′, Long. 73°51′: Charts 226, 1213.

At the head of the bay an L-shaped wharf with depths of 14 feet (4.3 m.) along the north face and 9 feet (2.7 m.) on the south end of the east face encloses a basin for landings by pulling boats. Water may be obtained at this wharf.

Ice generally obstructs navigation in Flushing Bay and Creek during a part of January and February.

Flushing Creek has its entrance at the southeast end of Flushing Bay. For controlling depths see Flushing Bay, page 332.

Barges are taken about 1 mile above Main Street Bridge to **Strongs Causeway,** above which the creek is very crooked but is navigable for a farther distance of about 1 mile.

Bridges.—The creek is crossed by five drawbridges, as follows:

Drawbridges over Flushing Creek

Name or location	Distance above mouth	Kind	Clearances		
			Horizontal	Vertical	
	Miles		*Feet*	*Feet*	*Meters*
Willets Point Boulevard	0. 2	Bascule	140	40. 7	12. 4
Northern Boulevard	0. 4	Bascule	80	25. 5	7. 8
Roosevelt Avenue (I. R. T.)	0. 8	Bascule	70	2. 6	7. 5
Main Street (Long Island R. R.)	1. 1	Swing	30	3	. 9
Strongs Causeway	2. 2	Swing	47	3	. 9

NOTE.—The vertical clearances are given for the bridges closed, at mean high water. Special regulations for Roosevelt Avenue Bridge are given in following text. For other bridges use the usual signal of 3 blasts of the whistle.

Bridge Regulations have been prescribed for the Flushing Creek, New York City bridge (combined rapid transit and highway) at Roosevelt Avenue and the most important of them are given below.

(*a*) If weather conditions are good and sound signals can be heard, when a vessel approaches the bridge and desires to pass through the draw, the person in charge of said vessel shall cause to be sounded, within reasonable hearing distance of the bridge, three distinct blasts of a whistle, horn, or megaphone, or three loud and distinct strokes of a bell.

When the draw of the bridge can be opened immediately the draw tender shall reply by three distinct blasts of a whistle, horn, or megaphone, or by three loud and distinct strokes of a bell.

When the draw of the bridge cannot be opened immediately, the draw tender shall reply by two long, distinct blasts of a whistle, horn, or megaphone, or by two loud and distinct strokes of a bell.

(*b*) When weather conditions prevent hearing the sound signals, signals shall be made from the vessel by swinging in circles at arm's length a lighted lantern at night and a flag by day.

When the draw of the bridge can be opened immediately, the draw tender shall reply by raising and lowering in vertical plane a number of times a lighted lantern at night and a flag by day.

When the draw of the bridge cannot be opened immediately, the draw tender shall reply by swinging to and fro horizontally a number of times a lighted lantern at night and a flag by day.

(*c*) The draw shall be opened with the least possible delay, upon receiving the prescribed signal, except as provided in the following special regulations; and provided, that the drawspan shall not be opened when a train is approaching so closely that it cannot safely be stopped before reaching the bridge.

SPECIAL REGULATIONS

(*d*) The draw shall not be required to open to vessels during the periods from 7:30 a. m. to 9:30 a. m. and from 4:30 p. m. to 6:30 p. m., except to vessels owned, controlled, or employed by the United States Government or by the departments of the city of New York. Such vessels shall be passed without delay through the draw at any time, on signal of four blasts of whistle, horn, or megaphone, or four strokes of a bell.

Flushing has some trade in building material, coal, and ashes, carried in vessels of 5 to 14 foot (1.5 to 4.3 m.) draft. Vessels must go to the wharves, as there is no room in the creek for anchorage. Coal, gasoline, water, ice, and other supplies can be obtained.

La Guardia Airport, situated on the west side of **Flushing Bay,** was under construction in 1939. An aviation beacon on the top of the control tower near south central part of the field is prominent at night. At the west end of the field there is a seaplane basin which is closed to the navigation of boats.

Caution.—The development of **La Guardia Airport** has required the establishment of several water areas in the locality of Flushing Bay and Rikers Island as **Marine Aircraft Operating Lanes.** This will cause changes to be made in the limits of the anchorage areas in this locality, and also some changes in the regulations governing the operation of certain types of vessels in these areas. New Rules and Regulations will probably be available during 1940. All persons are **cautioned** to consider these conditions when navigating these waters. Principal changes will be shown on **large scale charts** as soon as practical.

Rikers Island is partly occupied by buildings of the Department of Correction of New York. A large area of the flats on the southeast side of the island has been reclaimed and is used as a dump for ashes and rubbish. The main channel of East River leads northward of Rikers Island. Rocky patches, with 23 and 24 feet (7 and 7.3 m.) over them, are located about 0.3 mile southeastward of **Barretto Point** and 300 yards from the north shore of Rikers Island. The south side of the main channel off the north edge of the eastern part of the flats extending eastward from Rikers Island is much used as an anchorage by coasting vessels, the depths being 23 to 30 feet (7 to 9 m.).

The buoyed channel southward of Rikers Island has ample width and is easily followed, except at its western end between Rikers Island and Lawrence Point. At this point the channel is narrow, with rocky, uneven bottom, and has rocks, with little depth, on both sides. The controlling depth in 1939 was 20 feet (6.1 m.) for a width of 300 feet. Strangers should proceed with caution in this locality as the tidal currents are strong.

Lawrence Point is occupied by extensive gas and power works. **Lawrence Point Ledge Light*** is located on the reef, partly bare at low water, which extends 0.2 mile off the wharves extending eastward from Lawrence Point. The northerly and northeasterly sides of the reef are marked by black buoys. A buoyed channel leads from the southeastward along the wharves.

The passage between Rikers Island and **South Brother Island** is much used as an anchorage by motorboats, the depths being 5 to 12

*Lat. 40°47'.6, Long. 73°54'.3: Charts 226, 274, 1218.

feet (1.5 to 3.7 m.). Care should be taken to avoid the extensive reef, partly bare at low water, which extends about 0.3 mile southward and south-southeastward from South Brother Island.

North Brother Island is occupied by hospitals and other buildings, and is marked at its south end by a lighthouse (white dwelling) and at its north end by a light on a black skeleton tower.

There is a fog bell at the lighthouse.

The main channel is northward of North Brother Island. A shoal extends about 275 yards off the east end of North Brother Island and is marked by a buoy. The rocky shoals between North Brother Island and Port Morris have been removed to a depth of 34 feet (10.4 m.).

A channel 300 feet wide and 26 feet (7.9 m.) deep has been completed midway between North and South Brother Islands. The direction of the improved channel is 70° true. It is well marked by buoys.

There are extensive railroad terminals at **Port Morris,** northward and northwestward of North Brother Island, to and from which car floats are taken through East River.

Bronx Kill is a narrow, shallow, unnavigable passage on the northeast side of Randalls Island, connecting East and Harlem Rivers. **Randalls Island** has municipal buildings scattered over it, and is prominently marked by the Triborough Bridge.

Sunken Meadow, lying off the northeast end of Wards Island, has been diked and is being filled in. The dike is marked on the southeast side by a light. The Harlem River can be approached through Little Hell Gate by an unmarked channel leading past the north end and along the west side of Sunken Meadow. This channel can be used only by small craft.

The **Triborough Bridge** furnishes highway connections between the boroughs of Manhattan, Queens, and The Bronx. The approaches extend southwestward from The Bronx (New York mainland) and southeastward from Manhattan across Randalls and Wards Islands when the bridge crosses East River to Queens Borough on Long Island.

The approaches cross three waterways, namely, Bronx Kill, Little Hell Gate, and the Harlem River. The main suspension span, across the East River, is 1,380 feet between center of towers and provides an unobstructed waterway passage. The minimum vertical clearance at mean high water is 138.3 feet (42.2 m.) for 800 feet at the center of the span.

The approach which crosses Harlem River has a vertical lift span the horizontal clearance of which is 204 feet and a vertical clearance at mean high water of 137 feet (41.8 m.) when in a raised position and 55 feet (16.8 m.) when in a lowered position. The Bronx Kill and Little Hell Gate bridges of the approach are fixed spans. The former has a horizontal clearance of 338 feet and a vertical clearance of 51 feet (15.5 m.) above mean high water, and the latter has a horizontal clearance of 112 feet and a vertical clearance of 60 feet (18.3 m.) above mean high water.

Hell Gate Railroad Bridge crosses the East River from Negro Point Bluff, southeast side of Wards Island. The height of the bridge above mean high water is 134.5 feet (41 m.).

The approach to Hell Gate railroad bridge consists of fixed spans which cross Bronx Kill and Little Hell Gate. The bridge crossing Bronx Kill has a horizontal clearance of 119 feet and a vertical clearance of 68 feet (20.7 m.) above mean high water; the bridge crossing Little Hell Gate has a horizontal clearance of 200 feet and a vertical clearance of 61 feet (18.6 m.) above mean high water.

A low-level fixed-span highway bridge crosses Little Hell Gate immediately southeastward of the Triborough approach span. The horizontal clearance is 163 feet and the vertical clearance 30 feet (9.1 m.) above mean high water at the center of the arch.

Wards Island lies southward of Randalls Island and Sunken Meadow, and is separated from them by **Little Hell Gate,** a narrow and foul passage leading into Harlem River. The insane asylum and some hospitals are located on this island.

There is a light and fog bell on the south end of Wards Island at **Negro Point.**

Hell Gate (chart 226) 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 current, the crooked channel, and crowded traffic in Hell Gate require extra caution on the part of the navigator to avoid accident or collision, and makes it dangerous for sailing vessels. Strangers in low-powered vessels should never attempt it.

Holmes Rock and **Hogback,** which show above water, lie in the bight on the south side of Wards Island westward of Negro Point, Ledges extend 300 feet southwestward from the easterly rock and 400 feet southwestward from the westerly one. A light marks the southwest end of the latter.

Hallets Point, on Long Island southward of Wards Island, is marked by Hell Gate Light and fog bell. The channel extends close to this point.

Mill Rock,* lying northwestward of Hallets Point, is 250 yards long and is occupied by buildings of the United States Engineers in connection with the work of improving Hell Gate. There is a light at the north and south ends of the rock. There is a depth of 25 feet (7.6 m.) 150 yards to the southward of the southerly light on Mill Rock.

Rhinelander Reef, lying westward of Mill Rock, has been dredged to a depth of 26 feet (7.9 m.) outside the buoy which marks it, and has depths of 5 and 6 feet (1.5 and 1.8 m.) close to the piers. It extends off the ferry slips at the foot of East Ninety-second Street northward to the north line of East Ninety-third Street.

Blackwells Island, known locally as **Welfare Island,** divides East River, forming two channels. The western channel is the wider, has the deeper water, and is generally used.

For controlling depths in these channels see East River, page 327.

The island is occupied by municipal buildings of the city, and a sea wall extends along both sides of the island to its south end. The north end of the island is marked by a light on a stone tower, maintained by the city of New York.

Queensboro Bridge, a cantilever structure, with a minimum clearance in the west span of 131.5 feet (40.1 m.) above mean high water, crosses East River and Blackwells Island about 0.4 mile from the south end of the island.

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*Lat. 40°46′.8, Long. 73°56′.3: Charts 226, 369.

Blackwells Island Reef, partly bare at half tide, extends 900 yards southwestward from the southerly end of Blackwells Island. The reef has a general width of about 125 yards, and is marked at its end by a bell buoy. **Blackwells Island Reef Light** is shown from a white skeleton tower on the south end of **Belmont Island,** 125 yards north of the southerly end of the reef.

Man of War Rock had a depth of 23½ feet (7.2 m.) 420 yards 217° true from Blackwells Island Reef Light in November 1939.

A good anchorage in 4 to 10 fathoms (7 to 18 m.) is found between East Thirty-second Street and East Twenty-fourth Street Wharves, on the New York side of the river.

Ferry Reef has been removed to a depth of 35 feet (10.7 m.).

Newtown Creek (charts 369 and 745) entrance is on the east side of East River 0.8 mile southward of the southerly end of Blackwells Island.

The controlling mean low water depth in main channel of Newtown Creek, according to surveys made in October 1938, was 22 feet (6.7 m.) from the entrance to 150 feet above Maspeth Avenue. In the turning basin near the entrance to **Maspeth Creek** the depth was 23 feet (7.0 m.).

When examined in May 1933, the controlling depth in **Dutch Kills** was about 16 feet (4.9 m.) except at Hunters Point Avenue Bridge, where it was 13 feet (4.0 m.). As shown by an examination made in August 1932, the depth in Maspeth Creek was 19 feet (5.8 m.). The controlling mean low water depth in **East Branch,** according to surveys made to May 1937, was 16 feet (4.9 m.) from 150 feet north of Maspeth Avenue to opposite the entrance to **English Kills;** thence to Grand Avenue, 13 feet (4.0 m.); and thence to Metropolitan Avenue, 12 feet (3.7 m.). When examined in May 1937, the depth in English Kills (West Branch) to Metropolitan Avenue was 16 feet (4.9 m.) and thence to 80 feet north of Montrose Avenue (the head of the project) the depth was about 8 feet (2.4 m.).

Whale Creek is navigable for vessels of 11 feet (3.4 m.) draft for about 0.3 mile. The mean rise and fall of tide is about 4 feet. The **current** is weak and variable.

Bridges.—Dutch Kills is crossed by four drawbridges the minimum horizontal clearance of which is 46 feet and the minimum vertical clearance 0.5 foot (0.1 m.) above mean high water. Newtown Creek is crossed by four drawbridges as shown in the following table:

Drawbridges over Newtown Creek

Name or location	Type	Clearances		
		Horizontal	Vertical	
		Feet	*Feet*	*Meters*
Vernon Avenue	Bascule	147. 4	25. 1	7. 6
Greenpoint Avenue	Bascule	149. 9	27. 7	8. 4
Meeker Avenue	Fixed	249. 3	125. 0	38. 1
Grand Street	Swing	87	10	3. 0

NOTE.—The vertical clearances are given for the bridges closed, at mean high water. The signal for the bridges is 3 blasts of the whistle.

(Reported in 1940 that Meeker Ave. Bridge was being removed.)

Regulations for the drawbridge crossing Newtown Creek at Grand Avenue are as follows:

The draw in the bridge across Newtown Creek at Grand Avenue shall be opened promptly upon reasonable signal for the passage of boats and other water craft, except between 12 m. and 12:15 p. m., and 12:45 p. m. and 1 p. m.

Regulations for the drawbridge crossing Newtown Creek at Vernon Avenue are as follows:

(1) The draw shall be opened promptly upon signal, for the passage of all vessels unable to pass under the closed bridge, at any hour of the day or night except on weekdays between the hours of 6:20 and 6:30 a. m., 7:20 and 7:30 a. m., 7:50 and 8 a. m., 8:20 and 8:30 a. m., 12 and 12:10 p. m., 12:50 and 1 p. m., 5:10 and 5:20 p. m., and 5:50 and 6 p. m.

(2) The signal for the draw to be opened shall be three blasts of a whistle or horn. The tender or operator of the bridge, in case the draw can be opened immediately, shall reply by three blasts of a whistle or horn, or by three strokes of a bell. In case of delay in opening the draw, the signal from the vessel shall be answered by two blasts of a whistle or horn or by two strokes of a bell.

From Pier No. 72, at the foot of East Twenty-fourth Street nearly to the Williamsburg Bridge, sunken reefs extend from 300 to 400 yards off the piers on the New York side of the river. **Shell Reef,** with a least depth of 24 feet (7.3 m.), is marked by a red buoy lying about 0.5 mile northward of the Williamsburg Bridge.

The **United States Navy Yard,** on **Wallabout Bay,** is on the south shore southward of Williamsburg Bridge, where the East River makes a bend westward.

Williamsburg, Manhattan, and **Brooklyn Bridges,** crossing East River, are suspension bridges. The minimum safe clearances in the center above mean high water are 135.6 feet (41.3 m.), 133.9 feet (40.8 m.) and 127.2 feet (38.7 m.), respectively.

Wallabout Channel, with entrance on the east side of Wallabout Bay, is 2,000 feet long and is maintained at a depth of 20 feet (6.1 m.)

Governors Island lies in the middle of East River where it joins New York Upper Bay. **Fort Columbus** is on the northeast part of the island, and **Castle William** at its northwest end. There are lights on the northwest and southwest ends of the island, the fog signal at the former being a siren and the latter a reed horn. When the horn is disabled a bell will be sounded. There is also a siren located on the wharf at the northern end of the island. The main channel leads north of the island.

Buttermilk Channel leads from New York Upper Bay into East River, between Governors Island and Brooklyn, and forms the access to **Atlantic Basin.**

The existing project provides for a channel 1,000 feet wide extending along the southeast side of Governors Island with widened turns at the junction of Anchorage Channel and East River. Dredging operations are now in progress. When examined in 1938, the controlling mean low water depth was 40 feet (12.2 m.) for the easterly 500-foot section of the channel from deep water at the southerly entrance to the junction with the East River. The westerly 500-foot section, when examined in 1939, had a depth of not less than 20 feet (6.1 m.) except along the westerly channel line adjacent to Governors Island where it was 16 feet (4.9 m.) deep.

East River Channel, between The Battery* and Governors Island.—This channel is being improved to a depth of 40 feet (12.2 m.) for a width of 1,000 feet.

Battery Reef has been removed to depths of 18 to 26 feet (5.5 to 7.9 m.), **South Ferry Reef** to a depth of 19 feet (5.8 m.), **Coenties Reef** to a depth of 39½ feet (12.0 m.) and **Dimond Reef** to a depth of 24 feet (7.3 m.) That portion of the latter reef extending into the 40-foot channel has been removed to a depth of 40 feet (12.2 m.).

Regulations governing the navigation of East River during the improvement operations have been prescribed by the Secretary of War, and copies of these regulations may be obtained from the Army Engineers, 39 Whitehall Street, New York City.

Directions, East River.—With the aid of a pilot, vessels of as much as 30-foot (9.1 m.) draft are taken to some of the piers in East River from Upper New York Bay. The strong tidal currents and the crowded traffic in the river between Rikers Island and Governors Island makes great caution necessary. Strangers in low-powered vessels should not attempt to pass through Hell Gate except at slack water, and then only during the daytime, and all strangers are advised to take a pilot.

Throgs Neck to Hell Gate Bridge.—Passing about 400 yards southward of Throgs Neck, steer **280°** true for 1.3 miles until Whitestone Point Light is abeam distant about 400 yards; then steer **260°** true for 2.5 miles, passing about 250 yards southward of Old Ferry Point, 400 yards northward of College Point Light off College Point to a position with Hunts Point Light bearing 350° true (abeam to starboard) distant 400 yards.

Then steer **287°** true to a mid-channel position between Barretto Point and the north end of Rikers Island, and with east end of wharf on Rikers Island abeam; then steer **295°** true and round the north end of North Brother Island in mid-channel. When rounding North Brother Island extra caution is necessary to avoid collision with passing vessels and tows off Port Morris.

Pass about 100 yards off the wharves at Port Morris and steer **216°** true passing 150 yards southeastward of Sunken Meadow Light heading to pass under the center of Hell Gate Bridge.

Hell Gate Bridge to Blackwells Island Reef.—Keeping near mid-channel pass under the center of Hell Gate Bridge and the Triborough Bridge and steer **mid-channel course** while rounding Hallets Point. Pass about 175 yards northward and northwestward of Hallets Point Light.

Vessels proceeding westward against the current here must exercise great caution in rounding Hallets Point to avoid being set across the channel on the shoals off Mill Rock. Follow a mid-channel course westward of Blackwells Island and then follow the wharves on the New York side until abreast East Thirty-third Street, at a distance of about 100 yards, to avoid Blackwells Island Reef.

The **tidal currents** have great velocity between Sunken Meadow and the north end of Blackwells Island; the greatest velocity is between Negro Point and Hallets Point, where extra caution is necessary to avoid collision with passing vessels. The west shore of Black-

*Lat. 40°42'.1, Long. 74°01'.0; Charts 745, 369, 1213, 1215.

wells Island should be given a berth of at least 70 yards, and when abreast of East Sixty-fifth Street the west shore of the island should not be approached closer than 100 yards.

Blackwells Island Reef to Governors Island.—Passing about 100 yards off the Manhattan wharves to the wharf at the foot of East Thirty-third Street steer various courses which will lead in mid-channel passing under the center of the Williamsburg, Manhattan, and Brooklyn Bridges. Vessels can pass on either side of Governors Island into New York Upper Bay, taking care not to pass too close to the Battery and Governors Island.

East River Rule.—Attention is called to the following statute (Greater New York Charter of 1901, Section 1610):

All the steamboats passing up and down the East River, between the Battery at the southern extremity of the City of New York, and Blackwells Island, shall be navigated as near as possible in the center of the river except in going into or out of the usual berth or landing place of such steamboat, and shall not be propelled at a greater rate of speed than 8 miles an hour below Corlears Hook, nor 10 miles an hour above Corlears Hook.

To pass northward of Governors Island, from a mid-river position off Pier 7 or 8, hold to mid-river until on the East River deep-water range (front mark a fixed red light and a white, slatted, diamond-shaped target on the southwest corner of Pier 11, Brooklyn; rear mark, a fixed green light and a white, vertical-striped target with central black stripe on warehouse No. 38, Brooklyn, under a square slatted target with black center and white margin, on warehouse No. 36); then steer 260° true on the range astern.

To pass through Buttermilk Channel, follow the wharves of Brooklyn at a distance of less than 300 yards until abreast Red Hook and the south end of Governors Island. Vessels can then continue to follow the wharves of Brooklyn southward, passing through Red Hook and Bay Ridge Channels, or can steer 244° true to the channel of New York Upper Bay, passing between the shoal extending southwestward from Governors Island and the north end of the shoal lying westward of Red Hook Channel.

HARLEM RIVER AND SPUYTEN DUYVIL CREEK

(CHART 274)

These waters form a through passage from Hudson River, 11.8 miles above the Battery, to East River westward of Wards Island. The channel is narrow and crooked and is navigable only for steamers or powered vessels. The traffic is extensive. Vessels of too great height to pass under the bridge should preferably make the passage against the current.

Channel.—The controlling depth from East River to Hudson River as shown by examinations to 1939 is 14 feet (4.2 m.) at mean low water.

Tides.—The mean rise and fall of the tides at Willis Avenue Bridge is about 5 feet; Central Bridge, 4¾ feet; Broadway Bridge, 3¾ feet; Spuyten Duyvil Bridge, 3½ feet.

Currents.—The local rule for the tidal currents is that the current in Harlem River runs from the Hudson River toward East River (south current), while the easterly current is running in East River

(Hell Gate); and the reverse. In Harlem River the southerly stream is considered the flood.

The times of slack water are subject to variations depending upon freshet conditions in the Hudson River, but generally the slacks before the southward and northward currents, occur about 2 hours after low water and high water, respectively, at Sandy Hook. The strengths of the southward and northward currents occur about 1 hour before high water and low water, respectively, at Sandy Hook. The velocity of the current is 2 knots or more in the narrower parts of the channel. Strong currents with swirls occur between the piers of High Bridge.

Bridges.—The following bridges cross the Harlem River.

Bridges over Harlem River

Name or location	Type	Distance from East River	Clearances		
			Horizontal	Vertical	
		Miles	*Feet*	*Feet*	*Meters*
125th Street	Vertical lift	1. 3	204	[4] 55. 2 [5] 137. 0	16. 8 41. 8
Willis Avenue	Swing	1. 5	109. 2	25. 6	7. 8
Second Avenue	do	1. 7	98. 4	29. 1	8. 9
Third Avenue	do	1. 9	100. 5	26. 7	8. 1
Fourth Avenue	do	2. 1	103. 3	26. 0	7. 9
Madison Avenue and 138th Street.	do	2. 3	104. 5	25. 9	7. 9
145th Street	do	2. 7	104. 1	26. 4	8. 0
Central (Macombs Dam)	do	2. 2	164. 3	28. 8	8. 8
157th Street (Putnam)	do	3. 5	123. 2	29. 5	9. 0
High Bridge	Fixed	4. 3	[1] 322. 5	[2] 93. 5 [3] 77. 2	28. 5 23. 5
Washington—181st Street	do	4. 6	[1] 354	135. 1	41. 2
207th Street	Swing	6. 0	101. 4	27. 1	8. 3
Broadway	do	6. 8	101	26. 4	8. 0
Henry Hudson	Fixed	7. 2	417. 9	142. 9	43. 6
Spuyten Duyvil	Swing	7. 9	100. 1	6. 7	2. 0

[1] Unobstructed channel.
[2] At center.
[3] At end.
[4] Lowered position.
[5] Raised position.

NOTE.—The vertical clearances are given for the bridges closed, at mean high water. The signal for the bridges is 3 blasts of the whistle, except for vessels belonging to the United States Government or the city of New York, which give a signal of 4 blasts of the whistle.

Bridge regulations.—The following are from the regulations prescribed by the Secretary of War for the opening and operation of the draws in the bridges crossing Harlem River:

1. The drawbridges spanning the Harlem River which have a clear space of 24 feet between the undersides thereof and the high water of spring tides shall not be required to open, except for vessels propelled by steam, with or without vessels in tow, nor to open at any time other than between 10 a. m. and 5 p. m., except as hereinafter prescribed in section 4.

2. When a steam vessel wishes to pass the bridge within the time prescribed for opening the draws, the master thereof shall signify his intention by three blasts of the whistle. If the draw is ready to be opened, the signal shall be answered by three blasts of the whistle from the bridge; if the draw is not ready for opening, by two blasts from the bridge.

3. The bridge at the mouth of Spuyten Duyvil Creek, being a low bridge, shall be opened at all times during the day and night when approached by vessels desiring to pass it, upon receiving the signals prescribed in section 4.

4. The foregoing regulations apply only to commercial or pleasure vessels, tugs, and steamers. Steam vessels owned, controlled, or employed by the United States Government or by the departments of the city of New York, shall be passed without delay through the draws of said bridges at any hour of the day or night, after giving a signal of four blasts of the whistle.

GENERAL INFORMATION, APPROACHES TO NEW YORK

(CHART 1108)

Radio service.—Vessels equipped with radio transmitters and being in doubt of their position should make frequent use of radio finder bearings. For the approaches to New York Harbor the radio direction finder stations at Amagansett, Fire Island, Sandy Hook, and Manasquan should be used, the last three forming a harbor entrance group. Radiobeacon signals are transmitted from Fire Island, Ambrose and Scotland Lightships, and from Sea Girt Lighthouse.

For detailed information see Radio, Maritime Services, and publication No. H. O. 205, "Radio Aids to Navigation," prepared by the Hydrographic Office, United States Navy.

Three whistle buoys are located off the south shore of Long Island from Fire Island Lightship westward; they are aids to keep vessels off the Long Island shore in thick and foggy weather. They are all in approximate lat. 40°31′.5, the first about 3 miles northward of Fire Island Lightship, the second off Jones Inlet, and the third off East Rockaway Inlet.

Soundings.—The lead will be found most useful to warn vessels of too close an approach to the shore. Many vessels have been wrecked on the coasts of New Jersey and Long Island through neglect to take frequent soundings when the position was uncertain.

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. A frequent use of the lead and close study of the charts will always give sufficient warning of danger.

If not sure of the position, the depth should not be shoaled to less than 15 fathoms (27 m.) on the south coast of Long Island eastward of Fire Island Lighthouse, 12 fathoms (22 m.) between Fire Island Lighthouse and Barnegat, and 10 fathoms (18 m.) southward of Barnegat.

From the position of the two shores relative to each other and to the entrance to New York Bay it follows that a 215° true course will deepen the water if the vessel is on the Long Island side of the approach and will shoal it if she is off the New Jersey coast. A 35° true course will deepen the water if the vessel is off the New Jersey side of the approach and will shoal it if she is off the Long Island coast.

Eastward of Fire Island Lighthouse the water shoals quite rapidly toward the Long Island shore, but inside of a line drawn through Fire Island Lightship to Barnegat Lighthouse there is no marked difference in the soundings, except in the mud gorge, as either shore is approached.

Hudson Canyon and Mud Gorge.—Modern surveys have shown the existence of a canyon, evidently cut by the Hudson River in pre-

historic days, across the continental shelf and extending in a southeast direction from off Sandy Hook for about 120 miles. The inshore section is called the **Mud Gorge** and the offshore the **Hudson Canyon.** In some sections of this cut the depths are considerably greater than those adjacent to it and the walls are very steep. The use of soundings, with the chart, especially on a vessel equipped with an echo sounding machine, permits one to make a very accurate determination of a ship's position by a comparison of the soundings taken with the depth curves as shown on the charts.

The bottom of the Mud Gorge is usually of mud while on both sides of it sand predominates.

Cholera Bank, lying about 10 miles southeastward of Ambrose Lightship, has a least depth of 10 fathoms (18.3 m.) and is about 2 miles in extent in an east and west direction. This bank is very little raised above the general level of the bottom, but being rocky in character a careful use of the lead will give useful indications in thick or foggy weather. During the summer months numerous fishing vessels may be seen on this bank.

North Atlantic lane routes to and from New York Harbor were revised and adopted by the principal trans-Atlantic steamship companies in June 1930. Owing to the frequency of collisions in the approaches to New York Harbor, all trans-Atlantic vessels are urgently recommended to use the following routes:

(*a*) Westbound vessels following the regular trans-Atlantic route should pass close to southward of Nantucket Shoals Lightship; thence 267° true for 193 miles to Ambrose Lightship.

(*b*) Eastbound vessels to steer 96° true from Ambrose Lightship for 177 miles to a position, latitude 40°10′ N., longitude 70°00′ W.

Attention is called to the fact that there are three lanes that are used from United States ports (eastward of the seventieth meridian), depending on the season of the year. These are shown on the back of United States Hydrographic Office chart No. 1262.

For description of Ambrose Channel Lightship and Scotland Lightship, see page 344.

Caution—Telegraph cables.—The Compagnie Française des Cables Telegraphique, 25 Broad Street, New York, reports serious interruptions of international telegraphic communication resulting from repeated breaking of its cables by vessels anchoring southeastward of Ambrose Lightship. The company states that it will be glad to compensate any vessel, which, having fouled the cable, cuts away its anchor and chain in order to save the cable from interruption. Vessels making New York in thick weather and finding it necessary to anchor before entering Ambrose Channel should do so in the area southward of Scotland Lightship and westward of the meridian passing through Ambrose Lightship.

Currents—Approaches to New York Harbor.—Between Nantucket and Cape May the tidal currents are weak and veer around the compass, accompanied by a general drift of the sea southwestward, amounting to about 0.1 knot.

Approaching from eastward from the vicinity of Nantucket Shoals Lightship, a slight allowance should be made for a southwesterly set of the current. Should the wind be easterly it is customary to allow, in order to make the course good, a set of the current with it of at least ½ knot.

The effect of the wind on the currents should always be considered. The ordinary maximum velocities caused by a combination of tidal currents and wind currents from strong gales are 2 to 2½ knots at Nantucket Shoals Lightship, and 1 to 1½ knots at Fire Island and Ambrose Channel Lightships. Alongshore winds produce the highest velocities at Fire Island Lightship and off Five Fathom Bank.

Between Gay Head and Montauk Point the tidal currents set northward on the flood and southward on the ebb. The estimated velocity in a depth of about 25 fathoms (46 m.) is about ½ knot; closer inshore this velocity increases.

At Fire Island Lightship the tidal currents have a mean velocity at strength of about ¼ knot in a west-northwest and east-southeast direction on the flood and ebb, respectively.

The important currents affecting navigation are those due to winds, the maximum velocities of current ranging from 1 to 1½ knots. A sudden reversal in the direction of the wind produces a corresponding change in the current either diminishing or augmenting the velocity. Sustained winds do not maintain the currents at the maximum velocities, as the angle of the coast between Long Island and New Jersey prevents a free circulation and a long-continued flow.

At Ambrose Channel Lightship * the velocity at strength of the tidal current is about ¼ knot. The maximum velocities noted, due to winds, are 1 to 1½ knots.

Landmark.—The most prominent landmark southward of the entrance of New York Harbor is the high, wooded ridge forming the **Highlands of Navesink,** on the south side of which, in a cleared space, is **Navesink Lighthouse.** The lighthouse consists of two brownstone towers connected by a dwelling. The light is shown from the southerly tower and is 246 feet (75.0 m.) above the water. The light is of high power and is visible about 22 miles.

Ambrose Channel Lightship has a black hull, with "AMBROSE" on the sides, in white, and two white masts with a black circular grating at each masthead. The light is 65 feet (19.8 m.) above the water and visible 14 miles. Should the flashing light become inoperative a fixed white light will be shown. A fixed white riding light is exhibited on the bow, 21 feet (6.4 m.) high.

The fog signal is an air diaphragm horn which has been synchronized with the fog signal for distance finding. A submarine bell is also operated. The radio station receives messages of importance regarding maintenance of aids and other matters of urgency. For additional details see Light List.

Scotland Lightship has a red hull with "SCOTLAND," in white, on each side, and two white masts with black circular gallery at each masthead. The light (on foremast) is 57 feet (17.4 m.) high and visible 15 miles. If foremast light is inoperative a similar light will be shown from the mainmast.

The fog signal is an air diaphragm horn. A radio beacon is also operated.

Sandy Hook Radio Direction Finder Station is located near the northeast part of Sandy Hook.

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*Lat. 40°27'.1, Long. 73°49'.4: Charts 1215, 1108.

This station, together with Fire Island and Manasquan Radio Direction Finder Stations, form a harbor entrance group for the approach to New York Harbor. In foggy weather use should also be made of radio-beacons at Fire Island and Ambrose Lightships and at Sea Girt Lighthouse. (For details of these stations see publication H. O. No. 205.)

Sandy Hook, the southern point at the entrance of New York Harbor, is low and sandy. On the north end of Sandy Hook is North Hook Fog Signal, which is a diaphragm horn, and at the northwest end of the Hook is **Sandy Hook Point Light,** a fixed white light with vertical beam, and fog signal which is a bell.

Near North Hook Fog Signal there is a Coast Guard station, a storm warning display station, and two tall observation towers from which coastwise and foreign vessels are reported to the Maritime Exchange in New York City. These observation towers and a large black tank to the southeast are the most prominent objects on the northern end of the hook. Southward from these are some houses, and Sandy Hook Lighthouse.

Sandy Hook Lighthouse is a white stone tower. The light is 88 feet (26.8 m.) above the water, and visible 15 miles.

Romer Shoal Lighthouse, located on Romer Shoal, on the northeast side of Swash Channel, is a conical tower, lower part white, upper part brown, on a black pier.

Ambrose Channel range is formed by West Bank and Staten Island Lighthouses, and marks the axis of the outer section of Ambrose Channel.

Staten Island Lighthouse, located on high land at Richmond, Staten Island, 5⅛ miles 297° true (NW. ¾ W. mag.) from West Bank Lighthouse, is a light-colored octagonal brick tower. The light is 231 feet (70 m.) above the water, and visible 21 miles.

Ambrose Channel, the principal entrance to New York Harbor extends from the sea to deep water in the lower bay.

This channel is maintained, so far as practical, 2,000 feet wide and 40 feet (12.2 m.) deep, is used by nearly all steamers, and is the best one for strangers.

The controlling depth in September 1938 was 40 feet (12.2 m.), for a width varying from 1,700 to 2,000 feet.

In June 1939 dredging operations were in progress to increase the depth in the channel to 45 feet (13.7 m.) and were about 65 percent completed.

Aids.—In addition to the range lights, Ambrose Channel is marked at short intervals by buoys. The lighted buoys on the northeasterly side of the straight sections of the channel show fixed red lights, those at the entrances and turns beng lighted bell buoys (flashing red). The lighted buoys on the southwesterly side of the straight sections of the channel show fixed white lights; those at the entrances and turns being lighted whistle buoys (flashing white) on the southwest side and gas and bell buoys on the northeast side.

Regulations.—The following are extracts from the regulations prescribed by the Secretary of War for the navigation of Ambrose Channel:

1. The use of Ambrose Channel is hereby restricted to navigation by vessels under efficient control with their own power and not having barges or other

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vessels or floats in tow. Sailing vessels and vessels carrying tows are not permitted to use this channel, except under permit as provided in paragraph 2 of these regulations.

2. The district engineer in charge of the improvement of Ambrose Channel may, by written permit, authorize vessels under tow to use Ambrose Channel in special cases, when in his judgment the draft of such vessels, or other conditions, may render unsafe the use of other channels.

3. Vessels permitted to use Ambrose Channel under paragraphs 1 and 2 of these regulations must proceed through the channel at a reasonable speed such as not to endanger other vessels and not to interfere with any work which may become necessary in maintaining, surveying, or buoying the channel; and they must not anchor in the channel except in cases of emergency, such as fog or accident, which would render progress unsafe or impossible.

4. These regulations are not to be construed as prohibiting any necessary use of the channel by any Government boats while on Government duty, nor in emergencies by pilot boats whether steam or sail, nor by police boats.

Directions, Ambrose Channel.—From Ambrose Channel Lightship a 297° true course for 3.7 miles leads to Gedney Channel lighted and whistle buoys, which is at the intersection of the axes of Ambrose and Gedney Channels.

From Scotland Lightship* a 350° true course for 3 miles will lead to the entrance of Ambrose Channel.

From Gedney Channel buoy the course through the outer section of Ambrose Channel is 297° true for about 6 miles, with West Bank Lighthouse in range with Staten Island Lighthouse, until between the lighted bell buoy and lighted whistle buoy which mark the sides of the channel at the turn; Romer Shoal Lighthouse will then bear about 186° true.

The course is then 324° true for 0.9 mile until between the lighted bell buoy and lighted whistle buoy which mark the sides of the channel at the turn; West Bank Lighthouse will then bear about 271° true.

The course is then 348° true, with Sandy Hook Lighthouse astern; this course made good for 3 miles will lead to a position 0.3 mile eastward of Craven Shoal lighted bell buoy.

A 338° true course for 1.9 miles will lead through the Narrows to a position 0.6 mile northward of Fort Wadsworth Lighthouse. An 18° true course then leads to Bay Ridge Channel. Or continuing on the 338° true course will lead to the temporary quarantine anchorage off the northeast side of Staten Island. Anchorage areas are shown on chart 541.

Gedney-Sandy Hook-Chapel Hill Channel is a secondary route from sea to the deep water in Lower Bay. The controlling depth in the Gedney-Sandy Hook Channel was 35 feet (10.7 m.) in May 1939, and in the Chapel Hill Channel, 30 feet (9.1 m.) in 1936.

Directions—Gedney Channel.—From Gedney Channel lighted whistle buoy the course through Gedney Channel is 282° true heading for Old Orchard Shoal Lighthouse and passing between the lighted buoys which mark the sides of the channel. After entering Sandy Hook Channel steer about 253° true following the buoys with which the channel is well marked. Continue this course for about 1.3 miles past Sandy Hook and then swing right to pass through Chapel Hill Channel and steer 6° true on the range Conover and Chapel Hill Beacons past West Bank Lighthouse to the deep water at the north

*Lat. 40°26'.6, Long. 73°55'.2: Charts 369, 1215, 1108.

end of Ambrose Channel. These channels are well-buoyed but due to the numerous changes in the buoyage the latest charts are the best guides.

South Channel is the next channel of importance, and has a least depth of 22 feet (6.7 m.). A straight course leads from its entrance near Scotland Lightship through it and Swash Channel into the bay, on the lighted range of the Elm Tree Beacon and New Dorp Beacon, course 311½° true.

There is an aeronautical light on the top of **Elm Tree Beacon** which shows above the regular range light.

Swash Channel leads from the junction of Gedney and South Channels in a northwesterly direction between Romer Shoal and Flynns Knoll and passes close to the southwesterly edge of Romer Shoal. It is a narrow channel with depths on the range by the last survey of 22 to 27 feet (6.7 to 8.2 m.), but there are several lumps with 18 feet (5.4 m.) over them close by.

False Hook Channel leads along and close to the eastern shore of Sandy Hook and joins the main channel eastward of the point of the Hook. It is buoyed, and by the last survey had a depth of 12 to 14 feet (3.7 to 4.3 m.), but is not safe for strangers.

Chapter 15.—NEW YORK BAY AND HARBOR

(CHART 369)

New York Bay is the principal entrance by water to New York City and surrounding ports. It is divided by The Narrows, a passage 1 mile wide, into an upper and lower bay. The harbor and surrounding ports are shown on charts, as indicated on the index map.

Caution.—On account of the dredging operations going on in New York Bay, mariners must be guided by the chart and the latest reports, as published in the Notices to Mariners, as to the conditions of the channels.

LOWER BAY

The lower bay extends to The Narrows. That part of it lying westward of Sandy Hook and the main channels extending up that bay are described under the heading "New York Lower Bay, western part." The entrance between Sandy Hook on the south and Coney Island on the north is about 6 miles wide. An extensive bar through which several channels lead extends across the entrance.

The shoals on the bar at the entrance of New York Bay are as follows: **East Bank** lies eastward of Ambrose Channel; **Romer Shoal** lies between Ambrose and Swash Channels; **Flynns Knoll,** lying between Swash, Sandy Hook, and Chapel Hill Channels; and **False Hook,** which lies off the northeastern side of Sandy Hook. For depths on these shoals reference is to be made to the chart. They are subject to changes in depth and should be avoided by strangers.

West Bank borders the western side of the channel between West Bank Lighthouse and Fort Wadsworth, a distance of 4 miles. The bank is marked on its eastern side by black buoys, which are placed in depths of 18 feet (5.5 m.) or more. **Swinburne** and **Hoffman Islands,** two artificial islands, each having a number of buildings, are located on West Bank.

The United States Coast Guard in conjunction with the United States Maritime Commission operates a school at Hoffman Island for the training of maritime cadets.

West Bank Lighthouse,* located off the south end of West Bank, is a brown, conical tower on a black pier having a white horizontal band.

Craven Shoal, lying 0.5 mile northeast of Hoffman Island and 1.3 miles south-southeastward of Fort Wadsworth, has been removed to a least depth of 30 feet (9.1 m.), except for a shoal 27 feet (8.2 m.) along the westerly limit of the excavation. It is marked on the east side by a lighted bell buoy.

*Lat. 40°32′.3, Long. 74°02′.6: Charts 369, 1215.

Coney Island, on the north side of lower bay, is a large summer amusement resort, which is a prominent feature. **Coney Island Lighthouse,** located on **Norton Point,** on the west end of Coney Island, is a white, square, pyramidal skeleton tower.

Coney Island Channel leads nearly parallel with the south shore of Coney Island, about 0.3 mile from the beach near its western end. It is marked by buoys, and is being improved by dredging a channel 600 feet wide and 20 feet (6.1 m.) deep.

In June 1939 the channel had its project depth of 20 feet (6.1 m.) throughout except for three small isolated shoals with a least depth of 14 feet (4.3 m.).

The channel is used principally by vessels going to Jamaica Bay and Coney Island.

The channel **between Staten Island** and **Hoffman** and **Swinburne Islands** has a project depth of 16 feet (4.9 m.) for a width of 200 feet.

This channel extends from a position about 0.6 mile south of Fort Wadsworth Light to the wharves at Hoffman and Swinburne Islands and is marked by buoys.

In 1938 there was a controlling depth of 14 feet (4.3 m.) for 1 mile; thence to Swinburne Island 12 feet (3.7 m.).

Gravesend Bay makes into the Long Island shore between the western end of Coney Island and the Narrows. The bay affords good anchorage in 11 to 16 feet (3.4 to 4.9 m.), but the southeasterly part of the bay southward of a line joining Norton Point and the pier northward of the marine basin is shoal, having depths of 1 to 6 feet (0.3 to 1.8 m.).

A marine basin is on the east side of the southerly part of Gravesend Bay. The entrance is on the north side and is reached through a dredged channel. The controlling depth in the bay is 12 feet (3.7 m.); and there is a greater depth in the dredged channel and basin; vessels of 16-foot (4.9 m.) draft enter at high water. To enter, keep northward of the line of the pier, lying northward of the basin, pass 150 feet off the end of the pier, and steer for the east side of the entrance of the basin.

There is a shipyard on the east side of the bay which has a floating drydock with a lifting capacity of 400 tons. It can accommodate vessels up to lengths of 275 feet and has a depth of 22 feet (6.7 m.) over the blocks. There is also a marine railway with a capacity of 575 tons that can haul out vessels up to lengths of 125 feet. There are good facilities for storing and repairing.

Coney Island Creek, emptying into the southeast end of Gravesend Bay, is crossed by five drawbridges. The openings for the first threo are 75, 40, and 34 feet, respectively, and the vertical clearances above mean high water are 11 feet (3.4 m.), 5.5 feet (1.7 m.), and 3.6 feet (1.1 m.) respectively. The last two bridges are not used to any great extent. Above the drawbridges are fixed bridges which obstruct further navigation. With local knowledge a draft of 8 feet (2.4 m.) can be carried to the entrance of the creek and a draft of 5 feet (1.5 m.) to the head of navigation. A large gas tank on the north side of the creek, about 0.8 mile from the entrance is very prominent.

Bridge Regulations for the drawbridge across Coney Island Creek, at Stillwell Avenue, Brooklyn, New York.

When the master of a boat has signified by three blasts of a whistle or horn his intention to pass the bridge, the draw shall be opened at all times during the day or night for the passage of all vessels which cannot pass the closed bridge.

THE NARROWS *

Connects the upper and lower bays, and has a clear width of over 0.6 mile at its narrowest part between Fort Wadsworth and Fort Lafayette. **Fort Lafayette** is a brown-stone structure on the edge of the flats, 300 yards from the Long Island shore. There is a light, 47 feet (14.3 m.) above water, on a red skeleton tower near the southwest corner of the seawall of Fort Lafayette. The fog signal is a bell.

East of Fort Lafayette, on Long Island, is **Fort Hamilton. Bay Ridge,** a part of Brooklyn, is about 1 mile northward of Fort Hamilton.

Fort Wadsworth Lighthouse, on the west side of the Narrows, is a red-brick, semicylindrical tower on the northeast salient of the fort. It is 78 feet (23.8 m.) above the water. The fog signal is a bell.

Above Fort Wadsworth, on Staten Island, are **Clifton (Rosebank), Stapleton, Tompkinsville,** and **St. George.** The latter has communication with Manhattan Island by ferry. Just above Fort Wadsworth in the Narrows are the **Quarantine Headquarters** and **Boarding Station.** Vessels subject to visitation by the health officer are boarded when abreast of or a little northward of Fort Wadsworth.

UPPER BAY

The upper bay extends from the Narrows to the Battery. The main channel leads between Jersey Flats and Gowanus Flats and has depths of 33 to 88 feet (10.1 to 26.8 m.) and a width of about 0.5 mile, the shoaler water is found on the eastern side of the channel abreast Gowanus Flats. Bay Ridge and Red Hook Channels follow the wharves of Brooklyn eastward of Gowanus Flats. Kill van Kull connects the bay with Newark Bay and Arthur Kill, and separates the northern shore of Staten Island from Bergen Neck (Bayonne).

The whole of the western part of the bay is occupied by extensive flats, with 1 to 6 feet (0.3 to 1.8 m.) over them, known as **Jersey Flats.** The eastern edge of the flats is marked by Robbins Reef Lighthouse, Bedloes Island, Ellis Island, the black gong buoy southeastward of Robbins Reef Lighthouse, lighted buoys at the entrances of Greenville and Black Tom dredged channels, and a number of black buoys.

Gowanus Flats, with a least depth of 8 feet (2.4 m.), lie eastward of the main channel of the upper bay and westward of Bay Ridge and Red Hook Channels.

Anchorage Channel, a continuation of Ambrose Channel, has a project depth of 45 feet (13.7 m.) for a width of 2,000 feet and

*Lat. 40°36′.3, Long. 74°03′.3: Charts 541, 369, 1215.

extends northward and north-northeastward from the western side of the Narrows to deep water westward of Governors Island. In 1936 this channel had its project depth in a width of 800 to 2,000 feet.

Bay Ridge Channel leads from the Narrows to Gowanus Bay, between the wharves of Brooklyn and Gowanus Flats. It is being improved by dredging a channel 1,750 feet wide from a junction with Red Hook Channel to Bay Ridge Avenue, thence 1,200 feet wide to the Narrows, and 40 feet (12.2 m.) deep throughout.

The piers on the upper part of Bay Ridge Channel southward of Gowanus Bay are used by large foreign shipping interests, and the **Bush Terminal** buildings are located here.

In 1939 the controlling depth at mean low water was 40 feet (12.2 m.) for the full project width from deep water in the Narrows to 65th Street, Brooklyn; thence 40 feet (12.2 m.) for widths of 800 to 1,700 feet to 36th Street; and thence 34 feet (10.4 m.) for a width of 1,000 feet to 400 feet to the head of the improvement.

Red Hook Channel leads from Gowanus Bay to Buttermilk Channel between the wharves of Brooklyn and the northerly part of Gowanus Flats. The project provides for deepening this channel to 40 feet (12.2 m.) for a width of 1,200 feet.

In 1939 the controlling depth at mean low water was 30 feet (9.1 m.) from its junction with Bay Ridge Channel for a distance of 3,200 feet northward; thence 35 feet (10.7 m.) to the intersection with Buttermilk Channel. Shoals along the channel line and the westerly half of the south portion have limiting depths of 20 to 25 feet (6.1 to 7.6 m.).

Gowanus Bay is the bight in the Brooklyn shore about 1.3 miles southward of Governors Island. **Gowanus Creek Channel** has been dredged to a depth of 26 feet (7.9 m.) from its junction with Bay Ridge and Red Hook Channels to the foot of Percival Street, and for a width of 300 feet at its outer end decreasing to 200 feet at its inner end, and thence 18 feet (5.5 m.) deep to Hamilton Avenue Bridge, gradually decreasing in width to 100 feet at the bridge.

Gowanus Creek Channel.—In 1939 the controlling depth at mean low water was 24 feet (7.3 m.) for a width of 300 to 150 feet, from the entrance up to Percival Street; thence 18 feet (5.5 m.) through a channel gradually decreasing in width to 100 feet at a point 300 feet south of Hamilton Avenue Bridge; and thence 12 feet (3.7 m.) to Hamilton Avenue Bridge.

The waterway above Percival Street is locally known as **Gowanus Canal.** It is under improvement above Hamilton Avenue Bridge to maintain a depth of 12 feet (3.7 m.) for a width of 100 feet to Ninth Street Bridge; 10 feet (3 m.) to Third Street Bridge; 9 feet (2.7 m.) to Carroll Street Bridge; and 7 feet (2.1 m.) to a point 100 feet northward of the north line of Douglass Street, a total distance of 5,300 feet.

Bridges.—Five drawbridges cross Gowanus Canal, and their width of openings and vertical clearances above mean high water when closed are as follows: Hamilton Avenue, 46 feet wide, 18 feet (5.5 m.) clearance; Ninth Street, 45 feet wide, 7 feet (2.1 m.) clearance; Third Street, 41 feet wide, 10 feet (3 m.) clearance; Carroll Street, 36 feet wide, 3 feet (0.9 m.) clearance; and Union Street, 43 feet

wide, 9 feet (2.7 m.) clearance. In addition to the above there is a fixed, rapid transit bridge in the vicinity of Smith and Ninth Streets (0.2 mile above the Ninth Street Bridge), with clearance in the center, above mean high water, of 90½ feet (27.6 m.). The channel is unobstructed by this bridge. That part of the canal that extends southeastward along Fifth Street is crossed by a fixed bridge at Third Avenue with a vertical clearance of 20 feet (6.1 m.) above mean high water.

Erie Basin is on the north side of Gowanus Bay, and is entered from Red Hook Channel. It is important on account of its dry docks and facilities for repairing vessels.

Buttermilk Channel leads from the upper bay into East River between Governors Island and Brooklyn. It is described with East River.

Various channels lead to the piers and terminals on the west side of Upper Bay.

The New Jersey Pierhead Channel has recently been completed. The controlling depth is 20 feet (6.1 m.) for a width of 500 feet. The channel is well buoyed and the buoyage system for the north and south entrances changes at the Bayonne Terminal Pier. The latest chart for this area is the best guide.

A dredged channel, 800 feet wide and 20 feet (6.1 m.) deep, leads to the piers of the Pennsylvania Railroad terminal at **Greenville.** The channel is marked by buoys, and its entrance lies 0.9 mile northeastward of Robbins Reef Lighthouse.

A channel 250 feet wide and 30 feet (9.1 m.) deep leads into the Lehigh Valley Railroad pier just northward of the Pennsylvania Railroad terminal. The entrance lies 300 yards northeastward of the channel described in the preceding paragraph and is marked by buoys and the lighted Claremont Terminal range which is on a course of 312° true.

A channel, 20 feet (6.1 m.) deep and marked by buoys, has been dredged through the flats southward of Bedloe's Island to the piers of the Lehigh Valley Railroad terminal on **Black Tom Island.** From the north side of the channel a channel 8 feet (2.4 m.) deep and marked by dolphins has been dredged to the wharf at the west end of **Bedloe's Island.*** The colossal **Statue of Liberty** on Bedloe's Island is more than 300 feet (91 m.) high.

GENERAL INFORMATION, NEW YORK

Port administration.—The administration of the Port of New York and the enforcement of its laws is vested in no single body, but is divided among various departments of the Federal, State, and municipal governments.

The **collector of the port** is a United States Customs official who is charged with the enforcement of the general navigation laws. The police power necessary for the enforcement of these laws are vested in the United States Coast Guard which maintains patrols and reports violations to the proper authority. This office is located in the Customs House.

The **captain of the port** is the District Commander of the United States Coast Guard and is charged with the issuance of anchorage

*Lat. 40°41'.4, Long. 74°02'.7; Charts 541, 745, 369, 1215.

and explosive permits. This office is located in the Customs House. In conjunction with this office one is also located at the Barge Office at the Battery.

The **supervisor of the harbor** is a naval officer assigned to duty with the War Department. He supervises the dumping of waste material. This office is located at the United States Engineer Office.

The administration of the piers along the New York water front are under the direction of the Department of Docks of the City of New York. This office is located at Pier A, at the Battery.

The **Port of New York Authority** is an executive body and is essentially a port development body. It serves as a bureau of port information and is empowered to make regulations for the improvement of the conduct of navigation and commerce.

For additional information reference should be made to the port series publications prepared by the United States Corps of Engineers.

The **wharves and piers** of New York City along the waterfront of the Hudson and East Rivers are numbered, the numbers beginning at the Battery and following in sequence eastward along the East River and northward along the Hudson River waterfronts of the city.

Foreign trade zone.—This is an enclosed, isolated, and policed area under the supervision of Federal officials. It is located at Stapleton, Staten Island, about 1.5 miles northward of Fort Wadsworth and embraces Piers No. 12 to No. 16 containing six slips each having a depth of about 30 feet (9.1 m.) and lengths of over 1,000 feet with a width of approximately 300 feet.

There are good facilities for loading and unloading. Cargo handling cranes have a capacity up to 2½ tons. There are facilities for storage, and reshipments to foreign points. If reshipped to foreign ports the goods may leave the zone without payment of duty

Further detailed information may be obtained from the Commissioner of Docks, Pier A (North River).

Pilotage is compulsory for foreign vessels, vessels from a foreign port, and all vessels sailing under register. Pilots generally cruise westward of a line drawn from Fire Island to Sea Girt. Pilot boats are always found near Scotland and Ambrose Channel Lightships.

For detailed information regarding fees for piloting see Bulletin No. 6 issued by the Port of New York Authority; or, Port and Terminal Charges at United States Ports, or Port of New York, Port Series No. 20, Part 1, prepared by the Corps of Engineers, United States Army. The two latter publications are for sale by the Superintendent of Documents, Washington. D. C.

Immigration.—The United States immigration station for the port of New York is located on **Ellis Island,** in the Upper Bay, and is reached by ferry from the barge office at the Battery.

Customs.—The customhouse is located at Bowling Green, New York City, near the Battery.

Quarantine regulations for the port are changed from time to time, as found necessary by the local authorities. The quarantine headquarters and boarding station are just above Fort Wadsworth in the Narrows.

Hospitals.—There are three marine hospitals operated by the United States Public Health Service. These are located at Staple-

ton, Staten Island, Ellis Island, in the Upper Bay, and at 67 Hudson Street, New York City. The latter serves as the principal admitting hospital from which patients are transferred to the other hospitals as the cases warrant.

Anchorage.—There have been changes in the boundaries of the anchorage grounds in New York Harbor. The regulations and limits concerning the anchorage areas may be obtained from the District Engineer, United States Engineers, New York City, or by consulting the latest charts of this area. See Chart No. 541.

The New York Yacht Club maintains a landing station at Twenty-sixth Street, East River, off which there is good anchorage for yachts.

There is also an anchorage off Eighty-sixth Street, Hudson River, which is used by yachts and small craft, and there is a landing for small boats.

Caution—Pipe-line areas.—Vessels are especially cautioned against anchoring in the vicinity of the pipe-line area across the Narrows as shown on the chart. These pipes carry the water supply for Staten Island.

Caution—Cable areas.—Masters of vessels are cautioned not to anchor on the line of cable running from the west dock, Bedloes Island, to dredged channel, approximately 100 yards east of nun buoy 4, thence approximately 830 yards in the direction 120° along the dredged channel and fairway to a point just beyond the limits of the adjacent anchorage areas, thence in the direction 60° to a point on the northwest shore of Governors Island, approximately 430 yards from the southwesterly end of Governors Island.

Tides.—The mean rise and fall of the tide at the Battery is 4.4 feet. For heights of tide in other parts of New York Harbor see Tide Tables, Atlantic Coast, or Tide Tables, New York Harbor.

CURRENTS, NEW YORK BAY AND HARBOR

Approaching New York Bar from seaward the flood current rarely attains a velocity of 1 knot, and sets fair for the entrance, except that it is disposed to press upon the outside shores of Sandy Hook and Coney Island. At the beginning of the flood the current sets in at the bottom, while the surface current is still running out.

The ebb current issuing from the harbor is stronger than the flood, even when the river is low, the excess being seldom less than 10 per cent, except near Coney Island and the outside shore of Sandy Hook, where the flood and ebb approach equality.

Caution.—The action of the current in the channel northward of Governors Island is very erratic, and great care must be taken by large vessels in navigating this channel. It is reported that the most dangerous conditions occur near the end of the flood current, about 2 hours after high water at the Battery (see Tidal Current Charts, New York Harbor). At this time the current is flooding north in the Hudson River while a subsurface current sets westward from the East River. These cross currents are known locally as **The Spider.** Their effect on a large vessel, coming from southward and turning into the East River, is to throw her stern to port and her bow to starboard, thus causing a sheer to starboard toward

the shoals off the north end of Governors Island. When coming from northward in the Hudson River the same effect tends to prevent the vessel from turning and to cause her to overrun her course.

In Ambrose Channel slack waters before flood and ebb occur ¾ hour after low water and high water, respectively, at the Battery. The mean velocity at strength of the flood current is about 1¾ knots and of the ebb current 2¼ knots.

Caution.—The current on an ebb tide through Ambrose Channel sets in a southward direction converging and meeting in South Channel. Caution should be maintained to prevent being set onto Roamer Shoal when using either channel. On a flood tide and especially with a westerly wind caution should be exercised to prevent being set onto Romer Shoal when using Swash Channel.

In the Narrows slack waters before flood and ebb occur about 1¾ hours after low water and high water, respectively, at the Battery. The mean velocity at strength of the flood current is about 1½ knots and of the ebb current 2 knots. Daily predictions of slack water and strength of current are given in the Atlantic Coast Current Tables.

In Hudson River, off the Battery, slack waters before flood and ebb, occur about 3¼hours after low water and high water, respectively, at the Battery. Off Thirty-ninth Street, slack waters before flood and ebb, occur about 3½ hours after low water and high water, respectively, at the Battery.

The mean velocities at strength of the flood and ebb currents are about 1¼ and 2¼ knots, respectively, off the Battery, and 1½ and 2¼ knots, respectively, off Thirty-ninth Street.

Between the Battery and Yonkers the current at a depth of about 15 feet is running flood approximately ¾ hour before the turning from ebb to flood at the surface.

Tidal current charts.—The direction and velocity of the current throughout New York Harbor for every hour at the tidal cycle is shown in the Tidal Current Charts, New York Harbor. Copies of this publication can be obtained from the Coast and Geodetic Survey, Washington, D. C., its field station, New York City, or any of its agencies, price, 25 cents.

Prevailing winds.—During 10 months of the year the prevailing winds are from the northwest, in July and August the prevailing winds are southwesterly. Gales with velocities of 40 miles or more per hour are also predominantly from the northwest.

Ice.—The channels of the port of New York are navigable throughout the year. The main channels do not freeze over and any ice in the smaller waterways is well broken up by tugs and general traffic. Fresh water ice is brought down the Hudson River in large floes during periods of thaws or winter freshets. Occasionally there are large accumulations of ice at Spuyten Duyvil where the Harlem River joins the Hudson and at these times it is difficult for low-powered vessels or tows to make much headway. Under conditions of strong winds, the slips on the exposed side of the channel become packed with drift ice causing difficulty when maneuvering in the slip or when berthing. During extremely severe winters navigation is interfered with seriously for only short periods of time.

Storm warnings of the United States Weather Bureau are shown in New York City from the Whitehall Building.* They are also displayed at Sandy Hook.

Time ball.—A time ball is dropped at noon each day on the Seaman's Church Building.

Daylight-saving time.—From May through September each year New York City uses daylight-saving time, which corresponds to 60th meridian time, the standard meridian for the locality being 75°.

Reporting stations.—Vessels are reported to the Maritime Exchange at New York from City Island, Sandy Hook, and Quarantine.

A Coast and Geodetic Survey field station is located in the Federal Office building, 90 Church Street, New York City. Complete files of **Charts, Coast Pilots, Tide and Current Tables,** and other publications relating to navigation may be consulted here, and other information affecting navigation obtained without charge.

A United States Branch Hydrographic Office is established at the Custom House, New York City. Bulletins are posted here giving information of value to seamen, who are also enabled to avail themselves of publications pertaining to navigation and to correct their charts from standards. No charge is made for this service.

Port services.—Detailed information on terminal facilities, dockage, lighterage, storage, bunkering, supplies, stevedoring, facilities for repairs, and other information pertaining to maritime activities will be found in the publication prepared by the Corps of Engineers, United States Army, entitled "The Port of New York," Port Series No. 20, which is for sale by the Superintendent of Documents, Washington, D. C.

Repairs.—For the dimensions of the largest dry docks and marine railways see Appendix.

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*Lat. 40°42′.3, Long. 74°01′.0: Chart 745.

Chapter 16.—KILL VAN KULL, NEWARK BAY AND TRIBUTARIES

KILL VAN KULL

(CHART 285)

Kill van Kull connects New York Upper Bay with Newark Bay and Arthur Kill and separates the southern shore of Bergen Neck (city of Bayonne) from Staten Island. There is an extensive through traffic and there are large manufactories on its shores. The Kill is about 3.5 miles long, 300 to 500 yards wide, and has general depths of 30 to 42 feet (9.1 to 12.8 m.).

The controlling mean low water depths through Kill van Kull in 1939 were 30 feet (9.1 m.) from the junction with Newark Bay Channel, near Bergen Point to near Port Richmond; thence 35 feet (10.7 m.) to New York Upper Bay.

The main channel from Kill van Kull to Arthur Kill leads southward of **Shooters Island,** and then in a northwesterly and westerly direction to Arthur Kill, at Elizabethport. It is marked by buoys between **Bergen Point** and Elizabethport and is easily followed. Improvements are authorized to dredge this channel 600 feet wide and 35 feet (10.7 m.) deep in connection with the improvement of Arthur Kill and Raritan Bay. (See description of New York and New Jersey Channels on p. 350.) In 1939 this channel had a depth of 30 feet (9.1 m.)

The channel north of Shooters Island had a controlling depth at mean low water of 22 feet (6.7 m.) in 1939. Dredging is in progress to deepen this channel which will become the main channel when completed.

Bergen Point Lighthouse is a gray granite tower on a stone pier. The fog signal is a bell. There is a light at the end of the north pier on the east side of Shooters Island. The wharves and structures on the north side of the island are part of the shipyard which is now abandoned.

Bayonne Bridge crosses Kill van Kull at a point just east of Bergen Point. It is a steel arch bridge and has a vertical clearance of 150 feet (45.7 m.) above mean high water.

Constable Hook and **Port Johnson,** on the north shore of the Kill, are parts of the city of **Bayonne,** and are commercially important for the shipment of mineral oil and other products in foreign vessels. A dredged channel 31 feet (9.4 m.) deep, marked by buoys and private range targets, leads from southward of Baxters Ledge to the wharf on the north side of Constable Hook.

New Brighton, Factoryville, Port Richmond, and **Mariners Harbor** are on the south shore of Kill van Kull. Several shipyards and floating dry docks are located on this shore.

(See list of dry docks and marine railways in Appendix.)

There is railroad communication from these to other parts of Staten Island, and ferry communications with Bayonne, and with New York City from **St. George** at the eastern end of New Brighton.

Currents.—In Kill van Kull the flood current sets westward and ebb eastward. Slack waters before flood and ebb occur about ½ hour after low water and high water at the Battery, respectively. The mean velocity at strength of the currents is about 2 knots.

The direct currents favor the Bergen Point side of the channel between West New Brighton and Port Richmond; between these points, in the bight on the south shore of the Kill, there is more or less of an eddy when the current is at strength.

NEWARK BAY

Newark Bay has a length of about 4 miles from Kill van Kull to the junction of the two channels leading to Passaic and Hackensack Rivers. The greater part of the bay is very shoal, but a channel, obtained by dredging, leads through the bay to the rivers. (See descriptions of Passaic and Hackensack Rivers following.)

Newark Bay Channel has a project depth of 30 feet (9.1 m.) for a width of 1,800 feet at the entrance, including the removal to a depth of 30 feet (9.1 m.) of part of the rock area at Bergen Point, decreasing to a width of 400 feet at the Central Railroad bridge, and continuing with the same width to the junction of the Passaic and Hackensack River Channels. In June 1932 this channel had a controlling depth of 28 feet (8.5 m.) to the junction of the river channels. The channel is well marked by lights and buoys, and strangers in small vessels should have no difficulty when using the chart as a guide. Deep-draft vessels should employ a pilot.

Port Newark terminal* is located on the western side of Newark Bay, just southward of the second drawbridge. A channel 30 feet (9.1 m.) deep and 400 feet wide leads from a widened section of the Newark Bay Channel to a turning basin of the same depth at the upper end of the terminal wharf.

When examined in November 1939 there was a controlling depth of 28 feet (8.5 m.) at mean low water at the entrance. A light and a black buoy marks the junction of the Port Newark terminal channel and Newark Bay channel. The terminal has excellent facilities for loading and unloading with direct transfer from railroad to ship and vice versa. The terminal is served by three trunk line railroads. Regulations governing the supervision of the facilities, system of charges and rates have been prepared by the city of Newark and are available at the administration office of the Port Supervisor, Port of Newark.

For **pilotage** see New York Harbor.

For **anchorage** limits see large-scale chart.

Tides.—The mean rise and fall of tides is about 5 feet.

Storm warning displays are made at Port Newark.

Ice sometimes closes navigation during a part of January and February.

Bridges.—Two vertical lift railroad bridges, with vertical clearances of 35 feet (10.7 m.) when down and 135 feet (41.1 m.) when raised, cross the bay. The flood current sets in a northeasterly and

*Lat. 40°42′, Long. 74°09′: Charts 287, 369, 1215.

the ebb in a southwesterly direction diagonally through the openings in the southern bridge. The Central Railroad of New Jersey bridge, the southernmost, has an opening 134 feet wide on the east side and 216 feet wide on the west side. The width of opening at the Lehigh Valley Railroad bridge, 3.8 miles above the mouth of the river, is 300 feet. The signal for these bridges is 3 blasts of the whistle.

Bridge Regulations.—For regulations governing the operation of these bridges see page 362.

PASSAIC RIVER

(CHART 287)

Passaic River is under improvement to secure a channel 300 feet wide and 30 feet (9.1 m.) deep from the upper end of Newark Bay Channel to about ½ mile above the Lincoln Highway Bridge; thence 20 feet (6.1 m.) deep and 300 feet wide for about 4 miles to Nairn Linoleum Works; thence 200 feet wide and 16 feet (4.9 m.) deep a distance of 1 mile to the Erie Railroad (Montclair and Greenwood Lake) bridge at **Arlington**; and thence a channel about 150 feet wide and 10 feet (3 m.) deep a distance of 6.4 miles to Eighth Street Bridge, **Passaic.**

When examined in February 1939, the controlling mean low water depth in the Passaic River was 21 feet (6.4 m.) for a distance of 1,600 feet; thence 24 feet (7.3 m.) to a point 3,000 feet above the Lincoln Highway Bridge; thence 20 feet (6.1 m.) to the Jackson Street Bridge; thence 16 feet (4.9 m.) to the Erie Railroad Bridge (Newark Branch); thence 13 feet (4.0 m.) to the Nairn Linoleum Works; thence 12 feet (3.7 m.) to the Montclair and Greenwood Lake Railroad Bridge; thence 8 feet (2.4 m.) to a point 500 feet below the Eighth Street Bridge; thence 6 feet (1.8 m.) to Eighth Street Bridge.

There is some commerce up to Wall Street, about 0.8 mile above Eighth Street. Above the Wall Street Bridge the river is obstructed by boulders partly showing above water. Dundee Dam, the first one above Passaic, is 1.5 miles above Wall Street Bridge.

The city of **Newark** extends along the Passaic River for a distance of nearly 5 miles above its mouth. The towns of **Belleville, Rutherford, Nutley, Garfield,** and several villages are located on the river between Newark and Passaic. The latter is a manufacturing city at the head of navigation.

At Rutherford, on the east side of the River about 1.5 miles below Passaic, there is a small marine railway capable of hauling out small craft up to lengths of 30 feet and a draft of 4 feet (1.2 m.).

Tides.—The mean rise and fall of tides is about 5 feet at the mouth of the river, 5¼ feet at Newark and 5½ feet at Passaic. High and low water at these points occur about ½ hour, ¾ hour, and 1¼ hours, respectively, later than at the Battery. Ordinarily the flood current extends above Second Street bridge, Passaic.

Freshets overcome the flood current down as far as Newark, and sometimes to the mouth of the river. Ordinary freshets cause a rise of about 2 feet and a current velocity of about 3 knots at Newark and are of a few hours' duration. Destructive freshets occasionally occur at intervals of years, generally in the spring and fall.

Bridges.—The following are the bridges crossing the Passaic River. They are all drawbridges, except as noted.

Bridges over Passaic River

Name or location	Distance above mouth	Clearances		
		Horizontal	Vertical	
	Miles	*Feet*	*Feet*	*Meters*
Central Railroad of New Jersey	1. 0	100. 0	25. 0	7. 6
Lincoln Highway	1. 6	101. 5	10. 0	3. 0
State Route No. 25 [3] (Pulaski Skyway)	1. 7	520. 0	133. 0	40. 5
Pennsylvania Railroad (freight at Point No Point).	2. 2	103. 0	16. 6	5. 1
Jackson Street (highway)	3. 8	75. 0	15. 4	4. 7
Market Street (P. R. R.) Vertical lift	4. 2	201. 0	[1] 136. 9 [2] 24. 0	41. 7 7. 3
Center Street (P. R. R.)	4. 5	81. 0	10. 0	3. 0
Bridge Street (highway)	4. 8	80. 9	7. 9	2. 4
Newark Branch (D., L. & W. R. R.)	4. 9	77. 8	15. 8	4. 8
Clay Street (highway)	5. 1	75. 5	8. 5	2. 6
Fourth Avenue (E. R. R.) bascule	5. 3	126. 7	7. 7	2. 3
Newark-Arlington (E. R. R.)	6. 8	45. 0	45. 5	13. 9
Rutgers Street (highway) bascule	7. 5	98. 9	8. 6	2. 6
Avondale (highway)	9. 1	65. 8	7. 8	2. 4
Boonton Branch (D., L. & W. R. R.)	10. 0	47. 8	26. 1	8. 0
Rutherford Avenue (highway)	10. 2	67. 8	9. 4	2. 9
Union Avenue (highway)	11. 4	65. 0	13. 0	4. 0
Aycrigg Avenue (Erie R. R.)	11. 7	[4] 62. 0	18. 6	5. 7
Gregory Avenue (highway)	12. 2	56. 5	12. 5	3. 8
Second Street (highway) bascule	12. 7	100. 0	5. 9	1. 8
Eighth Street (highway) bascule	13. 1	70. 4	5. 7	1. 7
Wall Street (highway) [3]	13. 6	78. 0	5. 6	1. 7

[1] Up. [2] Down. [3] Fixed spans. [4] West opening used only.

NOTE.—The vertical clearances are given at mean high water and when the drawbridges are closed, 3 high-tension lines cross the river, and the minimum clearance is 135 feet (41.1 m) above mean high water. The bridge signal is 3 blasts of the whistle.

Bridge regulations.—For regulations governing the operation of the bridges crossing the Passaic River see page 362.

HACKENSACK RIVER

(CHART 287)

Hackensack River empties at the northeast end of Newark Bay and is navigable a distance of about 17.6 miles to dams at New Milford. The principal navigable tributaries are **Berry Creek Canal** * (entrance to **Berry Creek**) and **Overpeck Creek,** 6.8 and 11.1 miles, respectively, above the entrance, which are crossed by drawbridges and are navigable for distances of about 3 miles from Hackensack River. Berry Creek Canal, which is 1 mile long, 150 feet wide, has a least channel depth of about 11 feet (3.4 m.) and leads to Berry Creek above the Erie Railroad.

The project for the improvement of the river is to obtain a channel 30 feet (9.1 m.) deep and 400 feet wide from the upper end of Newark Bay Channel for about 1 mile to the Central Railroad bridge; thence 30 feet (9.1 m.) deep and 300 feet wide for about 2 miles to the Delaware, Lackawanna & Western Railroad bridge at Marion; thence 12 feet (3.7 m.) deep and 200 feet wide for about 9 miles to Little Ferry; and thence the same depth and 150 feet wide

*Lat. 40°47'.9, Long. 74°05'.5: Chart 287.

for about 2 miles to the New York, Susquehanna & Western Railroad bridge at Hackensack.

When examined in February 1939 the controlling mean low water depth in the Hackensack River was 27 feet (8.2 m.) to a point about 2,000 feet above the Delaware, Lackawanna & Western Railroad bridge; thence 12 feet (3.7 m.) to the head of the project at the New York, Susquehanna & Western Railroad bridge at Hackensack.

Tides.—The mean rise and fall of the tides is about 5 feet at the mouth of the river and 5¼ feet at Little Ferry and Hackensack. High and low water at these points occur about ½ hour, 1½ hour and 1¾ hours, respectively, later than at the Battery. The river has little freshet flow, and the tidal currents are rarely affected by it.

Bridges.—The following are the bridges crossing the Hackensack River. They are all drawbridges, except as noted.

Bridges over Hackensack River

Name or location	Distance above mouth	Clearances			Remarks
		Horizontal	Vertical		
	Miles	*Feet*	*Feet*	*Meters*	
Central Railroad of New Jersey	1. 0	94. 4	25. 0	7. 6	
Lincoln Highway	1. 7	150. 0	10. 0	3. 0	
State Route No. 25 [3]	1. 9	300. 0	135. 0	41. 1	
Pennsylvania Railroad, passenger	2. 6	168. 0	[1] 40. 0 [2] 135. 0	12. 2 41. 1	
Pennsylvania Railroad, freight	2. 6	158. 0	[1] 11. 6 [2] 135. 0	3. 5 41. 1	
Newark Turnpike	2. 6	158. 0	[1] 35. 0 [2] 135. 0	10. 7 41. 1	
Delaware, Lackawanna & Western Railroad (at Marion).	3. 0	150. 0	[1] 40. 0 [2] 135. 0	12. 2 41. 1	
Pennsylvania Railroad (near Snake Hill).	4. 3	99. 6	23. 5	7. 2	
Erie Railroad (near Snake Hill).	4. 6	99. 0	7. 5	2. 3	
Delaware, Lackawanna & Western Railroad (Boonton branch).	6. 0	56. 0	5. 5	1. 7	
Erie Terminals Railroad	6. 7	99. 0	4. 4	1. 3	
State Route No. 3	7. 7	150. 0	35. 0	10. 7	
State Route No. 6	12. 2	150. 0	35. 0	10. 7	
Court Street, Hackensack	14. 1	56. 5	3. 95	1. 2	
Railroad bridge, Hackensack	14. 2	43. 0	2. 2	0. 7	East opening only used.
Bergen County traction (Hackensack).	14. 3	58. 0	7. 6	2. 3	
Anderson Street (Hackensack).	15. 1	45. 0	3. 5	1. 1	
State Route No. 4 [3]	15. 7	70. 0	20. 5	6. 2	
New Bridge (highway)	16. 6	39. 1	2. 7	0. 8	
River Edge (highway)	17. 9	39. 0	5. 5	1. 7	

[1] Down. [2] Up. [3] Fixed bridges.

NOTE.—The vertical clearances are given at mean high water and when the drawbridges are closed. 2 high-tension lines cross the river and the minimum clearance is 139 feet (42.4 m.) above mean high water. The bridge signal is 3 blasts of the whistle.

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Bridge Regulations.—Part of the bridge regulations prescribed for the operation of drawbridges across Newark Bay, the Passaic and Hackensack Rivers, and their navigable tributaries, follow:

(*a*) (1) The draws shall be opened promptly, upon signal, for the passage of vessels during the day or night, except as hereinafter prescribed.

(2) During the hours between 7:30 and 10:00 a. m. and between 5:00 and 7:30 p. m. drawbridges shall not be required to remain open longer that 10 minutes nor shall the passage of any vessel be delayed for longer than 10 minutes except as provided in subparagraph (6).

(3) The draw of any bridge used solely for the United States mail, passenger, and express trains need not be opened for a vessel reaching said draw less than 5 minutes before the scheduled arrival of any such train until such train passes, unless the bridge tender has notice that the train is delayed more than 5 minutes. The owners of bridges acting under this rule shall maintain a tug at the drawbridge to control and aid in the passage of vessels.

(4) When a vessel approaches within signaling distance of a bridge for passage, the master thereof shall signify his intention by three blasts of a whistle or horn. For those bascule bridges that have two separate and distinct drawspans the approaching vessel shall signal for an opening of the bridge in the customary manner by three blasts of a whistle or horn, and this shall be followed after a short interval with one blast, if it is desired that the drawspan on the starboard hand as the vessel approaches be opened, or by two blasts if it is desired that the one on the port hand be opened. The signal of the craft shall be immediately answered by the tender or operator of the bridge. If the draw is ready to be immediately opened, the answer shall be three blasts of a whistle or horn from the bridge. In case of delay in opening the draw, as is provided for in these regulations, or as may be necessary by accident to the machinery or other contingency, the signal from the vessel shall be answered by two long blasts of a whistle or horn from the bridge. In all cases when delay signals have been given, a signal of three blasts of a whistle or horn shall be given as soon as it is possible to open the draw.

(5) The foregoing regulations apply only to commercial or pleasure vessels. Steamers or vessels employed or controlled by the United States Government, State government, or by municipal departments shall be passed without delay through the draws of said bridges at any hour of the day or night, upon giving four blasts of the whistle.

SPECIAL REGULATIONS

(*b*) The following special regulations are prescribed to govern the operation of the following bridges across the Hackensack and Passaic Rivers, and Overpeck Creek:

Hackensack River: Anderson Street Bridge, Hackensack, N. J., New Bridge, Cherry Hill, N. J., River Edge Bridge, New Milford, N. J.

Passaic River: West Eighth Street Bridge, Passaic, N. J.

Overpeck Creek: For Lee Turnpike Bridge, Leonia, N. J., Bergen Turnpike Bridge, Ridgefield Park, N. J.

(1) The owner of, or agency controlling, the bridge will not be required to keep a draw tender in constant attendance at the above-named bridges.

(2) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, at least 24 hours' advance notice of the time the opening is required shall be given, by telephone or otherwise, to the authorized representative of the owner or agency controlling the bridge.

(3) Upon receipt of such notice, the authorized representative specified therein, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(4) The owner of, or agency controlling, the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge in a manner that it can easily be read at any time a copy of these regulations together with a notice stating exactly how the representative specified in subparagraph (2) may be reached.

Chapter 17.—NEW YORK LOWER BAY, WESTERN PART

SANDY HOOK BAY

Sandy Hook Bay is the southern part of the lower bay, lying westward of Sandy Hook* and eastward of Point Comfort. The bay is an excellent anchorage, the depth of water ranging from 30 feet (9.1 m.) just inside the Hook to 15 feet (4.6 m.), near its southern part; the shoaling is gradual and the bottom good holding ground. The best anchorage for easterly and southeasterly winds is in the eastern part of the bay. Steamers ply between Atlantic Highlands and New York daily during the summer months, and during this season anchorage on a line between Atlantic Highlands railroad pier and the entrance to the channel west of Flynns Knoll should be avoided. Vessels of over 24-foot (7.3 m.) draft will not find good anchorage out of the channel until above Quarantine. Extensive shoals make off 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. There are heavy fish traps, extending out to a depth of 20 feet (6.1 m.) in places, on the shoals on the southwest side of Sandy Hook Bay between Atlantic Highlands and Point Comfort.

Navesink River and Shrewsbury River are described on page 365.

Atlantic Highlands is a town situated on the south side of Sandy Hook Bay about 2 miles west of Sandy Hook. There are several prominent wharves the easternmost of which is used by the railroad for connections by ferry which runs to New York. The westernmost wharf is owned by the Standard Oil Co. of New York and has a pipe line for transferring their products from vessel to storage tanks. There is a depth of about 14 feet (4.3 m.) near the end of the railroad wharf and about 10 feet (3.0 m.) near the end of the Standard Oil Co. wharf.

Railroad communication is also had with New York and other points. Very few boat supplies can be obtained, and gasoline is not sold from any of the wharves.

Compton Creek (charts 369 and 543) is on the south side of Sandy Hook Bay, 4 miles west-southwestward of Sandy Hook Lighthouse; the entrance is called **Shoal Harbor.** A channel 150 feet wide has been dredged to the entrance of the creek and when examined in 1939 there was a controlling depth of 5 feet (1.5 m.) for the full width of the channel. There are depths of 7 feet (2.1 m.) in the creek as far as the drawbridge at Main Street. The entrance channel is well marked. The creek is navigable by small boats a distance of 1 mile to a railroad bridge without a draw. A highway drawbridge crosses the creek 0.3 mile above the entrance which has a horizontal clearance of 40 feet and a vertical clearance of 4.9 feet (1.5 m.) above mean high water when closed. One-half mile above the entrance, two

*Lat. 40°26'.6, Long. 73°59'.5: Charts 543, 369, 1215, 1108.

highway bridges, without draws but having a clearance of about 4 feet (1.2 m.) at high water, cross the creek.

Port Monmouth, a village at the mouth of the creek, is the shipping point for garden produce from the adjoining country, and for fish and oysters. The creek is used extensively as a harbor of refuge by small fishing craft.

Staten Island (Richmond Borough of New York City) forms the northwest side of New York Lower Bay. The high wooded ridge of the island has elevations of 100 to over 300 feet (30 to over 91 m.). **South Beach** and **Midland Beach** are summer resorts and amusement areas on the southeast side of the island.

Miller Field is an airport of the New York National Guard and is located at **New Dorp Beach,** southwestward of Midland Beach. At the south corner of the field is **Elm Tree Beacon** which is used in conjunction with **New Dorp Beacon** to form the entrance range for South Channel and Swash Channel. Elm Tree Beacon has an airway beacon on the top of it.

Staten Island Flats are the extensive shoals making off from the southeast side of Staten Island. Parts of these flats are known as Old Orchard Shoal and West Bank, the latter bordering on the main channel up the bay. A channel used by local vessels of less than about 8-foot (2.4 m.) draft leads westward of **West Bank**. From the bell buoy 0.6 mile southward of Fort Wadsworth steer southwestward through the dredged channel to gong buoy about 0.5 mile northward of Hoffman Island and then steer for a bell buoy in range with Old Orchard Shoal Lighthouse.

Old Orchard Shoal Lighthouse* is a conical tower, lower half brown, upper half white, on a black pier.

The light shows white from a bearing of 203° true to 87° true (from seaward) and red in the remaining sector. The fog signal is a diaphragm horn.

Great Kills Harbor is a shallow bight on the south side of Staten Island northwestward of Old Orchard Shoal Lighthouse. It is used as an anchorage by small local craft, but is exposed to southerly and southwesterly winds.

An entrance channel has been dredged from the vicinity of Great Kills Light to the entrance of the harbor at the westerly end of **Crooks Point.** When examined in 1939 the controlling depth at mean low water was 7 feet (2.1 m.) in the entrance channel. Depths in the northern part of the harbor are shoal but there are depths of 10 to 14 feet (3.0 to 4.3 m.) in the south part.

A jetty about 0.2 mile long extends from Crooks Point toward Great Kills Light.

There are several boat yards at Great Kills having marine railways which are capable of hauling out small craft up to lengths of 60 feet and a draft of 5 feet (1.5 m.). Gasoline and oil are available and during the summer a barge is anchored in the harbor where these supplies can also be obtained.

Great Kills Light is a red skeleton tower with a white tankhouse situated about 1 mile southeastward of Great Kills Harbor.

New York and New Jersey Channels are the channels extending from deep water in the main channel, northwest of Sandy Hook,

*Lat. 40°30'.7, Long. 74°06'.0: Charts 369, 1215.

through Lower New York Bay and Raritan Bay to Perth Amboy, and thence through Arthur Kill, lower Newark Bay, and Kill van Kull, known collectively as **Staten Island Sound,** to deep water in Upper New York Bay. This route is located approximately along the boundary line between the States of New York and New Jersey.

These channels are under improvement to maintain a depth of 30 feet (9.1 m.) for a width of 600 feet from deep water in Lower New York Bay through Raritan Bay and Staten Island Sound to deep water in Upper New York Bay, with a branch channel in Raritan Bay to South Amboy, and a branch channel north of Shooters Island, protected by a dike on its northern side.

In 1939 the controlling mean low water depth from Lower New York Bay to Upper New York Bay through these channels was 30 feet (9.1 m.) for a width of 400 feet.

In the branch channel to South Amboy the controlling depth was 22 feet (6.7 m.).

NAVESINK RIVER AND SHREWSBURY RIVER

(CHART 543)

Navesink River and Shrewsbury River empty through a common entrance into the southern extremity of Sandy Hook Bay eastward of the Highlands of Navesink. The rivers have a navigable length of about 7 miles above the entrance in Sandy Hook Bay.

The controlling depth at mean low water when examined in 1939 was 12 feet (3.7 m.) from Sandy Hook Bay to the vicinity of the bridges at Highlands; thence 8 feet (2.4 m.) for the full channel width of 150 feet to the Branchport Avenue Bridge at Branchport, except for minor shoaling along the edge of the channel lines. Near the junction of the channels of the Shrewsbury and Navesink Rivers just south of the highway bridge there is a shoal with a controlling depth of 3 feet (0.9 m.).

In the **Navesink River** the controlling depth was 6 feet (1.8 m.) from the junction with the Shrewsbury River to Red Bank, New Jersey, except for a shoal 1,200 feet west of the Rumson-Locust Point Bridge where the depth was 5 feet (1.5 m.).

In the absence of local knowledge the chart is the best guide. The following remarks may be of some assistance to small craft using the chart.

In approaching through Sandy Hook Bay, bring Navesink Lighthouse to bear 151° true and head for it on this bearing, passing close eastward of the entrance lighted bell buoy.

The Channel is well marked and no difficulty should be had if mid-channel courses are followed. Pass through the west draw of the railroad bridge and the draw of the highway bridge. The horizontal clearance of the west draw is 98 feet with a vertical clearance of 6 feet (1.8 m.) above mean high water when the bridge is closed. The bascule highway bridge has an opening 100 feet wide and a vertical clearance of 35 feet (10.7 m.) above mean high water when the bridge is closed.

The east side of the river northward of the bridges and west side 0.3 mile southward of the bridges are used as anchorages for motor-

boats. From the bridges the channel follows the west side to the junction of the channel leading into Navesink River, and Reeves Channel leading to Shrewsbury River.

When entering **Navesink River** caution should be used to avoid the submerged stone jetty at the junction of the channels of the Navesink and Shrewsbury Rivers. A lighted horizontally banded buoy marks the junction of the channels, and craft going to points on the Navesink River should pass westward of this buoy. Many craft have been damaged by confusing the buoys and running aground on the east side of the jetty. The channel from **Lower Rocky Point** westward is crooked but well marked by buoys. The Oceanic-Locust Point Bridge has a bascule opening 75 feet wide and a vertical clearance or 25 feet (7.6 m.) above mean high water when the bridge is closed.

Just west of the bridge is a landing, depth 5 feet (1.5 m.), at **Oceanic,** from which the channel leads northwestward. The landings above Oceanic are **Fairhaven,** depth 8 feet (2.4 m.), and Red Bank, depth 3 feet (0.9 m.). The channel to **Red Bank** is buoyed and the chart is the best guide.

Reeves Channel and the channel in Shrewsbury River are marked by several lighted buoys, which are maintained from April 1 to November 1. The horizontally striped lighted buoy on the west side of the channel at the entrance is off the north end of a submerged jetty, which shows only at lowest tides.

A highway bridge crosses the channel in the vicinity of Seabright which has a horizontal clearance of 75 feet and a vertical clearance of 9 feet (2.7 m.) above mean high water when closed. There is a submerged rock jetty extending northeastward from the northeast end of **Sedge Island** which blocks the passage to the eastward of this island.

The channel trends southwestward for about 1 mile from Sedge Island and then southward through **Pleasure Bay** to Branchport. It is well marked by buoys. A highway drawbridge crosses the channel in Pleasure Bay which has a horizontal clearance of 70 feet and a vertical clearance of 7.9 feet (2.4 m.).

Sandy Hook, including **Island Beach,** is a Government reservation down to the north end of Highland Beach, and landing is not permitted. **Highland Beach, Navesink Branch, Normandie, Seabright, Monmouth Beach,** and **Long Beach** are summer resorts, with railroad communication, on the outside beach.

Highlands,* a town on the west side of the entrance, is a summer resort and has only a small native population during the winter. Fishing is the chief industry.

Gasoline, water, and other supplies can be obtained. The Central Railroad of New Jersey connects Highlands with New York and with Long Branch, Asbury Park, and points to the south.

There is a public landing north of the bridges at Highlands.

Fairhaven, a suburb of Red Bank, lies about 1 mile above the Oceanic Bridge on the Navesink River. Gasoline and supplies in limited quantities can be obtained.

Red Bank is a town at the head of navigation on Navesink River. Water is piped to the steamboat dock, which has a depth of about 2

*Lat. 40°24′, Long. 74°00′ : Charts 543, 369, 1215.

feet (0.6 m.) alongside. Gasoline and supplies in limited quantities can be obtained.

Branchport, at the head of navigation on Pleasure Bay, Shrewsbury River, has two small marine railways. Supplies and repairs can be had.

Oceanport, at the head of navigation on Shrewsbury River, has a depth of ½ foot (0.1 m.) at low water to it, the channel leading through two drawbridges. The horizontal clearance of the draw opening in the highway bridge is 62 feet with a vertical clearance of 5.9 feet (1.8 m.) above mean high water when the bridge is closed. The railroad drawbridge has a horizontal clearance of 61 feet and a vertical clearance of 5 feet (1.5 m.) above mean high water when closed.

Tides.—The mean rise and fall of tides are as follows: Entrance, 4¾ feet; Highlands Bridges, 3½ feet; Seabright Bridge, 2 feet; head of Shrewsbury River, about 1¼ feet; Oceanic, 2¾ feet; Red Bank, about 2¾ feet. Strong southerly and westerly winds lower the water about 1 foot, and northerly and easterly winds raise it an equal amount; the greatest variations noted are from 2 to 2½ feet.

High water occurs later than the time of high water at Sandy Hook, as follows: Rocky Point, 1 hour; Red Bank, 2 hours; head of Shrewsbury River, 3½ hours.

Currents.—The tidal currents have considerable velocities in the contracted parts of the channel. The currents generally set fair with the channels and through drawbridges. Slack waters before flood and ebb occur about 3 hours after low water and 2¾ hours after high water, respectively, at Sandy Hook. The velocity at strength is about 2½ knots.

In Navesink River, in the vicinity of the bridge off Oceanic, the currents have a velocity of about 2 knots at strength, and slack water occurs about 3 hours after high and low waters at Sandy Hook.

At Seabright Bridge, Shrewsbury River, the average velocity at strength is about 1½ knots. Slack water before flood occurs about 2½ hours before high water and slack before ebb about 3¼ hours before low water, at Sandy Hook.

Storm warnings are displayed at Long Branch, Sandy Hook, and Red Bank.

Ice.—Navigation in Navesink and Shrewsbury Rivers is generally suspended on account of ice from December to March, inclusive.

Bridge regulations.—The bridge regulations governing the opening of drawbridges across the Navesink and Shrewsbury Rivers are listed under those for Raritan Bay. See page 370.

Directions.—The channels are well buoyed and otherwise marked so that with a chart as a guide and the information already given in the preceding text no detailed directions are required.

Repairs.—There are several boat yards on the Navesink and Shrewsbury Rivers which have marine railways and at which repairs can be obtained. At Seabright and Branchport small craft up to lengths of 40 feet and a draft of 5 feet (1.5 m.) can be accommodated. At Fairhaven the marine railway has a capacity of 150 tons and can haul out vessels up to lengths of 100 feet and drafts of 6 feet (1.8 m.). At Red Bank the marine railway can accommodate small craft up to lengths of 60 feet and a draft of 5 feet (1.5 m.).

Supplies.—Gasoline and oil can be obtained at most of the towns along the shores of the Navesink and Shrewsbury Rivers.

Communication.—There is railroad communication to New York and to points on the New Jersey Coast.

RARITAN BAY

(CHARTS 369 AND 286)

Raritan Bay is the part of New York Lower Bay lying westward of Point Comfort and southward of Staten Island. The bay is full of shoals, with depths of 7 to 18 feet (2.1 to 5.5 m.).

Raritan Bay Channel, leading to the south end of Arthur Kill from the junction of Sandy Hook and Chapel Hill Channels west of Sandy Hook, through the Lower Bay and along the southern shore of Staten Island, is well marked by lights and buoys. In 1939 the controlling mean low-water depth was 30 feet (9.1 m.) from the junction of the above-mentioned channels to the widening in the vicinity of **Ward Point** at the south end of Staten Island. The direct channel over the shoals is good for a depth of about 11 feet (3.4 m.) and is used only by small vessels and towboats.

Point Comfort, on the south side of Raritan Bay, is the location of **Keansburg,** a summer resort. There are two wharves on the western side of the point, the northern one having a depth of 7 feet (2.1 m.) at its end. The other is in poor condition and is no longer used. It has about 3 feet (0.9 m.) at its end. Further south is the ruins of another pier. Steamboat connection is maintained with New York during the summer, and there are railroad connections with New York and with points east and south.

Matawan Creek empties into Raritan Bay from southward, between **Conaskonk Point** and **Matawan Point.***

A channel has been dredged from Raritan Bay to the entrance of Matawan Creek. When examined in 1939 the controlling mean low water depth was 5 feet (1.5 m.). The channel is well marked by buoys. Buoys also mark the west side of the shoal westward and northward of Conaskonk Point.

The mean rise and fall of the tide at Keyport is about 5.0 feet.

Matawan Creek above Keyport is very shoal, there being only about 1 foot (0.3 m.) of water in the creek at low water. It is used by local craft, but it is not commercially important. It is crossed by a highway drawbridge at Keyport which has a horizontal clearance in the draw opening of 49 feet and vertical clearance of 6 feet (1.8 m.) above mean high water when the bridge is closed. Several other bridges cross the creek in the vicinity of Matawan, there being a minimum horizontal clearance of 23 feet and a minimum vertical clearance of 12 feet above mean high water.

Keyport is at the entrance of Matawan Creek. There is railroad and bus service to New York, a passenger steamer runs to Perth Amboy and New York during the summer. When the harbor freezes over, freight is trucked to Perth Amboy for shipment to New York. Water, coal, gasoline, and other supplies can be obtained. There is a marine railway capable of hauling out vessels 80 feet long and

*Lat. 40°26′.8, Long. 74°12′.6: Charts 286, 369.

up to 35 tons, and there are facilities for repairing wooden hulls and making machine repairs.

There is a privately dredged channel, about 25 feet wide in places, from the steamboat wharf at Keyport to a small boat basin at the entrance to **Oyster Creek.** In 1939 the channel was being used only at high water and was marked by bush stakes.

Gasoline, oil, water, and boat supplies can be obtained at the basin. Boats up to 60 feet and about 25 tons can be hauled out. There are facilities for repairing wooden hulls, the machine repairs being done elsewhere in Keyport.

Cheesequake Creek is on the south side of Raritan Bay southward of Great Beds Lighthouse. The entrance is between two strong jetties, awash at high water, which are 200 feet apart and are marked at the outer ends by a light on the west jetty and a spindle on the east jetty.

The controlling depth off the entrance was about 4 feet (1.2 m.) in 1939. About 50 yards north of the north end of the east jetty there is a small shoal which was reported locally to have a depth of only 2½ feet (0.8 m.) at mean low water. There is deeper water in the creek.

Local boats bound for the creek from the Lower Bay usually steer for the boundary beacon 1.6 miles northeastward of the jetties. Passing close to the beacon a course of about 265° true is steered, heading for a prominent brick stack about 0.9 mile northwestward of the entrance, until Great Beds Lighthouse bears approximately 0° true. The east transmission tower, near the entrance, and the light at the north end of the west jetty is then used as a range on a course of about **196°** true until almost at the entrance light, then turn and follow midchannel courses between the jetties.

Caution is recommended to avoid the wrecks lying about 0.2 mile eastward of the east jetty. These wrecks are bare at low water.

The creek is crossed at the inner end of the jetties by a highway trestle bridge (opening 51 feet) and a short distance farther up by a railroad trestle bridge (opening 50 feet). The vertical clearances are 5 feet and 3.8 feet (1.5 m. and 1.2 m.), respectively, above mean high water, when closed. The channel in the creek is good for a depth of about 3 feet (0.9 m.) at low water for a distance of about 3 miles above the entrance to **Cheesequake.** The mean rise and fall of **tides** is about 5¼ feet.

There are two **boat yards** with marine railways which can accommodate small craft up to lengths of 40 feet and a draft of 3½ feet (1.1 m.). Repairs to both hull and motors can be obtained. Gasoline, oil, fresh water, and bait are available. There is a limited amount of ship chandlery supplies.

Laurence Harbor, a summer resort, lies on the east side of the entrance to Cheesequake Creek, and **Morgan,** a small settlement, lies on the west side. Gasoline and supplies in limited quantities can be obtained here.

Great Beds Lighthouse,* white conical tower on black pier, is on the shoals at the western end of Raritan Bay.

The fog signal is a bell.

*Lat. 40°29'.2, Long. 74°15'.2: Charts 286, 375, 369.

On the **south side of Staten Island,** there is a prominent tower with a statue on the top on the west side of **Princess Bay** and there are prominent buildings near the point at **Red Bank.**

Lemon Creek is a narrow, shallow stream on the south side of Staten Island 0.2 miles westward of Seguine Point. It is not used except by local boats which enter at high water as the entrance is practically bare at low water. There are several small boat yards where small craft up to lengths of 45 feet and a draft of 4 feet (1.2 m.) can be hauled out. Gasoline and motor-boat supplies are available. A drawbridge (opening 30 feet) about 4 feet (1.2 m.) above high water crosses the creek near its mouth. There is a yacht club just eastward of the entrance with depths of 4 feet (1.2 m.) at the landing.

Seguine Point is marked by a prominent large factory, with a conspicuous chimney and cupola to northward. There is a depth of about 9 feet (2.7 m.) at the wharf.

Pilotage for ports in the States of New York and New Jersey is compulsory for certain vessels (see pilotage under New York Harbor preceding). Pilots for New York Bay have authority and sometimes bring vessels into Perth Amboy and South Amboy. Vessels bound up the Raritan River or Arthur Kill, and desiring a pilot, can get one at Perth Amboy or from a pilot boat cruising off Sandy Hook.

Towboats are used by the larger sailing vessels, and by all but very small craft, bound up the Raritan River and Arthur Kill. They can be had by making signal off the entrance to the dredged channel, and are found cruising in the lower bay inside Sandy Hook.

Quarantine.—The national quarantine boarding station is at a landing near the southern end of Perth Amboy. The quarantine anchorage is westward of the middle ground off the south end of Perth Amboy, see large-scale chart.

Hospital.—At Perth Amboy there is a relief station of the United States Public Health Service.

The **anchorage** limits are given on large-scale chart.

Tides.—The mean rise and fall of the tides is about 5¼ feet.

Storm warnings are displayed at Sandy Hook.

Ice.—In ordinary winters ice does not seriously interfere with navigation in Raritan Bay or Arthur Kill, but in severe winters the ice sometimes prevents the movements of vessels for periods of two weeks at a time. In easterly winds the drift ice in New York Lower Bay collects in Raritan Bay and obstructs navigation, but usually only for a short time, as the prevailing westerly winds drive the ice out of the bay.

Bridge regulations have been prescribed, the most important of which follow:

1. All drawbridges spanning Raritan Bay, Arthur Kill, and their navigable tributaries, and Shrewsbury River shall be opened promptly upon signal, for the passage of vessels during the day or night, except as prescribed in paragraph 2.

2. During the hours between 7:30 and 10 a. m. and between 5 and 7:30 p. m. drawbridges shall not be required to remain open longer than 10 minutes nor be permitted to remain closed longer than 10 minutes to the exclusion of vessels approaching for passage. *Provided*, That the draw of any bridge used solely for United States mail, passenger, and express trains need not be opened for a vessel reaching said draw less than five minutes before the

scheduled arrival of any such train, until such train passes, unless the bridge tender has notice that the train is delayed more than five minutes: *Provided further*, That the owners of bridges acting under this rule shall maintain a tug at the drawbridge to control and aid in the passage of vessels.

3. When a vessel approaches within signaling distance of a bridge for passage, the master thereof shall signify his intention by three blasts of a whistle or horn. The signal shall be answered by three blasts of a whistle or horn from the bridge, unless, under paragraph 2, a delay in opening is permitted, when the answer from the bridge will be two blasts of a whistle or horn, and the tug stationed at the draw shall immediately go to the assistance of the vessel.

4. The foregoing regulations apply only to commercial or pleasure vessels. Steamers or vessels employed or controlled by the United States Government or by municipal departments shall be passed without delay through the draws of said bridges at any hour of the day or night upon giving four blasts of the whistle.

Supplies.—Coal and water can be had at the wharves in Perth Amboy and South Amboy. Provisions and ship chandler's stores can be had at Perth Amboy, South Amboy, Tottenville, and New Brunswick.

Repairs.—See description of Perth Amboy and Tottenville.

Directions, Raritan Bay.—The approach to the entrance of the dredged channel in Raritan Bay is easy of access in the daytime with the aid of the chart, and anchorage can be selected below the dredged channel. For anchorage limits see large scale chart. Vessels of a greater draft than about 15 feet (4.6 m.) should take a pilot. The sides of the dredged channel are marked by lights and numerous buoys.

Enter the bay on courses as given under the description of **Sandy Hook-Gedney Channel** (p. 346) and proceed to a position near the lighted gong buoy marking the junction of the Sandy Hook, Chapel Hill, and Raritan Bay Channels. From this lighted gong buoy steer **286°** true following a midchannel course to Sequine Point being guided by the buoys and lights marking the channel.

When beacon No. 2 bears 145° true, steer **267°** true. An unused lighthouse tower, on the top of which there is a statue, on the west side of Princess Bay will be on the port bow. Pass about 150 yards southward of Seguine Point. From a position 225 yards north of beacon No. 3 steer a midchannel course of **226°** true until beacon No. 5 bears 270° true at a distance of about 350 yards. From this position the channel turns and leads westward, by dredged channels to the Raritan River and South Amboy, and also northwestward to Perth Amboy and Arthur Kill.

To South Amboy.—From a position 107° true, 800 yards distant from Great Beds Lighthouse steer a midchannel course of **269°** true and pass about 225 yards south of Great Beds Lighthouse. When beacon No. 1 bears 359° true (on starboard beam) distant 100 yards, steer in midchannel course of **306°** true and head for the drawspan in the railroad bridge. Anchorage can be had on the north side of the channel below the bridge. See anchorage areas on large-scale chart.

To Perth Amboy.*—From a position 90° true, 600 yards distant from Great Beds Lighthouse, steer **333°** true for the wharves at Perth Amboy or to the ancorage west of Ward Point.

Small vessels of less than 9-foot (2.7 m.) draft can use the direct channel over the shoals in Raritan Bay. Passing close to the black bell buoy lying 0.7 mile northward of West Bank Lighthouse, steer

*Lat. 40°30'.5, Long. 74°16'.4: Charts 286, 375, 369.

232° true, which will lead northward of Old Orchard Shoal Lighthouse; then bring this lighthouse astern on a 246° true course and pass northward of the lighted buoy off Conaskonk Point. Continue the course past the buoy until Great Beds Lighthouse bears 276° true, and then steer this course for the lighthouse until up to the buoys marking the channels southward of Ward Point.

ARTHUR KILL

(CHARTS 285 AND 286)

Arthur Kill is the narrow body of water separating Staten Island from New Jersey and has an extensive traffic. On its shores are located Perth Amboy, Tottenville, Elizabethport, many large manufactories, and two important coal-shipping points.

Arthur Kill is under improvement to secure a channel 35 feet (10. 7 m.) deep and 600 feet wide, connecting with channels of the same depth and width through Kill van Kull at the north end and Raritan Bay at the south end. In 1939 the channel through Arthur Kill had a controlling depth of 30 feet (9.1 m.). The channel has been widened at Fresh Kills to secure a turning basin of suitable size. A cut-off channel 800 feet wide connecting the channel in Arthur Kill with the Raritan River Channel has been dredged to a controlling depth of 17 feet (5.2 m.) as determined in June 1939. For general information relating to Arthur Kill see Raritan Bay.

Tides.—The mean rise and fall of the tides in Arthur Kill is about 5 feet.

Currents.—Throughout Arthur Kill the flood current sets from Raritan Bay to Newark Bay and the ebb the reverse. Slack water occurs at Perth Amboy, at the south end of Arthur Kill, about 1 hour earlier than the corresponding slack at the Narrows (about 45 minutes after low and high water at the Battery.)

The mean velocity of the current at strength is about 1 knot. Slack waters before flood and ebb occur at Perth Amboy, at the south end of Arthur Kill, about ¾ hour after low water and high water at the Battery, respectively. Proceeding northward the slack waters occur later. At Travis, slack waters occur about 1½ hours after low and high waters at the Battery, while at Elizabeth slack waters occur about 2 hours after low and high water at the Battery.

Perth Amboy is on the point at the junction of Raritan River and Arthur Kill at the western end of Raritan Bay. The principal wharves are situated along the west bank of Arthur Kill. The deepest draft entering is about 23 feet (7 m.) at high water. There is a depth of 14 to 20 feet (4.3 to 6.1 m.) at low water alongside some of the wharves. There is good anchorage abreast the wharves in about 30 feet (9.1 m.). For anchorage areas see large scale chart. There are several floating docks at Perth Amboy. The largest is 250 feet long, has a dead-weight capacity of 2,500 tons, and will take a draft of 18 feet (5.5 m.). The facilities for repairs to hulls of vessels are excellent. See appendix.

There is communication by ferry from Perth Amboy to Tottenville, thence by railroad to St. George, and thence by ferry to the Battery.

Tottenville, a small town on the southwestern end of Staten Island, is of little commercial importance, but has a number of ship-

yards and marine railways for building and repairing vessels. The largest railway is 200 feet long, draft 8 feet (2.4 m.) forward and 14 feet (4.3 m.) aft, and capacity 1,000 tons.

The **Outerbridge Crossing Bridge** crosses Arthur Kill about 300 yards northward of Ploughshare Point and connects Perth Amboy with Tottenville. The height of the bridge above mean high water is 135 feet (41 m.).

Woodbridge Creek enters Arthur Kill from westward about 3 miles above Ward Point. A channel with a depth of 8 feet (2.4 m.) and least bottom width of 50 feet is maintained for a distance of 1.5 miles about the entrance, to the Salamander Dock. In June 1939, the controlling depth was about 7 feet (2.1 m.) for a distance of about 1.2 miles above the entrance, thence 4 feet (1.2 m.) to the Salamander Dock. Above this point the channel shoals gradually from a depth of 3 feet (0.9 m.) to 1 foot (0.3 m.) at the fixed bridge, which forms the head of navigation, about 2 miles above the entrance. Two bascule drawbridges, 300 feet apart, cross the creek 0.5 mile above the entrance. The draw openings are 50 feet wide, and the vertical clearances above mean high water, when closed, are 7.6 feet (2.3 m.) for the lower or highway bridge and 5 feet (1.5 m.) for the upper or railroad bridge. The overhead wires at the lower bridge are 113 feet (34.4 m.) above high water. There is some traffic to the various industrial plants on the creek, in vessels drawing from 5 to 10 feet (1.5 to 3 m.).

Smith Creek enters Arthur Kill from northward about ½ mile northward of Woodbridge Creek. There is a depth of about 2 feet (0.6 m.) on the bar at the entrance and greater depth inside. The channel at the entrance follows the western shore to avoid a shoal which extends southward from the marshy point on the east side of the creek and was marked by bush stakes in 1939. The creek is used as an anchorage for small craft, and there are numerous boathouses and private landings. Gasoline and supplies can be obtained at the hotel landing just south of the entrance.

Port Reading is a large freight terminal from which coal is shipped.

Fresh Kills enters Arthur Kill from eastward southward of the town of Travis. There are several brickyards on its banks, but the section is generally agricultural. There are two entrances 0.4 mile apart. The northern one is good for a depth of about 3 feet (0.9 m.) at low water, the channel at the entrance favoring the southerly shore to avoid a shoal which extends in a southwesterly direction from the point on the north side.

The southerly entrance of Fresh Kills, opposite the steel works at **Chrome,** is approached on a northeasterly course, favoring the south shore to avoid a shoal which extends southwestward from the shore on the north side. There is a depth of about 10 feet (3 m.) in the channel to the brickyard 0.4 mile inside the entrance, and a least depth of 8 feet (2.4 m.) to the forks in the Kills 1.4 miles above the southerly entrance.

Richmond Creek, the easterly branch of Fresh Kills, has a controlling depth of about 6 feet (1.8 m.) at low water for a distance of 1 mile to a drawbridge (bascule span, opening 60 feet wide and vertical clearance 9 feet (2.7 m.) above mean high water when closed).

Barges load to 11½ feet (3.5 m.) at high water at the brickyard at the village of Fresh Kills, below the bridge. Above the bridge the channel narrows and gradually shoals to a depth of about 2 feet (0.6 m.) at **Richmond,** a distance of 0.8 mile. The northerly branch is shoal, but barges of 5 feet (1.5 m.) draft are towed by launches at high water to the head of the creek at **Travis,** a distance of about 1.5 miles.

Bridge Regulations.—The drawbridge crossing Richmond Creek at Richmond Avenue is attended only on week days between 8 a. m. and 4 p. m. Anyone wishing to have the draw opened at other times must give 24 hours' notice.

Rahway River enters Arthur Kill from westward 0.5 mile southward of **Pralls Island** and extends westward about 4.5 miles to the town of **Rahway.** It is frequented only by motorboats and other small craft. The mouth of the river has been dredged along the south side from deep water in Arthur Kill to the railroad bridge.

There is a controlling depth of 6 feet (1.8 m.) for a width of 50 to 100 feet from the entrance to Lamberts wharf, a distance of about 2 miles.

A draft of 5 feet (1.5 m.) can be taken to Rahway at high water and this is about the deepest draft of boats that go above the first bridge.

Bridges across Rahway River

Name or location	Type	Distance above mouth	Clearances		
			Horizontal	Vertical	
		Miles	*Feet*	*Feet*	*Meters*
Carteret, Central R. R. of N. J	Swing	0. 1	50	4. 2	1. 2
East Rahway, Central R. R. of N. J	Bascule	1. 7	65	10. 3	3. 1
East Rahway, Public Service Corporation.	do	1. 8	65	6. 8	2. 1
Rahway:					
Lawrence St	Swing	3. 8	59	6. 2	1. 9
State Route No. 25	Fixed	3. 9	55	27. 0	8. 2
Milton Ave	Swing	4. 2	43	4. 9	1. 5
Monroe St	Fixed	4. 4	31	5. 9	1. 8

NOTE.—The vertical clearances are given at mean high water and when the drawbridges are closed. The bridge signal is 3 blasts of the whistle.

The **Goethals bridge** and the **Baltimore & Ohio Railroad bridge** cross Arthur Kill just southward of Elizabethport. The former is a cantilever bridge with a vertical clearance of 135 feet (41 m.) above mean high water. The railroad bridge is a center pier draw, with least opening (east) 202 feet wide and a vertical clearance of 31 feet (9.4 m.) above mean high water when closed.

Elizabethport,* the eastern part of the city of **Elizabeth,** is at the northern end of Arthur Kill at its junction with Newark Bay.

There is a shipyard at Elizabethport on the west side near the entrance of the Elizabeth River which has a marine railway with a capacity of 1500 tons and is capable of hauling out vessels up to

*Lat. 40°39′, Long. 74°11′: Charts 285, 369.

lengths of 200 feet and a draft of 12 feet (3.7 m.). There is also a small floating drydock of 200 tons capacity capable of accommodating small craft up to lengths of 100 feet. There is communication by ferry across Arthur Kill, thence by railroad to St. George, and thence by ferry to the Battery. Coal, water, gasoline, and supplies of all kinds are obtainable.

Elizabeth River enters Arthur Kill at Elizabethport. When examined in March, 1939, the controlling mean low water depth was 4 feet (1.2 m.) for a width of 40 feet from the entrance to the drawbridge at South First Street. Depths above this point are shoal and can be used only by small motorboats.

The following are the bridges crossing the Elizabeth River:

Bridges across Elizabeth River

Name or location	Type	Distance above mouth	Clearances		
			Horizontal	Vertical	
		Miles	*Feet*	*Feet*	*Meters*
South Front St	Bascule	0. 04	75	4. 0	1. 2
South First St	do	. 3	59. 9	5. 0	1. 5
Elizabethport	do	. 6	59. 3	15. 6	4. 8
Baltic St	do	. 8	60. 2	5. 8	1. 8
Summer St	do	1. 1	60	5. 5	1. 7
State Route 25	Fixed	1. 5	60	22. 0	6. 7
South St	Swing	1. 6	49. 5	2. 5	. 8
State Route 25	Fixed	1. 6	60	22. 0	6. 7
State Route 25	do	1. 7	60	22. 0	6. 7
Bridge St	Swing	1. 8	31. 6	3. 0	. 9

NOTE.—The vertical clearances are given at mean high water and when the drawbridges are closed. The bridge signal is 3 blasts of the whistle.

RARITAN RIVER

(CHART 375)

Raritan River empties into the western end of Raritan Bay between Perth Amboy and South Amboy. It has a length of about 11 miles from South Amboy to **New Brunswick** and is very crooked. Dredging has been done to provide a channel to New Brunswick. The channel is marked by lights, but the chart is the best guide. When examined at various times up to August 1938, the controlling mean low-water depth was 23 feet (7.0 m.) from the vicinity of Great Beds Lighthouse to the vicinity of the highway bridge at **Marsh Point**; thence 16 feet (4.9 m.) to the vicinity of **Keasby**; thence 15 feet (4.6 m.) to the north entrance of the **Washington Canal**; thence 10 feet (3.0 m.) to the lock of the **Delaware & Raritan Canal** at New Brunswick.

In the south channel, from the vicinity of **Keasby**, southwestward, there was a controlling depth at mean low water of 9 feet (2.7 m.) to the docks of a manufacturing plant on the east side of the river; thence 7 feet (2.1 m.) to **Crossman Dock**; thence 3 feet (0.9 m.) for about 6,000 feet; thence 1½ feet (0.5 m.) to the junction with the main channel in the vicinity of **Crab Island**.

Harbor control.—It is not lawful for any steamer to pass any of the wharves on either side of Raritan River, between New Brunswick and a point 200 yards below Frenchs or Woods landing, at a greater speed than 4 miles (statute) per hour while any vessel is lying thereto, nor pass up and down the river between said points at a greater speed than 7 miles (statute) per hour.

Bridges.—Two center-pier drawbridges cross Raritan River just above South Amboy. The lower or railroad bridge has openings 132 feet wide and 8.6 feet (2.6 m.) above high water. Victory Bridge, a highway bridge, 0.9 mile above the railroad bridge, has openings 140 feet wide and 28 feet (8.5 m.) above mean high water. The northern opening only should be used.

A high level highway bridge crosses the river about 0.5 mile above **Victory Bridge.** The horizontal clearance is 200 feet and the vertical clearance is 135 feet (41.2 m.) above mean high water.

In the vicinity of New Brunswick two fixed span highway bridges cross the river. The high concrete-arch bridge, about 1 mile below the city has a horizontal clearance of 90 feet and a vertical clearance of 100 feet (30.5 m.) above mean high water. The other bridge, crossing to Highland Park, has a horizontal clearance of 75 feet and a vertical clearance of 16.5 feet (5.0 m.) above mean high water.

Bridge regulations.—The bridge regulations for the operation of the bridges crossing the river are given under those of Raritan Bay and its tributaries. See page 370.

South Amboy Channel has a project depth of 25 feet (7.6 m.) for a width of 300 feet, extending from a junction with the Raritan Bay Channel eastward of Great Beds Light to deep water above the bridge of the Central Railroad of New Jersey at South Amboy. This channel had a controlling depth of 23 feet (7.0 m.) in 1939.

South Amboy * is an important port for the shipment of coal, petroleum products, and building materials, which are carried in vessels of 5 to 16 foot (1.5 m. to 4.9 m.) draft. There is a depth of about 19 feet (5.8 m.) at the principal wharves and this is about the deepest draft taken to this port. Coal, fresh water, and supplies of all kinds can be obtained here. There is bus service to Perth Amboy and along the south shore of Raritan Bay and to Atlantic City.

Sayreville is a village with extensive brickyards located on the south bank of the river 6 miles above the entrance. The entrance of the Washington Canal is at the western end of Sayreville.

The **Delaware and Raritan Canal** which has its entrance to the Raritan River at **New Brunswick** is closed to navigation.

The inside route from New York Bay to Delaware and Chesapeake Bays is described in United States Coast Pilot, Section C; and Inside Route Pilot, New York to Key West.

South River is entered through the **Washington Canal,** the entrance of which is at the western end of Sayreville, 6 miles above South Amboy.

When examined in May 1937 the controlling mean low-water depth in the **Washington Canal** was 12 feet (3.7 m.); thence 12 feet (3.7 m.) to the highway bridge at the town of **South River;** thence 10 feet (3.0 m.) to about 600 feet north of **Old Bridge.**

*Lat. 40°29′, Long. 74°17′: Charts 286, 375, 369.

Tides.—The mean rise and fall of tides is about 5¼ feet at South Amboy and 5¾ feet at New Brunswick; and on South River, about 5½ feet at Raritan Railroad Bridge. High and low water occur later than at Sandy Hook, as follows: South Amboy, about 15 minutes; New Brunswick, about 1 hour.

Bridge regulations.—Bridge regulations governing the operation of these bridges are given under those for Raritan Bay and its tributaries. See page 370.

Bridges.—The bascule highway bridge at South River has a horizontal clearance of 60 feet and a vertical clearance of about 6 feet (1.8 m.) at mean high water when the bridge is closed. The railroad swing bridge has a horizontal clearance of about 49 feet and a vertical clearance of about 40 feet (1.2 m.) at mean high water when the bridge is closed.

Repairs can be obtained at a small boat yard at South River which has a marine railway capable of hauling out small craft up to lengths of 40 feet and a draft of 4 feet (1.2 m.).

Supplies in limited amounts are available. Gasoline, Diesel oil, and fresh water may be obtained at the landings.

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Chapter 18.—HUDSON RIVER *

GENERAL INFORMATION

Hudson River, sometimes called **North River** in the vicinity of New York, has its source in Tear of the Clouds, a small lake in the Adirondack Mountains in the northeastern part of the State of New York. It flows southerly and empties in New York Upper Bay, the total length of the river being about 300 miles. The Federal dam at Troy, which is about 132 nautical miles above the Battery at the mouth of the river, is the head of tidewater. The dam contains a lock which permits boats to pass above Troy to the town of Waterford, which is about 2.5 miles above the dam.

From the Battery to Albany, the river now has a channel through which a depth of 27 feet (8.2 m.) can be carried. Above Albany there is a channel 12 feet (3.7 m.) deep to the Federal dam at Troy.

Fish traps.—Numerous fish traps are planted each spring, usually from about the middle of March to the middle of May, during the seasonal running of shad to the spawning grounds in the upper Hudson. In general the traps extend from one-fourth to two-thirds the distance across the river from the west side of the channel to the New Jersey shore. The outer end of stakes are usually marked by a flag during the day and by a lantern at night. Extreme caution should be used when navigating an area where the fish traps have previously been planted because of the danger from stakes broken off below the surface of the water.

Ice.—Navigation is interfered with by ice in the winter months to some extent, particularly in severe weather. The river steamers operating between Albany and New York are usually able to operate except for 1 or 2 months. On the Hudson River, ice conditions have, in general, permitted navigation almost without interruption since the deepening of the channels, but during severe winters navigation may be suspended for about 3 weeks. A United States Coast Guard vessel is usually assigned as an ice breaker during the winter months. Closing dates for the New York State Canal System vary, usually being between November 10th and November 18th.

Tides, Hudson River.—The tides in the Hudson River vary greatly with changes in the stages of the river as caused by freshet conditions, winds, and droughts. Because of these variable conditions, the prediction of the tides given in the tide tables for points on the Hudson River above the George Washington Bridge are based upon averages for 6-month periods, May to October, when the fresh water discharge is a minimum.

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*Charts 745, 746, 747, 748; 281, 282, 283, 284.

The publication, **Tide Tables Atlantic Ocean** gives tables for the time and height of high water and low water for the Battery at New York and at Albany as well as tidal differences and constants for numerous places between these points.

The **following table** gives the time differences of the tide referred to the Battery, and also the tidal range for various points on the river for normal conditions.

The mean rise and fall of the tide at Albany, 125 miles above the Battery, is about 4½ feet although extreme due to wind conditions and variations of fresh water run-off, particularly freshet conditions which occur in the spring and autumn, vary from about 3½ feet below mean low water to about 7 feet above mean high water. Daily tide predictions for Albany are given in the Tide Tables, Atlantic Ocean.

See Freshets, page 380.

Below Albany.—Tides and currents in the river below Albany are affected in a similar manner but generally to a lesser degree. The smaller freshets also somewhat delay the times of high and low waters.

Freshets most frequently occur in the spring, especially in March and April.

Currents, Hudson River.—Complete daily current predictions for the Narrows, New York Harbor are given in the publication "Current Tables Atlantic Coast." Current differences and constants for various points along the Hudson River from New York to Troy are given and referred to the currents at the Narrows. With this information the times of slack water and times of strengths of flood and ebb current can be determined for any point for which constants and current differences have been determined.

Owing to the variations of conditions caused by freshets, winds and other causes, the current constants for points on the Hudson River are derived from observations made during the summer months when the fresh water discharge is at a minimum.

During low-water stages at Albany there is an ebb current for about 8 hours and a clearly definable flood current for from 2½ to 4 hours. At such times the velocity of the flood current at strength is about ¼ knot and the ebb ¾ knot.

Currents are swift and erratic around the entrance to **Spuyten Duyvil.** The directions and velocities of the currents throughout New York Harbor for every hour of the tidal cycle are shown in the **Tidal Current Charts, New York Harbor.**

In the table which follows there is included the approximate time differences between the time of low water at the Battery and the time of maximum ebb current at various points along the river.

Approximate tide and current data for Hudson River

(FOR MORE DETAILED DATA SEE, "TIDE TABLES, ATLANTIC OCEAN," AND "CURRENT TABLES, ATLANTIC COAST.")

Nautical miles above Battery	Location	Tides			Currents	
		Time difference referred to Battery [1]		Mean range	Time of ebb strength referred to low water at Battery [2]	Velocity ebb strength
		Hours	*Minutes*	*Feet*	*Hours*	*Knots*
15	Yonkers	+1	10	3. 6	+1	1. 9
24	Tarrytown	+1	50	3. 2	+1½	1. 5
38	Peekskill	+2	40	2. 9	+2	1. 2
52	Newburgh	+3	50	2. 8	+2¾	1. 1
65	Poughkeepsie	+4	35	3. 1	+3¼	1. 2
79	Kingston	+5	25	3. 7	+3¾	1. 6
101	Hudson	+7	00	4. 0	+4½	2. 0

[1] Add to time of tide at Battery, as given in tide tables to obtain approximate time of same stage of tide at place indicated.
[2] Add to time of low water at Battery the hours given to obtain approximate time of ebb strength at place indicated.

The directions of currents in the Hudson River approximates the directions of the channel. Variations occur, however, near the bends and wharves.

For further information reference should be made to the Current Tables, Atlantic Coast.

Copies of Tide and Current publications can be obtained from the Coast and Geodetic Survey, Washington, D. C., its field station, New York City, or any of its agencies.

Freshets, Albany.—During March, April, and May freshets may be expected of from 8 feet (2.4 m.) upward in height at Albany above the plane of lowest low water and lasting as much as 10 days and more. During warm months freshets may be expected from 8 to 14 feet (2.4 to 4.3 m.) in height at Albany above the plane of lowest low water, with from 3 to 5 days' duration. Rain freshets are not, as a rule, very destructive, the main damage being interference with navigation due to wharves being under water. Freshets caused by ice gorges, which occur nearly every year in February or March, usually rise higher, last longer, cause loss and destruction on shore, and form shoals and bars in the channel.

When the freshet low water rises to mean half tide (about 2½ feet) the flood current disappears, and the tidal wave is felt only by small fluctuations in the water level. When the freshet height reaches 10 feet above the plane of lowest low water the tidal action ceases to be apparent. During freshets of not less than 6 feet the flood current disappears and there is an ebb current of about 1½ knots. After the flood current disappears the average difference in the velocities of the ebb current between flood and ebb tides is about 1¼ knots, and during extreme freshets the current reaches a velocity of nearly 5 knots.

HUDSON RIVER BELOW YONKERS *

(CHARTS 745, 746, 747, AND 281)

Hudson River below Yonkers includes that portion of the river extending from the Upper New York Bay to the northern limits of New York City, a distance of about 14.5 miles. The deepest portion of the river in this section is sometimes called **Hudson River Channel** and is a continuation of Ambrose and Anchorage Channels.

Existing project.—This provides for a channel 48 feet (14.6 m.) deep at mean low water and 2,000 feet wide, suitably widened at the bends, from West Fifty-ninth Street, Manhattan, to West Fortieth Street, thence 45 feet (13.7 m.) deep at mean low water of the same width to deep water in Upper Bay; for a channel 40 feet (12.2 m.) deep at mean low water for the full width of the river extending from the north line of Fifty-ninth Street to the south side of Little Basin, and thence a channel of the same depth to deep water in the Upper New York Bay off Ellis Island, a channel 750 feet wide and 30 feet (9.1 m.) deep along the Weehawken-Edgewater water front; the removal of a shoal on the New York side between West Fifty-ninth and West Sixty-first Streets to a depth of 40 feet (12.2 m.); and the removal of an obstruction north of the mouth of Spuyten Duyvil Creek to the depth of the surrounding river bottom.

In June 1938 about 85 percent of the work under the existing project had been completed. The work of widening and deepening Weehawken-Edgewater Channel to project dimensions was completed in 1937. About 70 percent of the work of widening the 40-foot (12.2 m.) channel for the full width of the river from Ellis Island to West Fifty-ninth Street, Manhattan, had been completed.

When examined intermittently from July 1932 to May 1939 the controlling mean low water depth was 40 feet (12.2 m.) for the full width of the river from opposite Ellis Island to West Fifty-ninth Street, except for shoals extending not more than 180 feet channelward from the easterly channel off pier A, Battery, where the depth was 32 feet (9.8 m.); from Canal Street to West Twentieth Street, 33 feet (10.1 m.); thence to West Thirty-fourth Street, 35 feet (10.7 m.); thence to West Sixty-first Street over separated shoals 32 feet (9.8 m.); and shoals extending channelward 300 feet from the channel line along the Jersey City waterfront south of Morris Canal Basin where the limiting depth was 34 feet (10.4 m.).

When examined intermittently from June 1934 to January 1939 the controlling mean low water depth in Weehawken-Edgewater project was 26 feet (7.9 m.) for the full channel width of 750 feet.

Navigation regulations, prescribed by the Secretary of War, provide that vessels drawing 25 feet (7.6 m.) or more shall have the right of way in the 40-foot channel between Piers 31 and 39, Manhattan (in the vicinity of the Canal Street vehicular tubes).

The **western bank** of the river opposite Manhattan Borough (New York City) is occupied by **Jersey City, Hoboken, Weehawken, Guttenberg, Shady Side,** and **Edgewater.**

*Lat. 40°56′, Long. 73°54′: Charts 747, 748, 281.

On the **eastern bank,** nearly opposite Edgewater, is **Grants Tomb,** a prominent landmark. About 2 miles above the tomb is **Fort Washington Point** (marked by Jeffreys Hook Light), and a little more than 1.3 miles above the bridge is **Tubby Hook,** which is about 0.5 mile below the mouth of Spuyten Duyvil Creek. The latter is marked by the drawbridge at the entrance; the creek is described with Harlem River.

Landmark.—Near Grants Tomb on Riverside Drive at One Hundred and Twenty-first Street is the Riverside Drive Church. This is a prominent stone structure, the tower of which rises 400 feet (122 m.) above the river.

Surveys in March 1939 revealed an **obstruction** apparently the remains of an old wreck about 120 feet long with a least depth of 31 feet (9.4 m.) over it, about 285 yards offshore at 145th Street, Manhattan.

Ferries cross the river between One Hundred and Twenty-fifth Street, Manhattan, and Edgewater, N. J. Caution is required in this vicinity.

Between Fort Washington Point and Fort Lee, **George Washington Bridge** crosses the river. This suspension bridge has a vertical clearance of 248 feet (76 m.) at mean high water and a horizontal clearance of 3,418 feet. The towers of the bridge rise to a height of about 600 feet (183 m.) above the river.

Jeffreys Hook Lighthouse stands a few feet from the southeast corner of the east abutment of this bridge.

Fort Lee is on the west bank of the river opposite Fort Washington Point. From Fort Lee to Piermont, 12.5 miles farther up the river, on the same side, the western bank is rocky cliffs (in places thickly wooded with scrub), 300 to 500 feet (91 to 152 m.) high, known as **The Palisades.**

Measured Mile.—Markers for a measured statute mile (5,280 feet) course, established by the New York Sun, are located on the New York side of the river at West One Hundred and Forty-fourth Street and West One Hundred and Sixty-fourth Street. The course, northward, is 29° true.

Gas, oil, water, and boat supplies are obtainable in this locality at the float landings. There is also anchorage and mooring place for small boats and a place to haul out and store small boats.

Terminal facilities.—Along the lower Hudson water front there are about 17 miles of continuous water terminals, consisting of piers, bulkheads, warehouses equipped with modern appliances for handling freight, modern coal piers, bridges for the transfer of cars to and from floats, marine railways, drydocks, and ferry racks.

The Manhattan water front has about 7 miles of continuous water terminals, of which the majority are owned by the city of New York, and by the railroads. Most of the city-owned terminals are leased for commercial purposes; a few are open to the public and some are used by city departments. Many of the city terminals are designed to accommodate trans-Atlantic steamships up to 1,000 feet in length and 40-foot (12.2 m.) draft.

When tied up to wharves parallel to the river, small craft should be aware of the heavy swells caused by passing steamers. If possible, small craft should tie up with the bow or stern facing out.

The New Jersey water front has a large number of water terminals. These terminals accommodate steamships of all classes up to the largest trans-Atlantic steamships afloat. About 55 percent of all terminals along this front are owned or controlled by railroad companies and are so used. The privately owned terminals accommodate vessels of all classes up to 30-foot (9.1 m.) draft. Of the terminals along the New Jersey shore but one in Jersey City is owned by and open to the public.

For additional information see General Information Port of New York, page 352.

Repairs.—There are several floating docks and marine railways along the New Jersey water front, the largest having a capacity of 10,000 tons. (See descriptions in Appendix.)

Pilots.—See 'New York Harbor" on page 353.

Anchorage areas are shown on the large scale charts.

Small yachts may anchor inside the pier line off Columbia Yacht Club at Eighty-sixth Street.

Storm warnings are displayed in New York from the **Whitehall Building.**

YONKERS TO HAVERSTRAW

(CHART 281)

The project for the improvement of the river provides for a channel 27 feet (8.2 m.) deep and 300 feet wide up to Hudson; thence 400 feet wide through rock cuts, and 300 feet elsewhere, from Hudson to the Albany-Greenbush Bridge in Albany; thence a channel 12 feet (3.7 m.) deep to Waterford, with a general width of 400 feet to the dam at Troy and 200 feet thence to Waterford, increased at bends and widened to form harbors in front of the cities of Troy and Albany. In 1939, the controlling depth to Albany was 27 feet (8.2 m.) through a navigable channel 300 to 400 feet in width, thence 12 feet (3.7 m.) to Troy through a navigable channel varying in width from 400 feet at Albany to 100 feet near the south entrance to the lock.

The channel is well marked by lights and buoys. About 2 miles above Tarrytown there are some shoal spots in the channel with 17 feet (5.2 m.) over them, but eastward of these spots is a clear width of channel 1,800 feet wide marked on the eastern side by a lighted buoy. About 6 miles north of Tarrytown and 7/8 mile westward of the south end of Croton Point is a shoal spot with 18 feet (5.5 m.) over it, and it is marked by a buoy. Below Rondout, which is 79 miles above the Battery, the river is easy to navigate; above Rondout navigation is made difficult by numerous shoals and middle grounds which rise abruptly from deep water.

The river also forms a waterway for the traffic of the Erie Canal (New York State Barge Canal), which extends to the Great Lakes at the foot of Lake Erie, and of the Champlain Canal, which extends to the head of Lake Champlain. The latter is connected with the St. Lawrence River by the Richelieu River.

The New York Central Railroad, with its main line on the east bank and its west shore division on the west bank, follows the Hudson from New York to Albany and on the east bank to Troy. Albany

and Troy are important railroad centers. Several lines of large steamers, carrying passengers and freight, operate on the river between New York and Albany.

Yonkers, on the east bank of the river, 15 miles above the Battery, has a number of wharves and considerable trade. It is adjacent to the northerly limits of New York City and lies within the limits of the port of New York. The Federal services and regulations of that port are applicable.

The shore line of the city is generally straight with the developed portion of the water front directly adjacent to deep water in the river.

There are docks and terminals with depths alongside up to 30 feet (9.1 m.) at mean low water.

Anchorage.—No official anchorage areas are designated. Vessels may enter the harbor and anchor at any time.

Customs.—As a general practice vessels are visited for official inspection while in stream, but may be boarded in stream or at berth. Vessels may clear between the hours of 9 a. m. and 4:30 p. m., or by special arrangement with the customs officials.

Englewood and **Alpine** are two landings across the river from Yonkers. They are quite prominent and are the western terminals of ferry lines from Dyckman Street and Yonkers respectively. Yacht basins, sheltering numerous small craft, have been built at these landings.

About 1 mile north of Alpine there is a prominent radio tower 400 feet (122 m.) high.

Above Yonkers, two good wharves, **Twombly Landing** and **Forest View Landing,** serve picnic grounds, excursion boats making regular trips during the summer months. About 4 miles above Yonkers, on the same side of the river, is **Hastings on Hudson.**

In June 1939 floodlights on the waterfront and a fixed red light on top of a large building nearby were prominent at night.

Dobbs Ferry is a village on the same side of the river about 1½ miles further upstream.

Piermont is on the west bank, 22 miles above the Battery. Here is a long, grassy, earthen embankment, formerly a pier of the New York & Erie Railroad, and marked near the outer end by a light on an unpainted wooden post. The end of the submerged pier is marked by a black buoy. **Irvington,** a village opposite Piermont, has a harbor extending along the east shore for a distance of about 0.5 mile. There is a prominent wharf here which is used for the receipt of lumber. In June 1939 it was reported that there were depths of 24 feet (7.3 m.) for a distance of 400 feet along the face. A clock tower in the village is prominent when illuminated.

Tappan Zee is the name given to the stretch of the river, about 2 miles wide, extending from abreast Piermont to Croton Point, a distance of 7.5 miles.

TARRYTOWN

Tarrytown* is on the east bank of the river, 24 miles above the Battery. It has a water front extending along the shore for a distance of about 1 mile.

*Lat. 41°05′, Long. 73°52′: Chart 281.

The harbor embraces two buoyed entrance channels which extend from deep water in the Hudson River to a connecting channel along the waterfront. One entrance is from the northwest of the port, the other from the southwest.

Tarrytown south channel is marked by a lighted range for a course of 48½° true. Both day marks are white squares with black centers on red skeleton towers.

The controlling depth in the dredged channels as determined in March 1939 was 11 feet (3.4 m.) for a width of about 100 feet.

A piling bulkhead has been set up south of the steamboat wharf which is being filled in to be used for park purposes. This forms a protected slip for a distance of about 200 feet.

Anchorage.—There are no approved anchorage areas in the harbor. Vessels usually lie at their berths during lay-over or loading and unloading of cargo.

Ice.—The port is open to navigation throughout the year. Navigation is sometimes impeded during severe winters by wind and ice floes from the upper section of the river.

Customs and Immigration.—Tarrytown is included in the New York customs district, but is not a port of entry. Matters pertaining to the Public Health, Customs, and Immigration Services in relation to vessels bound to or from Tarrytown would be handled at New York. The nature of the present commerce of the locality is such that these services are not required.

Dockage and wharfage.—There are seven wharves and terminals along the waterfront with depths ranging from 2 to 14 feet (0.6 m. to 4.3 m.). They are used mostly for handling coal, building materials, and the shipment of automobiles.

No charges are assessed for occasional tying up at the city-owned wharf. Other wharves in the harbor are used for private purposes and no dockage or wharfage is assessed vessels handling cargo. Tying up of pleasure craft at privately owned wharves is by agreement.

Supplies.—Fresh water may be obtained at the ferry slip, at the east end of the town wharf, and some of the private landings. A marine service station is maintained near the steamboat wharf where gasoline, lubricants, and other boat supplies may be obtained. There is a depth of about 10 feet (3.0 m.) at mean low water at the south side of the wharf.

A yacht club is located near the south end of the waterfront where there is a marine railway for private use. Permission for use of the railway may be obtained in an emergency. The railway can accommodate small craft up to 45 feet in length and 4 feet (1.2 m.) in draft. At the north end of the water front, near Kingsland Point, the Chevrolet Motor Co. assembly plant exhibits a large sign which is prominent when illuminated.

A **ferry** operates between Tarrytown and Nyack unless prevented by ice.

Directions, Tarrytown.—To enter the harbor through the south channel steer 48½° true on the lighted range previously described and pass about 75 feet off the wharf.

From the northward steer a mid-channel course of 121° true passing close to the northward of the red buoy at the edge of the main channel and passing about 175 yards southwestward of Tarrytown Lighthouse.

Tarrytown Lighthouse lies southwestward of Kingsland Point, just above Tarrytown, and 400 yards eastward of the main channel of Hudson River. A buoy marks the edge of the main channel abreast the lighthouse.

Nyack, opposite Tarrytown, has a depth of about 8 feet (2.4 m.) at the principal wharves. There is a shipyard with several railways and good facilities for repairing wooden hulls, and a launch building and storing yard.

The capacity of the railways is limited to craft of not more than 80 feet in length and a draft of 4 feet (1.2 m.).

A marine railway, located at Upper Nyack is 110 feet long, and can take out a vessel 115 feet long, 150 tons and draft about 6 feet (1.8 m.).

There are depths of 8 feet (2.4 m.) at mean low water at the wharf at this shipyard.

Ferries run to Tarrytown. Fresh water and launch supplies can be obtained.

For a distance of 0.8 mile in the vicinity of **Rockland Lake Landing** the shore is occupied by quarry wharves, which were not being used in 1939. **Rockland Lake Lighthouse** is in a depth of about 12 feet (3.7 m.) on the shoal off the landing, and is on the west edge of the main channel of Hudson River.

A promontory, formerly known as **Verdrietege Hook,** extends about 1.5 miles southward from **Rockland Lake Landing.** It is 600 to 730 feet (183 to 223 m.) high and wooded with scrub, but in places shows bare, precipitous cliffs. Near the southern part it has a height of 730 feet (223 m.), and is called **Hook Mountain.** The west bank of the river between Rockland Lake Landing and Haverstraw rises precipitously to heights varying from 400 to 820 feet (122 to 250 m.), the hightest part, **High Tor,** lying about 0.5 mile southward of Haverstraw. An aviation beacon is located on the summit of High Tor.

About 0.6 mile southward of High Tor is a row of hoppers, at a stone quarry, which is very prominent.

Ossining is on the east bank, 28 miles above the Battery. The controlling depth is 7 feet (2.1 m.) on the flats off Ossining and 5 to 7 feet (1.2 to 2.1 m.) at the wharves, except that a bar with little depth extends a short distance off the mouth of **Sing Sing Creek,** at the foot of Quimby Street. **Sing Sing prison,** the State penitentiary, is located on the flat shore at the south end of Ossining.

Croton Point is the long peninsula just above Ossining. Haverstraw Bay is the wide stretch of the river extending from Croton Point to Stony Point, a distance of 5 miles. The extensive flats on the east side of **Haverstraw Bay** have ruling depths of 7 to 9 feet (2.1 to 2.7 m.), as shown on the chart. **Croton-on-Hudson** is on the east bank, northward of Croton Point. There is a depth of about 6 feet (1.8 m.) at the principal wharves. About 0.7 mile southeastward of Croton is the repair shop of the New York Central Railroad at Harmon. A tall chimney here is prominent.

A pinnacle rock with 18 feet (5.5 m.) over it, and marked by a buoy, lies in mid-channel west of the south end of Croton Point.

It was reported in June 1939 that a depth of 11 feet (3.4 m.) lies 207° true, 725 yards from the south end of Croton Point.

HAVERSTRAW TO NEWBURGH

(CHART 282)

Haverstraw, on the west bank of the river, 32 miles above the Battery, has numerous abandoned brickyards extending along the waterfront. Near the south end of the waterfront an anchorage basin is used by local craft. The entrance channel is usually marked by brush stakes and leads to the basin near a prominent brick stack at the north end of a dike on the east side of the basin. There is a stone quarry and rock crusher about 0.5 mile southward of the town.

Minisceongo Creek has its entrance at the head of the shoal bight westward of **Grassy Point.** A channel, with a least depth of about 5 feet (1.5 m.) and marked on its south side by stakes, follows the shore through the flat westward of Grassy Point and through the west opening (clear width 45 feet, height above high water 9 feet (2.7 m.)) in the drawbridge at the entrance of the creek. The drawbridge will be opened during daylight; the signal for it is three blasts. The bridge is seldom opened. There is very little traffic in the creek, the brickyard, formerly located there, is no more in use.

Stony Point is on the west bank 3 miles above Haverstraw. A light with fog bell is located on this point. Opposite Stony Point is a shoal bight called **Greens Cove,** on the north side of which is Verplanck Point and the village of **Verplanck.**

Verplanck Point is used by various oil companies for terminal and storage purposes. Depths alongside the various wharves range from 8 to 18 feet (2.4 to 5.5 m.). On the northwestward side eroded gray banks of tailings from a trap rock plant are prominent. There is a small boat yard and marine railway at Verplanck. Gasoline and oil can be obtained.

Tomkins Cove, on the west side of the river opposite Verplanck, has a large stone quarry, rock crusher, and trap rock establishment. Barges tie up at the wharf while loading crushed rock for river transportation.

Peekskill is a village in the shoal bight on the east bank of the river 38 miles above the Battery.

The controlling depth in the dredged channels at mean low water as shown by an examination made in April 1939, was 10 feet (3.0 m.) for the full width of 100 feet in the north and south entrance channels and the channel along the wharf fronts. The outer sections of the entrance channels are marked by buoys.

From the main channel, two channels with depths of 26 feet (7.9 m.) and 16 feet (4.9 m.) and widths of 120 feet and 80 feet, respectively, lead to the wharf on the north side of **Charles Point.** The former is marked by ranges consisting of white diamond-shaped targets with black centers. The range is lighted only when a ship is expected at the wharf.

Peeks Kill (Annsville Creek), just northward of Peekskill, has shoaled and in 1939 had been abandoned by commercial interests. The railroad drawbridge crossing the waterway at the entrance no longer opens. The vertical clearance at mean high water is 2 feet (0.6 m.).

A second bridge (highway), with a fixed span 50 feet wide and 23.8 feet (7.3 m.) vertical clearance at mean high water, crosses the waterway about 0.2 mile above the railroad bridge.

Opposite Peekskill is **Dunderberg,** a high, densely wooded hill terminating eastward in a low, flat point called **Jones Point (Kidds Humbug).** An aviation beacon is located on the summit of Dunderberg. About 1.5 miles above Jones Point is **Iona Island,** a Government naval depot. Government vessels only are permitted to land here.

Just above Peekskill the river becomes much narrower and for a distance of 8 miles has a width of about 0.3 mile. The river here flows along the base of very high hills (some over 1,000 feet (305 m.) in height) known as the **Highlands. Anthonys Nose** is the high, steep, thickly wooded hill on the eastern bank about 2 miles above Jones Point.

There is an aviation beacon on its summit.

A rock with 10 feet (3.0 m.) over it lies on the west side of the channel 400 yards from the west bank and 350 yards north-northwestward of the north end of **Iona Island.** This rock is marked by a buoy.

Bear Mountain Bridge is a suspension bridge with a vertical clearance of 155 feet (47 m.) at mean high water under the center of the span and crosses the river between Anthonys Nose and Bear Mountain. A light is located on the end of the point at Anthonys Nose.

Bear Mountain Wharf light is sometimes obscured during the winter months by vessels which are tied up at the wharf.

Popolopen Creek, on the west side of the river above the bridge, is crossed by two bridges.

The first, formerly a drawbridge, no longer opens, has a horizontal clearance of about 34 feet and a vertical clearance of 2 feet (0.6 m.) above mean high water. The second, a fixed span of 327 feet, has a vertical clearance of 118 feet (36 m.) above mean high water.

Caution should be exercised when approaching the sharp turns in the river in this general vicinity and a warning signal should be given.

When descending the river, particularly with a strong fair current, a careful watch should be maintained to prevent being set onto the 10-foot (3.0 m.) shoal which is marked by a buoy about 950 yards southward of Bear Mountain Bridge.

Mystery Point, on the east side of the river, is a prominent headland 1.2 miles above Bear Mountain Bridge.

On the west bank, 2 miles above Anthonys Nose, is **Con Hook** (marked by a light), and 1.5 miles farther up the river is **Highland Falls.**

Precautions are necessary to avoid a 7-foot (2.1 m.) shoal about 700 yards southward of Con Hook light. When descending the river particularly, with a fair current, there is a tendency to be set towards the shoal.

The **clock tower** at the **Ladycliff School** for Women at Highland Falls is usually illuminated until shortly after midnight and affords an excellent landmark.

West Point,* 45 miles above the Battery, is the site of the United States Military Academy, and can be easily recognized from the

*Lat. 41°23'.5, long. 73°57'.4: Chart 282

prominence of the buildings and the road leading up the hillside from the ferry wharf and station of the West Shore Railroad.

On the opposite shore is the village of **Garrison,** a station of the Hudson River Railroad. There is a landing here with 14 feet (4.3 m.) alongside, where gasoline can be obtained. The bight between the landing and the old ferry slip has some sunken piling, which are covered at high water, and the bight should be avoided. The northeastern extremity of West Point descends to a rocky point **(Gees Point),** upon the extremity of which is West Point Lighthouse. On the opposite side of the river and north of West Point is **Constitution Island,** marked at **Magazine Point** by a light; the bend between the two is locally known as **Worlds End,** and has very deep water, 36 fathoms (66 m.) being found in the channel.

Extreme **caution** is necessary when rounding Gees Point at West Point. The channel turns sharply and view is obstructed. Vessels should reduce speed and sound a warning signal.

A little above Constitution Island, on the west bank of the river, is a steep, rocky wooded hill 1,396 feet (425 m.) high, known as **Crows Nest,** and just above it an equally steep and prominent hill 1,340 feet (408 m.) high known as **Storm King.** On the east shore, 1.5 miles above Magazine Point, at Little Stony Point, is a rock quarry, and a structure with hoppers is prominent.

At **Breakneck Point,** 1 mile above **Little Stony Point,** there are three prominent tunnels, two railroad and one highway; the lights are prominent at night.

About 4 miles above West Point and on the west bank is **Cornwall on the Hudson,** just above which is **Moodna Creek.** There is a depth of about 20 feet (6.1 m.) at the coal docks at Cornwall, which is a railroad shipping point for coal. **Pollepel Island,** also called **Bannermans Island,** is the site of a private arsenal. It is a small island lying near the edge of the shoal on the eastern side of the river opposite Moodna Creek. The buildings on the island have the appearance of a medieval castle. There is a light just west of this island.

NEWBURGH TO HUDSON

(CHART 283)

Newburgh, a city on the west bank of the river, 52 miles above the Battery, has some manufacturing facilities, but is primarily a distributing point. It has about 2 miles of waterfront directly on natural deep water of the river. There are numerous abandoned brickyards on both sides of the river.

Anchorages.—There are no approved anchorages.

Customs and immigration.—Newburgh is included in the New York customs district, but it is not a port of entry. Matters pertaining to the Public Health, Customs, and Immigration Services in relation to vessels bound to and from Newburgh are handled at the port of New York.

Dockage and wharfage.—Dockage charges are based on registered tonnage for vessels and a flat rate for barges. Towboats and pleasure crafts tying up for only short periods of time or while taking on supplies are not assessed.

Supplies.—Gasoline, oil, water, and the usual marine supplies are obtainable.

Piers.—A majority of the piers are of the open-pile type with depths alongside ranging from 10 feet to 35 feet (3.0 m. to 10.7 m.) at mean low water. Depths along the bulkhead are approximately 5 feet (1.5 m.). A yacht club landing at the north end of waterfront has depths of 4 feet (1.2 m.).

Repairs.—There is a shipyard with good facilities for construction and repair of steel and wooden hulls, machinery, and boilers. The marine railway has capacities for vessels up to 115 feet in length, 7 feet (2.1 m.) draft and approximately 500 tons.

Opposite the city is **Beacon,** which is connected by ferry and submarine cable. About 3 miles eastward of Beacon, on the summit of a hill, is an aviation beacon, and there is a fire lookout tower on the hill to the southward of it.

There is a large brickyard on the west bank of the river between **Roseton** and **Danskammer Point. New Hamburg** is a village on the east bank, 58 miles above the Battery and on the north side of the shoal bight at the entrance of Wappinger Creek. Opposite New Hamburg, on the west bank, is the village of **Marlboro.**

Diamond Reef, a shoal with depths of 5 feet (1.5 m.) is marked by a lighted buoy. The channel west of the reef is preferred. South of Marlboro there is a large trap rock quarry and prominent plant buildings. The quarry was not being worked in June 1939. There is a cable crossing here.

Wappinger Creek has been improved by dredging a channel 8 feet (2.4 m.) deep and 80 feet wide for a distance of 11,000 feet from the channel of Hudson River to a point 200 feet below a bridge at the lower falls where there are large bleaching works.

In April 1939 the controlling depth was 5 feet (1.5 m.). The northern section is shoaling and has depths of only 3 feet (0.9 m.) extending along both sides of the dredged cut.

Two bridges cross the creek. The railroad bridge at the entrance is a bascule bridge with a clear opening 40 feet wide and 3 feet (0.9 m.) above high water; the highway bridge, 1,100 feet above the railroad bridge has openings 48 feet wide, and 11 feet (3.4 m.) above high water. The mean rise and fall of tides is about 3 feet.

Directions, Wappinger Creek.—The channel, the entrance of which is buoyed, leads to the drawbridge opening. A course of 59° true should be followed until the draw opening bears 100° true.

From the upper end of the fender piers the channel leads for the south end of the highway bridge, above which the south bank should be followed about 100 feet off and pass close to the old foundry bulkhead; then head across to pass about 80 feet off the next point on the west bank and follow this bank and the dike above it at a distance of about 60 feet. The channel then leads close to the coal dock, and then follows the south bank at a distance of about 70 feet (a little more in the bight to the upper end of a bulkhead, from which a narrow channel, with a depth of about 6 feet (1.8 m.) leads to what was formerly some lumber sheds on the south bank. The main channel, however, from the upper end of the bulkhead follows the north bank at a distance of about 100 feet, drawing in to about 50 feet when passing the steep part of the bank near the bend at the north end of the creek. Then keep near midcreek.

Lange Rack is that section of the river extending from New Hamburg to **Crum Elbow,** 3 miles above Poughkeepsie.

North of **Howland** and 1.8 miles above New Hamburg there is a large trap rock plant and quarry. Excavation of this rock is cutting away the hillside.

The west side of the river should be favored to Poughkeepsie to avoid several buoyed dangers with depths of 18 feet (5.5 m.).

POUGHKEEPSIE

Poughkeepsie,* about 7 miles above New Hamburg and 65 miles above the mouth of the river, has about 1 mile of wharf front and is the center of an important trade in manufactured goods and lumber.

Two nun buoys are located off the wharves of a lumber company to guide approaching vessels. The Day Line, which maintains regular excursion passenger service on the river, has a modern pier at Poughkeepsie north of the ferry landing.

At Poughkeepsie the river is crossed by two bridges, a highway suspension bridge and a fixed railway bridge. The vertical clearances are 137 feet (42 m.) and 167 feet (51 m.), respectively, and the horizontal clearance at the center of the railroad bridge is 490 feet. There are fog bells on the piers nearest Poughkeepsie, and the bridges are well lighted at night. There is a ferry to the post village of **Highland,** opposite Poughkeepsie. Submarine cables cross the river on the south sides of the bridges and a pipeline crosses on the north side of the railroad bridge. There is a yacht club with mooring space on the east side of the river, just south of the highway bridge. All kinds of supplies can be obtained at Poughkeepsie.

Anchorages.—There are no official anchorage areas designated in this vicinity. Vessels sometimes anchor in the river awaiting cargos or berth.

Ice conditions.—The harbor at Poughkeepsie is open to navigation throughout the year except as noted below. Ice conditions resulting from natural freezing over of the river and heavy drift ice moving downstream during months of thaw sometimes make the berthing and unberthing of vessels difficult. A record extending over a period of 60 years shows an average closed period of but 65 days on account of ice.

Piers and wharves.—The wharves have depths alongside of 8 feet to 30 feet (2.4 m. to 9.1 m.) at mean low water. The majority are open pile type with mooring dolphins giving ample berthing space. There are two lights on the Standard Oil dock for the guidance of their barges.

Dockage and wharfage.—Charges are not made for the occasional use of the city pier at the foot of Main Street. The local lumber company, although not making a practice of permitting public use of their wharf, will permit such use when it does not interfere with their own activities. There is no schedule of charges, special arrangements being necessary in each case.

Federal services and regulations.—Poughkeepsie is included in the New York Customs District, but is not a separate port of entry.

*Lat. 41°42′, Long. 73°56′ : Chart 283.

Matters pertaining to the Public Health, Customs, and Immigration Services in relation to vessels bound to and from Poughkeepsie are handled at the port of New York.

NORTH OF POUGHKEEPSIE

From Poughkeepsie to Rondout, 13.5 miles farther up, the river has a deep and unobstructed channel, and on its banks between these two places are a number of villages and landings. A light on east bank marks the northern end of **Crum Elbow.** This was formerly charted as **Greer Point.**

Esopus Island, small and narrow, with a light at its south end, is 72.5 miles above the Battery and 7 miles above Poughkeepsie. A ledge, partly bare at low water and marked by a buoy, extends 300 yards northward in prolongation of the island. The better channel is westward of the island. **Esopus** is a village on the west bank of the river abreast Esopus Island. About 2.5 miles above Esopus Island, on the west bank, is **Dinsmore Point,** on the eastern extremity of which is Esopus Meadows Lighthouse. About 0.5 miles north of Esopus there is a large gray stone building which is prominent.

Rondout Creek enters the western side of Hudson River 79 miles above the Battery. The lower portion of this creek for about two miles above its mouth serves as a harbor for **Kingston.** The city is situated partly on the lowlands adjacent to the north bank of the creek and partly on the high plateau to the north and west. The area adjacent to the creek was formerly called **Rondout.** The entrance is between two long dikes, marked by lights, and a channel 100 feet wide and 14 feet (4.3 m.) deep has been dredged.

A prominent spherical gas tank is situated on the north side of the creek near the inshore end of the north jetty. Near the inshore end of the south jetty is a stone tower formerly used as a lighthouse.

An examination made in Nov. 1938 showed that the controlling depth at mean low water, from the Hudson River to the west end of Island Dock, was 14 feet (4.3 m.) for a width of 100 feet, for a distance of 1.3 miles, thence 12 feet (3.7 m.) for a width of 100 feet to the head of the project, except for a shoal opposite the Tide Water Oil Company Plant where the channel is restricted to a width of 60 feet with an available depth of 14 feet (4.3 m.).

The channel leads close to the north dike and the bulkhead at Kingston. Above Kingston there is a depth of about 9 feet (2.7 m.) at high water to **Wilbur,** thence 5 feet (1.5 m.) can be carried to **Eddyville.** The head of navigation is at the lock of the abandoned **Delaware and Hudson Canal** above Eddyville landing, 3.3 miles from the entrance. Two fixed bridges, with clear heights of 86 and 144 feet, respectively, above mean high water, cross Rondout Creek about 1.5 and 2 miles above the entrance. The mean rise and fall of tides is 3½ feet.

Kingston, 79 miles above the Battery, has considerable trade, and is the home port of a large fleet of towboats operating on Hudson River. At Kingston and **South Rondout** there are facilities for building and repairing wooden hulls and ordinary repairs to machinery. Due to the restricted width of the harbor no anchorage grounds are available. The harbor is open to navigation throughout the year.

Federal services.—Kingston is included in the New York Customs District, but is not a separate port of entry. Matters pertaining to the Public Health, Customs, and Immigration Services in relation to vessels bound to and from Rondout are handled at the port of New York.

Dockage, in general, is not charged if vessels tie up for short periods. Any charges are by private arrangement. Wharfage is also arranged by private agreement.

Supplies of all kinds are available.

Bunkering facilities, although not public, are maintained by private interests and may be obtained in cases of emergency. A coal supply of about 300 tons is usually kept on hand.

The majority of the wharves are located on the north side of the Creek and have depths alongside of 4 feet to 16 feet (1.2 m. to 4.9 m.) at mean low water.

Repairs.—The marine railway at Kingston is located on the eastern portion of Island Dock, near the highway bridge. Vessels and barges can be accommodated up to limits of 1,000 tons, 240 feet in length, 42 feet in width and a draft of 14 feet (4.3 m.). A smaller yard located at the foot of Ravine Street is equipped to build and repair wooden hulls. Derricks with hoists having capacities of 2 tons with reaches of 60 feet are available.

The shipyard at South Rondout is located on the south side of the creek opposite the westerly end of Island Dock. The marine railway has a capacity of 50 tons and can accommodate vessels up to limits of 40 feet in length. There are two floating drydocks at this plant of 800 and 1100 tons capacity with overall lengths of 150 and 180 feet, widths on the keel blocks of 43 and 53 feet and depths on the keel blocks of 14 feet (4.3 m.) and 17 feet (5.2 m.) respectively.

Facilities at the various repair shops provide for repairs to all types of machinery and boiler work including foundry work and pattern making. Shafts up to 20 feet in length and 18 inches in diameter can be turned.

A ferry runs to **Rhinecliff,** opposite the mouth of Rondout Creek.

Kingston Point is an oil terminal. Petroleum products, which comprise a large percent of the local marine traffic, are brought here by tugs in barges drawing 10 feet to 15 feet (3.0 m. to 4.6 m.). There is a conspicuous warning sign for the cable crossing here.

The Flat, extending northward from just above Kingston Point for a distance of 3.8 miles is marked at its south end by a flashing light and a buoy. Depths on The Flat vary from 2 feet to 4 feet (0.6 m. to 1.2 m.). The east and west sides of the shoal are very abrupt but depths at the northern and southern end are more gradual. The main channel is westward of the shoal and is marked by lighted buoys. A dredged channel in which it is reported that a depth of 27 feet (8.2 m.) is maintained leads through to deep water at the north end. Caution should be exercised, however, as it is reported that the north end of The Flat is making to the westward, encroaching on the south entrance of the dredged channel.

Barrytown is a village on the east bank of the river, 5 miles above the mouth of Rondout Creek. There are prominent storage tanks here. Navigating the river above this point becomes increasingly more difficult due to numerous shoals.

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From Kingston to **East Kingston,** on the west bank, there are many brickyards. **Magdalen Island** is a small island lying in the eastern part of the river 2.7 miles above Barrytown. Nearly 1 mile above the island, on the east bank, is the village of **Tivoli.**

Esopus Creek enters the western side of Hudson River 88 miles above its mouth. The village of **Saugerties** is on the creek about 0.7 mile from its mouth. A dam crosses the river at this point.

The creek has been improved by dredging a channel 200 feet wide and 12 feet (3.7 m.) deep for a distance of 4,000 feet above the lights at the entrance between the dikes to the landing on the south bank of the creek. A shoal, which bares at low water, lies on the west side of the creek about 200 yards south of the sharp bend to westward. West of this bend, the bottom of the creek is strewn with large boulders. Small craft, with local knowledge, use this area as an anchorage but it should be avoided by strangers. At the latest examination (1936) this channel had a controlling depth of 12 feet (3.7 m.). For a distance of about 1,000 feet below the landing a shoal extends 20 to 35 yards from the north bank.

A landing for Saugerties, now used by some of the steamers, is the Long Dock on the west bank of the river 0.4 mile southward of Esopus Creek. A ferry runs from here to Tivoli. For a distance of about 5 miles north of the mouth of Esopus Creek the main channel favors the west side of the Hudson River.

Malden on Hudson is a village on the west bank about 1.25 miles above the mouth of Esopus Creek. About 2 miles above Malden is the village of **West Camp.** It has been reported that a rock with 17 feet (5.2 m.) over it lies 185° true and 700 yards from the south end of Eves Point.

On the opposite bank of the river is **Cheviot,** which is 92 miles above the Battery. The landing for **North Germantown** is 2 miles above the wharf at Cheviot.

At **Cementon,** 0.5 mile above West Camp there are several large cement manufacturing plants. The plant buildings and silos are prominent.

At **Dewitt Point,** 2 miles above Cementon, there is a large cement factory. A wharf is maintained and the depth at the end is 8 feet (2.4 m.).

Catskill Creek enters the western side of Hudson River 97 miles above the Battery. **Catskill** is a village, with a number of factories, on the creek. A long wharf extends from the village to the channel of Hudson River and forms the north side at the entrance of the creek. The Hudson River Day and Night Lines boats stop here. Gasoline and motorboat supplies can be obtained. A ferry runs to **Greendale,** opposite Catskill Creek.

The channel in Catskill Creek has a least width of about 100 feet and least depth about 10 feet (3 m.) to the head of navigation, about 6,500 feet above the entrance, and 1,200 feet above the highway bridge. The north edge of the channel leads close to the end of the wharf at the entrance, then passes 75 feet off the first small pier, lying 200 yards inside the end of the wharf, and then passes close to the next small pier on the north side. The best water is then in mid-creek until near the first sharp bend, taking care to avoid a rock with 4 feet (1.2 m.) over it, lying about 50 feet off the western end of

the wharf on the north side, where the shore curves to the northward to a bight, where a small boat yard is located. The rock is about 150 yards southeastward of the float at the boat yard and 100 yards southeast of rocky point locally known as **The Hop'o Nose.** The rock is also just above (approximately 50 feet) a small brick building on the east side of the creek and about even with the point where the bulkheading breaks in to the right of the bight. The channel then follows the south bank until about 360 yards from the highway bridge, then the east shore to the highway bridge. The highway bascule bridge has a clear opening of 70 feet and a vertical clearance of 12 feet (3.7 m.) at mean high water. The river is navigable about 100 yards above the bridge.

The boat yard previously mentioned has a small marine railway capable of accommodating boats up to 35 feet in length and a draft of 4 feet (1.2 m.). A yacht club is adjacent to the shipyard.

At the landing there are depths of 30 feet (9.1 m.) at mean low water, and facilities for mooring boats up to 100 feet in length. The channel from the Hudson River up to the landing is buoyed by local interests during the summer months only.

Gasoline, oil, water, ice, and other supplies may be obtained.

About 2.5 miles southeastward of the entrance of Catskill Creek, there is an aviation beacon on the summit of a hill.

A new highway bridge (the **Rip Van Winkle Bridge)** with a vertical clearance of 144 feet (44 m.) crosses the Hudson River just above Catskill.

HUDSON TO TROY

(CHART 284)

Hudson, on the east bank, 101 miles above the Battery, is a large shipping point for cement and manufactures. The deepest draft of vessels loaded at Hudson is about 22 feet (6.7 m.). **Athens,** a village opposite Hudson, has a marine railway with a capacity of 300 tons, and can accommodate vessels and barges up to 175 feet in length, 40 feet in width, and 9 feet (2.7 m.) draft. This is reported to be the oldest active marine railway with continuous operation in the United States. It was established in 1862. Some of the river boats tie up here for the winter. Two sets of high-voltage transmission lines cross the Hudson River between Hudson and Athens. The lowest set of wires is about 155 feet (47 m.) above the water at the center of the river. Two red lights are exhibited from the top of the two western towers.

A ferry runs from Hudson to Athens and passes north of the lighthouse at the south end of **Middle Ground Flats,** through a dredged channel 200 feet wide and about 15 feet (4.6 m.) deep. The channel is marked on the north side by two private lights and on the south side by a bush stake. Gasoline, oil, water, and supplies can be obtained, and there is from 12 to 14 feet (3.7 to 4.3 m.) along the wharves at Hudson.

The following are the principal villages between Hudson and Albany, and their distances in nautical miles above the Battery: **Coxsackie,** 107 miles: **Stuyvesant,** 109 miles; **New Baltimore,** 113 miles; **Coeymans,** 115 miles; and **Castleton-on-Hudson,** 118 miles. About 1.2 miles northeastward of New Baltimore there is an aviation

beacon, about 350 yards eastward from the shore, east of **Houghtaling Island.**

A railroad bridge crosses the Hudson River 1.7 miles southward of Castleton-on-Hudson. It has two fixed spans over the river with a vertical clearance of 139 feet (42.4 m.) at mean high water over the main channel.

ALBANY

Albany* is on the west bank of the river, 24 miles above Hudson and 125 miles above the Battery. The port district embraces the city itself, the lands belonging to the City of Albany within the town of Bethlehem, and the city of Rensselaer. The lower harbor comprises that portion of the Hudson River extending from the southerly end of **Cabbage Island** to a point about 1,000 feet south of the highway bridge, a distance of about 2.5 miles. The upper harbor comprises that portion of the river northward of this point to the northern limits of the city of Albany and Rensselaer. It is approximately 6 miles south of the eastern and southern termini of the Erie and Champlain branches of the **New York State Barge Canal System.**

The State of New York has provided a **barge canal terminal** in the upper harbor principally for the use of vessels using these canals but it may also be used by others. The Erie and Oswego divisions of the canal connect with **Buffalo** and **Oswego** on the Great Lakes, while the Champlain division connects with the **St. Lawrence River** through **Lake Champlain** and the **Richelieu River.**

For further information regarding these canals, see Inland Waterways, page 35.

Albany is also the terminus of the Hudson River Day and Night Line steamers, which make regular trips during the summer and in the winter when the river is open.

It is principally a reshipping point and serves not only this immediate vicinity but large areas of New England and most of the area accessible by waterways. Petroleum products from the Gulf and Atlantic ports are received in steamers and oceangoing barges and reshipped to points on the canals and Great Lakes in craft of lesser draft. In reverse direction grain is received from the west and reshipped to New York.

Anchorages.—The restricted width of the river at Albany is not sufficient to permit vessels to swing at anchor without interfering with passing craft. In an emergency, vessels sometimes drop anchor in midstream to wait for berthing space, but ordinarily berths can be secured without the necessity for vessels to lie at anchor for any extended period. Vessels proceeding from New York to Albany often anchor overnight in the vicinity of Kingston, about 46 miles below Albany, to await daylight hours for passing through the narrower channel above Hudson. Good mooring facilities for yachts can be obtained inside the T-shaped pier which is occupied by a local yacht club. There are depths of 4 feet (1.2 m.) at the landing.

Bridges.—The following are the drawbridges crossing the Hudson River at Albany and Troy:

*Lat. 42°39′, long. 73°45′: Chart 284.

Bridges over Hudson River at Albany and Troy

Name or location	Clearances			Remarks
	Horizontal	Vertical		
	Feet	*Feet*	*Meters*	
Albany-Rensselaer	300	[1] 40 [2] 139.5	12. 2 42. 5	Vertical lift.
New York Central Railroad (Passenger), at Albany.	109	27. 7	8. 4	Swing.
New York Central Railroad (freight), at Albany.	103	27. 5	8. 4	Do.
Troy-Menands (highway)	316	[1] 62. 5 [2] 139. 4	19. 1 42. 5	Vertical lift.
Congress Street, at Troy	181	32	9. 7	Swing.
Delaware & Hudson Railroad, at Troy.	160	[1] 24. 4 [2] 129. 5	7. 4 39. 5	Vertical lift.
Troy to Cohoes	200	24. 4	7. 4	Bascule.

[1] Down [2] Up.

NOTE.—The vertical clearances are given at mean high water and when the bridges are closed.
Above the Troy-Cohoes Bridge the bridges are all fixed, and have a least vertical clearance of 14.3 feet (4.4 m.) above mean high water. 3 high-tension lines cross the river between Albany and Troy, and the minimum clearance is 141 feet (43 m.) above mean high water.
For signals, see regulations following.

Bridge regulations.—Hudson River Bridges at Albany and Troy. Special regulations have been prescribed by the Secretary of War for the operation of these bridges. Further information (including certain exceptions) than is given below may be obtained at the local offices of the U. S. Engineer or from the "Rules and Regulations, Relating to the Navigable Waters of the United States," which is published by the War Department.

AT ALBANY

The draw in each of the bridges crossing the Hudson River at Albany, N. Y., shall, upon the signal prescribed in paragraphs below being given, be opened at all hours for the passage of any vessel or vessels or other water craft not able to pass underneath it.

Signals.—The signal for boats desiring to use the draw shall be by whistle or horn. The signals from the bridges shall be by blasts of whistle or horn with an additional visible signal as prescribed below. A long blast of whistle or horn shall continue 5 seconds, a short blast 1 second.

The visible signals, by day, shall be displayed at least 15 feet (4.6 m.) above the fixed day signal at the middle point of the draw span and visible from both sides of the bridge, and by night at a height of at least 15 feet above the fixed light at the center of the draw, the "fixed" signals referred to being those required by the general "Regulation for lighting bridges over navigable waters."

By day, if the draw *is to be* opened, the visible signal shall be a round ball not less than 3 feet in diameter and *painted green*, or, if the draw *is not to be* opened, it shall be a latticework barrel-shaped sign 5 feet 6 inches high and 4 feet in diameter *painted red*.

By night, if the draw *is to be* opened, the visible signal shall be a *green* light from a standard marine lamp, or, if the draw *is not to be* opened, it shall be a *red* light from a standard marine lamp.

Signal code, vessels bound north.—A vessel bound north shall, on approaching a bridge, give three long blasts of the whistle or horn.

Vessels bound south.—A vessel bound south shall, on approaching a bridge, give three long blasts followed by one short blast of the whistle or horn.

If a vessel desires to pass through more than one bridge the signal calling for the bridge to be opened will be repeated for each bridge.

If a draw is to be opened, the signal from the vessel shall be answered from the bridge by three long whistle blasts and by displaying the green-ball visible signal. If the draw is not to be opened in time for the vessel to pass through safely, five short blasts of the whistle shall be sounded and the red-barrel visible signal be displayed.

AT TROY

The draw in each of the bridges crossing the Hudson River at Troy, N. Y., below the head of tidewater shall, upon the signal prescribed below being given, be opened promptly at all hours for the passage of any vessel or vessels or other water craft not able to pass underneath it, except that the bridge of the D. & H. Co. need not be opened between the hours of 6 p. m. and 6 a. m., unless notice has been given before 6 p. m. of the time or times when vessels may be expected to pass through.

Signals.—The signals for boats desiring to use a draw shall be by whistle or horn, as prescribed in paragraph 9. The signals from the bridges shall be by blasts of whistle or horn.

Signal code, vessels bound north.—A vessel bound north shall on approaching a bridge give three long blasts of the whistle or horn.

Vessels bound south.—A vessel bound south shall on approaching a bridge give three long blasts followed by one short blast of the whistle or horn.

If a vessel desires to pass through more than one bridge, the signal calling for the bridge to be opened will be repeated for each bridge.

If a draw is to be opened, the signal from the vessel shall be answered from the bridge by three long blasts of whistle or horn. If the draw is not to be opened in time for vessel to pass through safely, five short blasts of the whistle or horn shall be sounded.

Customs.—The port of Albany Customs District includes the counties of Warren, Washington, Saratoga, Fulton, Montgomery, Schenectady, Rensselaer, Albany, Schoharie, Otsego, Delaware, Greene, Columbia, Ulster, Sullivan, and Duchess (except the townships of Fishkill, Wappinger Falls, East Fishkill, Beeman, and Pawling). Clearance is obtained at the United States Customhouse, Federal Building, Albany. Bonded warehouses are situated at Albany and Rensselaer.

Immigration.—Immigration inspectors are on duty at the port terminal office.

Hospital.—The United States Public Health Service maintains a relief station at 447 State Street. Emergency cases are attended at Memorial Hospital, North Pearl Street.

Quarantine.—Matters pertaining to quarantine are handled by authorities at the port of New York.

Pilotage.—Pilotage service at Albany is provided by the Sandy Hook Pilots Association which maintains offices in New York and Albany. In 1939 the charge for pilotage from New York Harbor to Albany was $115 round trip. This charge is in addition to the pilotage in and out of New York Harbor. Between November 1st and April 1st, inclusive, $4 is added to the full pilotage for every vessel entering or leaving via Sandy Hook.

Towage.—Tugboats are available for harbor service. Barge Canal lighterage, and for tows down the Hudson River. The running time to New York under normal conditions is about 40 hours. Rates are on a cargo ton basis which includes loaded movement one way and return light.

Dockage.—A charge is made for dockage for all vessels except cargoes being received or delivered at railroad wharves. At the State Barge Terminal dockage is also charged except when engaged in delivering or receiving freight shipped through or destined for shipment through the canal.

Wharfage.—Charges are made in all cases except for shipments moving through the grain elevator when such shipments are the property of the lessee of the elevator. No charges are made for liquids moving through pipe lines.

Piers and wharves.—The piers and wharves in the port area are of modern design with concrete bulkheads providing over 1.5 miles of berthing space. Depths alongside were 30 feet (9.1 m.) at the lowest low water in 1939. A turning basin 500 feet by 600 feet provides ample space for maneuvering to and from the piers.

Lighterage.—There is no necessity for lighterage at this port.

Bunkering.—Coal for bunkers is available and is delivered to vessels by truck on the wharves or by barge alongside. Fuel and diesel oil are available in large quantities with good facilities for handling. Bunkering rate is up to 1,000 barrels per hour.

Marine repairs.—There are no drydocks or marine railways at the port of Albany for seagoing vessels. Inland craft, usually avail themselves of the services at Kingston. See appendix. Facilities for repairs which do not require hauling out are available at Albany and consist of all types of repairs to both steel and wooden hulls, machinery, boiler work, and machine shop work. Shafts up to 24 feet in length and 40 inches in diameter can be turned.

Supplies.—All kinds of supplies are available.

ALBANY TO TROY

Rensselaer is a town opposite Albany, and **Troy** is a manufacturing city on the east bank of the river, 6 miles above Albany and 131 miles above the Battery. **Watervliet,** opposite Troy, is the site of the United States Arsenal. Passenger and freight steamers run from New York to Albany and Troy during the summer.

Troy.*—The harbor at Troy embraces the entire water front of the city from the southerly limits of the city to the foot of Jacob Street, about 500 feet north of the Delaware & Hudson Railroad bridge. From the southerly limits to about 1 mile south of the Congress Street Bridge the channel is about 400 feet wide, northerly to the bridge the channel is about 600 feet wide. Access to the harbor from the Great Lakes and Canada is through canals and the pool above the locks and dam, the controlling depth of which is about 12 feet (3.6 m.). The locks have usable dimensions of about 300 feet in length, 43½ feet in width, and 12 feet (3.7 m.) over the sill.

Anchorages.—Restricted width of the river and the character of the bottom are not suitable for safe anchorage of vessels. Vessels usually lie at the wharves.

Federal services.—Troy is included in the New York customs district, the nearest port of entry being at Albany. For matters pertaining to the Public Health, Customs, and Immigration Services, see the corresponding paragraphs for Albany, which will also apply to Troy.

Dockage.—The State barge canal terminal provides the only public-docking facility at Troy. Dockage is not charged against vessels engaged in carrying cargo destined to or from the State canals. All other vessels are charged.

*Lat. 42°44′, Long. 73°41′: Chart 284.

Wharfage.—The wharfage charges at the State barge canal terminal for noncanal business is based on net, gross, or measurement tons, as the cargo is rated.

Piers and wharves.—These are of the open pile and concrete bulkhead type with depths of water alongside ranging from 9 feet to 14 feet (2.7 m. to 4.3 m.) at the lowest low water. At the United States Arsenal on the west bank there is an excellent masonry bulkhead 755 feet long. At **Starbuck Island** there are oil storage terminals with depths of about 9 feet (2.7 m.) at the lowest low water at the floats.

Marine repairs.—There are no drydocks or marine railways, but a floating dock at **Cohoes** on the west bank of the river about 1 mile above the Federal Dam is available. The drydock has a length of 150 feet, a width of 36 feet and a depth of 14 feet (4.3 m.) over the sill and 11 feet (3.4 m.) over the blocks. Vessels not requiring drydocking or hauling out may obtain repairs at Troy for all types of repairs to steel and wooden hulls, machinery, and boiler equipment.

DIRECTIONS, HUDSON RIVER

For the charts covering Hudson River see the index map.

The channel of Hudson River is broad and has few obstructions as far as Kingston. It is good for depth of 27 feet (8.2 m.) to Albany and 12 feet (3.7 m.) to Troy.

From the Battery to Irvington, about 22 miles, the deepest water follows the east bank and then leads between the shoals along the east bank and the extensive shoals, fringed by broken ground, making off from the west bank from southward of Piermont to Rockland Lake Lighthouse.

Broken ground, on which the least depths found are 13 to 21 feet (4 to 6.4 m) extends in a northerly direction on the west side of the channel and lies from 2 to 3 miles northward of Tarrytown Lighthouse. Lighted buoys, lying 1.75, and 4 miles, respectively, and a light 3 miles northward of Tarrytown Lighthouse, mark the east edge of the channel abreast the broken ground and assist in avoiding it, but strangers should proceed with caution in vessels drawing more than about 15 feet (4.6 m.).

About 6 miles above Tarrytown and 0.6 mile westward of the south end of Croton Point is a shoal spot with 18 feet (5.5 m.) over it, which is marked by a buoy.

It was reported in June 1939 that a depth of 11 feet (3.4 m.) lies 207° true, 725 yards from the south end of Croton Point.

A shoal bank, with a least depth of about 23 feet (7.0 m.), extends southward from the Dunderberg, opposite Peekskill, and lies on the west side of the channel.

With the exception of the flats in the bights and along the banks, the obstructions in the channel above the Dunderberg are rocky.

A rock with 9 feet (2.7 m.) over it lies on the west side of the channel 400 yards from the west bank and 350 yards north-northwestward of the north end of **Iona Island.** This rock is marked by a buoy.

Con Hook Rocks, with 7 feet (2.1 m.) over them, lie 300 yards from the west bank and nearly 0.4 mile south-southwestward of the light at Con Hook; the rocks are marked by a lighted buoy. (See p. 388.)

The Brothers is a ledge, partly bare at extreme low water, which lies on the east side of the channel off the shoal bight northward of Constitution Island, and is marked by a red buoy.

Diamond Reef has 5 feet (1.5 m.) over it, and lies near mid-river off the lower end of New Hamburg. It is about 300 feet in diameter, with depths of less than 18 feet (5.5 m.), and is marked near its shoalest part by a lighted buoy. The gas buoy is withdrawn from station between December 1 and April 1; spar buoy on station throughout year. There is a clear channel on either side of the reef. (See p. 390.)

A rocky patch with a least depth of 18 feet (5.5 m.) lies 300 yards from the east bank off a sand wharf which lies about 3½ miles northward of New Hamburg. The rock is marked by a horizontally banded buoy.

Another small rocky patch with 18 feet (5.5 m.) over it lies in mid-river 1.5 miles southward of the highway bridge at Poughkeepsie and is marked by a horizontally banded buoy.

From Rondout to Hudson the channel has a navigable depth of 27 feet (8.2. m.), but is rendered more difficult than southward of Rondout by reason of numerous middle grouids and flats. With the aid of the chart, however, small vessels should have no difficulty in making the passage. From Kingston Point to Barrytown the channels on both sides of the Flats are used. The principal channel then leads westward of the Hogs Back, eastward of Saddle Bags, westward of Green and Upper Flats, westward of Upper Coal Beds (there is 24 feet (7.3 m.) on the east side), westward of Rogers Island and eastward of Middle Ground Flats to Hudson.

From Hudson to Troy the river is being improved to obtain a channel 300 feet wide,, with 400 feet through the rock cuts, to the highway bridge in Albany, thence 400 feet wide to Troy. The depth to Albany is 27 feet (8.2 m.) and 12 feet (3.7 m.) to Troy, but not for the full width of the project. The channel is well marked by buoys and lights. The bottom is rocky at many of the bars under improvement, and some local knowledge is required to insure safety for anything but small craft. Strangers are advised to take a pilot; one can be obtained at Hudson and at other cities and towns on the river, but pilots are usually engaged at New York.

Chapter 19.—APPENDIX

COAST AND GEODETIC SURVEY *

COAST PILOTS

	Price
U. S. Coast Pilot, Atlantic Coast, Section A, St. Croix River to Cape Cod	$0.75*
U. S. Coast Pilot, Atlantic Coast, Section B, Cape Cod to Sandy Hook, including Long Island Sound	1.00
U. S. Coast Pilot, Atlantic Coast, Section C, Sandy Hook to Cape Henry, including Delaware and Chesapeake Bays	.75*
U. S. Coast Pilot, Atlantic Coast, Section D, Cape Henry to Key West	.75*
U. S. Coast Pilot, Gulf Coast, from Key West to the Rio Grande	.75*
U. S. Coast Pilot, West Indies, Puerto Rico, and Virgin Islands	.75
Inside Route Pilot, New York to Key West	.50
U. S. Coast Pilot, Pacific Coast, California, Oregon, and Washington	.75*
U. S. Coast Pilot, Alaska, Part I, from Dixon Entrance to Yakutat Bay	.75*
U. S. Coast Pilot, Alaska, Part II, Yakutat Bay to Arctic Ocean	.75*
U. S. Coast Pilot, Hawaiian Islands	.50
U. S. Coast Pilot, Philippine Islands, Part I, Luzon, Mindoro, and Visayas	1.25
U. S. Coast Pilot, Philippine Islands, Part II, Palawan, Mindanao, and Sulu Archipelago	1.25
Distances Between United States Ports	.10

* The price of these publications will be $1.00 per copy as new editions are issued.

FIELD STATIONS

Boston, Mass., 10th floor, Customhouse.
New York, N. Y., 620 Federal Office Building, 90 Church Street.
New Orleans, La., room 314, Customhouse, 423 Canal Street.
San Francisco, Calif., room 307, Customhouse.
Seattle, Wash., room 601, Federal Office Building.
Manila, P. I., Engineer Island.

CHART AGENCIES

MASSACHUSETTS:
- Bass River
- Chatham
- Edgartown
- New Bedford
- Provincetown
- Vineyard Haven

RHODE ISLAND:
- Newport
- Providence

CONNECTICUT:
- Bridgeport
- Devon
- Essex
- Hartford
- New Haven
- New London

CONNECTICUT—continued.
- South Norwalk
- Stamford

NEW YORK:
- Albany
- Bay Shore, L. I.
- City Island
- Flushing, L. I.
- Freeport, L. I.
- Greenport, L. I.
- Huntington, L. I.
- New Rochelle
- New York City
- Port Jefferson, L. I.
- Port Washington, L. I.
- Sag Harbor, L. I.

Distances between ports on the Atlantic Coast of the United States, from Cape Cod to New York

(DISTANCES ARE GIVEN IN NAUTICAL MILES)

From— \ To—	Nantucket	Vineyard Haven	Woods Hole	New Bedford	Brenton Reef Lightship	Fall River	Providence	Newport	Great Salt Pond	Stonington	New London	Hartford	New Haven	Bridgeport	South Norwalk	Stamford	Montauk	Sag Harbor	Greenport	Port Jefferson	Oyster Bay	New York (Battery)	4 miles 130° true from Montauk Pt. Lt.	Cape Cod Canal east entrance	Pollock Rip Channel	Nantucket Shoals Lightship
Nantucket, Mass	----	28	32	53	66	86	90	70	80	92	103	155	139	151	165	167	98	114	113	149	169	195	89	68	20	68
Vineyard Haven, Mass	28	----	6	27	39	60	64	44	54	66	77	129	113	126	139	141	72	88	87	123	143	169	63	42	33	92
Woods Hole, Mass	32	6	----	15	36	56	60	40	50	61	73	125	109	121	135	137	68	84	83	118	139	165	59	22	36	87
New Bedford, Mass	53	27	15	----	35	51	55	35	47	58	70	122	107	119	132	134	65	81	80	116	137	163	58	30	58	92
Brenton Reef Lightship	66	39	36	35	----	20	26	5	18	28	41	92	78	90	104	105	36	51	50	86	108	134	30	49	72	94
Fall River, Mass	86	60	56	51	20	----	20	18	38	48	61	113	97	109	122	124	56	71	70	106	127	153	50	68	90	113
Providence, R. I	90	64	60	55	26	20	----	22	43	53	65	117	102	114	127	129	61	76	75	111	132	158	55	73	95	118
Newport, R. I	70	44	40	35	5	18	22	----	23	33	46	98	82	95	108	110	41	56	55	91	112	138	55	53	75	98
Great Salt Pond, Block I	80	54	50	47	18	38	43	23	----	18	29	81	65	78	91	93	22	38	37	73	94	121	15	64	84	101
Stonington, Conn	92	66	61	58	28	48	53	33	18	----	12	66	51	64	77	79	17	28	27	60	81	107	19	76	96	114
New London, Conn	103	77	73	70	41	61	65	46	29	12	----	62	47	59	72	74	19	25	24	56	76	103	26	88	107	125
Hartford, Conn	155	129	125	122	92	113	117	98	81	66	62	----	76	88	101	103	67	66	63	86	106	132	77	140	159	177
New Haven, Conn	139	113	109	107	78	97	102	82	65	51	47	76	----	22	36	38	50	49	46	23	40	67	62	124	144	162
Bridgeport, Conn	151	126	121	119	90	109	114	95	78	64	59	88	22	----	21	23	61	60	57	15	26	52	74	136	156	174
South Norwalk, Conn	165	139	135	132	104	122	127	108	91	77	72	101	36	21	----	11	75	74	71	23	15	40	87	150	169	187
Stamford, Conn	167	141	137	134	105	124	129	110	93	79	74	103	38	23	11	----	76	75	72	24	11	33	89	152	171	189
Montauk, Long Island, N. Y	98	72	68	65	36	56	61	41	22	17	19	67	50	61	75	76	----	20	21	58	78	105	16	83	103	115
Sag Harbor, Long Island, N. Y	114	88	84	81	51	71	76	56	38	28	26	66	49	60	73	75	20	----	11	56	76	103	30	98	118	131
Greenport, Long Island, N. Y	113	87	83	80	50	70	75	55	37	27	24	63	46	57	71	72	21	11	----	54	74	101	29	97	117	130
Port Jefferson, Long Island, N. Y	149	123	118	116	86	106	111	91	73	60	56	86	23	15	23	24	58	56	54	----	26	53	66	133	153	166
Oyster Bay, Long Island, N. Y	169	143	139	137	108	127	132	112	94	81	76	106	40	26	15	11	78	76	74	26	----	34	86	154	174	187
New York (Battery)	195	169	165	163	134	153	158	138	121	107	103	132	67	52	40	33	105	103	101	53	34	----	120	180	200	214

NOTES.—Distances between points in Buzzards Bay and points eastward are via Quicks Hole. For distances via Woods Hole, combine distances to the latter.

Distances from New York to points eastward are via Long Island Sound except distances to Nantucket Shoals Lightship and to point 4 miles 130° true from Montauk Point Light which are via the south coast of Long Island.

Distances to point 4 miles 130° true from Montauk Point Light are for use in connection with tables south of New York to obtain distances via east end of Long Island between ports east of New York and ports in and south of Delaware River. Distances in this column can also be combined to obtain distances, via east end of Long Island, between New York and the other ports listed in this table.

PLANIMETRIC MAPS

Along the Atlantic coast of the United States within the limits of this Coast Pilot planimetric maps are available for the following areas:

MASSACHUSETTS:
Buzzards Bay to Sakonnet River.
CONNECTICUT:
Connecticut River to New York State boundary.
NEW YORK:
Long Island, south and east coasts.
New York Harbor and vicinity.
Hudson River at Haverstraw.

VARIATION OF THE COMPASS

The magnetic variation for 1940 and annual increase at points mentioned are as follows:

Locality	Variation	Annual increase
	° ′	′
Cape Cod Lighthouse	16 15 W.	2
Handkerchief Lightship	15 30 W.	2
Nantucket Shoals Lightship	15 15 W.	2
Cape Poge	15 00 W.	2
Gay Head	14 45 W.	2
Hen and Chickens Lightship	14 45 W.	2
Conimicut Lighthouse	14 30 W.	2
Point Judith	14 15 W.	2
Montauk Point	13 30 W.	2
Gardiners Bay	13 15 W.	2
New London Harbor	13 30 W.	2
New Haven Harbor	12 45 W.	2
Bridgeport Harbor	12 30 W.	1
Greens Ledge Lighthouse	12 00 W.	1
Great Captain Island	12 00 W.	1
Throgs Neck	11 45 W.	1
Fire Island Lightship	11 45 W.	1
New York Bay entrance	11 15 W.	1
Kingston	12 45 W.	1
Albany	13 15 W.	2

ARMY ENGINEERS

The area with which this Coast Pilot is concerned lies entirely within the North Atlantic Division of the United States Engineers.

The district offices are: Boston District, Third Floor, Park Square Building, Boston, Mass. Providence District, 819 Industrial Trust Building, Providence, R. I. New York District, 710 Army Building, 39 Whitehall St., New York, N. Y., and 322 Federal Building, Albany, N. Y.

Port Series.—The following volumes of the Port Series sold by Superintendent of Documents, Washington, D. C., are available for the ports within this Coast Pilot:

No. 18. The Ports of Southern New England.
(Providence, Newport, New Bedford, Fall River, New London, Bridgeport, Norwalk, and Stamford).

No. 20. The Port of New York.
Part 1.—General Report.
Part 2.—Piers, Wharves, and Docks.
Part 3.—Atlas of Port Facilities, Maps.
No. 25. The Ports on the Upper Hudson River.

HYDROGRAPHIC OFFICE

Boston, Mass., Tenth floor, Customhouse.
New York, N. Y., Room 728, Customhouse.
Philadelphia, Pa., Room 1001, Customhouse.

List of Coast Guard Stations, Cape Cod to Sandy Hook

Official designation [1]	Name	Location
32	Wood End	0.1 mile east of Wood End Light, Cape Cod.
33	Race Point	1.6 miles northeast of Race Point Light.
34	Peaked Hill Bars [2]	2.5 miles northeast of Provincetown.
36	Highland	0.9 mile northwest of Cape Cod Light.
37	Pamet River [2]	3.5 miles south of Cape Cod Light.
38	Cahoons Hollow	2.5 miles east of Wellfleet.
39	Nauset	1.3 miles south of Nauset Beach Light.
40	Orleans	Abreast of Pochet Island.
41	Old Harbor	On beach 0.5 mile north of Chatham Inlet.
42	Chatham	On Morris Island 1 mile south-southwest of Chatham Light.
43	Monomoy [2]	2.2 miles north of Monomoy Tower.
44	Monomoy Point	0.8 mile southwest of Monomoy Tower.
45	Coskata	2.3 miles south of Nantucket (Great Point) Light.
47	Maddaket	On south side of Nantucket Island, 6 miles west of Nantucket Village.
49	Gay Head	On Martha's Vineyard, west end, near Gay Head Light.
50	Cuttyhunk	Near east end of Cuttyhunk Island.
53	Castle Hill	On Newport Neck, 0.3 mile eastward of Castle Hill Light.
54	Narragansett [2]	At Narragansett Pier north part of town.
55	Point Judith	Near Point Judith Light and 0.5 mile east of Harbor of Refuge.
56	Green Hill [2]	6 miles west of Point Judith Light.
57	Quonochontaug [2]	12.8 miles west of Point Judith Light; 8 miles east of Watch Hill Light.
58	Watch Hill	Near Watch Hill Light.
59	Fishers Island	North side of Fishers Island, west shore of East Harbor.
61	New Shoreham [2]	On Block Island, east side, near breakwater.
62	Block Island	West side near Dickens Point.
65	Ditch Plain	3.5 miles southwest of Montauk Point Light, abreast of Montauk Harbor.
66	Hither Plain [2]	0.5 mile south of Fort Pond.
67	Napeague	Abreast of Napeague Harbor.
68	Amagansett [2]	Abreast of Amagansett.
69	Georgica	Near Georgica Pond, 1 mile south of East Hampton.
70	Mecox [2]	Between Stag Pond and Mecox Bay, 2 miles south of Bridgehampton.
71	Southampton [2]	South end of Town Pond, 0.7 mile south of Southampton.

[1] For aviation purposes only. [2] Discontinued as an active unit.

List of Coast Guard Stations, Cape Cod to Sandy Hook—Continued

Official designation [1]	Name	Location
72	Shinnecock	Near the Shinnecock Bay Old Tower on Ponquogue Point.
73	Tiana	3.2 miles southwest of Shinnecock Light.
74	Quogue	On beach 0.5 mile south of Quogue.
75	Potunk [2]	Near eastern end of Moriches Bay, 1.5 miles southwest of West Hampton Beach.
76	Moriches	
77	Forge River	Abreast of and 2.5 miles south of Center Moriches.
78	Smith Point [2]	At eastern end Bellport Bay, abreast of Smith Point.
79	Bellport	Abreast of and 4 miles south of Bellport.
80	Blue Point [2]	Abreast of and 4.5 miles south of Patchogue.
81	Lone Hill [2]	Abreast of Sayville and 8 miles east of Fire Island Light.
82	Point o' Woods [2]	On Great South Beach and 4.5 miles east of Fire Island Light.
83	Fire Island	1.9 miles west of Fire Island Light.
84	Oak Island Beach [2]	On Oak Beach, near entrance to Fire Island Inlet, 4.5 miles west of Fire Island Light.
86	Jones Beach	On Jones Beach, 3.5 miles west from Fire Island Inlet.
87	Zachs Inlet [2]	On Jones Beach, 4.5 miles east from Jones Inlet.
88	Short Beach	On beach, 0.5 mile east of Jones Inlet.
89	Point Lookout [2]	On Long Beach abreast of Freeport, 1 mile west of Jones Inlet.
90	Long Beach	On Long Beach, 0.5 mile east of East Rockaway Inlet.
92	Rockaway Point	On Rockaway Beach, 2.5 miles east of Rockaway Point.
94	Eatons Neck	On Eatons Neck, near light, north shore of Long Island, east side entrance to Huntington Bay.
95	Rocky Point [2]	At Rocky Point, north shore of Long Island, about 2.5 miles northerly from Greenport.
97	Sandy Hook	On bay side, 0.5 mile east of point of Sandy Hook.
98	Spermaceti Cove	On Sandy Hook, 2.5 miles south of Sandy Hook Light and 2.2 miles north of Navesink Light.

[1] For aviation purposes only. [2] Discontinued as an active unit.

Coast Guard air stations.—In the general area covered by this pilot the United States Coast Guard maintain facilities for rendering assistance by airplane at Salem, Mass.; New York, N. Y.; and Cape May, N. J.

CUSTOMS

In connection with the Customs Service, there are listed the Custom Collection Districts and the ports of entry for the United States within the limits covered by this volume. The headquarters for Custom Collection Districts are indicated by italics. Marine documents may be issued at all of the ports with an asterisk preceding the name.

No.	District	Boundary	Ports
4	Massachusetts	All of the State of Massachusetts.	**Boston* (including Braintree, Cambridge, Chelsea, Everett, Hingham, Medford, Quincy, Somerville, Weymouth, and waters adjacent thereto) *Fall River, *Gloucester, Lawrence, *New Bedford, Plymouth, *Provincetown, *Salem (including Beverly, Marblehead, and Lynn), Springfield, Worcester.
5	Rhode Island	All of the State of Rhode Island.	**Providence*, *Newport.
6	Connecticut	All of the State of Connecticut.	**Bridgeport*, *Hartford, *New Haven, *New London.
9	Buffalo	All of the counties of Niagara, Erie, Cattaraugus, and Chautauqua, in the State of New York.	**Buffalo*, Dunkirk, Niagara Falls (including Lewiston).
10	New York	All of that part of the State of New York not expressly included in the districts of Buffalo, Rochester, and St. Lawrence, and also to include the counties of Sussex, Passaic, Hudson, Bergen, Essex, Union, Middlesex, and Monmouth in the State of New Jersey.	**New York*, *Albany, N. Y., *Newark, and *Perth Amboy, N. J.

MARINE INSPECTION AND NAVIGATION

Supervising inspectors are located at Boston, Mass., and New York City.

Local inspectors are located as follows:

Providence, R. I., 43 Federal Building.
New London, Conn., Post Office Building.
New Haven, Conn., 308 Federal Building.
New York, N. Y., 45 Broadway.
Albany, N. Y., 313 Federal Building.

SHIPPING COMMISSIONERS

Offices are maintained at New York City (45 Broadway); Boston, Mass. (408 Atlantic Ave.)

PUBLIC HEALTH SERVICE

Relief stations are located as follows:

Albany, N. Y., 447 State Street.
Boston, Mass., High Street, Chelsea, and customhouse.
Bridgeport, Conn., Collector of Customs.
Ellis Island, N. Y., Marine Hospital.

Fall River, Mass., 130 Rock Street.
Hartford, Conn., Deputy Collector of Customs.
New York, N. Y., Marine Hospital, 67 Hudson Street.
New York, N. Y., out-patient office (barge office).
Nantucket, Mass., 31 Center Street.
Newark, N. J., 234 Lafayette Street.
New Bedford, Mass., 105 South 6th Street.
New Haven, Conn., 85 Whitney Avenue.
New London, Conn., 205 William Street.
Newport, R. I., 280 Broadway.
Perth Amboy, N. J., customhouse.
Providence, R. I., 403 Federal Building.
Provincetown, Mass., 234 Commercial Street.
Stapleton, N. Y., Marine Hospital, Bay Street.
Vineyard Haven, Mass., Marine Hospital.

There are **quarantine officers** at Gloucester, Boston, Plymouth, Vineyard Haven, New Bedford, Providence, Newport, New London, Bridgeport, and New York.

Largest drydocks and marine railways

Port	Name	Length over blocks	Depth over blocks at high water [1]	Capacity
MASSACHUSETTS:		*Feet*	*Feet*	*Tons*
Fairhaven	Railway	140	9–13	700
Fall River	do	300	12–17	[2] 2, 500
RHODE ISLAND:				
Newport	do	140	7–13	750
Do	do	130	9–15	500
Bristol	do	175	18	350
Providence	do	340	22	700
CONNECTICUT:				
Grotan	do	212	12–18	2, 500
New London	do	250	16–18	2, 500
West Haven	do	110	6–14	400
Stratford	do	100	5–12	500
Bridgeport	do	140	12–16	500
LONG ISLAND, N. Y.:				
Greenport	do	180	14–28	700
Port Jefferson	do	160	12–21	900
College Point	do	240	9–14	1, 000
Patchogue	do	140	9–14	300
EAST RIVER, N. Y.:				
Brooklyn Navy Yard	Drydock	717	25	
Brooklyn (Quay St.)	Floating dock	165	17	1, 600
Astoria	Railway	120	8	400
E. 7th St. (Manhattan)	Floating dock	194	18	1, 000
City Island	Railway	185	12–17	500
HARLEM RIVER:				
177th Street	do	200	6–12	300
NEW YORK HARBOR:				
Bay Ridge Channel	Floating dock	685	30	27, 000
Gowanus Bay	do	444	30	10, 000
Do	do	350	20	3, 000
Do	do	408	25	8, 200
Erie Basin	Drydock	720	32	35, 000
Do	Floating dock	410	22	10, 000
Do	do	446	35	9, 000
Brooklyn	do	250	18	3, 000
Hackensack River	do	438	22	8, 500

[1] Depths indicated by two groups of figures are maximum for forward and aft, respectively.
[2] Inoperative June 1939.

Largest drydocks and marine railways—Continued

Port	Name	Length over blocks	Depth over blocks at high water	Capacity
ARTHUR KILL:		*Feet*	*Feet*	*Tons*
Tottenville	Railway	200	8–14	1, 000
Do	Floating dock	160	14	800
Perth Amboy	do	250	18	2, 500
Do	do	213	17	1, 500
Do	do	160	14	1, 000
KILL VAN KULL:				
Elizabeth	Railway	250	8–12	1, 500
Mariners Harbor	Floating dock	534	26	12, 000
Do	do	410	27	6, 600
Port Richmond	do	180	15	1, 500
Do	do	150	22	[2] 2, 000
West New Brighton	do	260	24	3, 500
Do	do	200	14	1, 500
HUDSON RIVER:				
Jersey City	do	220	20	3, 200
Do	do	150	24	2, 000
Do	do	200	30	1, 500
Do	do	200	13	1, 000
Hoboken	do	490	25	10, 000
Do	do	462	40	10, 000
Weehawken	do	210	10	2, 500
Nyack	Railway	115	6	150
Newburgh	do	115	7	500
South Rondout	Floating dock	180	17	1, 100
Kingston	Railway	240	8–16	1, 000
Athens	do	175	5–9	300
Cohoes	Floating dock	150	15	750

[2] Inoperative June 1939.

STORM WARNING STATIONS

The following are the storm warning display stations within the limits covered by this volume:

MASSACHUSETTS:
- Race Point.
- Provincetown.
- Cape Cod Light.
- Wellfleet.
- Chatham.
- Harwich Port.
- Sandwich.
- Nantucket.
- Nobska Point Light.
- Tarpaulin Cove.
- Cuttyhunk.
- Wings Neck Light (Pocasset).
- Fairhaven.

RHODE ISLAND:
- Saunderstown.
- Edgewood.
- Providence.
- Point Judith.
- Wickford.
- Block Island.

CONNECTICUT:
- Bridgeport.
- New Haven.
- New Haven old light.
- New London.

NEW YORK:
- Centre Island (Oyster Bay).
- Fort H. G. Wright (Fishers Island).
- Fort Schuyler (Throgs Neck).
- New Rochelle (Glen Island Park).
- New Rochelle (Huguenot Yacht Club).
- New York (Whitehall Building).
- Port Washington.
- Bayside.
- Ditch Plain.
- Fire Island.
- Short Beach.
- Eatons Neck.
- Hoffman Island.

NEW JERSEY:
- Sea Bright.
- Port Newark.
- Long Branch.
- Sandy Hook.
- Red Bank.

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Hours of Operation of Fog Signals

Light station	January	February	March	April	May	June	July	August	September	October	November	December	Total
Race Point	43	66	16	24	35	86	151	49	7	33	72	36	618
Cape Cod	70	83	31	59	29	101	165	100	9	33	109	58	847
Pollock Rip Lightship	85	78	56	49	84	200	351	199	47	53	128	64	1,394
Great Round Shoal Lightship	54	85	50	39	72	139	234	129	22	50	128	57	1,059
Nantucket Shoals Lightship	72	77	64	44	94	232	290	178	52	46	111	28	1,288
Nobska Point	60	70	16	23	49	88	118	41	21	20	76	42	624
Vineyard Sound Lightship	64	75	36	45	70	148	188	104	30	38	99	55	952
Dumpling Rock	91	85	22	25	55	111	121	63	20	26	108	51	778
Wings Neck	81	76	12	15	52	65	100	36	20	17	85	59	618
Brenton Reef Lightship	119	109	39	41	25	142	187	98	31	46	131	65	1,033
Newport Harbor	48	45	1	10	33	66	69	27	12	18	67	27	423
Prudence Island	57	85	5	12	34	82	85	47	10	25	86	42	570
Borden Flats	45	59	5	1	10	17	22	4	1	14	54	27	259
Plum Beach	45	72	8	16	23	85	104	25	6	23	79	34	520
Conimicut	36	52	---	4	4	17	48	7	3	17	54	33	275
Pomham Rocks	19	48	1	1	1	9	18	6	2	14	31	13	163
Point Judith	95	98	23	30	62	145	153	67	30	34	109	56	902
Block Island Southeast	85	75	43	52	73	177	233	102	36	54	97	69	1,096
Watch Hill	100	81	42	27	57	125	169	84	21	24	97	54	881
Montauk Point	98	80	67	43	71	164	208	104	38	49	102	57	1,081
New London Ledge	107	92	35	27	46	129	193	85	18	49	112	63	956
Little Gull Island	34	54	76	43	119	87	19	36	74	10	60	25	637
Orient Point	57	59	16	14	36	85	115	30	1	17	75	47	552
Saybrook Breakwater	83	53	2	16	34	79	148	55	3	45	71	44	633
Cornfield Point Lightship	103	98	35	17	30	106	158	86	31	46	132	75	917
Falkner Island	107	110	19	27	48	90	101	31	26	32	165	83	839
Stratford Point	56	72	9	14	25	52	34	11	8	16	93	50	440
Stratford Shoal	54	58	16	16	23	62	43	19	12	11	72	42	428
Eaton Neck	57	66	18	25	10	52	54	16	13	14	78	44	447
Greens Ledge	42	32	---	6	14	44	40	8	4	11	62	32	295
Great Captain Island	57	64	8	15	14	51	35	12	12	24	110	51	453
Execution Rocks	70	72	14	15	12	35	29	14	17	10	94	41	424
Throgs Neck	37	31	---	4	6	20	12	6	7	10	46	37	216
Fire Island Lightship	119	105	74	46	48	67	146	114	73	21	155	67	1,035
Ambrose Channel Lightship	158	151	114	73	63	150	128	163	75	91	215	125	1,506
Romer Shoal	48	57	17	24	7	43	24	8	16	19	87	44	394
Robbins Reef	12	4	17	6	34	8	4	20	11	22	61	5	204
Great Beds	25	34	2	6	2	4	1	4	1	20	54	42	195
Stony Point	92	83	5	8	13	12	3	6	2	30	130	71	455
Hudson City	17	13	23	1	6	3	5	6	39	47	33	56	249
Northeast End Lightship	115	63	65	76	105	92	57	43	23	25	136	29	829

Meteorological Table, Nantucket, Mass.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level				Air temperature, in °F.							Average relative humidity	Average amount of clouds 0-10	Precipitation			Wind										Number of days with winds of 32 miles or over	Number of days fog
	Mean	Extremes			Mean				Extremes								Statute miles		Average number of times (observations at 8 a. m. and 8 p. m.) from—										
	For month	Highest	Lowest	Range	For month	Mean maximum	Mean minimum	Range	Highest	Lowest	Range			Average fall	Number of days 0.01 inch or more	Maximum fall in 24 hours	Average hourly velocity	Highest velocity	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	30.04	30.99	28.82	2.17	32.4	38.5	26.4	12.1	64	−4	68	78	7	3.77	13	2.47	16	64	6	6	3	4	5	9	14	15	0	8	3
February	30.04	30.97	28.78	2.19	30.8	36.5	25.0	11.5	60	−6	66	78	6	3.37	12	2.77	16	60	7	5	2	3	3	8	15	13	0	4	4
March	29.98	30.87	28.47	2.40	36.6	42.1	31.0	11.1	68	6	62	78	6	3.75	13	3.22	16	66	7	6	4	6	6	13	9	11	0	6	5
April	29.97	30.68	28.89	1.79	44.0	49.7	38.4	11.3	74	15	59	77	6	2.96	12	2.51	16	61	6	8	2	6	8	14	8	8	0	6	5
May	29.99	30.54	29.25	1.29	52.9	59.1	46.7	12.4	86	34	52	80	6	2.85	11	2.78	14	47	5	8	5	6	7	20	7	4	0	3	5
June	29.98	30.49	29.31	1.18	61.4	67.7	55.1	12.6	90	43	47	82	6	2.67	10	3.74	13	52	5	9	4	5	7	20	7	3	0	1	9
July	29.98	30.51	29.41	1.10	67.8	74.0	61.6	12.4	92	48	44	83	5	2.87	9	3.69	12	59	3	6	2	5	8	27	7	4	0	1	10
August	29.99	30.45	28.71	1.74	67.9	73.8	62.0	11.8	90	51	39	82	5	3.40	9	5.73	12	53	5	11	4	6	8	18	6	4	0	1	7
September	30.08	30.63	29.48	1.15	63.2	68.9	57.6	11.3	88	41	47	80	5	2.45	9	3.70	13	56	6	11	6	5	9	14	5	4	0	2	5
October	30.05	30.61	29.05	1.56	54.4	59.8	49.1	10.7	81	30	51	76	6	3.39	10	4.25	15	53	7	9	6	7	4	11	9	9	0	4	2
November	30.05	30.80	29.13	1.67	45.2	50.5	39.8	10.7	68	15	53	77	6	3.22	12	3.58	16	62	8	5	2	4	4	9	14	14	0	6	2
December	30.05	30.91	28.73	2.18	36.0	41.6	30.5	11.1	61	−3	64	77	6	3.74	13	2.62	16	62	6	6	3	5	3	8	16	15	0	6	3
Mean	30.02				49.4	55.3	43.6	11.7				79	6				15												
Total														38.44	133				71	90	43	62	72	171	117	104	0	48	60

NOTE.—All wind velocity data in true values.

Meteorological Table, Block Island, R. I.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level				Air temperature, in °F.							Average relative humidity	Average amount of clouds 0-10	Precipitation			Wind										Number of days with winds of 32 miles or over	Number of days fog
	Mean	Extremes			Mean				Extremes								Statute miles		Average number of times (observations at 8 a. m. and 8 p. m.) from—										
	For month	Highest	Lowest	Range	For month	Mean maximum	Mean minimum	Range	Highest	Lowest	Range			Average fall	Number of days 0.01 inch or more	Maximum fall in 24 hours	Average hourly velocity	Highest velocity	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	30.07	30.96	28.80	2.16	31.0	37.0	25.0	12.0	59	−4	63	76	6	3.78	13	2.90	18	62	7	5	3	4	5	12	10	16	0	14	3
February	30.06	30.98	28.72	2.26	30.4	36.2	24.6	11.6	58	−10	68	76	6	3.66	11	4.54	18	60	10	4	2	4	2	9	10	15	0	9	3
March	29.98	30.94	28.72	2.22	35.4	40.8	30.0	10.8	68	6	62	79	5	3.83	12	4.29	17	65	5	6	5	5	5	14	9	13	0	10	4
April	29.98	30.75	28.87	1.88	44.0	49.4	38.6	10.8	78	14	64	80	5	3.53	11	3.73	15	56	3	7	5	4	7	13	10	11	0	8	4
May	29.99	30.52	29.12	1.40	52.8	58.5	47.2	11.3	82	31	51	83	5	3.48	11	3.19	14	56	2	7	6	6	7	19	8	7	0	3	6
June	29.97	30.54	29.32	1.22	61.8	67.6	56.0	11.6	88	44	44	85	5	2.62	10	4.93	13	56	3	8	5	5	6	21	8	4	0	1	8
July	29.97	30.52	29.46	1.06	68.4	73.9	62.8	11.1	92	52	40	85	5	3.08	10	6.22	12	49	3	4	4	4	11	21	9	6	0	1	7
August	29.99	30.48	28.96	1.52	68.4	73.6	63.3	10.3	90	49	41	84	5	3.67	9	4.48	12	60	3	8	6	5	7	18	7	8	0	1	5
September	30.08	30.62	29.40	1.22	63.4	68.4	58.3	10.1	87	38	49	81	5	2.66	8	4.88	13	65	6	8	6	6	8	15	4	7	0	1	4
October	30.05	30.71	29.06	1.65	54.8	59.8	49.9	9.9	77	29	48	76	5	3.56	9	3.46	15	65	7	8	4	5	5	14	6	13	0	7	2
November	30.06	30.82	28.51	2.31	44.6	49.7	39.4	10.3	70	14	56	76	6	3.63	10	4.54	17	69	6	6	2	3	3	11	12	17	0	10	2
December	30.06	30.92	28.77	2.15	36.0	41.6	30.3	11.3	61	−6	67	75	6	3.80	11	2.52	18	66	6	4	2	2	4	14	14	16	0	12	2
Mean	30.02				49.2	54.7	43.8	10.9				80	5																
Total														41.30	125				61	75	50	53	70	181	107	133	0	77	50

NOTE.—All wind-velocity data in true values.

Meteorological Table, New London, Conn.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level				Air temperature, in °F.							Average relative humidity	Average amount of clouds 0-10	Precipitation			Wind										Number of days with winds of 32 miles or over	Number of days fog
	Mean	Extremes			Mean				Extremes								Statute miles		Average number of times (observations at 8 a. m. and 9 p. m.) from—										
	For month	Highest	Lowest	Range	For month	Mean maximum	Mean minimum	Range	Highest	Lowest	Range			Average fall	Number of days 0.01 inch or more	Maximum fall in 24 hours	Average hourly velocity	Highest velocity	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	30.08	30.82	28.90	1.92	29.2	36.9	21.5	15.4	65	−17	72	75	5	3.90	14	2.85	9	46	12	6	2	2	3	8	1	18	0	1	2
February	30.08	30.86	28.85	2.01	29.2	36.5	21.9	14.6	68	−10	78	74	5	3.73	13	6.66	9	62	11	4	3	3	2	6	10	17	0	1	2
March	29.99	30.57	29.07	1.50	37.0	45.4	28.6	16.8	84	3	81	72	5	4.02	14	2.46	9	47	12	5	3	3	4	8	7	20	0	0	2
April	29.98	30.74	29.10	1.64	46.6	55.4	37.8	17.6	91	13	78	70	5	3.65	12	2.38	9	32	8	6	3	7	8	9	6	13	0	0	2
May	29.98	30.48	29.29	1.19	57.2	66.5	47.9	19.6	93	31	62	73	5	3.39	12	2.05	8	35	7	8	5	13	3	12	5	9	0	0	3
June	29.98	30.50	29.57	0.93	65.9	74.7	57.1	17.6	97	38	59	77	5	3.10	10	5.97	7	30	6	5	3	9	9	13	8	7	0	0	2
July	29.97	30.49	29.58	0.91	71.4	79.6	63.2	16.4	99	44	55	78	5	3.59	12	1.71	7	38	5	2	4	7	11	16	8	9	0	0	1
August	30.00	30.31	29.57	0.74	69.9	78.1	61.7	16.4	95	46	49	79	5	4.23	10	3.71	6	45	8	2	3	6	7	12	9	15	0	0	1
September	30.08	30.58	29.43	1.15	64.1	72.7	55.5	17.2	95	35	60	78	5	3.30	11	1.90	7	33	9	6	3	4	12	13	3	10	0	0	1
October	30.06	30.58	29.35	1.23	53.8	62.6	45.0	17.6	87	26	61	76	5	3.62	11	2.88	8	49	10	9	4	3	4	9	9	14	0	0	1
November	30.07	30.81	29.32	1.49	42.8	50.9	34.7	16.2	74	10	64	73	5	3.85	12	2.54	9	49	9	7	2	2	4	8	12	16	0	1	1
December	30.08	30.90	29.36	1.54	32.7	39.9	25.5	14.4	67	−11	78	74	5	3.65	12	2.27	9	54	10	5	1	2	3	8	14	19	0	1	1
Mean	30.02				50.0	58.3	41.7	16.6				75	5				8												
Total														44.03	143				107	65	36	61	70	122	102	167	0	4	19

Note.—All wind-velocity data in true values.

Meteorological Table, New Haven, Conn.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level: Mean: For month	Barometer: Extremes: Highest	Barometer: Extremes: Lowest	Barometer: Extremes: Range	Air temperature, in °F.: Mean: For month	Air temperature: Mean: Mean maximum	Air temperature: Mean: Mean minimum	Air temperature: Mean: Range	Air temperature: Extremes: Highest	Air temperature: Extremes: Lowest	Air temperature: Extremes: Range	Average relative humidity	Average amount of clouds 0-10	Precipitation: Average fall	Precipitation: Number of days 0.01 inch or more	Precipitation: Maximum fall in 24 hours	Wind: Statute miles: Average hourly velocity	Wind: Statute miles: Highest velocity	Wind: Average number of times (observations at 8 a. m. and 8 p. m.) from—: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Number of days with winds of 32 miles or over	Number of days fog
												%																	
January	30.08	31.00	28.76	2.24	29.0	36.4	21.5	14.9	67	−14	81	70	6	4.00	13	2.74	9	47	11	10	2	3	6	8	9	13	0	1	2
February	30.07	31.04	28.76	2.28	28.7	36.4	21.0	15.4	69	−15	84	69	5	3.85	11	4.13	10	44	11	7	2	2	3	9	9	12	0	1	1
March	29.99	30.94	28.27	2.67	36.8	44.5	29.0	15.5	84	0	84	68	5	4.27	12	4.78	10	46	10	11	2	5	7	7	8	12	0	1	2
April	29.99	30.72	28.98	1.74	47.0	55.5	38.6	16.9	91	13	78	66	5	3.74	12	5.90	10	44	10	7	5	7	7	6	7	11	0	1	1
May	29.99	30.53	29.05	1.48	58.0	67.1	49.0	18.1	95	30	65	67	5	3.65	12	3.32	8	36	7	9	3	11	11	8	5	8	0	0	1
June	29.97	30.58	29.30	1.26	66.9	75.8	58.0	17.8	99	41	58	70	5	3.42	11	7.50	8	38	7	9	3	6	10	11	6	8	0	0	1
July	29.97	30.51	29.45	1.06	72.2	80.7	63.8	16.9	101	48	53	71	5	4.28	11	7.00	7	35	6	6	2	7	15	10	6	9	1	0	*
August	29.99	30.47	29.44	1.03	70.4	78.7	62.1	16.6	98	45	53	73	5	4.37	10	8.73	7	45	13	8	3	5	11	10	5	7	0	0	*
September	30.07	30.64	29.27	1.37	64.0	72.6	55.5	17.1	100	32	68	73	4	3.72	9	6.69	8	47	13	7	4	5	9	9	4	9	0	0	*
October	30.06	30.79	29.10	1.69	53.6	62.3	44.9	17.4	89	24	65	70	5	3.63	9	5.19	8	49	13	10	2	3	6	9	7	12	0	0	1
November	30.07	30.84	28.65	2.19	42.4	50.0	34.9	15.1	75	2	73	70	5	3.55	10	3.41	9	41	13	6	1	2	4	10	11	13	0	1	1
December	30.07	30.94	28.87	2.07	32.4	39.6	25.3	14.3	68	−12	80	70	5	3.80	11	3.75	9	48	10	9	1	1	3	15	11	12	0	1	2
Mean	30.02				50.2	58.3	42.0	16.3				70	5				9												
Total														46.28	131				124	99	30	57	92	112	88	126	1	6	12

* Less than 1.

Note.—All wind velocity data in true values.

Meteorological Table, New York, N. Y.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level: Mean: For month	Barometer: Extremes: Highest	Barometer: Extremes: Lowest	Barometer: Extremes: Range	Air temperature, in °F.: Mean: For month	Air temperature: Mean: Mean maximum	Air temperature: Mean: Mean minimum	Air temperature: Mean: Range	Air temperature: Extremes: Highest	Air temperature: Extremes: Lowest	Air temperature: Extremes: Range	Average relative humidity	Average amount of clouds 0-10	Precipitation: Average fall	Precipitation: Number of days 0.01 inch or more	Precipitation: Maximum fall in 24 hours	Wind: Statute miles: Average hourly velocity	Wind: Statute miles: Highest velocity	Wind: Average number of times (observations at 8 a. m. and 8 p. m.) from—: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Number of days with winds of 32 miles or over	Number of days fog
January	30.10	31.01	28.61	2.40	30.9	37.4	24.5	12.9	67	−6	73	67	6	3.66	12	2.48	17	66	4	7	4	3	5	8	14	16	1	12	3
February	30.08	31.00	28.70	2.30	31.3	38.4	24.2	14.2	73	−7	80	65	6	3.82	10	3.25	17	73	5	5	4	2	4	6	13	17	0	10	2
March	30.00	30.95	28.38	2.57	37.7	45.4	30.2	15.2	80	3	77	63	6	3.64	12	3.60	18	70	4	8	7	4	6	6	10	17	0	13	2
April	30.00	30.68	29.03	1.65	49.4	57.2	41.6	15.6	91	12	79	62	6	3.23	11	3.72	16	65	4	7	7	5	7	5	9	16	0	11	1
May	29.99	30.56	29.02	1.54	60.6	68.5	52.6	15.9	95	34	61	63	6	3.24	11	4.17	14	69	3	6	10	7	9	9	7	11	0	6	2
June	29.98	30.56	29.34	1.22	68.8	77.0	60.5	16.5	97	44	53	66	6	3.33	10	3.88	13	59	4	7	5	6	10	8	8	9	3	5	1
July	29.98	30.51	29.46	1.05	73.8	81.7	65.9	15.8	99	50	49	67	6	4.24	10	3.80	12	68	4	5	3	5	12	11	10	12	0	4	1
August	30.00	30.44	29.28	1.16	73.1	80.1	66.2	13.9	102	51	51	70	6	4.33	10	5.05	12	59	4	8	7	6	12	8	7	10	0	3	†
September	30.08	30.61	29.19	1.42	66.8	73.7	59.8	13.9	100	39	61	70	5	3.39	9	6.17	13	62	5	7	8	6	10	8	6	10	0	4	1
October	30.06	30.72	29.06	1.66	56.3	63.7	49.0	14.7	88	29	59	67	5	3.53	9	9.40	15	65	6	8	4	6	6	7	12	13	0	7	2
November	30.09	30.81	28.70	2.11	44.2	51.0	37.3	13.7	74	7	67	68	6	2.96	9	3.62	16	60	4	5	3	1	5	6	17	19	0	10	2
December	30.09	30.93	28.97	1.96	35.0	41.2	28.8	12.4	68	−13	81	67	6	3.62	11	2.93	16	69	4	6	3	2	5	9	15	18	0	11	3
Mean	30.04				52.3	59.6	45.0	14.6				66	6				15												
Total														42.99	124				51	79	65	53	91	91	128	168	4	96	20

† Less than 1.

Note.—All wind velocity data in true values.

Meteorological Table, Albany, N. Y.

COMPILED BY THE UNITED STATES WEATHER BUREAU

Month	Barometer at 32° F. and mean sea level				Air temperature, in °F.							Average relative humidity	Average amount of clouds 0-10	Precipitation			Wind										Number of days with winds of 32 miles or over	Number of days fog
	Mean	Extremes			Mean				Extremes								Statute miles		Average number of times (observations at 8 a. m. and 8 p. m.) from—										
	For month	Highest	Lowest	Range	For month	Mean maximum	Mean minimum	Range	Highest	Lowest	Range			Average fall	Number of days 0.01 inch or more	Maximum fall in 24 hours	Average hourly velocity	Highest velocity	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm		
January	30.07	31.10	28.46	2.64	23.8	31.8	15.9	15.9	71	−24	85	76	6	2.40	12	1.66	8	59	9	6	1	4	15	6	5	16	0	(1)	1
February	30.07	31.10	28.80	2.30	23.7	31.9	15.5	16.4	66	−20	86	75	6	2.46	11	1.92	9	54	9	7	1	4	12	2	4	17	0	(1)	1
March	30.01	30.92	28.85	2.07	33.4	41.4	25.5	15.9	79	−8	87	70	5	2.62	12	2.29	9	43	8	6	1	5	16	3	5	18	0	(1)	1
April	30.00	30.69	29.08	1.61	46.6	55.7	37.4	18.3	91	9	82	64	5	2.46	12	2.02	9	38	8	6	1	5	13	4	7	16	0	(1)	(1)
May	29.98	30.54	28.90	1.64	58.9	68.8	49.0	19.8	97	29	68	62	5	2.90	12	2.19	8	34	8	4	1	5	21	4	7	12	0	(1)	(1)
June	29.97	30.50	29.22	1.28	68.0	77.7	58.2	19.5	100	40	60	66	5	3.37	12	2.95	7	38	8	4	2	8	18	5	5	10	0	(1)	(1)
July	29.96	30.55	29.44	1.11	72.8	82.4	63.1	19.3	104	47	57	65	5	3.43	12	3.12	7	46	5	4	2	7	22	6	6	10	0	(1)	1
August	29.98	30.51	29.36	1.15	70.4	79.9	61.0	18.8	102	43	59	68	5	3.71	11	4.23	7	35	8	5	2	7	22	4	4	10	0	(1)	1
September	30.07	30.65	29.23	1.42	63.6	72.8	54.3	18.5	98	32	66	72	5	3.11	10	3.27	3	32	8	7	1	6	20	4	4	10	0	(1)	3
October	30.06	30.72	28.94	1.78	51.8	60.5	43.0	17.5	90	22	68	72	5	2.73	10	4.75	8	51	8	6	1	6	17	6	5	13	0	(1)	4
November	30.06	30.80	29.00	1.80	39.8	46.8	32.8	14.0	74	−10	84	74	6	2.78	11	3.49	8	41	9	4	1	4	16	5	5	16	0	(1)	2
December	30.08	30.94	29.07	1.87	28.3	35.3	21.3	14.0	67	−21	88	76	7	2.61	11	2.39	8	47	9	5	1	4	18	5	4	16	0	(1)	1
Mean	30.03				48.4	57.1	39.7	17.4				70	6				8												
Total														34.58	136				97	64	15	65	210	54	61	164	0	(1)	15

(1) Less than 1

Note.—All wind velocity data in true values.

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