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UNITED STATES COAST PILOT 3

ATLANTIC COAST

COAST & GEODETIC SURVEY
NOV 20 1961
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Sandy Hook to Cape Henry

Seventh (1961) Edition

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United States Government Printing Office, Washington : 1961

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National Oceanic and Atmospheric Administration

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Preface

United States Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, Seventh (1961) Edition, is the sixth of the streamlined "Blue Coast Pilots." The book is corrected through Notice to Mariners 24 of June 17, 1961.

The Coast Pilots—eight in all—are a series of nautical books containing a wide variety of information important to navigators of United States coastal and intracoastal waters. Subjects include landmarks, navigation regulations, channels, anchorages, dangers, weather, ice, routes, pilotage, and port facilities. Most of this information cannot be shown conveniently on the standard nautical charts and is not readily available elsewhere. New editions every 5 years are planned for the six Atlantic, Gulf, and Pacific coast volumes; the two Alaska volumes may vary up to 10 years. Cumulative Supplements, containing revisions and new information reported since the dates of the editions, usually are issued early each year.

Most new editions of Coast Pilots are written only after thorough field inspection by special Coast Pilot ship or shore parties. Field inspection for the 1961 edition of Coast Pilot 3 was accomplished in 1960 by the USC&GS Ship SCOTT, a 73-foot vessel captained by Lieutenant Commander P. A. Stark, USC&GS. The book was written under the direction of Mr. John A. McCormick, Chief, Coast Pilot Branch, USC&GS.

Coast Pilot 3 contains many items of general interest. For example, "Sandy Hook Light was established in 1764 and is the oldest in continuous use in the United States." And, "The dividing line between Delaware River and Delaware Bay is 42 miles above the Delaware Capes. The line was defined arbitrarily by the legislatures of Delaware and New Jersey and extends from a monument on Liston Point, Delaware, to a similar monument on the south side of the entrance to Hope Creek, New Jersey." Then there is, "Mount Vernon, the home of George Washington, is on the Virginia side of Potomac River 83.5 miles above the mouth. The custom of tolling the ship's bell while passing Mount Vernon is said to have originated the night of Washington's death, December 14, 1799."

United States Coast Pilot 3 is sold for $2.50 only by the Coast and Geodetic Survey and its sales agencies. The annual supplements are distributed free. The Survey welcomes comment and/or criticism; write to Director, Coast and Geodetic Survey, U.S. Department of Commerce, Washington 25, D.C.

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1. GENERAL INFORMATION

EXPLANATORY.—Coast Pilot Supplements should be kept intact; the numbered-line continuity with the editions was designed to eliminate cutting and pasting.

Bearings.—These are true, and when given in degrees are clockwise from 000° (north) to 359°. Light-sector bearings are toward the light.

Bridges and cables.—Clearances of bridges and overhead cables are in feet above normal high water unless otherwise stated; clearances of drawbridges are for the closed position. These are the vertical clearances approved by the Nautical Chart Division, C&GS. They may be as-built, authorized, or reported; see latest prints of nautical charts for possible modifier. Also see charts for horizontal clearances of bridges; these are repeated in the Coast Pilots only when they are less than 50 feet and then only in terms of channel width or length of span.

Courses.—These are true and are given in degrees clockwise from 000° (north) to 359°. The courses given are the courses to be made good.

Currents.—Stated current velocities are the averages at strength. Velocities are in knots, which are nautical miles per hour. Directions are the true directions to which the currents set.

Depth units.—Depths are in feet or fathoms below the low-water tidal datum of the charts unless otherwise stated.

Distances.—These are in nautical miles unless otherwise stated. A nautical mile is 1 minute of latitude, or approximately 2,000 yards, and is about 1.15 statute miles.

Elevations.—These are in feet above the plane of reference used for that purpose on the charts.

Light and fog-signal characteristics.—These are not described and light sectors are not usually defined. See Coast Guard Light Lists for complete information.

Radio navigational aids and radio weather aids.—These are not fully described. See Coast Guard Light Lists and H.O. Publications 117 and 118.

Winds.—Directions are the true directions from which the winds blow. Velocities are in knots, which are nautical miles per hour.

The COAST AND GEODETIC SURVEY is required to provide charts and related information for the safe navigation of marine and air commerce, and to provide basic data for engineering and scientific purposes and for other commercial and industrial needs.

District Offices of the Coast and Geodetic Survey are located at some of the principal ports in the United States; see Appendix. Files of charts, Coast Pilots, and other publications are maintained at these offices for the use of mariners, who are invited to avail themselves of the facilities afforded.

Sales agents for Charts, Coast Pilots, Tide Tables, Tidal Current Tables, and Tidal Current Charts of the Coast and Geodetic Survey are located in many ports of the United States and in some foreign ports. See Appendix for list of sales agents. The charts and books also may be purchased from the Washington Office or from the District Offices. Orders mailed to Washington, D.C., should be accompanied by check or money order, made payable to C&GS, Department of Commerce. Indexes of charts and books will be furnished free, upon receipt of request designating areas of interest.

Special signals for surveying vessels.—Pilot Rules for Inland Waters, § 80.33, state that by day a surveying vessel of the Coast and Geodetic Survey, underway and employed in hydrographic surveying, may carry in a vertical line, one over the other not less than 6 feet apart where they can best be seen, three shapes not less than 2 feet in diameter of which the highest and lowest shall be globular in shape and green in color and the middle one diamond in shape and white.

(a) Vessels of the Coast and Geodetic Survey shall carry the above-prescribed marks while actually engaged in hydrographic surveying and underway, including drag work. Launches and other boats shall carry the prescribed marks when necessary.

(b) It must be distinctly understood that these special signals serve only to indicate the nature of the work upon which the vessel is engaged and in no way give the surveying vessel the right-of-way over other vessels or obviate the necessity for a strict observance of the rules for preventing collisions of vessels.

(c) By night a surveying vessel of the Coast and Geodetic Survey, underway and employed in hydrographic surveying, shall carry the regular lights prescribed by the rules of the road.

(d) A vessel of the Coast and Geodetic Survey, when at anchor in a fairway on surveying operations, shall display from the mast during the daytime two black balls in a vertical line and 6 feet apart. At night two red lights shall be displayed in the same manner. In the case of a small vessel the distance between the balls and between the lights may be reduced to 3 feet if necessary.

(e) Such vessels, when at anchor in a fairway on surveying operations, shall have at hand and show, if necessary, in order to attract attention, a flare-up light in addition to the lights which are, by this section, required to be carried.

International Rules of the Road, Part B, Rule 4(c), states that a vessel engaged in laying or in picking up a submarine cable or navigation mark, or a vessel engaged in surveying or underwater operations when from the nature of her work she is unable to get out of the way of approaching vessels, shall carry, in lieu of the lights specified in Rule 2(a) (i) and (ii), three lights in a vertical line one over the other not less than 6 feet apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all round the horizon at a distance of at least 2 miles. By day, she shall carry in a vertical line one over the other not less than 6 feet apart, where they can best be seen, three shapes each not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and red in colour, and the middle one diamond in shape and white.

The **wire drags** used by the Coast and Geodetic Survey in sweeping for dangers to navigation may be crossed by vessels without danger of fouling at any point except between the towing launches and the large buoys near them, where the towline approaches the surface of the water. Vessels passing over the drag are requested to change course so as to cross it approximately at right angles, as a diagonal course may cause the propeller to foul the supporting buoys and attached wires. No attempt should be made to pass between the drag launches while the wire is being set out or taken in, unless it would endanger a vessel to do otherwise, because the bottom wire is slack and the floats at each 100-foot section may lift it nearly to the surface; at this time the launches usually are headed directly toward or away from each other and the operation may be clearly seen.

Nautical charts are published primarily for the use of the mariner but serve the public interest in many other ways. They are compiled principally from Coast and Geodetic Survey basic field surveys, supplemented by data from other Government organizations.

The **scales of nautical charts** range from 1:2,500 to about 1:5,000,000. Graphic scales are generally shown on charts with scales of 1:80,000 or larger, and numerical scales are given on smaller-scale charts. Coast and Geodetic Survey charts are classified according to scale as follows:

Sailing charts, scales 1:600,000 and smaller, are for use in fixing the mariner's position as he approaches the coast from the open ocean, or for sailing between distant coastwise ports. On such charts the shoreline and topography are generalized and only offshore soundings, the principal lights, outer buoys, and landmarks visible at considerable distances are shown.

General charts, scales 1:100,000 to 1:600,000, are for coastwise navigation outside of outlying reefs and shoals.

Coast charts, scales 1:50,000 to 1:100,000, are for inshore navigation leading to bays and harbors of considerable width, and for navigating large inland waterways.

Harbor charts, scales larger than 1:50,000, are for harbors, anchorage areas, and the smaller waterways.

Intracoastal Waterway charts, scale 1:40,000, are a special series covering the New Jersey inside route, the Atlantic Coast inside route from Norfolk, Virginia, to Key West, Florida, and the Gulf Coast inside route from Carrabelle, Florida, to Port Brownsville, Texas.

Small-craft charts are another special series, started in 1959, covering areas of most interest to the amateur navigator. This unique series combines the graphics of the standard nautical charts with the verbal information of the Coast Pilots.

The **date of a chart** is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Up-to-date charts should be obtained at regular intervals.

A **new edition** of a chart is printed only when corrections are so extensive or of such importance to navigation as to necessitate a replacement of all previous issues; the number and date of the current edition are printed in the lower left corner. When the edition is revised, the date of the **latest revision** is printed to the right of the edition date. Before a chart is issued by the Coast and Geodetic Survey it is corrected by hand for all important information published in the weekly Notice to Mariners since the date of printing; the number and date of the last Notice to Mariners used are **stamped** in the lower right corner. Purchasers of charts should consult the Notice to Mariners for corrections subsequent to the stamped date.

The **Mercator projection** used on most nautical charts has straight-line meridians and parallels that intersect at right angles. On any particular chart the distances between meridians are equal throughout, but distances between parallels increase progressively from the equator toward the poles, so that a straight line between any two points is a rhumb line. This unique property of the Mercator projection is one of the main reasons why it is preferred by the mariner.

Echo soundings.—Most of the various types of echo sounder are calibrated for a velocity of sound in water of 800 fathoms per second, but the actual velocity may differ from the calibrated value by as much as 5 percent, depending upon the temperature and salinity of the waters in which the vessel is operating; the highest velocities are found in warm, highly saline water, and the lowest in icy, fresh water. Variation in line voltage can also cause errors of 10 percent or more in reading. Echoes can be obtained from schools of fish; in fact, trawlers are using the sounders for that purpose. The most serious error commonly occurs where the depth is greater than the scale range of the instrument; a 400-fathom scale indicates 15 fathoms visually and graphically when the depth is 415 fathoms. Where possible, wide variations from charted depths should be checked by wire soundings.

The **plane of reference** for depths on C&GS charts is

the mean of all low waters for the Atlantic coast of the United States, including the West Indies, and the mean of the lower low waters for the Pacific coast, including the Hawaiian Islands and Alaska. The plane most frequently used on foreign charts is mean low water springs. The effect of strong winds, in combination with the regular tidal action, may at times cause the water level to fall considerably below the reference plane.

Compass roses on charts.—The annual change in variation gradually introduces an error in the magnetic compass roses on charts. The compass roses are replotted for every new edition of the chart if the error is appreciable; and the amount and date of the variation and the amount of annual change are stated for each compass rose. On some of the sailing and general charts the magnetic variation is shown by isogonic lines.

Deviations of the compass.—The magnetic effect of the ship itself combines with any instrumental error of the compass to cause the deviation, which varies with the heading of the ship and with the magnetic latitude. It is customary to counteract the deviation as far as possible with soft iron and permanent magnets, suitable placed in or on the binnacle.

Local magnetic disturbance.—The charts show areas where the compass is disturbed by magnetic masses external to the ship. Such disturbances are fairly common in shallow waters but are never encountered over oceanic depths. Magnetic force diminishes so rapidly with distance that a magnetic center on land would have to be of unprecedented intensity to affect the compass of a vessel 0.5 miles from shore.

Overhead cables are shown on the charts and described in the Coast Pilots; the clearances given are for the lowest wires at high water. Vessels with masts, stacks, booms, or aerials should allow for an additional clearance under power cables equal to the distance between adjacent cables.

Submarine cable areas are shown on the charts but are not described in the Coast Pilots. Special effort should be made to avoid anchoring or trawling in cable areas. If a vessel does foul a cable, extreme care should be used when attempting to clear. Should normal methods fail, the anchor or other gear should be slipped and abandoned rather than risk breaking or cutting the cable. The high voltages in certain cables could cause severe burn or loss of life.

Tide Tables are issued annually by the Coast and Geodetic Survey in advance of the year for which they are prepared. These tables include predicted times and heights of high and low waters for every day in the year for a number of reference stations and differences for obtaining similar predictions for numerous other places. They also include other useful information such as a method for obtaining heights of tide at any time, local civil time of sunrise and sunset for various latitudes, reduction of local civil time to standard time, and time of moonrise and moonset for various ports.

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

Tidal Current Tables for the coasts of the United States are issued annually by the Coast and Geodetic Survey in advance of the year for which they are prepared. These tables include daily predictions of the times of slack water and the times and velocities of strength of flood and ebb currents for a number of waterways, together with differences for obtaining predictions for numerous other places. Also included is other useful information such as a method for obtaining the velocity of current at any time, duration of slack, coastal tidal currents, wind currents, combination of currents, and current diagrams. Some information on the Gulf Stream is included in the tables for the Atlantic coast.

Tidal Current Charts are published by the Coast and Geodetic Survey for various localities. These charts depict the direction and velocity of the current for each hour of the tidal cycle. They present a comprehensive view of the tidal current movement in the respective waterways as a whole and when used with the proper current tables or tide tables supply a means for readily determining for any time the direction and velocity of the current at various localities throughout the areas covered.

The **COAST GUARD** has among its duties (1) enforcement of the laws of the United States on the high seas, in harbors, bays, sounds, roadsteads, and other like bodies of water along the coasts of the United States, its territories and possessions; (2) enforcement of navigation laws, neutrality laws and regulations, rules and regulations in relation to anchorage grounds, and the Oil Pollution Act; (3) inspection of vessels of the Merchant Marine to insure safety to passengers and crews; (4) aid to distressed mariners and saving of life and property from shipwreck; (5) issuance of Merchant Marine licenses and documents; (6) investigation of marine casualties and accidents and suspension and revocation proceedings; (7) destruction of derelicts; (8) construction, operation, maintenance, and inspection of aids to navigation; (9) publication of Lists of Lights and Other Marine Aids and Local Notices to Mariners; and (10) maintenance and operation of ice breaking facilities.

Lists of Lights and Other Marine Aids.—Aids to navigation, consisting of lights, radiobeacons, fog signals, buoys, lightships, and daybeacons, are described in the Lists of Lights and Other Marine Aids (commonly referred to as Light Lists), which are for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D.C., and by various sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the char-

acteristics, candlepower, and visibility of lights, as well as descriptions of light structures, lightships, daybeacons, buoys, radiobeacons, and fog signals.

Local Notices to Mariners.—Changes and deficiencies in aids to navigation maintained by or under the authority of the Coast Guard are published in Local Notices to Mariners issued by the District Commander of the area in which the aids are located. The local notices are intended for local navigation interests operating within the limits of a Coast Guard district. Changes in aids to navigation of the United States are also contained in the Weekly Notice to Mariners, Part I (Western Hemisphere Edition), prepared jointly by the U.S. Coast Guard and the U.S. Navy Hydrographic Office. The weekly notices are intended for mariners and others who have a definite need for them in connection with extended seagoing activities or those operating in several Coast Guard districts.

Reporting of defects in aids to navigation.—Promptly notify the nearest Coast Guard District Commander if an aid to navigation is observed to be missing, sunk, capsized, out of position, damaged, extinguished, or showing improper characteristics.

Radio messages should be prefixed "Coast Guard" and transmitted directly to one of the U.S. Government shore radio stations listed in H.O. Publication No. 117, Radio Navigational Aids, for relay to the Coast Guard District Commander. If the radio call sign of the nearest U.S. Government radio shore station is not known, radiotelegraph communication may be established by the use of the general call "NCG" on the frequency of 500 kc. Merchant ships may send messages relating to defects noted in aids to navigation through commercial facilities only when they are unable to contact a U.S. Government shore radio station. Charges for these messages will be accepted "collect" by the Coast Guard.

Lights.—The distances at which lights may be seen in clear weather, given in the Light Lists and on the charts, are the geographic ranges computed in nautical miles for a height of the observer's eye of 15 feet above sea level, unless the lights are not of sufficient candlepower to be seen to the limit of their geographic range, in which case the luminous range is given. These distances may at times be increased by abnormal atmospheric refraction and may be greatly decreased by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions. In some conditions of the atmosphere white lights may have a reddish hue.

Navigational lights should be used with caution because of the following conditions that may exist:

A light may be extinguished and the fact not reported to the Coast Guard for correction, or a light may be located in an isolated area where it will take time to correct.

In regions where ice conditions prevail the lantern panes of unattended lights may become covered with ice or snow, which will greatly reduce the visibility and may also cause colored lights to appear white.

Brilliant shore lights used for advertising and other purposes, particularly those in densely populated areas, make it difficult to identify a navigational light.

At short distances flashing lights may show a faint continuous light between flashes.

The distance of an observer from a light cannot be estimated by its apparent intensity. The characteristic of lights in an area should always be checked in order that powerful lights visible in the distance will not be mistaken for nearby lights showing similar characteristics at low intensity such as those on lighted buoys.

The apparent characteristic of a complex light may change with the distance of the observer. The characteristic as charted and shown in the light list may not be recognized until nearer the light.

Motion of a vessel in a heavy sea may cause a light to alternately appear and disappear, and thus give a false characteristic.

Where lights have different colored sectors, be guided by the correct bearing of the light; do not rely on being able to accurately observe the point at which the color changes. On either side of the line of demarcation of colored sectors there is always a small arc of uncertain color.

Arcs drawn on charts around a light show the bearings between which the variation of visibility or obscuration occurs and do not indicate the distance at which it can be seen. On some bearings the distance may be reduced or increased by land or other obstructions, depending on the distance from the light.

Lights should not be passed close aboard because in many cases rip-rap mounds are maintained to protect the structures against ice damage and scouring action.

Fog signals.—Caution should be exercised in the use of sound fog signals for navigation purposes. They should be considered solely as warning devices.

Sound travels through the air in a variable manner with or without the effects of wind and, therefore, the hearing of fog signals cannot be implicitly relied upon. Experience indicates that distances must not be judged only by the intensity of the sound; that occasionally there may be areas close to a fog signal in which it is not heard; and that fog may exist not far from a station, yet not be seen from it, so the signal may not be operating. It is not always possible to start a fog signal immediately when fog is observed.

Lightships.—Courses should invariably be set to pass lightships with sufficient clearance to avoid the possibility of collision from errors of observation, current and wind effects, other vessels in the vicinity, defect in steering apparatus, and from other causes. Experience shows that lightships cannot be safely used as leading marks to be passed close aboard, but should always be left broad off the course, whenever searoom permits.

During extremely heavy weather and due to their exposed locations, lightships may be carried off station without the knowledge and despite the best efforts of their crews. A lightship known to be off station will

secure her light, fog signal, and radiobeacon and fly the International Code signal "PC" signifying "Lightship is not at anchor on her station."

Station (watch) buoys are sometimes moored near lightships to mark the approximate station should the lightship be carried away or temporarily removed. Since these buoys are always unlighted and, in some cases, moored as much as a mile from the lightship, the danger of a closely-passing vessel colliding with them is always present, particularly so during darkness or periods of reduced visibility.

Buoys.—The navigator should check the position by shore bearings, soundings, or other means, and not rely entirely on a buoy being on its charted position and showing its proper characteristic. Buoys are liable to be carried away, shifted, capsized, or sunk as a result of storms, ice conditions, collision, or other accident. Lighted buoys may become extinguished or show improper characteristics, or sound buoys may not function because of storm, ice, or collision.

Buoys may not always properly mark shoals or other obstructions due to shifting shoals and storms. Buoys marking wrecks or other obstructions are usually placed on the seaward or channelward side and not directly over a wreck. Since buoys may be located some distance from a wreck they are intended to mark because of local conditions, and since sunken wrecks are not always static, extreme caution should be exercised when operating in the vicinity of such buoys.

Radiobeacons.—A list and descriptive details of all marine radiobeacons are given in the Light Lists and H.O. Publication No. 117, Radio Navigational Aids. There is included in these publications the procedure to follow for the use of radiobeacons for calibration of radio direction-finders as well as a list of special radio direction-finder calibration stations.

A vessel steering a course for a radiobeacon should observe the same precautions as when steering for a light or any other mark. If the radiobeacon is aboard a lightship, particular care should be exercised to avoid the possibility of collision, and sole reliance should never be placed on sighting the lightship or hearing its fog signal. If there are no dependable means by which the vessel's position may be fixed and the course changed well before reaching the lightship, a course should be selected that will insure passing the lightship at a distance, rather than close aboard, and repeated bearings of the radiobeacon should show an increasing change in the same direction.

Radio 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 recording the results. Bearings of aircraft ranges and standard broadcast stations should be used with particular caution due to coastal refraction and lack of calibration of their frequencies.

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 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 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.

A table of corrections is given in the Appendix for the conversion of a radio bearing into a Mercator bearing. It is sufficiently accurate for practical purpose for distances up to 1,000 miles.

The only data required are the latitudes and longitudes of the radiobeacons and of the ship by dead reckoning. The latter is scaled from the chart, and the former is either scaled from the chart or taken from the list of radiobeacons in the Light List or H.O. Publication No. 117, Radio Navigational Aids.

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.

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 or subtracted from 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.

Radio bearings from other vessels.—Any vessel with a radio direction-finder can take a bearing on a vessel equipped with a radio transmitter. 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. Although any radio station, for which an accurate position is definitely known, may serve as a radiobeacon for vessels equipped with a radio direction-finder, extreme caution must be exercised in their use. Stations established especially for maritime services are more reliable.

Loran.—A list of stations and descriptive details of the

Loran System are given in the Light Lists and H.O. Publication No. 117, Radio Navigational Aids. Instructions, tables, and charts of the Loran System are published by the Navy Hydrographic Office. Coast charts of the United States with Loran lines are published by the Coast and Geodetic Survey.

Exact data cannot be given as to the accuracy to be expected in Loran positions since the accuracy depends to a large extent on the skill of the operator, the condition and type of receiving equipment, and the area of operation. The accuracy of a Loran fix is determined by the accuracy of the individual lines of position used to establish the fix and by their angle of intersection.

Loran position determinations on or near the baseline extensions are subject to geometric errors exceeding two nautical miles per microsecond and, therefore, should be avoided whenever possible. Loran is a long range aid to navigation and should not normally be used in pilot waters. The use of skywaves is not recommended within 250 miles of either station.

Caution must be used in matching Loran signals to insure that the ground wave signal of one station is not unknowingly matched with a skywave signal of the other station of the pair, or a one-hop skywave signal from station with a two-hop skywave signal from the other.

Numbering and recording of undocumented vessels.—Certain undocumented vessels are required to be numbered by the Federal Boating Act of 1958, effective April 1, 1960. They may be numbered either by the U.S. Coast Guard or by a state having an approved numbering system. Owners may obtain the necessary information from any Coast Guard District Commander.

Licensing of vessels.—Navigation laws pertaining to registry, enrollment, and licensing of vessels are administered by the **United States Bureau of Customs.** The bureau's functions also include issuing of commissions to yachts and the assignment of signal letters; the measurement of vessels, administration of tonnage duties, and the collection of tolls; the regulation of vessels in the coasting and fishing trade and limitation of the use of foreign vessels in waters under the jurisdiction of the United States; the recording of sales, conveyances, and mortgages of vessels; the protection of steerage passengers, and the remission of fines, penalties, and forfeitures incurred under the laws governing these matters. Collection districts and ports of entry located within the area covered by this Coast Pilot are tabulated in the Appendix.

Advance notice of arrival of vessels in ports.—The master or agents of certain vessels (foreign and domestic) are required to give advance notice to the Captain of the Port, U.S. Coast Guard, of the time of arrival in port; see **§ 124.10,** Chapter 2.

Danger signal.—It is stated in the **Pilot Rules for Inland Waters,** § 80.1, if, when steam vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle, the danger signal. Article 18, Rule III, of the **Inland Rules of the Road** also contains this provision. The **International Rules of the Road,** Part D. Rule 28(b), states, in part, that, whenever a power-driven vessel which, under these Rules, is to keep her course and speed, is in sight of another vessel and is in doubt whether sufficient action is being taken by the other vessel to avert collision, she may indicate such doubt by giving at least five short and rapid blasts on the whistle.

Minesweeper signals.—United States vessels engaged in minesweeping operations have their maneuvering powers considerably hampered. All other vessels, whether steamers or sailing craft, should keep out of the way of the sweepers, remembering especially that it is dangerous to pass between the vessels of a pair or group sweeping together.

All vessels towing sweeps are to show a black ball at the foremasthead and at each yardarm **by day** and green lights instead of the black balls **by night;** the lights may only be exhibited when necessary to warn approaching friendly vessels. Other vessels are not to approach the sweepers nearer than 500 yards on either beam or 1,000 yards astern; under no circumstances is a vessel to pass through a formation of mine sweepers. The sweepers should be prepared to warn other vessels who persist in approaching too close by means of any of the appropriate signals from the International Code of Signals.

Improper use of searchlights prohibited.—No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilothouse of any vessel under way (46 CFR 78.27–1(a)). The International Code Signal "ZO" may be made by a vessel inconvenienced by the glare of a searchlight in order to apprise the offending vessel of the fact.

Unnecessary whistling prohibited.—The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States (46 CFR 78.23–1(a)).

Search and rescue operations.—The Coast Guard coordinates search and rescue operations in the cases of surface vessels or aircraft that are in distress or overdue. Search and rescue aircraft have special markings of international orange on the wing tips and wing-tip floats. The cooperation of vessel operators with search and rescue cutters and aircraft may mean the difference between life and death of persons in distress.

Operators of disabled wooden craft and persons adrift in rubber rafts or boats that are, or may consider themselves to be, the object of a search, should hoist on a halyard or otherwise place aloft as high as possible any metallic object that would assist their detection by radar. Coast Guard cutters and aircraft are radar equipped and thus are able to continue searching in darkness and during other periods of low visibility.

Search and rescue signals.—The information below is quoted from Annex 12 to The Convention on International Civil Aviation, Search and Rescue:

6.1—Signals, with surface craft.

6.1.1—When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or a surface craft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal.

If such precise instructions cannot be transmitted or when necessary for any other reason, the instructions shall be given by using the procedure prescribed in 6.1.2.

Note.—Current maritime signalling procedures include:

For acknowledging receipt of signals, (i) the hoisting of the Code pennant (vertical red and white stripes) close up (means understood); (ii) the flashing of a succession of **T**'s by signal lamp in the Morse Code; (iii) the changing of heading.

For indicating inability to comply, (i) the hoisting of the International flag **N** (a blue and white checkered square); (ii) the flashing of a succession of N's in the Morse Code.

6.1.2—The following procedures performed in sequence by an aircraft shall mean that the aircraft is directing a surface craft toward an aircraft or a surface craft in distress:

(a) Circling the surface craft at least once.

(b) Crossing the projected course of the vessel close ahead at a low altitude, opening and closing the throttle, or changing the propeller pitch.

(c) Heading in the direction in which the surface craft is to be directed. Repetitions of such procedures shall have the same meaning.

6.1.3—The following procedure performed by an aircraft shall mean that the assistance of the surface craft to which the signal is directed is no longer required: Crossing the wake of the surface craft close astern at a low altitude, opening and closing the throttle, or changing the propeller pitch.

Mariners are advised that United States Government vessels or planes in distress may exhibit, in addition to the distress signals set forth under International Rules of the Road, an orange smoke visible by day.

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 kc. to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "COGARD." 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 numbers of vessels and aircraft 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; color, size and shape.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea, and wind. Action taken, if any.
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 permits 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 Coast Guard assistance by transmitting the distress signal or call and the message on the 2182 kc. frequency.

Submarine emergency identification signals.—The following smoke-bomb or flare signals are made by submarines of the United States in cases of necessity:

Green indicates torpedo has been fired; will be used to simulate torpedo firing on special exercises such as convoy exercises.

Yellow indicates that submarine is about to come to periscope depth from below periscope depth. Surface craft terminate antisubmarine counterattacks and clear vicinity of submarine. Do not stop propellers!

Red indicates an emergency condition within the submarine and she will surface immediately if possible. Surface vessels clear the area and stand by to give assistance after the submarine has surfaced. In case of repeated red signals, or if the submarine fails to surface within a reasonable time, she may be assumed to be disabled. Buoy the location, look for submarine marker buoy, and attempt to establish sonar communications. Advise naval authorities.

The foregoing, all of which mark the submarine's position, are fired from a submerged signal ejector into the air to a height of about 300 feet, then float downward slowly, suspended from a small parachute, and give colored illumination for about 30 seconds.

Submarines are also equipped with messenger buoys which are about 3 feet in diameter and are painted international orange. A submarine on the bottom in distress and unable to surface, will, if possible, release this buoy. An object of this description which is sighted on the surface of the water should be investigated and naval authorities advised.

The **CORPS OF ENGINEERS,** U.S. Army, has charge of the improvement of the rivers and harbors of the United States and of miscellaneous other civil works which 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, and the granting of permits for structures or operations in navigable waters.

Information concerning the various ports, improvements, channel depths, navigable waters, and the condition of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer offices; see Appendix.

Anchorage areas and restricted areas in most places are defined and regulations governing them are established by the Corps of Engineers. The regulations are enforced by the U.S. Coast Guard, and 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 Corps of Engineers. The regulations also are copied into the appropriate Coast Pilots.

The **Port Series,** prepared jointly by the Corps of Engineers and the Maritime Administration and sold by the Superintendent of Documents, are complete reports on the principal seaports of the United States and are primarily of interest to commercial and industrial concerns. They cover the subjects of particular interest to the shipping world, such as the physical features of each port, its organization and practices, regulations regarding the movement of ships and goods, port dues and charges, fuel and water, rail connections, and commerce.

Protection of navigable waters.—Given below are 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 waters; 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 a manner as to obstruct, impede, or endanger navigation. And whenever a vessel, raft, or other craft is wrecked and sunk in a navigable channel, accidently 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 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.

WEATHER BUREAU.—Forecasts and warnings of the approach of storms over land and ocean areas are among the services of the Weather Bureau to navigation, commerce, agriculture, and the general public. Other warnings cover cold waves, frost, forest-fire hazard, and floods.

Meteorological information is collected and transmitted at hourly, 3-hourly, and 6-hourly intervals from land stations, ships at sea, and aircraft. These reports form a basis for the forecasting service, for summarization and publication of climatological data having general value and applicability, and for research basic to improvement of the national weather service.

Weather Bureau offices are located in many ports and other places throughout the continental United States and possessions. Stations in the area of concern to this Coast Pilot, at which the public may compare barometers against Weather Bureau barometers and discuss matters of weather service with Weather Bureau officials, are listed in the Appendix. By international agreement, the Weather Bureau also bears a share in the maintenance and operation of certain weather ships on the free oceans.

Marine meteorological service.—The collection of observations from ships at sea is conducted on a purely voluntary and cooperative basis. The Weather Bureau supplies shipmasters with blank forms, printed instructions, and such other material as is essential to the making and recording of observations. In the course of an average peacetime year, more than 400,000 observations are received from vessels representing every maritime nation and reaching every quarter of the globe.

The **hurricane and storm warning service** was established primarily to aid marine interests. Storm warnings are prepared at regular district forecast centers and at special hurricane forecast centers. The warnings are distributed to the public through all neighboring Weather Bureau offices by radio, the press, and every other available means. During the West Indian hurricane season, June to November, inclusive, teletype circuits expedite the exchange of reports from the Atlantic and Gulf

coasts; special reports are obtained from weather reconnaissance planes which fly near the storms and sometimes into the storm centers.

Coastal Warning Display System.—The Weather Bureau employs the following system for displaying warning signals at stations along United States coasts when winds dangerous to navigation are forecast.

Small-craft warning: One red pennant displayed by day and a red light above a white light at night to indicate that winds up to 33 knots and/or sea conditions dangerous to small craft operations are forecast for the area.

Gale warning: Two red pennants displayed by day and a white light above a red light at night to indicate that winds ranging from 34 to 47 knots are forecast for the area.

Whole gale warning: A single square red flag with black center displayed by day and two red lights at night to indicate that winds ranging from 48 to 63 knots are forecast for the area.

Hurricane warning: Two square red flags with black centers displayed by day and a white light between two red lights at night to indicate that winds of 64 knots and above are forecast for the area.

The **NAVY HYDROGRAPHIC OFFICE** exists for the improvement of the means of navigating safely the vessels of the U.S. Navy and the Merchant Marine by providing accurate nautical charts and related publications for foreign waters. Publications include Sailing Directions (pilots), Light Lists, Table of Distances, Radio Navigational Aids, Radio Weather Aids, International Code of Signals, the American Practical Navigator (Bowditch), and the Notice to Mariners.

The weekly **Notice to Mariners** contains corrections to Charts, Coast Pilots, Sailing Directions, Light Lists, and other publications. Part I, Western Hemisphere, covers North and South America and includes general information of world interest. Part II, Eastern Hemisphere, covers notices to mariners and light lists for the rest of the world.

The **IMMIGRATION AND NATURALIZATION SERVICE** administers the laws relating to admission, exclusion, and deportation of aliens, the registration and fingerprinting of aliens, and the naturalization of aliens lawfully resident in the United States.

The designated ports of entry for aliens are divided into three classes. Class A is for all aliens. Class B is only for aliens who at the time of applying for admission are lawfully in possession of valid and unexpired resident aliens' border-crossing identification cards or valid non-resident aliens' border-crossing identification cards. Class C is only for aliens who are arriving in the United States as seamen as that term is defined in the last sentence of section 1 of the Immigration Act of 1917 (39 Stat. 874; 8 U.S.C. 173). [That the term seaman as used in this Act shall include every person signed on the ship's articles and employed in any capacity on board any vessel arriving in the United States from any foreign port or place.] No alien may enter the United States until he has been inspected by an immigration officer. A list of the ports of entry for aliens is given in the Appendix.

The **PUBLIC HEALTH SERVICE** administers hospitalization and outpatient treatment to legal beneficiaries of the Government; it also administers foreign and domestic quarantine laws, supervising the medical examination of immigrants and enforcing interstate laws.

Quarantine.—A vessel arriving at a port under the control of the United States shall undergo quarantine inspection prior to entry unless: (1) In the current voyage the vessel has not touched at any port other than those under the control of the United States, or in Canada, the Islands of St. Pierre and Miquelon, Iceland, Greenland, the West Coast of Lower California, Cuba, the Bahama Islands, the Canal Zone, the Bermuda Islands, and the Islands of Aruba and Curacao; or (2) in the current voyage the vessel has received pratique at a port under the control of the United States and since receiving same has not touched at a port other than those listed in (1); or (3) the vessel possesses a duplicate of a pratique issued at a port in Canada or the Canal Zone and since receiving same has not touched at ports other than those listed in (1).

A vessel otherwise exempt from quarantine inspection shall undergo such inspection prior to entering a port under the control of the United States if the vessel has aboard a person infected or suspected of being infected with certain communicable diseases, or if the vessel arrives from a port where at the time of departure there was present or suspected of being present cholera, plague, or yellow fever, or there was a significant increase in the prevalence of smallpox or typhus.

Vessels subject to quarantine inspection shall upon arrival at ports under the control of the United States fly a yellow flag, anchor in the quarantine anchorage, and await inspection. Only the quarantine officer, quarantine employees, or pilots shall be permitted to board any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer. A person boarding such vessel shall be subject to the same restrictions as those imposed on the persons on the vessel.

Sanitary inspection.—Vessels arriving at a port under the control of the United States from a foreign port shall be subject to sanitary inspection to ascertain whether there exists rodent, vermin, or insect infestation or other unsanitary conditions requiring measures for the prevention of the introduction, transmission, or spread of communicable disease.

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

Medical service.—United States merchant seamen are

entitled to medical relief obtainable through the Public Health Service. A United States 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 so engaged. **Hospitals, outpatient clinics,** and **outpatient offices** of the Public Health Service are located at the addresses given in the Appendix. Free medical advice is furnished to seamen by radio; see H.O. Publication 117, Radio Navigational Aids.

RADIO.—The **Federal Communications Commission** controls radio communications in the United States and in all possessions except the Panama Canal Zone. Commission inspectors have authority to board ships to determine whether their radio stations comply with international treaties, Federal laws, and Commission regulations. The Commission has field offices in the principal United States ports. Information concerning ship radio regulations and service documents may be obtained from the Federal Communications Commission, Washington 25, D.C., or from any of the field offices.

Marine weather broadcasts.—Information on weather over North Atlantic and North Pacific waters is issued by the Weather Bureau for broadcast by commercial and Government radio stations. Marine bulletins for the western North Atlantic are broadcast by Navy station NSS, Washington, D.C.; those for the eastern North Pacific are transmitted by KPH, Bolinas, Calif., and KTK, San Francisco, Calif. A separate bulletin for Central Pacific waters is broadcast by KHK, Kahuku, Hawaii. The marine bulletins include storm advisories and forecasts. Station frequencies, broadcast times, and areas affected are stated in H.O. Publication 118, Radio Weather Aids.

Advisories and forecasts also are broadcast by Navy stations NBA, Balboa, C.Z.; NPG, San Francisco, Calif.; NHB, Kodiak, Alaska: and NPM, Honolulu, Hawaii.

Local weather bulletins, containing coastal-area forecasts, storm advisories, and weather summaries for specific areas, are broadcast on regular schedules by many Government and commercial radio stations.

Emergency broadcasts by Navy radio stations.—Storm advisories and notices concerning the safety of navigation at sea are broadcast by Navy radio stations in accordance with the degree of urgency, as follows:

A. Notices of tidal waves, hurricanes, typhoons, and cyclones so imminent as to warrant immediate broadcasting: (1) One transmission immediately on receipt; (2) one transmission at the end of the first ensuing silent period; and (3) one transmission during the first ensuing on-watch period for ships with one operator, in case both previous transmissions were made during the off-watch period.

B. Storm warnings and notices of less urgency than those specified in (A) and other than those normally included in scheduled hydrographic broadcasts: (1) One transmission at the end of the first ensuing silent period; and (2) one transmission during the on-watch period for ships with one operator in case the previous transmission was made during an off-watch period.

These broadcasts are preceded by transmission of the Urgent Signal (XXX) or the Safety Signal (TTT) and a preliminary announcement on 500 kc. of the message to follow on the station working frequency.

Emergency broadcasts by Coast Guard radio stations.—Storm and hurricane warnings, advisories and other urgent marine information are broadcast by Coast Guard radio stations:

A. By radiotelegraph on the station's medium frequency immediately following the first silent period after receipt of the message at the radio station (HH+18 or HH+48) preceded by an initial call on 500 kc. Whenever this transmission occurs outside the watch hours for single radio operator ships, the message will be repeated at the end of the next silent period falling within the radio watch hours for such vessels. If a station makes daily broadcasts of marine information, the message will also be included in its next scheduled transmission.

B. By radiotelephone on 2182 kc. immediately following receipt of the message at the radio station and repeated at the station's next scheduled broadcast.

Radiotelephone broadcasts of weather information (United States).—Transmission by voice of weather information from the Weather Bureau is made through certain radio stations of the Coast Guard and of the commercial coastal radiotelephone service. These broadcasts are followed immediately by reports of dangerous obstructions and changes in aids to navigation.

This service gives to yachts, fishing craft, tugboats, and other vessels equipped with a radio receiving set having a band covering the frequency range of 2 to 3 megacycles, official weather information from the Weather Bureau in plain language and on regular schedules.

These radiotelephone broadcasts are made twice and, in some cases, four times daily at definite times and include marine forecasts, and storm warnings whenever they are issued, for coastal waters in or adjacent to the areas served by the radio stations.

Certain local radio stations in the standard broadcast band have microphones installed in nearby Weather Bureau offices. From these stations forecasts, weather summaries, and warnings are broadcast on regular schedule. For stations and schedules in the area covered by this volume, see the Appendix.

West Indies.—Coast Guard station NMR, San Juan, P.R., broadcasts twice daily by radiotelephone and radiotelegraph a weather bulletin consisting of marine forecasts and weather summary for the Caribbean Sea area and small-craft, storm, and hurricane warnings when applicable.

Mexico and Canada.—Scheduled broadcasts of weather information affecting the coasts of Mexico and Canada are made by designated stations of those countries on marine frequencies by both radiotelegraph and radiotelephone.

Alaska.—Weather broadcasts are made by radiotelegraph by Naval station NHB, Kodiak, and Coast Guard

station NMJ, Ketchikan. Radiotelephone broadcasts are made by NMJ and by various stations of the Alaska Communication System operating in the 2-megacycle band.

Reports from ships.—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.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Caribbean Sea area, southern North Atlantic Ocean, and the Pacific waters west of Central America and Mexico are urged to cooperate with the Weather Bureau in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

TIME SIGNALS.—The **United States system** of broadcasting time signals begins at 55 minutes 0 second of some hour and continues for 5 minutes. Signals are transmitted on every second of this period except the 29th of each minute, the 51st of the first minute, the 52d of the second minute, the 53d of the third minute, the 54th of the fourth minute, the last 4 seconds of the first 4 minutes, and the last 9 seconds of the last minute. The hour signal is a 1.3-second dash, which is much longer than the others.

In all cases the beginnings of the dashes indicate the beginnings of the seconds, and the ends of the dashes are without significance. The number of dashes sounded in the group at the end of any minute indicates the number of minutes of the signal yet to be sent. In case of signal failure or error, the signal is repeated 1 hour later.

The **National Bureau of Standards** broadcasts time sugnals from its radio station **WWV** near Washington, D.C., on radio frequencies of 2.5, 5, 10, 15, 20, and 25 megacycles, which are on the air at all times, day and night. This insures reliable coverage of the United States and extensive coverage of other parts of the world. The services include time announcements, standard time intervals, standard audio frequencies, and radio-propagation disturbance-warning notices.

Time announcements.—The audio frequencies are interrupted at precisely 1 minute before each hour and each 5 minutes thereafter. They are resumed precisely on the hour and each 5 minutes thereafter. The beginnings of the periods, when the audio frequencies are resumed, are in agreement with the basic service of the U.S. Naval Observatory, and accordingly they accurately mark the hour and successive 5-minute periods.

Greenwich Mean Time is announced in telegraphic code each 5 minutes. The zero- to 24-hour system is used. This announcement refers to the end of the announcement interval. A voice announcement of eastern standard time is given following each telegraphic code announcement.

Standard time intervals.—On each carrier frequency is a pulse which occurs at intervals of precisely 1 second. The pulse is omitted at the beginning of the last second of every minute. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the second pulses, are marked by the beginning or ending of the periods when the audio frequencies are off.

A **radio-propagation disturbance warning** forecast is transmitted in Morse code twice each hour at 19½ and 49½ minutes past the hour. These warnings tell users of radio transmission paths over the North Atlantic, the condition of the ionosphere at the time of the announcement, and how good or bad communication conditions are expected to be for the next 12 hours. During a period of radio-propagation disturbance, direction-finder observations may be unreliable; the letters "N", "U", and "W" signify that radio propagation conditions are, respectively, normal, unsettled, or disturbed.

Radio station **WWVH**, on the island of Maui, Hawaii, broadcasts on 5, 10, and 15 megacycles. The schedule of broadcasts is the same as that of station WWV for standard time intervals, time announcements in code, standard audio frequencies, and accuracy. Simultaneous reception of WWV and WWVH does not interfere with ordinary use of the standard frequency and time signals.

The WWVH broadcast is interrupted for 4 minutes following each hour and half hour and for periods of 34 minutes each day beginning at 1900 GMT.

DESTRUCTIVE WAVES.—Unusual sudden changes in water level can be caused by seismic sea waves or violent storms. These two types of destructive waves have become commonly known as **tidal waves,** a name which is technically incorrect as they are not the result of tide-producing forces.

Seismic sea waves are set up by submarine earthquakes. Many such seismic disturbances do not produce sea waves and often those produced are small, but the occasional large waves can be very damaging to shore installations and dangerous to ships in harbors.

These waves travel great distances and can cause tremendous damage on coasts far from their source. The wave of April 1, 1946, that originated in the Aleutian Trench demolished nearby Scotch Cap Lighthouse and also caused $25,000,000 damage in the Hawaiian Islands 2,200 miles away.

The speed of seismic sea waves varies with the depth of the water, reaching 300 to 500 knots in the deep water of the open ocean. In the open sea they cannot be detected from a ship or from the air because their length is so great, sometimes a hundred miles, as compared to their height, which is usually only a few feet. Only on certain types of shelving coasts do they build up into waves of disastrous proportions.

There is usually a series of waves with crests 10 to 40 minutes apart, and the highest may occur several hours after the first wave. Sometimes the first noticeable part of the wave is the trough which causes a recession of the

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water from shore, and people who have gone out to investigate this unusual exposure of the beach have been engulfed by the oncoming crest. Such an unexplained withdrawal of the sea should be considered as nature's warning of an approaching wave.

Improvements have been and are being made in the quick determination and reporting of earthquake epicenters, but no method has yet been perfected for determining whether a sea wave will result from a given earthquake. The problem of detecting and reporting the existence of seismic sea waves when they do occur is being studied. A reporting system has been organized in the Pacific with its center in the Hawaiian Islands.

When an advance warning is available, waterfront areas should be vacated for higher ground and ships in the vicinity of land should head for the deep water of the open sea.

Storm waves.—A considerable rise or fall in the level of the sea along a particular coast may result from strong winds and a sharp change in barometric pressure. In cases where the water level is raised, higher waves can form with greater depth and the combination can be destructive to low regions, particularly at high stages of tide. Extreme low levels can result in depths which are considerably less than those shown on nautical charts. This type of wave occurs especially in coastal regions bordering on shallow waters which are subject to tropical storms.

Seiche is a stationary vertical wave oscillation with a period varying from a few minutes to an hour or more, but somewhat less than the tidal periods. It is usually attributed to external forces such as strong winds, changes in barometric pressure, swells, or seismic sea waves disturbing the equilibrium of the water surface. Seiche is found both in enclosed bodies of water and superimposed upon the tides of the open ocean. When the external forces cause a short-period horizontal oscillation of the water, it is called **surge.**

The combined effect of seiche and surge sometimes makes it difficult to maintain a ship in its position alongside a pier even though the water may appear to be completely undisturbed, and heavy mooring lines have been parted repeatedly under such conditions. Pilots advise taut lines to reduce the effect of the surge.

2. NAVIGATION REGULATIONS

THIS chapter contains the sections of **Code of Federal Regulations, Title 33, Navigation and Navigable Waters,** that are of most importance in the areas covered by Coast Pilot 3. The sections are from Part 82, Boundary Lines of Inland Waters; Part 124, Control Over Movement of Vessels; Part 202, Anchorage Regulations; Part 203, Bridge Regulations; Part 204, Danger Zone Regulations; and Part 207, Navigation Regulations.

PART 82—BOUNDARY LINES OF INLAND WATERS:

§ 82.1 General basis and purpose of boundary lines. By virtue of the authority vested in the Commandant of the Coast Guard under section 101 of Reorganization Plan No. 3 of 1946 (3 CFR, 1946 Supp., Ch. IV), and section 2 of the act of February 19, 1895, as amended (28 Stat. 672, 33 U.S.C. 151), the regulations in this part are prescribed to establish the lines dividing the high seas from rivers, harbors, and inland waters in accordance with the intent of the statute and to obtain its correct and uniform administration. The waters inshore of the lines described in this part are "inland waters," and upon them the inland rules and pilot rules made in pursuance thereof apply. The waters outside of the lines described in this part are the high seas and upon them the international rules apply. The regulations in this part do not apply to the Great Lakes or their connecting and tributary waters.

§ 82.2 General rules for inland waters. At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described in this part, the waters inshore of a line approximately parallel with the general trend of the shore, drawn through the outermost buoy or other aid to navigation of any system of aids, are inland waters, and upon them the inland rules and pilot rules made in pursuance thereof apply, except that Pilot Rules for Western Rivers apply to the Red River of the North, the Mississippi River and its tributaries above Huey P. Long Bridge, and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City alternate waterway.

§ 82.25 Delaware Bay and tributaries. A line drawn from Cape May East Jetty Light to Cape May Harbor Inlet Lighted Bell Buoy 2CM; thence to Delaware Bay Approach Lighted Whistle Buoy "D"; thence to the northernmost extremity of Cape Henlopen.

§ 82.30 Chesapeake Bay and tributaries. A line drawn from Cape Henry Lighthouse to Cape Henry Junction Lighted Whistle Buoy; thence to Cape Charles Lighthouse.

PART 124—CONTROL OVER MOVEMENT OF VESSELS:

§ 124.10 Advance notice of vessel's time of arrival to Captain of the Port. (a) The master or agents of every registered vessel of the United States, and every foreign vessel arriving at a United States port or place from a port or place outside the United States, or any such vessel destined from one port or place in the United States to another port or place in the United States, shall give at least 24 hours advance notice of arrival to the Captain of the Port at every port or place where the vessel is to arrive, except as follows:

(1) Registered United States pleasure vessels and registered United States fishing vessels are not required to submit advance notice of arrival report.

(2) When the port of arrival is not located within the geographical area assigned to a particular Captain of the Port, this advance notice of time of arrival shall be made to the Commander of the Coast Guard District in which such port or place is located.

(3) When the arrival is a direct result of the operation of "force majeure," and it is not possible to give at least 24 hours' advance notice of time of arrival, then advance notice as early as practicable shall be furnished.

(4) When the vessel, while in United States waters, does not navigate any portion of the high seas, i.e., does not navigate beyond the low water mark along the coasts or beyond the waters contained within the headlands of the United States.

(5) When a vessel is engaged upon a scheduled route if a copy of the schedule is filed with the Captain of the Port for each port of call named in the schedule and the times of arrival at each such port are adhered to.

(6) When the master of a merchant vessel (except on a coastwise voyage of 24 hours or less) reports in accordance with the U.S. Coast Guard's voluntary Atlantic Merchant Vessel Report (AMVER) System, he shall be considered to be in constructive compliance with the requirements of paragraph (a) of this section and no additional advance notice of vessel's arrival reports to the Captain of the Port is required. The master or agent of a vessel on coastwise voyages of 24 hours or less shall report the advance notice of vessel's arrival to the Captain of the Port at next port of call prior to or upon departure from port.

(7) When a vessel which is engaged in operations in and out of the same port, either on voyages to sea and return without having entered any other port, or on coastwise voyages within the same Coast Guard District, or from ports within the First, Ninth, Thirteenth, or Seventeenth Coast Guard Districts to adjacent Canadian ports, and where no reason exists which renders such

action prejudicial to the rights and interests of the United States; the Coast Guard District Commander having jurisdiction may prescribe conditions under which Coast Guard Captains of the Ports may consider such a vessel as being in constructive compliance with the requirements of this section without the necessity for reporting each individual arrival.

(8) A westbound vessel which is to proceed to or through United States waters of the St. Lawrence River and/or the Great Lakes under conditions other than provided for in subparagraphs (3), (5), and (7) of this paragraph, shall be subject to compliance with paragraph (b) of this section.

(b) The master or agent of every vessel other than vessels of United States or Canadian nationality engaged in the coastal trade of their respective countries or in trade between their two countries without calling at any other country en route, when proceeding westbound to United States waters of the St. Lawrence River and/or the Great Lakes shall:

(1) A least 24 hours in advance of the vessel's arrival at the Snell Lock, Massena, New York, advise the Commander, Ninth Coast Guard District, Cleveland, Ohio, of estimated time of arrival of such vessel at the Snell Lock.

(2) In addition, prior to or immediately on entering Lake Ontario inbound, advise the Commander, Ninth Coast Guard District, of the vessel's first intended United States port of call, if any, and estimated time of arrival at that port.

(3) Upon the vessel's arrival in the first United States port, cause to be delivered to the Captain of the Port (or the Commander, Ninth Coast Guard District where no Captains of the Port are assigned) an itinerary giving the intended ports of call on the Great Lakes and the estimated dates of arrival.

(4) A master of a vessel who reports in accordance with the U.S. Coast Guard's voluntary Atlantic Merchant Vessel Report (AMVER) System and who includes in this report an estimated time of arrival at the Snell Lock, Massena, New York, shall be considered to be in constructive compliance with the requirements of subparagraph (1) of this paragraph and no additional advance notice of vessel's arrival at the Snell Lock is required. Likewise a master of such vessel who indicates in this report the name of the first intended United States port of call and estimated time of arrival at that port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

§ 124.20 Penalties for violations. Failure to give advance notice will subject the master or agents of a vessel to the penalties of fine and imprisonment, as well as subject the vessel to seizure and forfeiture, as provided in section 2, Title II of the Act of June 15, 1917, as amended, 50 U.S.C. 192. In addition, such failure may result in delay in the movement of the vessel from the harbor entrance to her facility destination within the particular port.

PART 202—ANCHORAGE REGULATIONS:

§ 202.1 General. (a) The areas described in Subpart A of this part are designated as special anchorage areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150). Section 1 of the act amended Article 11 of the Navigation Rules for Harbors, Rivers, and Inland Waters Generally (33 U.S.C. 180), section 2 amended Rule 9 of the Navigation Rules for Great Lakes and Their Connecting and Tributary Waters (33 U.S.C. 258), and section 3 amended Rule 10 of the Navigation Rules for Red River of the North and Rivers Emptying into Gulf of Mexico and Tributaries (33 U.S.C. 319). Vessels not more than 65 feet in length, when at anchor in any special anchorage area, shall not be required to carry or exhibit the white anchor lights required by the Navigation Rules.

(b) The anchorage grounds for vessels described in Subpart B of this part are established, and the rules and regulations in relation thereto adopted, pursuant to the authority contained in section 7 of the River and Harbor Act approved March 4, 1915 (38 Stat. 1053; 33 U.S.C. 471).

(c) All bearings in this part are referred to true meridian.

Subpart A—Special Anchorage Areas:

§ 202.65. Indian River Bay, Del. Beginning at a point bearing 174°, 300 feet, from a point on the southerly edge of the project channel 5,500 feet westerly from the State highway bridge across Indian River Inlet; thence 174°, 600 feet; thence 264°, 800 feet; thence 354°, 600 feet; and thence 84°, 800 feet, to the point of beginning.

§ 202.67 Delaware River, Essington, Pa. North of Little Tinicum Island, between the mouth of Darby Creek and Jansen Avenue, Essington, bounded as follows: Beginning at a point (approximately latitude 39°51′31″, longitude 75°17′43″) on a line in prolongation of the westerly line of Jansen Avenue 135 yards southerly from the mean high water line; thence 184°, 300 yards; thence 274°30′, 1,700 yards; thence 04°, 425 yards; thence 100°, 1,225 yards; and thence 95°, 490 yards, to the point of beginning.

§ 202.70 Chesapeake and Delaware Canal, easterly of Courthouse Point, Md. Southerly of a line joining the northernmost extremity of Courthouse Point and the westernmost point of Herring Island; westerly of a line bearing 180° from the westernmost point of Herring Island; and northerly and easterly of the shore line.

§ 202.72 Blackhole Creek, Md. The waters on the west side of Blackhole Creek, a tributary of Magothy River, southwest of a line bearing 310°30′ from the most northerly tip of an unnamed island located 0.16 mile upstream from the mouth of the creek approximately 660 feet to the west shore of the creek; northwest of a line

ranging from the southwesterly tip of the island toward the point of land on the west shore of the creek immediately southwest thereof; and north of a line 100 feet from and parallel to the shore of the creek to its intersection with the south property line extended of the Potapskut Sailing Association, Inc., thence northwesterly along the said property line extended to the shore.

Subpart B—Anchorage Grounds.

§ 202.157 Delaware Bay and River. (a) **The anchorage grounds—(1) Anchorage A (tanker lightering) off the entrance to Mispillion River.** To the southwest of the channel along Brandywine Range, bounded as follows: Beginning at a point at latitude 38°57′42″ N., longitude 75°11′08″ W., bearing 246.5° true 7,400 yards from Brandywine Shoal Light; thence 330°, 5,000 yards; thence 240°, 2,000 yards; thence 150°, 5,000 yards; thence 060°, 2,000 yards, to the point of beginning. This anchorage is intended for the specific purpose of allowing deep draft tankers to anchor and lighter their cargo before proceeding up the Delaware River. Supervision over the anchoring of vessels in the anchorage area will be exercised by the District Commander or his authorized representative. The provisions of paragraph (b) of this section shall be applicable to the anchoring of vessels in this anchorage, except for subparagraphs (1) and (2).

(2) Anchorage 1 off Bombay Hook Point. On the southwest side of the channel along Liston Range, bounded as follows: Beginning at a point (approximately latitude 39°17′59″, longitude 75°23′07″) bearing 228° from Ship John Shoal Light, 167 yards southwest of the southwest edge of the channel along Liston Range; thence 228°, 2,000 yards; thence 318°, 8,000 yards; thence 48°, 2,000 yards; and thence 138°, 8,000 yards, to the point of beginning.

(3) Anchorage 2 (explosives) northwest of Artificial Island. On the east side of the channel along Reedy Island Range, bounded as follows: Beginning at a point bearing 105° from the northernmost point of Reedy Island, 167 yards easterly of the east edge of the channel along Reedy Island Range; thence 105°, 800 yards; thence 195°, 4,500 yards; thence 285°, 800 yards, to a point (approximately latitude 39°28′58″, longitude 75°-33′37″) opposite the intersection of Reedy Island and Baker Ranges; and thence 15°, 4,500 yards, to the point of beginning. This anchorage is intended for vessels engaged in the transportation and handling of explosives and other dangerous articles. No vessel not so engaged will be permitted to anchor in this anchorage except in case of emergency or by special permission of the District Commander. For special regulations relating to this anchorage, see paragraph (c) of this section.

NOTE: The term "District Commander" as used in this section means the Commander, Third Coast Guard District, or his authorized representative.

(4) Anchorage 3 southeast of Reedy Point. Southeast of the entrance to the Chesapeake and Delaware Canal at Reedy Point, bounded on the east by the west edge of the channel along Reedy Island and New Castle Ranges; on the west by a line beginning at a point on the west edge of the channel along Reedy Island Range at latitude 39°31′43″, thence to a point bearing 168°30′, 3,150 yards, from Chesapeake and Delaware Canal 2 Light, and thence to a point bearing 131°, 1,160 yards, from Chesapeake and Delaware Canal 2 Light; and on the north by a line running from the last-described point 113°30′, approximately 813 yards, to the west edge of the channel along New Castle Range.

(5) Anchorage 4 north of Reedy Point. North of the entrance to the Chesapeake and Delaware Canal at Reedy Point, on the West side of the river, bounded as follows: Beginning at a point (approximately latitude 39°33′51″, longitude 75°33′35″) 344°58′ true, 160 yards from Chesapeake and Delaware Canal Light 2; thence 306°26′, 1,442 yards; thence 36°26′, 377 yards; thence 126°26′, 1,442 yards; thence 216°26′, 377 yards to the point of beginning.

(6) Anchorage 5 southeast of Pea Patch Island. On the northeast side of the channel along New Castle Range, bounded as follows: Beginning at latitude 39°34′28″, longitude 75°33′06″; thence 334°, 2,343 yards; thence 64°, 512 yards; thence 154°, 2,343 yards; and thence 244°, 512 yards, to the point of beginning.

(7) Anchorage 6 off Deepwater Point. Southeast of the entrance to Christina River, on the east side of the channel along Cherry Island Range, bounded as follows: Beginning at latitude 39°41′31″, longitude 75°30′55″; thence 17°, 2,747 yards; thence 112°, 847 yards; thence 215°, 1,340 yards; thence 204°, 893 yards; thence 186°30′, 500 yards; and thence 286°, 377 yards, to the point of beginning. Vessels must not cast anchor in the cable area at the lower end of this anchorage except in case of emergency.

(8) Anchorage 7 off Marcus Hook. On the southeast side of the channel along Marcus Hook Range, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°25′50″; thence northeasterly along the edge of the channel to longitude 75°-23′30″; thence 207°, 933 yards; thence 237°, 2,692 yards; thence 267°, 933 yards, to the point of beginning. A preferential area in this anchorage is designated for the use of vessels awaiting quarantine inspection, this area being 333 yards wide on the downstream side of a line projected from Blueball Road in Marcus Hook. Should the remainder of the anchorage be in use, the preferential area, when available, may be used by vessels not subject to quarantine inspection.

(9) Anchorage 8 off Thompson Point. On the south side of the channel along Tinicum Range, between Thompson Point and the east side of Crab Point, bounded as follows: Beginning at a point on the south edge of the channel along Tinicum Range at longitude 75°18′24″; thence easterly along the edge of the channel to longitude 75°17′54″; thence 179°, 267 yards; thence 260°30′, 793 yards; thence 358°, 425 yards, to the point of beginning.

(10) Anchorage 9 near entrance to Mantua Creek. On the southeast side of the channel along Mifflin Range, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°14′26″; thence north-

easterly along the edge of the channel to longitude 75°-12′01.5″ thence 203°30′, 933 yards; thence 233°30′, 3,058 yards; and thence 263°30′, 933 yards, to the point of beginning. Vessels must not cast anchor in this anchorage in such manner as to interfere unreasonably with the passage of other vessels to and from Mantua Creek.

(11) Anchorage 10 (naval) at Naval Base, Philadelphia. On the north side of the channel along West Horseshoe Range, bounded as follows: Beginning at the southeasterly corner of Pier 7 (approximately latitude 39°53′11″, longitude 75°09′58.5″); thence 174°, 525 yards, to the north edge of the channel along West Horseshoe Range; thence 273°30′ along the edge of the channel, 880 yards; thence 354°, 433 yards, to the southeasterly corner of Pier 1; and thence 88°30′, 875 yards, to the point of beginning. This is a restricted naval anchorage.

(12) Anchorage 11 at Gloucester. On the east side of the channel south of the Walt Whitman Bridge at Gloucester, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°54′16″; thence 174°30, 500 yards, to latitude 39°54′02″, longitude 75°-07′43″; thence 202°, 1,133 yards; thence 217°30′, 1,142 yards, to the east edge of channel; thence northeasterly along the edge of the channel to the point of beginning.

(13) Anchorage 12 between Gloucester and Camden. On the east side of the channel adjoining and on the upstream side of Anchorage 11, from Gloucester to Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°54′16″; thence northerly along the edge of the channel to latitude 39°56′32.5″; thence 133°, 283 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude 39°54′02″; thence 354°36′, 500 yards to the point of beginning. The area between New York Shipbuilding Corporation Pier No. 2 and the MacAndrews and Forbes Company pier, Camden, shall be restricted to facilitate the movement of carfloats to and from Bulson Street, Camden. The area in front of the Public Service Electric and Gas Company pier shall be restricted to facilitate the movement of vessels to and from the pier. Should the anchorage become so congested that vessels are compelled to anchor in these restricted areas, they must move immediately when another berth is available.

(14) Anchorage 13 at Camden. On the east side of the channel adjoining and on the upstream side of Anchorage 12, to Cooper Point, Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°56′32.5″; thence northerly along the edge of the channel to latitude 39°57′39.7″; thence 139°, 217 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude 39°56′26.5″; thence 313°, 283 yards to the point of beginning.

(15) Anchorage 14 opposite Port Richmond. On the southeast side of the channel, north of Petty Island, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°05′43″; thence 163°, 248 yards; thence 253°, 1,978 yards, to the southeast edge of the channel; and thence northeasterly along the edge of the channel to the point of beginning. Vessels having a draft of less than 20 feet must anchor southwest of Pier No. 11, Port Richmond. The area off the Cities Service Oil Company wharves, Petty Island, shall be restricted to facilitate the movement of vessels to and from the wharves.

(16) Anchorage 15 off northeasterly end of Petty Island. On the southeast side of the channel, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°05′34.7″; thence northeasterly along the southeast edge of the channel to longitude 75°05′09.5″; thence 171°, 198 yards; thence 260°30′, 667 yards; and thence 351°, 198 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the District Commander to shift position.

(17) Anchorage 16 between Port Richmond and Five Mile Point. On the northwest side of the channel, bounded as follows: Beginning at a point on the northwest edge of the channel at longitude 75°05′35″; thence northeasterly along the edge of the channel to longitude 75°04′20″; thence 328°, 125 yards; thence 243°, 450 yards; thence 251°, 475 yards; thence 257°, 1,042 yards; thence 174°30′, 122 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the District Commander to shift position.

(b) General regulations. (1) Except in cases of great emergency, no vessel shall be anchored in Delaware Bay and River between Ship John Light and The Pennsylvania Railroad Company bridge at Delair, New Jersey, outside of the anchorage areas established in this section, or within a cable or pipe line area shown on a Government chart, or be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to obstruct or endanger the passage of any vessel. When an emergent condition exists due to congestion in the prescribed anchorage areas in the Delaware River, the District Commander may authorize the anchorage of vessels in locations other than the prescribed areas. Vessels so anchored must not be anchored within the channel limits. Any vessel anchored outside of the prescribed anchorage limits must move to a prescribed anchorage area when space becomes available.

(2) No vessel shall occupy any prescribed anchorage for a longer period than 48 hours without a permit from the District Commander. Vessels expecting to be at anchor for more than 48 hours shall obtain a permit from the District Commander for that purpose in either Anchorage 15 or Anchorage 16. No vessel in such condition that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and then only for such period as may be permitted by the District Commander.

(3) Whenever, in the opinion of the District Com-

mander such action may be necessary, he may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) Every vessel whose crew may be reduced to such number that it will not have sufficient men on board to weigh anchor at any time shall, before release or reduction of the crew, be anchored with two anchors with mooring swivel unless the District Commander shall waive the requirement of a mooring swivel.

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside of the anchorage area.

(6) Light-draft barges using the anchorages shall be anchored away from the deeper portions of the anchorages, so as not to interfere with the anchoring of deep-draft vessels. Any barges towed in tandem to an anchorage area shall be bunched together when anchoring.

(7) Upon approval of the District Engineer, Corps of Engineers, the District Commander may permit wrecking plant or other vessels legally engaged in recovering sunken property, or in laying or repairing pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engaged upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the District Commander in advance of all such proposed work.

(8) Whenever the maritime or commercial interests of the United States so require, the District Commander is hereby empowered to shift the position of any vessel anchored or moored within or outside an anchorage area, including any vessel which is so moored or anchored as to obstruct navigation or interfere with range lights.

(9) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(10) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws and regulations.

(c) Regulations for explosives anchorage. (1) All vessels carrying explosives and other dangerous articles, or on which explosives and other dangerous articles are to be loaded, shall be within Anchorage 2 when anchored, except as provided in subparagraph (7) of this paragraph.

(2) A written permit shall be obtained from the District Commander before vessels carrying explosives and other dangerous articles, or on which explosives and other dangerous articles are to be loaded, may anchor in Anchorage 2, and no vessel shall anchor therein except by authority of such permit, which may be revoked at any time. This anchorage shall not be used by vessels which do not carry explosives and other dangerous articles as cargo, or on which explosives and other dangerous articles are not to be loaded, except in cases of great emergency or by special permit from the District Commander. All other vessels, including tugs and stevedore boats, used in connection with loading or unloading explosives and other dangerous articles in this anchorage shall carry written permits from the District Commander and shall show such permits whenever required by him.

(3) Vessels shall be anchored in Anchorage 2 so as to be at least 1,000 feet apart, but the number of vessels which may anchor in the anchorage at any one time shall be at the discretion of the District Commander. This provision is not intended to prohibit barges or lighters from tying up alongside the vessels for the transfer of cargoes.

(4) Whenever any vessel or barge not mechanically self-propelled anchors in Anchorage 2 while carrying explosives and other dangerous articles, or on which explosives and other dangerous articles are to be loaded, the District Commander may require the attendance of a tug upon such vessel or barge when in his judgment such action is necessary.

(5) Every vessel transporting, stowing, storing, or handling explosives and other dangerous articles as cargo in the vicinity of Anchorage 2 shall display by day a red flag at least 16 square feet in area at its masthead, or at least ten feet above the upper deck if the vessel has no mast, and shall display by night a red light in the same position specified for the flag.

(6) Fishing and navigation are prohibited within Anchorage 2 at all times when vessels which are moored in the area display a red flag by day or a red light by night.

(7) The District Engineer, Corps of Engineers, may authorize, in writing, a vessel carrying explosives for use on river and harbor works or on other work under Department of the Army permit, to anchor in or near the vicinity of such work without a permit from the District Commander. The District Engineer will prescribe the quantity of explosives allowed and the conditions under which explosives shall be stored and handled in such cases, and will furnish the District Commander with a copy of such written authorization and instructions.

(8) Vessels carrying explosives and other dangerous articles, or on which explosives and other dangerous articles are to be loaded, shall comply with the general regulations in paragraph (b) of this section when applicable.

(9) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel, and all others concerned, of the duties and responsibilities imposed upon them to comply with the regulations governing the handling, loading, or discharging of explosives, and other dangerous articles, entitled "Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels" (46 CFR Part 146).

§ 202.159 Annapolis Harbor, Md.—(a) The anchorage grounds—(1) Naval anchorage for deep draft vessels. In Chesapeake Bay, bounded on the north by latitude 38°58′; on the east by a line bearing 203°05′ from latitude 38°58′, longitude 76°24′; on the south by latitude 38°56′30″; and on the west by a line bearing 139° from Greenbury Point Shoal Light. This anchorage is reserved for deep-draft naval vessels. Berths in the area will be

assigned on application to the Commandant, Severn River Naval Command.

(2) Middle Ground anchorage. In Severn River, beginning at a point bearing 126°, 800 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; thence 79°20′, 485 yards, to Annapolis Harbor Buoy 13; thence 144°, 220 yards; thence 153°10′, 715 yards; thence 270°, 175 yards; and thence 313° 30′, 1,060 yards, to the point of beginning.

(3) South anchorage. In Severn River, beginning at a point on the shoreline of Horn Point, Eastport, bearing 270° from Annapolis Harbor Buoy 5; thence 90° to Annapolis Harbor Buoy 5; thence 313°30′, 1,040 yards; thence 259°20′, 710 yards, to a point bearing 189°30′, 615 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; and thence 180° to the shoreline at Eastport. No vessels shall anchor within 100 feet of any wharf, marine railway, or other structure without permission of the owner thereof.

(4) Naval anchorage for small craft. In Severn River, beginning at a point on the prolongation of the line of the northeast seawall of the Naval Academy grounds, 80 feet from the face of the southeast seawall of the Naval Academy grounds; thence 81°, 470 yards, to Annapolis Harbor Buoy 15; thence 125°45′, 580 yards; thence 259°20′, 1,035 yards; thence 310°, 230 yards; and thence 40°, parallel to the southeast seawall of the Naval Academy grounds, 400 yards, to the point of beginning. Except in case of emergency, no vessel shall be anchored in this area without permission of the Commandant, Severn River Naval Command. Anchorages will be assigned upon request to the station ship at the Naval Academy.

(5) Anchorage A. In Spa Creek, beginning at a point bearing 214°, 420 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; thence 130°, 200 yards; thence 246°20′, 230 yards; thence 234°, 130 yards; thence 257°, 115 yards; thence 50°30′, 100 yards; thence 42°30′, 125 yards; and thence 34°, 200 yards, to the point of beginning.

(6) Anchorage B. In Spa Creek, beginning at a point bearing 204°, 660 yards, from the mast at the intersection of the northeast and southeast seawalls of the Naval Academy grounds; thence 144°, 22 yards; thence 204°45′, 140 yards; thence 214°, 195 yards; thence 331°, 160 yards; and thence 54°, 285 yards, to the point of beginning.

(b) The regulations. (1) Except in case of emergency, no vessel shall be anchored in the area to the north and east of the Annapolis Channel bounded on the east by Greenbury Point; on the south by a line bearing 270° from the southern tip of Greenbury Point; on the west by the Annapolis channel; and on the north by the southern boundary of the cable area and the shoreline of the Government reservation and Carr Creek.

(2) Except in case of emergency, no vessel shall be anchored in Annapolis Harbor to the westward of the dredged channel and northward of Annapolis Harbor Buoy 5 (off Horn Point, Eastport) outside of the established anchorage areas, except in Spa Creek and the area to the southwestward of the Naval anchorage for small craft. No vessel shall be so anchored that any part of the vessel extends at any time within this area. Any vessel anchoring, under great emergency, within this area shall be placed as close to an anchorage area as practicable, and shall move away immediately after the emergency ceases.

(3) No vessel shall be anchored in the cable and pipe-line area, lying between the Naval Academy and the Naval Engineering Experiment Station and having the following limits: Eastern limit, from mast at the landward end of Reina Mercedes Pier approximately 67° to white "Cable Crossing" sign at the Experiment Station; western limit, from "Cable Crossing" sign on the point at Fort Severn Beach 233° to America Dock, Naval Academy.

(4) Except in case of emergency, no vessel shall be anchored, without permission of the Commandant, Severn River Naval Command, in the Naval Academy Drill area described as follows: That portion of the Severn River lying to the northeastward of the Naval Academy, bounded on the north by the State Highway Bridge and on the south by the northern limit of the cable and pipe-line area, excluding that area off the eastern shoreline inclosed by a line extending approximately 131° between the eastern abutment of the State Highway Bridge and the outboard end of the pier on Ferry Point. This drill area also includes the lower part of Dorsey's Creek below the Naval Academy Drawbridge. Requests to anchor in this drill area shall be made to the station ship at the Naval Academy.

(5) The restrictions in this section do not apply to the anchoring or marking by buoys of apparatus used for the purpose of taking sea food, except within the cable and pipe-line area described in subparagraph (3) of this paragraph.

(6) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, and the Superintendent, United States Naval Academy, and such agencies as they may designate.

§ 202.166 York River, Va., naval anchorage.—(a) The anchorage grounds. Between Yorktown and the Naval Mine Depot, beginning at latitude 37°15′34″, longitude 76°31′25″; thence to latitude 37°15′25″, longitude 76°31′39.5″; thence to latitude 37°16′21.5″, longitude 76°-32′46″; thence to latitude 37°17′07.5″, longitude 76° 34′17″; thence to latitude 37°17′55″, longitude 76°-35′14.5″; thence to latitude 37°18′05″, longitude 76°35′01″; thence to latitude 37°17′20″, longitude 76°-34′07″; thence to latitude 37°16′33.5″, longitude 76°-32′34″, and thence to the point of beginning.

(b) The regulations. This anchorage is reserved for the exclusive use of naval vessels and except in cases of emergency, no other vessel shall anchor therein without permission from the local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

§ 202.168 Hampton Roads, Va., and adjacent waters—(a) Hampton Roads.—(1) Anchorage A, Hampton bar. South of a line running from latitude 37°00′45″, longitude 76°20′36″, across the mouth of Hampton Creek to latitude 37°00′47″, longitude 76°19′56″; thence along the shore to a point east of Mill Creek at latitude 37°-00′44″, longitude 76°19′38″; thence to latitude 37°-00′15″, longitude 76°19′29″; thence to latitude 36°59′33″, longitude 76°18′57″; thence to latitude 36°59′11″, longitude 76°19′00″; thence to latitude 36°59′09″, longitude 76°19′05″; thence to latitude 37°00′00″, longitude 76°-22′08″; and thence northeast along the shoreline to the point of beginning.

(i) No vessel shall be anchored in such manner as to swing within 200 feet of the dredged channel leading to Hampton.

(ii) This anchorage is reserved for the use of vessels while undergoing examination by quarantine, customs, or immigration authorities. Upon completion of these examinations vessels shall move promptly to a regular anchorage.

(iii) The master of every mechanically propelled vessel using this anchorage shall keep the vessel in condition to move promptly under its own power upon notification by the Captain of the Port, and when any such vessel is in charge of a pilot the pilot shall remain on board until the vessel is safely anchored in a regular anchorage. No sailing vessel using this anchorage shall be left unattended by a tugboat while undergoing examination by quarantine, customs, or immigration authorities, except when its stay is likely to be of several hours' duration when it shall be anchored in the western part of the anchorage out of the way of other vessels before the tug and pilot leave.

(iv) No master of a vessel awaiting or undergoing quarantine inspection shall release any part of the crew until the vessel has been passed by the proper quarantine officials and safely anchored or moored in a regular anchorage.

(2) Anchorage B, Hampton Flats (Naval). Shoreward of a line described as follows: Beginning at latitude 37°00′00″, longitude 76°22′08″; thence to latitude 36°59′08.5″, longitude 76°19′04.5″; thence to latitude 36°57′57.5″, longitude 76°20′46.5″; and thence to latitude 36°58′56″, longitude 76°23′47″, including within the above-described limits an Explosives Handling Berth W covering a circular area of 1,200 yards diameter with its center at latitude 36°58′18″, longitude 76°20′51″.

(i) Vessels shall not be anchored within 425 yards of Anchorage F–1 when that anchorage is occupied by a vessel carrying explosives.

(ii) Vessels shall not be anchored within 300 yards of Explosives Handling Berth W when that berth is occupied by a vessel handling explosives.

(iii) Anchorage B, including Explosives Handling Berth W, is reserved for the use of Naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit the anchorage and berth to be used by merchant vessels. Upon notification that need for occupancy by Naval vessels is expected, the Captain of the Port may cause a sufficient area in the anchorage to be vacated to accommodate the number of Naval vessels schedule to arrive.

(3) Anchorage C, Newport News Bar. Shoreward of a line described as follows: Beginning at latitude 36°-58′56″, longitude 76°23′47″; thence to latitude 36°-57′57.5″, longitude 76°20′46.5″; thence to latitude 36°-57′41″, longitude 76°21′12.5″; thence to latitude 36°57′35.5″, longitude 76°21′29″; thence along the north side of Newport News Channel to latitude 36°57′20″, longitude 76°24′38″; and thence to the radio tower at approximately latitude 36°57′47.5″, longitude 76°24′40.5″.

(i) (Revoked.)

(ii) When Anchorage F–1, which lies within Anchorage C, is not occupied by vessels carrying explosives, it may be used as a general anchorage in the same manner as other portions of Anchorage C. It shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives, of a draft too great to permit it to use Anchorage F, desires to anchor therein. Vessels shall not be anchored within 425 yards of Anchorage F–1 when that anchorage is occupied by a vessel carrying explosives.

(iii) This anchorage is a general anchorage for all vessels, but when fleet operations are scheduled the Captain of the Port may, in his discretion, permit it to be used by naval vessels. Upon receiving word that any part of the fleet is expected, the Captain of the Port may cause a sufficient area in this anchorage to be vacated to accommodate the number of vessels scheduled to arrive.

(4) Anchorage D. Beginning at a point west of Norfolk Harbor Channel at latitude 36°57′33.5″, longitude 76°20′31.7″; thence south to latitude 36°57′26″, longitude 76°20′31.7″; thence to latitude 36°56′08″, longitude 76°22′23″; thence to latitude 36°56′00″, longitude 76°22′50″; thence to latitude 36°56′00″, longitude 76°23′34″; thence to latitude 36°56′09.5″, longitude 76°23′33.5″; thence to a point on the south side of Newport News Channel at latitude 36°57′27.5″, longitude 76°21′41″; and thence along the south side of Newport News Channel and a line in prolongation thereof to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(ii) This anchorage shall be used by deep-draft vessels, wind-bound vessels from Lambert Point and Sewall Point, and vessels awaiting turn for docking. Other vessels may use this anchorage when permitted by the Captain of the Port.

(5) Anchorage E. Newport News Middle Ground. Beginning at a point on the south side of Newport News Channel at latitude 36°57′27.5″, longitude 76°21′41″; thence to latitude 36°56′09.5″, longitude 76°23′33.5″; thence to latitude 36°57′11″, longitude 76°25′02.5″; and thence to and along the south side of Newport News Channel to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(6) Anchorage H. Beginning at a point west of Norfolk Harbor Channel at latitude 36°57′26″, longitude 76°20′31.7″; thence southerly to latitude 36°57′07.7″, longitude 76°20′31.9″; thence southeasterly to a point on the west side of Norfolk Harbor Channel at latitude 36°57′01.5″, longitude 76°20′22.3″; thence along the west side of Norfolk Harbor Channel to latitude 36°56′00″, longitude 76°20′27″; thence to latitude 36°56′00″, longitude 76°22′50″; thence to latitude 36°56′08″, longitude 76°22′23″; thence to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(7) Anchorages for vessels carrying explosives.—(i) Anchorage F (for shallow draft vessels). Beginning at latitude 36°56′03″, longitude 76°23′50″; thence to latitude 36°54′30″, longitude 76°23′55.5″; thence to latitude 36°54′30″, longitude 76°24′59″; thence to latitude 36°56′44″, longitude 76°24′50″; thence to the point of beginning.

(ii) Anchorage F–1 (for deep-draft vessels). Within Anchorage C and having a northeast boundary coincident with a portion of the northeast boundary of Anchorage C, beginning at latitude 36°58′06″, longitude 76°21′13″; thence to latitude 36°57′49.5″, longitude 76°21′36″; thence to latitude 36°57′47.5″, longitude 76°22′04″; thence to latitude 36°57′56″, longitude 76°22′30″; thence to latitude 36°58′19.5″, longitude 76°21′56″; thence to the point of beginning.

(iii) Vessels are forbidden to anchor within 425 yards of Anchorage F or between the northeast boundary of Anchorage F and the southwest boundary of Anchorage E.

(iv) When Anchorage F–1 is not occupied by vessels carrying explosives it may be used as a general anchorage in the same manner as other portions of Anchorage C, except that it shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives of a draft too great to permit it to use Anchorage F desires to anchor. When Anchorage F–1 is occupied by a vessel carrying explosives, vessels shall not anchor in Anchorages B and C within 425 yards of Anchorage F–1. No vessel carrying explosives shall be anchored in Anchorage F–1 so as to swing within 500 yards of the Newport News Channel.

(v) Vessels carrying explosives or other dangerous cargo, including inflammable liquids, inflammable solids, oxidizing materials, corrosive liquids, compressed gases, and poisonous substances, shall be within Anchorage F or F–1 when anchored, except as provided in subdivision (x) of this subparagraph. Anchorage F is reserved for this special purpose and shall not be used by vessels carrying other classes of cargo except in cases of great emergency or by special permit from the Captain of the Port.

(vi) A written permit shall be obtained from the Captain of the Port before a vessel carrying explosives, or on which explosives are to be loaded, may proceed to an explosives anchorage; and no vessel shall occupy a berth in such an anchorage except by authority of such a permit which may be revoked at any time.

(vii) Vessels used in connection with loading or unloading explosives in anchorage areas, including tugs and stevedore boats, shall carry a written permit from the Captain of the Port. Such permits shall be shown whenever required by him or by his properly authorized agents.

(viii) Whenever any vessel not mechanically self-propelled anchors in an explosives anchorage while carrying explosives, the Captain of the Port may require the attendance of a tug upon such vessel when in his judgment such action is necessary.

(ix) Vessels carrying explosives shall comply with the general regulations in paragraph (h) of this section when applicable.

(x) The District Engineer, Corps of Engineers, may authorize a vessel carrying explosives for use on river and harbor works or on other work under permit issued by the District Engineer to anchor in or near the vicinity of such work without a permit from the Captain of the Port. The District Engineer will prescribe the quantities of such explosives allowed on such vessel and the conditions under which they are to be stored and handled, and will furnish the Captain of the Port with a copy of such instructions.

(b) James River—(1) Anchorage G. At the mouth of the river opposite Newport News; east of a line running from Barrel Point, latitude 36°54′53″, longitude 76°28′51″, across the mouth of Batten Bay to Candy Island, latitude 36°56′18″, longitude 76°29′05″; and shoreward of a line described as follows: Beginning at Fishing Point, latitude 36°57′50″, longitude 76°29′38″; thence to latitude 36°59′08″, longitude 76°27′56″; thence to latitude 36°58′37″, longitude 76°26′41″; thence to latitude 36°57′50″, longitude 76°26′04″; thence to latitude 36°57′08.5″, longitude 76°25′27″; thence to latitude 36°57′11″, longitude 76°25′04″; thence to latitude 36°55′52.5″, longitude 76°25′09.5″; and thence to latitude 36°54′00″, longitude 76°28′59″.

(2) Anchorage G–1. On the northeast side of the river downstream from the James River Bridge, and shoreward of a line described as follows: Beginning at latitude 36°59′41″, longitude 76°26′40″; thence to latitude 37°00′15″, longitude 76°27′52″; and thence to latitude 37°00′45″, longitude 76°27′17″.

(3) Anchorage G–2. On the northeast side of the river upstream from the James River Bridge and shoreward of a line described as follows: Beginning at latitude 37°00′58″, longitude 76°27′23″; thence to latitude 37°00′24″, longitude 76°28′06″; thence to latitude 37°01′55″, longitude 76°31′19″; and thence to latitude 37°03′06″, longitude 76°30′29″.

(c) East of Norfolk Harbor Channel.—(1) Anchorage K–1. Shoreward of a line described as follows: Beginning at the shoreward end of the jetty north of Army Base Pier No. 2, latitude 36°55′13″, longitude 76°19′42″; thence along the jetty to latitude 36°55′14″, longitude 76°19′46.5″; thence along the jetty to latitude 36°55′10″, longitude 76°19′49.5″; thence to a point on the east side of Norfolk Harbor Channel at latitude 36°55′06″, longitude 76°20′22″; thence northerly along the east side of Nor-

folk Harbor Channel to latitude 36°55′36.5″, longitude 76°20′20″; and thence to latitude 36°55′38″, longitude 76°19′47″.

(2) Anchorage K–2. South of a line running from Tanner Point latitude 36°54′13″, longitude 76°19′25″, across the mouth of the Lafayette River to latitude 36°54′14″, longitude 76°18′43″; and shoreward of a line described as follows: Beginning at latitude 36°52′56″, longitude 76°19′08″; thence to a point on the east side of the dredged area alongside Norfolk Harbor Channel at latitude 36°53′04.5″, longitude 76°19′58.5″, thence northerly along the side of the dredged area to latitude 36°53′27″, longitude 76°20′02″; thence northwesterly along the side of the dredged area to latitude 36°53′31″, longitude 76°20′06″; thence northerly along the east side of Norfolk Harbor Channel to latitude 36°54′45.5″, longitude 76°20′19″; and thence to latitude 36°54′49″, longitude 76°19′40.5″.

(i) Anchorage is prohibited in the dredged channel to Lafayette River.

(3) Anchorage K–3 (for yachts and pleasure craft). That part of Lafayette River upstream from Anchorage K–2 and downstream from a line crossing the river below the Hampton Boulevard bridge from latitude 36°54′27.5″, longitude 76°18′22.5″, to latitude 36°54′11″, longitude 76°18′18″.

(i) Anchorage is prohibited in the dredged channel in Lafayette River.

(d) Elizabeth River.—(1) Anchorage H–1, West Norfolk. An improved anchorage on the west side of Norfolk Harbor Channel, south of Craney Island, providing anchorage spaces 38 and 35 feet deep, each with a swing radius of 750 feet, and 3 anchorage spaces 20 feet deep, each with a swing radius of 500 feet, bounded as follows: Beginning at a point on the western boundary of Norfolk Harbor Channel at latitude 36°52′51.6″, longitude 76°20′08.8″; thence westerly to latitude 36°52′48.2″, longitude 76°20′39.3″; thence southerly to latitude 36°52′18.8″, longitude 76°20′34.3″; thence easterly to latitude 36°52′22.2″, longitude 76°20′03.8″; and thence northerly along the western boundary of Norfolk Harbor Channel to the point of beginning.

(i) No vessel shall remain anchored in this anchorage awaiting loading for a period longer than 48 hours, except when nonavailability of loading facilities, inclement weather, ice conditions, or other conditions reasonably require a longer period in awaiting turn for docking.

(ii) No vessel after receiving its load shall remain more than 12 daylight hours in this anchorage, i.e., vessels loaded during the afternoon or night shall clear the anchorage prior to the hour of darkness of the following day.

(2) Anchorage L. On the northeast side of Elizabeth River, south of Lambert Point, and shoreward of a line described as follows: Beginning at latitude 36°52′06.5″, longitude 76°19′04.5″; thence to latitude 36°51′56.5″, longitude 76°19′20″; thence to latitude 36°52′13″, longitude 76°19′44.5″; and thence to latitude 36°52′21″, longitude 76°19′34″.

(3) Anchorage M. On the northeast side of Elizabeth River, opposite Pinner Point, and shoreward of a line described as follows: Beginning at latitude 36°51′29.5″, longitude 76°18′37″; thence to latitude 36°51′32″, longitude 76°18′45.5″; thence to latitude 36°51′42″, longitude 76°19′00″; and thence to latitude 36°51′52″, longitude 76°18′47.5″.

(4) Anchorage N–1, Smith Creek (for yachts and pleasure craft)—(i) Mowbray Arch. Between Mowbray Arch and a line described as follows: Beginning at Ghent Bridge 150 feet from Mowbray Arch and continuing westerly the same distance therefrom to the intersection of the prolongation of the east side of Colonial Avenue; thence in a straight line to a point on the south side of Mill Street prolonged and 70 feet from Mowbray Arch; thence parallel to and 70 feet from Mowbray Arch to the south side of Pembroke Avenue prolonged; thence along the prolongation of the south side of Pembroke Avenue to a point 50 feet from Mowbray Arch; and thence in a straight line to a point on the south side of Fairfax Avenue prolonged and 40 feet from Mowbray Arch.

(ii) The Hague. Between the wall on the west side of the Hague and a straight line joining a point 40 feet easterly thereof in the south side of Fairfax Avenue prolonged with a point 70 feet easterly from the wall in a line perpendicular to the wall at the south end thereof.

(iii) No floats, rafts, lighters, houseboats, or other craft laid up for any reason shall be permitted within these anchorages, except by permission of the Captain of the Port.

(iv) No vessel shall anchor or moor alongside any wharf or pier in Smith Creek so as to extend more than 40 feet beyond the pierhead line except in the authorized anchorages.

(5) Anchorage O, Hospital Point. On the southwest side of Elizabeth River, adjacent to the Portsmouth Naval Hospital, and shoreward of a line described as follows: Beginning at latitude 36°50′57″, longitude 76°18′43″; thence to a point on the southwest side of Norfolk Harbor Channel at latitude 36°51′05″, longitude 76°18′23″; thence southeasterly along the side of the channel to latitude 36°50′49.5″, longitude 76°18′00″; thence southeasterly along the side of the channel to latitude 36°50′33.5″, longitude 76°17′50.5″; and thence to latitude 36°50′27″, longitude 76°17′55″.

(6) Anchorage P, Port Norfolk. On the southwest side of Elizabeth River, between Pinner Point and western Branch Channel, and shoreward of a line described as follows: Beginning at latitude 36°51′25″, longitude 76°19′59″; thence to latitude 36°51′44.5″, longitude 76°19′47″; thence to a point on the southwest side of Norfolk Harbor Channel at latitude 36°52′01″, longitude 76°19′42.5″; thence southeasterly along the side of the channel to latitude 36°51′32″, longitude 76°19′01″; and thence to latitude 36°51′18″, longitude 76°19′16″.

(e) Eastern Branch of Elizabeth River—(1) Anchorage Q, Berkley. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50′20″, longitude 76°17′12.5″; thence to latitude 36°50′24″,

longitude 76°17′14.5″; thence to latitude 36°50′22.5″, longitude 76°16′58.5″; and thence to latitude 36°50′13″, longitude 76°16′59″.

(2) Anchorage R—(i) Section 1. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50′11″, longitude 76°16′17″; thence to latitude 36°50′18″, longitude 76°16′19″; thence to latitude 36°50′20″, longitude 76°16′05″; and thence to latitude 36°50′14.5″, longitude 76°16′03″.

(ii) Section 2. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50′15″, longitude 76°15′48.5″; thence to latitude 36°50′21″, longitude 76°15′50.5″; thence to latitude 36°50′17″, longitude 76°15′18″; and thence to latitude 36°50′11″, longitude 76°15′20″.

(iii) Section 3. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50′10″, longitude 76°15′15″; thence to latitude 36°50′15.5″, longitude 76°15′12.5″; thence to latitude 36°50′10.5″, longitude 76°14′50″; and thence to latitude 36°50′08″, longitude 76°14′51″.

(iv) No vessel shall anchor within 200 feet of permanent improvements.

(3) Anchorage S—(i) Section 1. On the north side of the river, upstream from the Virginian Railway bridge, and shoreward of a line described as follows: Beginning at latitude 36°50′23″, longitude 76°14′18″; thence to latitude 36°50′18.5″, longitude 76°14′18″; thence to latitude 36°50′14″, longitude 76°14′35″; and thence to latitude 36°50′19.5″, longitude 76°14′33″.

(ii) Section 2. On the north side of the Eastern Branch, below the mouth of Broad Creek, and shoreward of a line described as follows: Beginning at latitude 36°50′22.5″, longitude 76°13′50″; thence to latitude 36°50′19.5″, longitude 76°14′12.5″; and thence to latitude 36°50′24″, longitude 76°14′13″.

(iii) Anchorage is prohibited within 200 feet of permanent improvements.

(f) Willoughby Bay—(1) Anchorage J-1 (for yachts and pleasure craft), East of the west end of Willoughby Spit, shoreward of a line running from latitude 36°57′54″, longitude 76°17′46″, to latitude 36°57′50.5″, longitude 76°17′49″.

(2) Anchorage J-2 (for yachts and pleasure craft). South of Willoughby Spit, shoreward of a line described as follows: Beginning at latitude 36°57′42″, longitude 76°16′21.5″; thence to latitude 36°57′44.5″, longitude 76°17′27″; thence to latitude 36°57′48″, longitude 76°17′43″; and thence to latitude 36°57′55.5″, longitude 76°17′44″.

(g) Lower Chesapeake Bay south of Thimble Shoal Channel—(1) Anchorage L-A (naval). Between Cape Henry and Little Creek, beginning at latitude 36°57′11′0″, longitude 76°03′03.0″; thence to latitude 36°55′41.0″, longitude 76°03′14.5″; thence to latitude 36°56′22.0″, longitude 76°05′53.5″; thence to latitude 36°57′01.5″, longitude 76°05′59.0″; thence to latitude 36°57′57.0″, longitude 76°09′35.0″; thence to latitude 36°58′47.0″, longitude 76°09′08.5″; thence to the point of beginning.

(i) This anchorage is reserved primarily for the use of naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit it to be used by merchant vessels. Movement of vessels through the area will not be restricted.

(2) Anchorage L-C. Northwest of Anchorage L-A, beginning at latitude 36°59′14″, longitude 76°10′56.5″; thence to latitude 36°58′18.3″, longitude 76°10′54″; thence to latitude 36°58′59″, longitude 76°13′32.5″; thence to latitude 36°59′56″, longitude 76°13′36.3″; thence to the point of beginning.

(i) This anchorage is primarily for the use of merchant vessels but the Captain of the Port may, in his discretion, permit it to be used by naval vessels, the commercial conditions at the time being given due consideration. No vessels shall occupy any berth in this anchorage without first obtaining permission from the Captain of the Port.

(3) Anchorage L-E (for naval amphibious craft). Southwest of Anchorage L-A, east of the Little Creek thorofare, and shoreward of a line described as follows: Beginning at Little Creek Harbor Jetty 1 light (approximately latitude 36°55′57.0″, longitude 76°10′36.0″); thence to latitude 36°58′04.0″, longitude 76°10′02.0″; thence to latitude 36°57′31.5″, longitude 76°07′55.0″; thence to latitude 36°55′25.0″, longitude 76°08′28.5″.

(i) This anchorage is reserved for the exclusive use of naval vessels and, except in case of emergency, no other vessel shall anchor therein without permission from local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

(h) General regulations. (1) Except in cases of great emergency, no vessel shall be anchored in Hampton Roads or adjacent waters outside of the anchorage areas established in this section or within a cable or pipe line area shown on a Government chart, nor be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to obstruct or endanger the passage of any vessel.

(2) No vessel shall occupy for a longer period than 30 days, unless a permit is obtained from the Captain of the Port for that purpose, any anchorage for which the time of occupancy is not otherwise prescribed in this section. No vessel in a condition such that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and then only for such period as may be permitted by the Captain of the Port.

(3) Whenever, in the opinion of the Captain of the Port, such action may be necessary, that officer may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) Every vessel whose crew may be reduced to such number that it will not have sufficient men on board to weigh anchor at any time shall, before release or reduction of the crew, be anchored with two anchors with mooring swivel unless the Captain of the Port shall waive the requirement of a mooring swivel.

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside the boundaries of the anchorage area.

(6) Any vessel anchoring under circumstances of great emergency outside an anchorage area shall be placed near the edge of the channel and in such position as not to interfere with the free navigation of the channel nor obstruct the approach to any pier nor impede the movement of any other vessel, and shall move away immediately after the emergency ceases, or upon notification by the Captain of the Port.

(7) Upon application, a berth in an anchorage, if available, will be assigned to any vessel by the Captain of the Port. He may grant revocable permits for the habitual use of the same berth, and no vessel shall occupy a berth habitually except under authority of such a permit.

(8) Upon approval of the District Engineer, Corps of Engineers, the Captain of the Port may permit wrecking plant or other vessels legally engaged in recovering sunken property or in laying or repairing legally established pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engaged upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the Captain of the Port in advance of all such proposed work.

(9) Whenever the maritime or commercial interests of the United States so require, the Captain of the Port is hereby empowered to shift the position of any vessel anchored or moored within or outside an achorage area, including any vessel which is so moored or anchored as to obstruct navigation or interfere with range lights.

(10) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(11) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws.

PART 203—BRIDGE REGULATIONS:

§ 203.1 General. Drawbridges across navigable waters of the United States will not be opened to navigation for certain periods determined to be in the interest of public safety by the proper civil defense authorities during a major disaster or civil defense emergency indicated by a civil defense condition of "Air Raid Warning" (attack by enemy aircraft probable, imminent, or taking place) notwithstanding any general or special regulations heretofore or hereafter prescribed for the operation of any such drawbridge or drawbridges.

§ 203.215 Navigable streams flowing into Raritan Bay (except Raritan River and Arthur Kill), the Shrewsbury River and its tributaries, and all inlets on the Atlantic Ocean including their tributaries and canals between Sandy Hook and Bay Head, N.J.; bridges. (a) The owners of or agencies controlling drawbridges shall provide the appliances and the personnel necessary for the safe, prompt and efficient operation of the draws.

(b) Drawbridges shall be opened promptly for the passage of any vessel or other watercraft unable to pass under the closed spans, except as hereinafter provided.

(c) Signals—(1) Call signals for opening of draw. (i) Sound Signal. 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.

(ii) Visual signal. To be used in conjunction with sound signals when conditions are such that sound signals cannot 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.

(2) Acknowledging signals by bridge operator—(i) 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 regular intervals until acknowledged by the vessel.

(ii) 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 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.

(3) Acknowledging signals 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.

(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) The owners of or agencies controlling these bridges shall provide and keep in good legible condition two board gauges painted white, with black figures not less than 8 inches high, to indicate the headroom clearance under the closed drawspan at all stages of the tide. The gauges shall be so placed on the bridge that they will be plainly visible to the operator of the vessel approaching the bridge either up or downstream.

(f) These drawbridges shall not be required to open for craft carrying appurtenances unessential for navigation which extend above the normal superstructure. Military masts shall be considered as part of the normal

superstructure. Upon request, the district engineer in charge of the locality will cause inspection to be made of the superstructure and appurtenances of any craft habitually frequenting those waterways, with a view to adjusting any differences of opinion in this matter between the vessel owner and the bridge owner.

(g) Copies of the regulations in this section shall be conspicuously posted on both the upstream and downstream sides of the bridges in such manner that it can be easily read at any time.

(h) (Revoked.)

(i) The regulations to govern the operation of the Ocean Avenue bridge across the mouth of the Shark River between Belmar and Avon-by-the-Sea, and to govern the operation of drawbridges across Manasquan River, its navigable tributaries and the Bay Head-Manasquan Canal, New Jersey, prescribed under the dates of March 29, 1933, and January 18, 1937, respectively, are hereby revoked.

(j) The general regulations contained in paragraphs (a) to (g), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in this paragraph.

(1) Lemon Creek, N.Y.; the City of New York highway bridge at Bayview Avenue, Borough of Richmond, Staten Island, New York. The draw need not be opened for the passage of vessels between the hours of 4:00 p.m. and 8:00 a.m. from November 1, to March 31, inclusive, and between the hours of 10:00 p.m. and 6:00 a.m. from April 1, to May 15, inclusive, and from October 16, to October 31, inclusive.

(2) Shark River, N.J. (i) For the purposes of the regulations in this paragraph, the Route 71, the New York and Long Branch Railroad Company and the Route 35 bridges, being less than 800 feet apart, shall be considered and operated as a unit. The owners thereof shall provide and install, for uninterrupted service, systems of electric signals on their respective bridges, so connected that the operator of any of the bridges may thereby simultaneously notify, by signal, the operators of all the other drawbridges of the desire of any vessel or other watercraft to pass through the draws. The operator of the first bridge to be passed by an approaching vessel or other watercraft shall be responsible for observing the approach of such vessel or other watercraft toward the bridge, for receiving and acknowledging the signal or notice for passing, and for communicating to the operators of the other bridges, the intention of such vessel or other watercraft to pass.

(ii) Except as otherwise provided in subdivisions (iii) and (iv) of this subparagraph, from May 15, to September 30, inclusive, on Saturdays, Sundays, Memorial Day, Independence Day and Labor Day, between the hours of 9:00 a.m. and 9:00 p.m., and on weekdays, between the hours of 4:00 p.m. and 7:00 p.m., the lift span of the Ocean Avenue bridge shall not be required to open except at half-hourly intervals 15 minutes before and 15 minutes after the hour and the lift span of the Route 71, the New York and Long Branch Railroad Company and the Route 35 bridges shall not be required to open except at half-hourly intervals on the hour and half-hour, for those vessels or other watercraft waiting to pass through the draws, provided that when once opened for the passage of any vessel or craft, the said bridge or bridges shall remain open sufficiently long to permit the passage of all vessels or craft which may be engaged in passing or which may be presenting themselves for passage.

(iii) The draws shall be opened promptly on signal for the passage of vessels in the event of emergencies.

(iv) The draws shall be opened promptly at any time for the passage of vessels owned, controlled or employed by the United States Government, the State government or municipal and local governments.

§ 203.220. New Jersey Intracoastal Waterway and tributaries; bridges. (a) The New Jersey Intracoastal Waterway referred to in this section is defined as that waterway extending through the bays and thoroughfares on the eastern coast of New Jersey from Manasquan Inlet on the north to Cape May on the south, including Cape May Canal to Delaware Bay.

(b) When drawbridges are less than 1,000 feet apart they shall, for the purposes of this section, be considered and operated as a unit. The owners thereof shall provide and install, for uninterrupted service, systems of electric signals on their respective bridges, so connected that the operator of any bridge of the group may thereby simultaneously notify, by signal, the operators of all the other drawbridges of that group of the desire of the master of any vessel or other watercraft to pass through the draws. The operator of the bridge first in any group of bridges to be passed by an approaching vessel or other watercraft shall be responsible for observing the approach of such vessel or other watercraft toward that bridge, also for receiving the signal or notice for passing and for communicating, by means of the electric signals prescribed above, to the operators of the other bridges composing such group the purpose of such vessel or other watercraft to pass.

(c) Whenever any vessel or watercraft approaches a bridge affected by this section, and under which it cannot pass, the lawful signal of the desire of the master of the vessel or craft to pass through the draw opening shall be three blasts of a whistle or horn blown on the vessel or craft. These drawbridges shall not be required to open for craft carrying appurtenances unessential for navigation which extend above the normal superstructure. Upon request, the district engineer in charge of the locality will cause inspection to be made of the superstructure and appurtenances of any craft habitually frequenting those waterways, with a view to adjusting any differences of opinion in this matter between the vessel owner and the bridge owner. Appurtenances unessential for navigation shall include but not be limited to fishing, outriggers, radio or television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation will not include flying bridges, sailboat masts, pile driver leads, spud frames on hydraulic dredges, or other items of equipment clearly necessary to the intended use of the vessel.

(d) The draws in each and every bridge or group of bridges shall, upon the signal prescribed in paragraph (c) of this section, be promptly opened at any and all hours of the day or night, except as provided in paragraph (m) of this section for the passage of any vessel, vessels, or other watercraft unable to pass safely underneath the draw when closed. For bridges crossing the New Jersey Intracoastal Waterway, failure of the draws to be fully opened within 4 minutes from the signal to open shall be considered a violation of the requirement for prompt opening, except as provided in paragraph (m) of this section.

(e) If a car, train of cars, or other vehicle is, at the time of receiving the signal prescribed in pargaraph (c) of this section, approaching any draw so closely that it cannot be safely stopped before reaching such draw, two blasts of a whistle or horn shall be blown on the bridge. As soon thereafter as such draw shall be cleared, such draw or all draws comprised in any group of bridges concerned shall be promptly opened, and three blasts of a whistle or horn blown on the bridge to indicate such clearance.

(f) After the draw or draws of any bridge or group of bridges shall have remained open for a period of 10 minutes or for such shorter period as may be necessary for the passage of vessels or other watercraft waiting to pass, the draw or draws may be closed for the crossing of cars, trains, vehicles, or individuals, if any be waiting to cross. After being so closed for a period of 10 minutes or for such shorter times as may be necessary, the draw or draws shall be again promptly opened for the passage of vessels or other watercraft, if there be any desiring to pass.

(g) No vehicle, car, locomotive, or train shall be stopped on the drawspan of any bridge subject to this section; nor shall any such bridges carrying railway or tramway tracks be used for switching purposes, except those bridges for which special regulations are prescribed in paragraph (m) of this section; nor shall locomotives or trains be stopped in bridge blocks of railroad bridges in such manner as to hinder or delay the operation of any draw, except in cases of urgent necessity. Vessels shall not be so moored nor maneuvered as to delay or hinder unnecessarily closing the draw of any bridge. All passages of vessels and other watercraft through or under the drawbridges and all passage of cars, locomotives, trains, and other vehicles over drawbridges shall be prompt and as rapid as practicable in order to avoid unnecessary delay to either land or water traffic.

(h) The owner or owners of each and every drawbridge covered by this section shall maintain in good and serviceable order the drawspan, together with the machinery and appliances required for operating the same, and the electric signal system prescribed in paragraph (b) of this section; shall provide such number of draw operators or tenders as may be found necessary to open and close the draws promptly; and shall also provide and maintain in good order on the bridge piers or fenders such fixtures as may be necessary for vessels to moor or make fast while waiting for the drawspan to be opened.

(i) The length of time that a draw has been opened shall be computed from the time that the drawspan begins to move in opening, and the length of time that a draw has been closed shall be computed from the time that the drawspan ceases to move in closing.

(j) At each opening of a draw full horizontal and vertical clearances shall be provided, regardless of the size or requirements of the passing vessel or other watercraft.

(k) The owner or owners of each and every bridge covered by this section shall provide and maintain in good legible condition two board gauges, with figures not less than 6 inches high, the figures painted black on a white background, or vice versa, to indicate the vertical clearance under the closed drawspan at all stages of the tide. The gauges shall be so placed on the ends of the drawspan fender that they shall be plainly visible to the master of a vessel or other watercraft approaching such bridge either up-stream or down-stream.

(l) The owner or owners of each and every bridge covered by this section shall cause to be kept a complete record of all openings of the draw and shall promptly report to the district engineer of the United States in charge of the river and harbor improvements in that vicinity all cases in which the drawspan has been required to remain open for an unreasonable length of time or to remain closed for more than 10 minutes after the prescribed signal to open the draw has been given.

(m) The provisions of paragraph (d) of this section shall be applicable to the bridge of the Pennsylvania-Reading Seashore Lines, over Beach Thorofare at Atlantic City, N.J., only between the hours of 11:00 p.m. and 6:00 a.m. daily. Between the hours of 6:00 a.m. and 11:00 p.m. this bridge shall be opened upon signal from any vessel or craft desiring to pass at any time during the periods form 20 to 30 minutes past each hour, but may remain closed during such periods if no vessel or craft give such signal, provided that when once opened for the passage of any vessel or craft the said bridge shall remain open sufficiently long to permit the passage of all vessels or craft which may be engaged in passing or which may be presenting itself for passage. Between such hours (6:00 a.m. and 11:00 p.m.) this bridge shall not be opened except as provided for in this paragraph.

§ 203.225 Navigable waters in the State of New Jersey; bridges where constant attendance of draw tenders is not required. (a) The owners of or agencies controlling the bridges listed in paragraph (f) of this section will not be required to keep draw tenders in constant attendance.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, 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.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

(f) The bridges to which this section applies, and the regulations applicable in each case, are as follows:

(1) through (5) See U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

(5-a) Beaver Dam Creek; Ocean County highway bridge near Point Pleasant. At all times during January, February, March and December and between 4:00 p.m. and 8:00 a.m., during April, May, October and November, at least 24 hours' advance notice required. At all other times the regulations in § 203.220 shall govern the operation of this bridge.

(5-b) Patcong Creek; Atlantic County highway bridge 0.5 mile upstream from the mouth. At least 24 hours' advance notice required.

(6) Tuckahoe River; New Jersey State Highway Department bridge at Tuckahoe. At least 24 hours' advance notice required.

(7) Great Channel; Cape May County Bridge Commission bridge between Stone Harbor and Nummy Island. From November 1 to April 30, inclusive, at least 24 hours' advance notice required.

(8) Maurice River; New Jersey State Highway Department bridge at Main Street, Millville. At least 24 hours' advance notice required.

(9) Manantico Creek; New Jersey State Highway Department bridge near Millville. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(10) Cohansey River; New Jersey State Highway Department bridge at Broad Street, Bridgeton. The draw need not be opened for the passage of vessels, and paragraphs (b) and (e), inclusive, of this section shall not apply to this bridge.

(11) Alloway Creek; Salem County highway bridges at Hancocks Bridge and at Upper Hancocks Bridge, and New Jersey State Highway Department bridge at Quinton. At least 24 hours' advance notice required.

(12) Oldmans Creek; New Jersey State Highway Department bridge near Nortonville, Pennsylvania-Reading Seashore Lines railroad bridge near Pedricktown, and Salem County highway bridge at Pedricktown. At least 24 hours' advance notice required.

(12-a) Woodbury Creek; Gloucester County highway bridge at National Park. At least 24 hours' advance notice required during December, January and February of each year.

(13) Delaware River (back channel); The Pennsylvania Railroad Company bridge between Petty Island and Camden. At least 24 hours' advance notice required.

(14) Rancocas River; Burlington County highway bridge and Pennsylvania Railroad Company bridge between Riverside and Delanco, New Jersey State Highway Department bridge at Bridgeboro, and Burlington County highway bridge at Centerton. Between 11:00 p.m. and 7:00 a.m. each day of the year the draws of these bridges need not be opened for the passage of vessels. At least 24 hours' advance notice required for opening these bridges between 7:00 a.m. and 11:00 p.m. during January, February, March and December.

§ 203.227 Delaware and Schuylkill Rivers, N.J. and Pa., in vicinity of Philadelphia and Bristol; bridges— (a) Signals. When at any time during the day or night any vessel, tug, or other watercraft unable to pass under a closed drawbridge approaches it with the intention of passing through the draw, the signal for the draw to be opened shall be three blasts of a whistle or horn blown on the vessel or craft. If the draw is ready to be opened immediately when the signal is given on the vessel or craft, the signal shall be answered by two blasts of a whistle or horn blown on the bridge; if the draw is not ready to be opened immediately, the signal shall be answered by one blast of a whistle or horn blown on the bridge.

(b) Opening the draw. Upon hearing or perceiving the prescribed signal, the bridge tender shall immediately clear the drawspan and open the draw to its full extent for the passage of the vessel or other craft: Provided, That the draw of a railroad bridge need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, nor within 5 minutes of the known time of passage of a scheduled passenger, mail, or express train; but in no event, except in case of breakdown of the operating machinery, shall the opening of the draw be delayed more than 5 minutes in the case of a highway bridge nor more than 10 minutes in the case of a railroad bridge: And provided further, That the draw need not be opened for the passage of a tug or other craft equipped with a movable stack or mast which can readily be lowered so as to permit its passage under the closed draw, unless such craft has in tow a vessel which is unable to pass under the closed draw or by reason of stress of weather it is unsafe to lower such stack or mast.

(c) Interference with operation. Vehicles, streetcars, locomotives, and trains shall not be stopped on the drawspans, nor shall locomotives or trains be stopped in the bridge blocks of railroad bridges in such manner as to delay the operation of the draw, except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing the draw, but all passages over, through, or under the bridges shall be prompt, to avoid delay to either land or water traffic.

(d) Hinged stacks and masts. Each tug, towboat, barge, and other small craft regularly and habitually navigating the Schuylkill River shall be subject to inspection and measurement by the District Engineer, Corps of Engineers, to determine the exact height above the water surface of its pilot or deckhouses when such vessel is in its ordinary trim; and the District Engineer is hereby empowered to decide in each case whether or not the vessel shall be equipped with hinged or removable stacks, masts, and flagpoles which can be lowered to enable the vessel to pass under the closed draw of any or all of the bridges. If the District Engineer decides that such action should be taken, he shall notify the vessel owner and the bridge owner of his decision, specifying a reasonable time for making the alterations; and after the expiration of the time specified the draw need not be opened for the passage of such vessel unless it has in tow a vessel unable to pass under the closed draw or by reason of stress of weather it is unsafe to lower such stack or mast.

(e) Operating machinery. All drawbridges shall be equipped with adequate, quick-operating power machinery for opening and closing the draw, and this machinery shall at all times be kept in good and effective working condition and manned by competent operators.

(f) Clearance gages. The owners of each bridge shall provide and keep in good legible condition two board gages, painted white with black figures not less than six inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gages shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the navigator of a vessel approaching the bridge either upstream or downstream.

(g) The general regulations contained in paragraphs (a) to (f), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in paragraphs (h) and (i) of this section.

(h) Pennsylvania Railroad Company bridge across Schuylkill River near Christian Street. (1) The owner of or agency controlling this drawbridge will not be required to keep drawtenders in constant attendance between 4:00 p.m. and 8:00 a.m. each day Monday through Friday and during the entire period from 4:00 p.m. Friday to 8:00 a.m. Monday. Whenever during these periods, including holidays, a vessel unable to pass under the closed bridge desires to pass through the draw, at least 2 hours' advance notice of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(2) Upon receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on proper signal at the time specified in the notice for the passage of the vessel.

(3) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in subparagraph (1) of this paragraph may be reached by telephone or otherwise.

(i) City of Philadelphia bridge across Schuylkill River at South Street. (1) The draw need not be opened for the passage of vessels and paragraphs (a) to (e), inclusive, of this section shall not apply to this bridge.

(2) The owner of or agency controlling this bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations of this section.

§ 203.228 Darby Creek, Pa., The Pennsylvania Railroad Company and Reading Company bridges near Essington. (a) The owners of or agencies controlling these bridges will not be required to keep draw tenders in constant attendance.

(b) Whenever a vessel unable to pass under the closed bridges desires to pass through the draws, 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling each of the bridges to insure prompt opening thereof at the time required.

(c) On receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on proper signal at approximately the time specified in the notice.

(d) The owner of or agency controlling each bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with information as to whom notice should be given when it is desired that the bridge be opened and directions for communicating with such person by telephone or otherwise.

(e) The operating machinery of the draws shall be maintained in a servicable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

§ 203.229 Chester River, Pa.; the Reading Company bridge at Front Street, Chester, Pa. (a) Between 6 a.m. and 10 p.m., the draw shall be opened promptly on signal for a vessel desiring to pass through the bridge. From 10 p.m. to 6 a.m., the draw will remain closed and the bridge unattended.

(b) The owner of or agency controlling this bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such manner that it can easily be read at any time, a copy of the regulations in this section.

§ 203.230 Brandywine River, Del.; bridges. (a) Seventh Street bridge, Wilmington, Del. (1) The owner of or agency controlling the bridge will not be required to keep a draw tender in constant attendance.

(2) The owner of or agency controlling the bridge shall provide the appliances and the personnel necessary for the safe, prompt and efficient opening of the draw at any time during the day or night, except as provided in subparagraph (5) of this paragraph, for the passage of

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any vessel or other watercraft which cannot pass under the closed draw, when the following signal is received: Three blasts of a whistle or horn. When the draw of the bridge can be opened immediately, the draw tender shall reply by two blasts of a whistle or horn. When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the draw tender shall reply by one blast of a whistle or horn.

(3) Vehicles shall not be stopped on the drawspan, in such manner as to delay the operation of the draw except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passage over, through, or under the bridge shall be prompt to avoid delay to either land or water traffic.

(4) The owner of or agency controlling the bridge shall provide and keep in good legible condition two board gauges painted white with black figures not less than 6 inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gauges shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the navigators of a vessel approaching the bridge from either direction.

(5) At least 24 hours' advance notice will be required for opening this bridge at all times during January, February, March and December and between 8:00 p.m. and 6:00 a.m. from April to November, inclusive.

(i) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(ii) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, 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.

(iii) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this paragraph together with a notice stating exactly how the representative specified in subdivision (i) of this subparagraph may be reached.

(iv) The operating machinery of the draw shall be maintained in a serviceable condition, and the draw shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(b) Pennsylvania Railroad bridge above Seventh Street and Highway bridges at Church Street and Sixteenth Street, Wilmington, Del. (1) The draws of these bridges need not be opened for the passage of vessels.

(2) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides of the respective bridges, in such manner that it can easily be read at any time, a copy of the regulations in this paragraph.

§ 203.235 Christina River, Del.; bridges. (a) The owners of or agencies controlling the bridges shall provide the appliances and the personnel necessary for the safe, prompt, and efficient opening of the draws at any time during the day or night for the passage of any vessel or other watercraft which cannot pass under the closed draws.

(b) Except as otherwise provided in paragraphs (g) and (h) of this section, the bridge tender upon hearing or perceiving the prescribed call signal shall immediately clear the drawspan and open the draw to its full extent for the passage of the vessel or other craft: Provided, That the draw of a railroad bridge need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, nor within 5 minutes of the known time of passage of a scheduled passenger, mail, or express train; but in no event, except in case of breakdown of the operating machinery, shall the opening of the draw be delayed more than 5 minutes in the case of a highway bridge, nor more than 10 minutes in the case of a railroad bridge.

(c) (1) Call signal for opening of draw. Three blasts of a whistle or horn.

(2) Acknowledging signal—(i) When the draw can be opened immediately. Two blasts of a whistle or horn.

(ii) When the draw cannot be opened immediately, or when it is open and is to be closed immediately. One blast of a whistle or horn.

(d) Vehicles, street cars, locomotives, and trains shall not be stopped on the drawspan, nor shall locomotives or trains be stopped in the bridge blocks of railroad bridges in such manner as to delay the operation of the draws, except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passages over, through, or under the bridges shall be prompt, to avoid delay to either land or water traffic.

(e) The owners of, or agencies controlling, the bridges shall provide and keep in good legible condition two board gages painted white with black figures not less than 6 inches high, to indicate the headroom clearance under the closed span at all stages of the tide. These gages shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the navigators approaching from either direction.

(f) The foregoing general regulations contained in paragraphs (a) to (e), inclusive, of this section shall apply to all bridges except as modified by the special regulations contained in paragraphs (g) and (h), of this section, prescribed to provide for closed or open periods when land or water traffic predominates and for the operation of a particular bridge on advance notice.

(g) (1) The owners of or agencies controlling the bridges listed in subparagraph (6) of this paragraph will not be required to keep draw tenders in constant attendance.

(2) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice

as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(3) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, 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 owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations together with a notice stating exactly how the representative specified in subparagraph (2) of this paragraph may be reached.

(5) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(6) The bridges to which the special regulations in this paragraph apply, the periods when draws need not be operated and advance notice required, are as follows:

(i) Pennsylvania Railroad Company bridge at Mile 4.12, Reading Company bridge at Mile 4.15 and Pennsylvania Railroad Company bridge at Mile 5.38. Between 8:00 p.m. and 6:00 a.m. the draws need not be opened for the passage of vessels. Between 6:00 a.m. and 8:00 p.m., at least 24 hours' advance notice required.

(ii) Delaware State Highway Department bridge at Newport. At least 24 hours' advance notice required.

(h) Closed periods. The Third Street, Walnut Street and Market Street bridges shall not be required to open for the passage of vessels between 7:00 a.m. and 8:00 a.m. and between 4:30 p.m. and 5:30 p.m., except on Sundays and legal holidays: Provided, That any vessel which has passed through one or more of these three bridges immediately prior to a closed period and will require passage through the other bridge or bridges in order to continue to its destination shall be passed through the draw or draws of such bridge or bridges without delay: Provided further, That in time of flood or other emergency the closed periods may be suspended or modified by the District Engineer, Corps of Engineers.

§ 203.236 Appoquinimink River, Del.; Delaware State Highway Department bridge at Fennimores, Del. (a) The owner of this bridge will not be required to keep a draw tender in constant attendance.

(b) 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 to the authorized representative of the owner of the bridge.

(c) Upon receipt of such advance notice, the authorized representative shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(d) The owner of the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such 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 paragraph (b) of this section may be reached.

(e) The operating machinery of the draw shall be maintained in a serviceable condition, and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

§ 203.237 St. Jones River, Del.; Delaware State Highway Department bridge at Lebanon. (a) The owner of or agency controlling this bridge will not be required to keep a draw tender in constant attendance.

(b) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw, 24 hours' advance notice of the time opening is required must be given to the authorized representative of the owner of or agency controlling the bridge to insure prompt opening thereof at the time required.

(c) On receipt of such advance notice the authorized representative, in compliance therewith, shall arrange for the prompt opening of the draw on signal at approximately the time specified in the notice.

(d) The owner of or agency controlling the bridge shall keep consipicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representatives specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draw shall be maintained in a serviceable condition, and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

§ 203.239 Indian River Inlet, Del.; State Highway Department bridge. (a) The owner of or agency controlling this bridge shall provide the appliances and the personnel necessary for the safe, prompt and efficient opening of the draw at any time during the day or night for the passage of any vessel or other watercraft which cannot pass under the closed draw, when the following signal is received: Three blasts of a whistle or horn. When the draw of the bridge can be opened immediately, the draw tender shall reply by two blasts of a whistle or horn. When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the draw tender shall reply by one blast of a whistle or horn.

(b) This drawbridge shall not be required to open for craft carrying appurtenances unessential to navigation and any vessel operator who causes the bridge to be opened in order to clear appurtenances unessential for navigation shall be considered in violation of the regulations of this section. Upon request, the district engineer in charge of the locality will cause inspection to be made of the superstructure and appurtenances of any craft habitually frequenting the waterway with a view

to adjusting any differences of opinion in this matter between the vessel owner and the bridge owner.

(c) Appurtenances unessential for navigation shall include but not be limited to fishing outriggers, radio or television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation will not include flying bridges, sailboat masts, pile driver leads, spud frames on hydraulic dredges, or other items of equipment clearly necessary to the intended use of the vessel.

(d) Vehicles shall not be stopped on the drawspan, in such manner as to delay the operation of the draw, except in case of urgent necessity, nor shall vessels be moored to the bridge fenders or so maneuvered as to unnecessarily hinder or delay the closing of the draw, but all passages over, through, or under the bridge shall be prompt to avoid delay to either land or water traffic.

(e) The owner of or agency controlling the bridge shall provide and keep in good legible condition two board gauges, with figures not less than 6 inches high, the figures painted black on a white background, or vice versa, to indicate the vertical clearance under the closed span at all stagés of the tide. These gauges shall be so placed on the ends of the drawspan fenders that they will be plainly visible to the master of a vessel approaching the bridge from either direction.

§ 203.240 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay and into the Gulf of Mexico (including the Lower Atchafalaya River, La.), except the Mississippi River and its tributaries and outlets; bridges. (a) Corporations or persons owning or controlling a drawbridge shall provide the same with the necessary tenders and the proper mechanical appliances for the safe, prompt, and efficient opening of the draw for the passage of vessels.

(b) If the weather conditions are good and sound signals can be heard when a vessel approaches a drawbridge and desires to pass through the draw, three distinct blasts of a whistle or horn shall be sounded or three calls through a megaphone shall be made from the vessel when within reasonable hearing distance of the bridge.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by three distinct blasts of a whistle or horn, by three calls through a megaphone, or by three loud and distinct strokes of a bell.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed, immediately, the drawtender shall reply by four or more short, distinct blasts of a whistle or horn, by four or more calls through a megaphone, or by four or more loud and distinct storkes of a bell (danger signal).

(c) When weather conditions prevent hearing the sound signals when a vessel approaches a drawbridge and desires to pass through the draw, 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.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by raising and lowering in vertical plane a number of times a lighted lantern at night and a flag by day.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the drawtender shall reply by swinging to and fro horizontally a number of times a lighted lantern at night and a flag by day.

(d) When a vessel wishes to pass two or more bridges close together or crossing a section of the waterway less than 500 feet in length, signals as prescribed above shall be given from the vessel for opening the first bridge, followed at an interval of about five seconds by the same signals for the second bridge, and so on, thus giving, at intervals of about five seconds, separate signals for each bridge the vessel desires to pass.

(e) When two or more vessels are approaching a bridge nearly the same time from the same or opposite directions with the draw opened or closed, each of these vessels shall signal independently for the opening of the draw, and the drawtender shall reply as prescribed and in turn to the signal of each vessel.

(f) Where bridges are less than 500 feet apart, the signals to govern the movements of the approaching vessel shall be given from the bridge nearest the vessel. If the bridge can be opened immediately, the bridgetender shall await the reply signals from the other bridges and then give the signal circumstances require. If the nearest bridge cannot be opened immediately, the prescribed signal shall be given the approaching vessel at once to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) The draw shall be opened with the least possible delay upon receiving the prescribed signal: 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, or when a passenger or mail train is approaching within sight or hearing of the operator of the drawspan.

(h) When a bridgetender is about to close a draw, he shall sound four or more short, distinct blasts of a whistle or horn, four or more calls through a megaphone, or four or more loud and distinct strokes of a bell (danger signal).

(i) Trains, wagons, and other vehicles shall not be stopped on a drawbridge for the purpose of delaying its opening, nor shall watercraft be so manipulated as to hinder or delay the operation of a drawspan, but all passage over, through, or under a drawbridge shall be prompt, to prevent delay to either land or water traffic.

NOTE: The special regulations contained in §§ 203.245 to 203.349, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.240.

§ 203.245 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay and into the Gulf of Mexico, except the Mississippi River and its tributaries and outlets; bridges where constant attendance of draw tenders is not required. (a) The owners of or agencies controlling certain bridges will not

be required to keep draw tenders in constant attendance. The bridges to which this section applies are listed, and the special regulations applicable in each case are set forth, in paragraphs (f) to (i), inclusive, of this section. At all times not covered by the regulations in this section, and in all other respects, the regulations contained in § 203.240 shall govern the operation of these bridges.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, 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.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(f) Waterways discharging into Chesapeake Bay. (1) Susquehanna River, Md.; The Pennsylvania Railroad Company bridge at Perryville. At least 24 hours' advance notice required.

(1–a) Bohemia River, Md.; Maryland State Roads Commission bridge at Cayots. From May 30 to September 30, inclusive, except on Saturdays, Sundays, State and Federal holidays, between sunrise and sunset, and from October 1 to May 29, inclusive, except between the hours of 7:00 p.m. on Fridays and 7:00 a.m. on Mondays, inclusive, the draw will not be required to be opened except upon 3 hours' advance notice. From October 1 to May 29, inclusive, between the hours of 7:00 p.m. on Fridays and 7:00 a.m. on Mondays, inclusive, the draw will not be required to be opened except upon advance notice given prior to 7:00 p.m. on Friday. From May 30 to September 30, inclusive, between sunrise and sunset on Saturdays, Sundays, State and Federal holidays, the regulations contained in § 203.240 shall govern operation of this bridge.

(2) Bush River, Md.; The Pennsylvania Railroad Company bridge at Bush River. From June 1 to September 30, inclusive, the draw will be required to be opened not more than two times each day on Saturdays and Sundays only between 10:00 a.m. and 5:00 p.m., on receipt of at least 24 hours' advance notice from the duly authorized representative of the Bush River Boat Club. At all other times the draw need not be opened for the passage of vessels. The notice posted in accordance with paragraph (d) of this section shall state exactly how the representative of the Bush River Boat Club may be reached.

(2–a) Chester River, Md.; Maryland State Roads Commission bridge at Chestertown. From October 1 to March 31, inclusive, and between 6 p.m. and 6 a.m. from April 1 to September 30, inclusive, at least six hours' advance notice required. Between 6 a.m. and 6 p.m. from April 1 to September 30, inclusive, the regulations contained in § 203.240 shall govern operation of this bridge.

(2–b) Bear Creek, Md.; The Baltimore County Revenue Authority highway toll bridges between Dundalk and Sparrows Point, Miles 1.3 and 1.8. Between the hours of 12 midnight and 8:00 a.m., inclusive (except Saturdays, Sundays, and the national and State legal holidays between April 16 and November 15 inclusive), at least one-half hour advance notice required.

(2–c) Colgate Creek, Md.; City of Baltimore highway bridge at Baltimore. At least 5 hours' advance notice required.

(3) Dorseys Creek, Md.; United States Naval Academy highway and railroad bridges, and Maryland State Roads Commission bridge at Annapolis. At least 5 hours' advance notice required.

(3–a) Dorseys Creek, Md.; Baltimore and Annapolis Railroad Company bridge at Annapolis. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(4) Weems Creek, Md.; Anne Arundel County highway bridge at West Annapolis. From October 1 to April 30, inclusive, and between sunset and sunrise from May 1 to September 30, inclusive, at least five hours' advance notice required.

(5) South River, Md.; Maryland State Roads Commission bridge at Edgewater. From December 1 to March 31, inclusive, the draw will not be required to be opened except upon at least 3 hours' advance notice for openings between10:00 a.m. Monday and 7:30 p.m. Friday, inclusive, such notice to be given between 7:00 a.m. and 4:30 p.m. Monday through Friday; and the draw will not be required to be opened from 7:30 p.m. Friday until 10:00 a.m. Monday except upon advance notice given between 7:00 a.m. and 4:30 p.m. Monday through Friday. From April 1 to November 30, inclusive, the regulations contained in § 203.240 shall govern operation of this bridge.

(5–a) South River, Md.; Anne Arundel County highway bridge at Riva. (NOTE: The former drawbridge was replaced by a fixed bridge; regulation no longer applicable.)

(6) Choptank River, Md.; Baltimore and Eastern Railroad Company bridge at Denton. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(7) Marshyhope Creek, Md.; Maryland State Roads Commission bridge at Brookview. Between sunrise and sunset, at least six hours' advance notice required. Be-

tween sunset and sunrise the draw need not be opened for the passage of vessels.

(8) Broad Creek River, Del.; Pennsylvania Railroad Company bridge at Laurel. At least four hours' advance notice required.

(8–a) Patuxent River, Md.; Maryland State Roads Commission bridge at Benedict. Between 6:00 p.m. and 6:00 a.m. (local time), advance notice required, to be given verbally or by telephone to the Toll Captain at the Administration Building at the east end of the bridge before 6:00 p.m. The owner of or agency controlling the bridge shall keep a complete record of all openings of the draw in such form as may be prescribed by the District Engineer, Corps of Engineers, and shall report to him all cases where the draw has been required to be kept open for an unreasonable length of time.

(9) Neale Sound, Md.; Maryland State Roads Commission bridge between Cobb Island and Cobb Neck. Between sunset and sunrise the draw need not be opened for the passage of vessels.

(10) Pocomoke River, Md.; Maryland State Roads Commission bridge at Snow Hill. At least five hours' advance notice required.

(11) Onancock River (Warrington Branch), Va.; highway bridge at Onancock. At least three hours advance notice required.

(11–a) Kinsale Creek, Va.; Virginia Department of highway bridge at Onancock. At least three hours' adopened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(11–b) Great Wicomico River, Va.; Virginia Department of Highways bridge at Tipers Ferry. Between 6:00 p.m. and 6:00 a.m., advance notice required to be given to the draw tender on duty at the bridge before 6:00 p.m.

(12) Urbanna Creek, Va.; Middlesex County highway bridge at Urbanna. (NOTE: The former drawbridge was replaced by a fixed bridge; regulation no longer applicable.)

(13) Cat Point Creek, Va.; Virginia Department of Highways bridge near Warsaw. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(13–a) Chuckatuck Creek, Va.; Virginia Department of Highways bridge at Crittenden. Between 9:00 p.m. and 5:00 a.m., at least 30 minutes' advance notice required to be given to the person in charge of the Nansemond River Bridge Toll Plaza. Between 5:00 a.m. and 9:00 p.m., the regulations contained in § 203.240 shall govern the operation of this bridge.

(14) Elizabeth River, Eastern Branch, Va.; City of Norfolk highway bridge (Campostella Bridge) at Norfolk. Between 7:35 a.m. and 7:50 a.m., on week days only, the draw need not be opened except for the passage of tugs with tows.

(15) Elizabeth River, Western Branch, Va.; Virginia Department of Highways bridge at Hodges Ferry. At least eight hours' advance notice required.

(16) Baines Creek, Va.; Atlantic Coast Line Railroad Company bridge at Portsmouth. At least 24 hours' advance notice required.

(17) Nansemond River, Western Branch, Va.; Virginia Department of Highways bridge at Reid's Ferry. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(18) Appomattox River, Va.; Seaboard Air Line Railroad Company bridge near Hopewell. At least 24 hours' advance notice required, such notice to be given to the Seaboard Air Line Railroad Agent at Hopewell, Virginia: Provided, that a drawtender shall be placed in constant attendance, on 30 days' notice in writing from the District Engineer, Corps of Engineers.

§ 203.250 Inlet from Little Annemessex River, Md.; bridge (highway) at Crisfield, Md. (a) The draw shall be promptly opened, during the hours specified in paragraph (b) of this section for the passage of any vessel whose masts permanently remain standing or which have masts that may be unstepped but which are 20 feet or more in height and 5 inches or more in diameter at the butt; or of any vessels whose hulls, deckhouses, or cargoes are of such height that they will not pass under the bridge safely when it is closed.

(b) During the period from March 20, to August 31, inclusive, the draw shall be opened upon signal for the passage of vessels at any hour of the day or night except between 11:30 a.m. and 12 noon. During the period from September 1 to March 19, inclusive, the draw shall be opened upon signal for the passage of vessels from 1 hour before sunrise to 11:30 a.m., and from 12 noon to 1 hour after sunset. During the hours above specified when the draw is to be opened upon signal an attendant shall be kept constantly on duty at the bridge for that purpose. At all other hours the operating machinery must be accessible to vessel captains who may desire to open the draw themselves for the passage of their vessels. In such cases it shall be the captain's duty to see that the draw is closed and properly secured after his vessel has passed through.

(c) Vessels have the right of way over vehicles or persons using the bridge except between the hours of 11:30 and 12 noon.

(d) Whenever a vessel of the kind described in paragraph (a) of this section approaches the bridge during the hours specified in paragraph (b) of this section, 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 one blast of a whistle or horn.

§ 203.260 Wicomico River, Md.; bridges (highway) across south prong at Camden Avenue and Division Street and north prong at Main Street, Salisbury, Md. (a) A vessel desiring to pass through the bridge shall signal its intention by three long blasts of a whistle or horn. The signal shall be answered by three blasts of a whistle or horn from the bridge, and the draw shall be opened within 3 minutes from time of signal. In case, however, of accident to the machinery or other contingency involving unavoidable delay in opening the draw, the signal shall be answered by one blast of a whistle or horn.

(b) The draw shall be promptly opened for all vessels desiring to pass through it whose hulls, deckhouses, or cargoes are of such height that they will not pass under the bridge safely when it is closed.

(c) The bridge shall be promptly opened whenever signaled between the hours of 6 a.m. and 9:30 p.m., except between 6:30 and 7 a.m., 8:30 and 9 a.m., noon and 1 p.m., and 6 and 6:30 p.m., and during these times it shall remain closed for the purpose of accommodating street traffic. An attendant shall be kept on duty during those periods in which this section requires that the bridge shall be opened promptly upon signal.

§ 203.270 Cambridge Harbor, Md.; bridge. (a) The draw shall be promptly opened at any time for the passage of vessels unable to pass under the closed bridge, except during the following hours (eastern standard time) when it need not be opened: From 8 p.m. to 6 a.m.; from 12 noon to 12:10 p.m.; from 12:50 p.m. to 1 p.m.; and for 20 minutes before the scheduled time of departure from Cambridge of any regularly scheduled passenger train on the Pennsylvania Railroad.

(b) With the exceptions noted in paragraph (a) of this section, vessels have the right of way over vehicles or persons using the bridge.

(c) 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 operated 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 one blast of a whistle or horn.

(d) The owner of the bridge shall post and maintain a copy of the regulations in this section in a conspicuous place at each end of said bridge.

§ 203.280 Miles River, Md.; bridge (highway) at Easton, Md. (a) Between sunrise and sunset the draw of the above-mentioned bridge shall be promptly opened for the passage of any vessel unable to pass under the closed bridge.

(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. Upon receiving the signal from the vessel the tender or operator of the bridge, in case the bridge can be opened immediately, shall reply by three blasts of a whistle or horn. In case, however, of accident to the machinery or other contingency involving unavoidable delay in the opening of the draw, the signal shall be answered by one blast of a whistle or horn.

(c) A vessel wishing to pass the bridge between sunset and sunrise and unable to pass under the closed draw will request that the bridge be opened by notifying the draw tender of the time at which it is desired to pass and the draw of the bridge shall be opened as soon as practicable after the receipt of notice.

(d) A copy of the regulations in this section will be conspicuously posted on both the upstream and downstream sides of the bridge in such manner that it can be easily read at any time, together with a notice stating exactly how the draw tender, when not on duty at the bridge, may be reached.

(e) The operating machinery of the draw shall be kept in serviceable condition and the draw shall be opened and closed at intervals frequent enough to make certain that the machinery is kept in proper condition for satisfactory operation.

§ 203.285 Oak Creek, tributary of Miles River, Md.; bridges of the Maryland State Roads Commission and the Baltimore, Chesapeake and Atlantic Railroad Company at Royal Oak, Md. (a) During the period from June 1 to September 30, inclusive, the draw shall be opened promptly at any time during the day or night for the passage of any vessel unable to pass under the closed bridge. During the period from October 1 to May 31, inclusive, the hours for opening the draw shall be from sunrise to sunset.

(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 one long blast of a whistle or horn.

(c) A copy of the regulations in this section shall be posted in a conspicuous place on each side of the bridge.

§ 203.290 Kent Island Narrows, Md.—(a) Bridge (highway) of Maryland State Roads Commission. (1) Between the hours of 1 hour before sunrise and 1 hour after sunset the draw shall be promptly opened for all vessels desiring to pass through it whose masts permanently remain standing or which have masts that may be unstepped but which are 20 feet or more in height and 5 inches or more in diameter at butt.

(2) Whenever a vessel of the kind described in sub-

paragraph (1) of this paragraph shall approach the bridge and desire to pass through the draw, the signal therefor shall be three blasts of a whistle or horn blown on the craft, and when such signal is given the draw shall be opened forthwith if no person or vehicle is then in the way, and immediately upon the person or vehicle then on the bridge, if any, passing out of the way, and before any person or vehicle not then on the bridge shall be allowed to come upon it.

(3) If the draw is ready to be opened immediately when the signal is given on the craft, the signal shall be answered immediately by three blasts of a whistle or horn blown on the bridge, and if the draw is not ready to be opened immediately, by reason of persons or vehicles being on the bridge as aforesaid, or by reason of accident to the machinery or other contingency involving unavoidable delay in opening the draw, the signal for the craft shall be answered immediately by one blast of a whistle or horn blown on the bridge.

(b) Bridge of Baltimore and Eastern Railroad (Pennsylvania Railroad Co.) (NOTE: Bridge removed; regulation no longer applicable.)

(3) If the draw is ready to be opened immediately when the signal is given on the craft the signal shall be answered immediately by three blasts of a whistle or horn blown on the bridge, and if the draw is not ready to be opened immediately by reason of a train passing or about to pass over the bridge, or by reason of accident to the machinery or other contingency involving unavoidable delay in opening the draw, the signal for the craft shall be answered immediately by one blast of a whistle or horn blown on the bridge.

(4) When the call for opening the draw is given not 10 minutes before the hour at which a train is expected, the opening of the draw shall be delayed until immediately after the passage of that train, but in no case shall there be a delay longer than 15 minutes in opening the draw.

§ 203.305 Baltimore Harbor, Md.; bridge (highway) at Hanover Street across Middle Branch of Patapsco River. (a) When, at any time between the hours of 5 a.m. and 6:30 a.m., 9:30 a.m. and 4 p.m., and 6 p.m. and 9 p.m., a vessel, tug, or any watercraft unable to pass under the bridge approaches it, the signal of intention to pass through the draw and for the draw to be opened shall be three blasts of a whistle or horn blown on the craft. When such signal is given, the bridge shall be immediately cleared, no vehicle or person not then on the drawspan shall be allowed to come upon it, and the draw shall be opened forthwith.

If the draw is ready to be opened immediately, the draw operator shall answer immediately by three blasts of a whistle or horn blown on the bridge; and if the draw is not ready to be opened immediately, he shall answed by one short blast of a whistle or horn blown on the bridge.

(b) The draw shall not be required to open to vessels between 6:30 a.m. and 9:30 a.m. and between 4 p.m. and 6 p.m., except in cases involving the passage of fire boats, police boats, and craft similarly engaged in emergency operations. An attendant shall be kept on duty during these periods.

(c) When a vessel, tug, or any watercraft unable to pass under the bridge desires to pass through the draw at any time between the hours of 9 p.m. and 5 a.m., notice of such intention shall be given to the superintendent of the bridge by telephone or otherwise, either at the bridge before 9 p.m. or at his residence thereafter. If the notice is given between the hours of 5 a.m. and 9 p.m., or if at least one-half hour has elapsed since it was given, the draw shall be promptly opened at the time specified in the notice on signal given and answered as hereinbefore prescribed.

(d) The owner of the bridge shall keep conspicuously posted thereon, in such manner that it may be easily read at any time, a notice stating how the superintendent may be reached and shall arrange for ready telephonic communication with him at any time between 9 p.m. and 5 a.m., either from the bridge or from its immediate vicinity.

§ 203.310 Severn River, Md.; bridge (highway) near Annapolis, Md. (a) The leaves of the draw shall be promptly raised to their full height so as to provide full horizontal clearance through the bridge at any time during the day or night for all vessels desiring to pass through it whose masts are 15 feet or more in height or for any vessels whose hulls, deckhouses, or cargoes are of such height that they will not pass under the bridge when it is closed.

(b) Vessels have the right of way over vehicles or persons using the bridge.

(c) A vessel approaching the bridge and desiring to pass through the draw shall signal by three blasts of a whistle or horn. The signal shall be answered by three blasts of a whistle or horn that can be heard three-fourths of a mile from the bridge, and the draw shall be opened forthwith. In case, however, of accidents to the machinery or other contingency involving unavoidable delay in opening the draw, the signal shall be answered by one blast of a whistle or horn.

§ 203.325 Potomac River at Washington, D.C.; drawbriges—(a) Operation requirements. The owners of or agencies controlling the bridges shall provide the appliances and the personnel necessary for the safe, prompt, and efficient operation of the draws.

(b) Advance notice is required for openings of the draws. Any vessel which will require an opening of the draws of the respective bridges shall give to the designated representative of the owners of or agencies controlling the bridges at least six (6) hours' advance notice of the time the opening will be required. The notice shall contain the name of the vessel and the expected time of its arrival at the bridges. Upon receipt of such notice the designated representative shall arrange for draw tenders to be in attendance at the bridges at the time specified in the notice and for the attendance of draw tenders for a reasonable time thereafter, if necessitated by a minor delay in arrival of the vessel. In the event

the vessel will be unduly delayed further notification shall be given to the designated representative. The actual opening of the bridges for the passage of the vessel will be accomplished only after exchange of the prescribed signals: Provided, That no openings shall be made during closed periods as specified in paragraph (h) of this section: Provided further, That when an approaching train is actually on the railroad bridge block, or a mail train is in motion toward the bridge in sight or hearing of the draw tender, the draw of the railroad bridge need not be opened until the train has passed and the drawspan is cleared: And provided further, That in time of floods or other emergencies the District Engineer, Corps of Engineers, may order that the drawspans on all bridges covered by this section be manned for immediate openings for the duration of the emergency.

(c) Interference with operation of bridge prohibited. Trains and vehicles shall not be stopped on a bridge for the purpose of delaying its opening, nor shall watercraft be navigated so as to hinder or delay the operation of the draw, but all passage over or through a drawbridge shall be prompt to prevent delay to either land or water traffic.

(d) Sound signals—(1) Call signal for opening of draw. Three long blasts of a whistle, horn, or siren, or three loud and distinct strokes of a bell, sounded within reasonable hearing distance of the bridge and in time to give due notice to the draw tender.

(2) Acknowledging signals. (i) When draw can be opened immediately: One long blast of a whistle, horn, or siren, or one loud and distinct stroke of a bell.

(ii) When draw cannot be opened immediately, or when it is open and must be closed immediately: Four short, rapid blasts of a whistle, horn, or siren, or four rapid strokes of a bell. The vessel shall acknowledge by one long blast followed by one short blast or by two strokes of a bell. Thereafter, as soon as the draw can be opened, the draw tender shall sound one long blast or one stroke of a bell.

NOTE: As used in this paragraph, the term "long blast" means a distinct blast of three seconds' duration, and the term "short blast" means a distinct blast of one second's duration.

(e) Visual signals. To be used in conjunction with sound signals when conditions are such that sound signals may not be heard:

(1) Call signal for opening of draw. A white flag by day or a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw.

(2) Acknowledging signals. (i) When draw can be opened immediately: A white flag by day or a green light by night, swung up and down vertically a number of times in full sight of the vessel.

(ii) When draw cannot be opened immediately, or when it is open and must be closed immediately: A red flag by day or a red light by night, swung to and fro horizontally in full sight of the vessel. The vessel shall acknowledge by swinging to and fro horizontally a red flag by day or a red light by night. Thereafter, as soon as the draw can be opened, the draw tender shall swing a white flag or a green light up and down vertically a number of times in full sight of the vessel.

(f) Passing of railroad bridge and two highway bridges at Fourteenth Street. A vessel desiring to pass these bridges shall give the call signal for the first bridge to be passed. A radio or other intercommunication system of a type approved by the District Engineer, Corps of Engineers, Washington, D.C., shall be provided and maintained by the owners in the control room of the drawspan of each bridge. When the call signal is given by an approaching vessel, the bridge nearest the vessel, if that bridge can be opened immediately, shall communicate with the other bridges to see if they can open immediately. The draw tender shall await the reply from the other bridges and then give the appropriate acknowledging signal. If any of the bridges cannot be opened immediately, the proper signal shall be given from the bridge nearest the vessel to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) Right of way—(1) Vessels approaching from opposite directions. When vessels are approaching from opposite direction to pass a bridge, each vessel shall give the call signal for opening of the draw. The vessel running with the current shall have the right of way. At slack tide the vessel running in the direction of the ebb current shall have the right of way.

(2) Vessels approaching from same direction. When vessels are approaching a bridge from the same direction to pass a bridge, each vessel shall give the call signal for opening of the draw. They shall be navigated in accordance with the applicable pilot rule.

(h) Closed periods. Between 6:45 and 9:15 a.m. and between 3:45 and 6:30 p.m., daily, the bridges shall not be opened for the passage of a vessel: Provided, That any vessel passing one of the drawbridges before a closed period begins will be entitled to passage through all remaining bridges in the direction of travel without delay: Provided further, That in time of flood or other emergency the closed periods may be suspended or modified by the District Engineer, Corps of Engineers.

(i) Clearance gauges. Clearance gauges of a type approved by the District Engineer shall be provided and maintained by the owners of the railroad bridge and the West Fourteenth Street highway bridge, as follows: One on the downstream end of the pivot-pier fender of the railroad bridge; one on the upstream end of the pivot-pier fender of the highway bridge; and an additional gauge on each bridge so placed that it can be distinctly read by the draw tender. These gauges shall be so set and maintained as to show accurately to an approaching vessel the actual vertical distance between the water surface and the lowest point of the lower chords of the drawspans.

(j) Minimum vertical clearance to be observed. No vessel shall pass under a closed drawspan at any time unless the vertical clearance between the lowest point of the span and the highest vertical projection of the vessel is at least 18 inches.

(k) Habitual users. Any vessel desiring to pass any of the bridges as often as once a day for 10 days in any 30-day period will be regarded as an habitual user of the

waterway within the meaning of this paragraph. Such vessels should be so constructed that stacks, masts, and flagstaffs may be lowered to permit their passage under the closed bridge. The draws shall not be required to open to permit the passage of vessels habitually using the waterway which have stacks, masts, or flagstaffs exceeding a height of 16.8 feet above the water line, and which, in the opinion of the District Engineer, can through structural modifications, be made capable of clearing the closed bridges.

(l) Records and reports. The owners of or agencies controlling the bridges shall keep a complete record of all openings of the draws in such form as may be prescribed by the District Engineer, and shall report to him all cases where the draws have been required to be kept open for an unreasonable length of time.

§ 203.330 Anacostia River, Washington, D.C.; bridges. (a) District of Columbia highway bridge at 11th Street SE. (1) From 9:00 a.m. to 4:00 p.m. daily the draw of this bridge shall, upon proper signal, be opened promptly for the passage of any vessel or other watercraft not able to pass safely under the closed draw.

(2) Whenever a vessel unable to pass safely under the closed bridge desires to pass through the draw at any time between 4:00 p.m. and 4:00 a.m., notice of the time the opening is required shall be given to the draw tender at the bridge or other authorized representative of the owner of or agency controlling the bridge not later than 4:00 p.m.

(3) Whenever a vessel unable to pass safely under the closed bridge desires to pass through the draw at any time between 4:00 a.m. and 9:00 a.m., at least 12 hours' advance notice of the time the opening is required shall be given to the watchman at the bridge or other authorized representative of the owner of or agency controlling the bridge.

(4) Upon receipt of advance notice as specified in subparagraph (2) or (3) of this paragraph the draw tender, watchman, or other authorized representative shall, in compliance therewith, arrange for the prompt opening of the draw upon proper signal at the time specified in the notice for the passage of the vessel or within a reasonable time thereafter: Provided, That from 6:45 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:30 p.m. daily the draw shall not be required to open for the passage of vessels except vessels owned or controlled by the United States or the District of Columbia.

(5) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations in this paragraph together with a notice stating exactly how the draw tender, watchman, or other authorized representative may be reached by telephone or otherwise.

(b) Pennsylvania Railroad Company Freight Bridge No. 134.35. (1) During the period from April 1 to September 30, inclusive, on Saturdays, Sundays, and legal holidays, the lift span shall be opened on signals. During the same period, on weekdays between the hours of 10:00 a.m. and 8:00 p.m., the lift span shall be opened on signal on the hour for the passage of two or more vessels or other watercraft: Provided, That in no case shall the delay to a single vessel be more than 30 minutes.

(2) During the period from April 1 to September 30, inclusive, on weekdays between the hours of 8:00 p.m. and 10:00 a.m., and from October 1 to March 31, inclusive, on Saturdays, Sundays, and legal holidays between the hours of 10:00 a.m. and 6:00 p.m., the lift span shall be opened on signal on the hour for the passage of any vessel or other watercraft: Provided, That when once opened the bridge shall remain open sufficiently long to permit the passage of all vessels or other watercraft which may be in sight of the bridgetender and expected to desire a passage of the bridge. The time referred to shall be eastern standard or eastern daylight time, whichever is in effect locally.

(3) At all other times not covered, at least two hours' advance notice is required to be given to the designated representative of the owner of or agency controlling the bridge. The notice shall contain the name or number of the vessel and the expected time of its arrival at the bridge.

(4) Vessels employed or controlled by the United States Government, the District of Columbia and agencies of the State of Maryland shall be passed without delay through the draw of said bridge at any hour of the day or night upon giving the proper signal.

(5) Clearance gages, of a type approved by the District Engineer of the U.S. Army Engineer District in charge of the locality, shall be provided by the owners of the bridge. These gages shall be so set and maintained on the upstream and downstream fenders of the bridge as to show accurately and clearly the distance between the water surface and the lowest point of the closed lift span.

(6) The bridge shall not be required to be opened for the passage of vessels habitually using the waterway and carrying appurtenances such as radio antenna or flag staffs which as determined by the District Engineer of the U.S. Army Engineer District in charge of the locality, can readily be removed, lowered or hinged, and which are otherwise capable of clearing the bridge when closed. Habitual users are defined as any vessel passing the bridge as often as seven (7) times in a 30-day period.

(7) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such a manner that it can easily be read at all times, a copy of the regulations in this paragraph, together with a notice stating a local telephone number where the representative specified in subparagraph (3) of this paragraph may be reached.

§ 203.340 Rappahannock River, Va.; all bridges. (a) The corporations or persons owning or controlling a drawbridge shall provide the same with the necessary tenders and the proper mechanical appliances for the safe, prompt, and efficient opening of the draw and shall maintain the fender system in good condition for the passage of vessels.

(b) If the weather conditions are good and sound

signals can be heard when a vessel approaches a drawbridge and desires to pass through the draw, three distinct blasts of a whistle, horn, or megaphone shall be sounded from the vessel when within reasonable hearing distance of the bridge.

(1) 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.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed 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.

(c) When weather conditions prevent hearing the sound signals when a vessel approaches a drawbridge and desires to pass through the draw, 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.

(1) 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.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed 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.

(d) When a vessel wishes to pass two or more bridges close together signals as prescribed above shall be given from the vessel for opening the first bridge, followed at an interval of about 5 seconds by the same signals for the second bridge, and so on, thus giving at intervals of about 5 seconds, separate signals for each bridge the vessel desires to pass.

(e) When two or more vessels are approaching the bridge at nearly the same time from the same or opposite directions with the draw opened or closed, each of these vessels shall signal independently for the opening of the draw, and the draw tender shall reply as prescribed and in turn to the signal of each vessel.

(f) Where bridges are less than 500 feet apart, the signals to govern the movements of the approaching vessel shall be given from the bridge nearest the vessel. If that bridge can be opened immediately, the bridge tender shall await the reply signals from the other bridges and then give the signal circumstances require. If the nearest bridge cannot be opened immediately, the prescribed signal shall be given the approaching vessel at once, to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) The draw shall be opened with the least possible delay, upon receiving the prescribed signal: 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, or when a passenger or mail train is approaching within sight or hearing of the operator of the drawspan.

(h) When a bridge tender is about to close a draw, he shall sound two distinct blasts of a whistle, horn, or megaphone, or two loud and distinct strokes of a bell.

(i) Trains, vehicles, vessels or other water craft shall not be stopped or manipulated in a manner hindering or delaying the operation of the draws, but all passage over the drawspans or through the draw openings shall be in a manner to expedite both land and water traffic.

(j) Any vessel with or without tows requiring the opening of the draw of a bridge on which only one draw opening is protected by a fender system, shall pass through the opening so protected.

(k) A copy of the regulations in this section will be conspicuously posted on both upstream and downstream sides of the bridges in such manner that it can be easily read at any time.

§ 203.343 Milford Haven, Va.; Virginia Department of Highways bridge between the mainland and Gwynns Island. (a) The draw of the bridge shall not be required to be opened for the passage of vessels, habitually using the waterway and carrying appurtenances unessential for navigation (such as patent tong masts, flagstaffs, radio antennas, etc.), which are otherwise capable of clearing the bridge when closed: Provided, That vessels engaged in commercial oystering or haul seine fishing shall be passed promptly at any time during the respective legal oystering or haul seine fishing seasons.

(b) Any vessel passing through the bridge as often as once a day for 5 consecutive days of any month will be regarded as a habitual user within the meaning of this section. Failure of any vessel to comply with the regulations after one warning by the person controlling the bridge shall be sufficient cause for refusal to open the draw for the future passage of the vessel.

§ 203.349 Eastern Branch of Elizabeth River, Va.; Elizabeth River Tunnel Commission bridge between Norfolk and Berkley—(a) Sound signals. To be used if weather conditions are such that sound signals can be heard:

(1) Call signal for opening of draw. When a vessel approaches the bridge and desires to pass through the draw, three distinct blasts of a whistle, horn or megaphone or three loud and distinct strokes of a bell shall be sounded from the vessel when within reasonable hearing distance of the bridge.

(2) Acknowledging signals—(i) When the draw must be cleared of traffic and prepared for opening. The draw tender shall reply with two distinct blasts of a whistle, horn or megaphone or by two loud and distinct strokes of a bell. The vessel shall be checked and stand by for either the signal in subdivision (ii) or subdivision (iii) of this subparagraph.

(ii) When the draw is clear of traffic and can be opened immediately. The draw tender shall reply with three distant blasts of a whistle, horn or megaphone or by three loud and distinct strokes of a bell.

(iii) When the draw cannot be opened for an indefinite period or when it is open and must be closed immediately. The draw tender shall reply with four or more distinct blasts of a whistle, horn or megaphone or four or more

loud and distinct strokes of a bell, to be followed by the signal in subdivision (ii) of this subparagraph when the draw is to be opened.

(b) Visual signals. To be used if weather conditions are such that sound signals may not be heard.

(1) Call signal for opening of draw. When a vessel approaches the bridge and desires to pass through the draw signals shall be made from the approaching vessel by swinging in vertical circles at arm's length a lighted lantern at night and a flag by day.

(2) Acknowledging signals—(i) When the draw must be cleared of traffic and prepared for opening. The draw tender shall reply by swinging in vertical circles at arm's length a lighted lantern at night and a flag by day. The vessel shall be checked and stand by for either the signal in subdivision (ii) or subdivision (iii) of this subparagraph.

(ii) When the draw is clear of traffic and can be opened immediately. The draw tender shall reply by raising and lowering in a vertical plane a number of times a lighted lantern at night and a flag by day.

(iii) When the draw cannot be opened for an indefinite period or when it is open and must be closed 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, to be followed by the signal in subdivision (ii) of this subparagraph when the draw is to be opened.

(c) Posting of regulations in this section. The owner of or agency controlling the bridge shall keep a legible copy of the regulations in this section posted conspicuously on both the upstream and downstream sides of the bridge.

PART 204—DANGER ZONE REGULATIONS:

§ 204.20 Waters of Atlantic Ocean; Sea Girt Military Reservation, Sea Girt, N.J.—(a) The danger zone. (1) The firing range of Sea Girt Military Reservation includes the waters of the Atlantic Ocean within an area bounded on the north by a line extending east from the end of Sea Girt Avenue, on the east by a line 1 mile long 3 miles offshore, and on the south by a line extending southeast from the radio station.

(2) The above-described area will be marked by spar buoys at the two points 3 miles offshore, to be placed and maintained by the Commanding Officer, New Jersey State Arsenal, Sea Girt, New Jersey.

(b) Regulations. (1) Range firing will normally take place between the hours of 8:00 a.m. and 6:00 p.m. on all Saturdays and Sundays during the period April to November, inclusive, and on certain designated weekdays during the period July to September, inclusive.

(2) No vessel shall enter or remain in the danger zone during the operation of the firing range excepting vessels of the United States.

(3) When firing is scheduled or is in progress a large red flag will be displayed from the flag staffs on the beach located at both the northern and southern boundaries of the reservation, so as to be clearly visible for a distance of at least 3 miles offshore.

(4) No permits to erect and maintain fish pounds within the zone will hereafter be issued.

(5) This section shall be enforced by the Adjutant General, State of New Jersey, and such agencies as he may designate.

§ 204.23 Atlantic Ocean off Cape May, N.J.; Coast Guard Rifle Range. (a) The danger zone. The waters of the Atlantic Ocean within an area described as follows: Beginning at Cape May West Jetty Light; thence 180° true, 800 yards; thence 250° true, 1,325 yards; and thence 335° true to the shore line.

(b) The regulations. (1) No vessel shall enter or remain in the danger area between sunrise and sunset daily, except as authorized by the enforcing agency.

(2) The regulations in this section shall be enforced by the Commander, Third Coast Guard District, or his authorized representative.

§ 204.24 Delaware Bay off Milford Neck; naval aircraft bombing target area—(a) The danger zone. A circular area of one nautical mile radius having its center in Delaware Bay at latitude 38°58′12″, longitude 75°17′30″.

(b) The regulations. (1) Anchoring, trawling, crabbing, fishing and dragging in the danger zone are prohibited during daylight hours.

(2) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

§ 204.25 Atlantic Ocean off Delaware coast; antiaircraft artillery firing areas, Second Army—(a) The danger zones—(1) Automatic weapons area. An area east and southeast of Rehoboth Beach described as follows: Beginning at a point on the shore at latitude 38°40′45″; thence to latitude 38°45′30″, longitude 75°01′24″; thence to latitude 38°43′00″, longitude 74°57′10″; thence to latitude 38°38′50″, longitude 74°55′33″; thence to latitude 38°36′15″, longitude 74°57′00″; thence to a point on the shore at latitude 38°37′54″; and thence northerly along the shore to the point of beginning.

(2) 90-mm. gun area. An area east of Bethany Beach described as follows: Beginning at a point on the shore at latitude 38°31′15″; thence to latitude 38°38′27″, longitude 74°52′42″; thence to latitude 38°35′45″, longitude 74°49′12″; thence 180° true to latitude 38°25′00″; thence to latitude 38°22′26″, longitude 74°52′06″; thence to a point on the shore at latitude 38°29′03″; and thence northerly along the shore to the point of beginning.

(3) 120-mm. gun area. An area which includes the 90-mm. gun area and extends that area about 7,800 yards on its northeast, east, and southeast sides, described as follows: Beginning at a point on the shore at latitude 38°31′15″; thence to latitude 38°40′26″, longitude 74°49′45″; thence to latitude 38°36′30″, longitude 74°44′18″; thence 180° true to latitude 38°24′32″; thence to latitude 38°20′30″, longitude 74°48′45″; thence to a

point on the shore at latitude 38°29′03″; and thence northerly along the shore to the point of beginning.

NOTE: The danger zones will be marked by buoys.

(b) The regulations. (1) All firing during the months of November to April, inclusive, will be conducted between 8:00 a.m. and 6:30 p.m., e.s.t. Scheduled firing during the months of May to October, inclusive, will be conducted between 12:00 noon and 6:00 p.m., e.s.t. Certain firing may be conducted, however, between 8:00 a.m. and 12:00 noon during this latter period and will be rounds fired at fixed points for settling weapons, testing and verification purposes only in accordance with established Department of the Army Safety Regulations, and will involve no restrictions on navigation. No firing will be conducted during hours of darkness.

(2) Firing will take place on certain days other than Saturdays, Sundays and national holidays, as listed in public notice to be issued each year by the District Engineer, U.S. Army Engineer District, Philadelphia, Pennsylvania.

(3) When it is determined that no firing will take place on any of the days for which firing is scheduled, the public will be so advised by radio and other practicable means as far in advance as possible.

(4) Except as provided in subparagraph (6) of this paragraph, no vessel shall enter or remain in the danger zones during the time of firing unless specific permission is granted in each case by one of the representatives of the enforcing agency policing the area in patrol boats.

(5) Prior to the conducting of each firing practice, the danger zones will be adequately patrolled to insure that no watercraft are within the danger zones and to warn any watercraft in a danger zone that firing is to take place. Any such watercraft shall, upon being so warned, immediately leave the area designated and shall remain outside the area until the conclusion of the firing practice.

(6) The regulations in this section shall not deny traverse of portions of the danger zones by regular cargo-carrying vessels, or commercial fishing vessels based at Lewes, Delaware. In case of the presence of any such vessel in a danger zone, the officer in charge of firing operations will cause the cessation or postponement of fire until the vessel has cleared the area. The vessel shall proceed on its normal course and shall not delay its progress.

(7) This section shall be enforced by the Commanding General, Second Army, Fort George G. Meade, Maryland, and such agencies as he may designate.

§ 204.30 Chesapeake Bay; United States Army Proving Ground Reservation, Aberdeen, Md.—(a) Restricted area defined. The following indicates the limits of the waters of or adjacent to the Aberdeen Proving Ground, Maryland, and inside of which boundaries will lie the restricted area known as the Aberdeen Proving Ground, Maryland.

(1) Beginning at a point on the westerly side of Chesapeake Bay, at the south side of the mouth of Swan Creek, Harford County, Maryland, the most northerly point of the reservation known as Plum Point; thence southeasterly along the low water mark on the shore of Chesapeake Bay to and across the north entrance of Spesutie Narrows to and thence along the low water mark on the north shore of Spesutie Island to Locust Point; thence along straight line from Locust Point to Turkey Point for a distance of approximately 1,400 yards; thence following a line parallel with and 1,000 yards from the low water mark on the easterly shore of Spesutie Island to a point 1,000 yards due southeast of Sandy Point; thence approximately southwest in a straight line to a point approximately 1,250 yards S. 10°30′ W. from Bear Point; thence approximately 9,275 yards S. 51°04′ W. to a point in Chesapeake Bay about 1,700 yards due east from Taylor Island Point; thence southwesterly in a straight course, except such variations as may be necessary to include all of Pooles Island to the southwesterly point of Pooles Island, thence in a northwesterly direction to the most southwesterly point of Spry Island, including all of Spry Island; thence northwesterly in a straight line to extreme southerly island off Lower Island Point; thence northwesterly in a straight line through Brier Point to a point in Seneca Creek where this line intersects a straight line which passes through monuments No. 124 and No. 125 on westerly part of Carroll Island; thence northeasterly in a straight line passing through Marshy Point, at the junction of Dundee Creek and Saltpeter Creek, to the intersection of the center line of Reardon Inlet with Gunpowder River, except such variations as may be necessary to exclude any and all parts of the point of land on the westerly side of Gunpowder River about one mile south of Oliver Point; thence northerly along the center line of Reardon Inlet to its intersection with the southeasterly line of the right of way of the Pennsylvania Railroad; thence northeast along the Pennsylvania Railroad following the reservation boundary line to shore of Bush River, and along its western shore to Fairview Point; thence northeast in a straight line across Bush River to concrete monument No. 64, located on the eastern shore of Bush River, south of Chelsea; thence along the eastern shore of Bush River northerly to the mouth of Sod Run; thence by a broken line along the boundary of the reservation to Swan Creek; and thence in a straight line to Plum Point. (The above description may be traced on Coast and Geodetic Chart No. 1226).

(b) Authority delegated Commanding Officer. Under authority delegated by the Secretary of the Army to the Commanding Officer, Aberdeen Proving Ground, to designate from time to time, by suitably posted bulletins, the conditions under which the public, including food fishermen may enter the waters of the Restricted Area, Aberdeen Proving Ground, the following regulations are published.

(c) Penalty. All persons who enter the restricted waters, except as authorized in this section, without the authority of the Commanding Officer, Aberdeen Proving Ground, Md., are under the terms of the information given

above, guilty of a misdemeanor and upon conviction thereon are punishable by a fine not exceeding $500.00 or by imprisonment not exceeding six months.

(d) Entrance into restricted waters by the public over weekends and on National holidays. Except as qualified in this paragraph, the waters, included in Aberdeen Proving Ground Reservation are open throughout the year to the public for fishing and traffic but not for hunting from 6:00 p.m. Fridays to 7:00 a.m. Mondays and on National (not State) holidays from 6:00 p.m. on the day preceding the holiday to 7:00 a.m. on the day following the holiday. In addition those waters west of the east shoreline of Bush River and the line Abbey Point to Poole's Island are further restricted to the public until 12:00 noon Saturdays.

(e) Entrance at night into restricted waters by the public between the dates of February 1st and June 15th. Between the dates of February 1st and June 15th, both dates inclusive, the waters included in Aberdeen Proving Ground Reservation are open to the public for fishing and other traffic but not hunting from 6:00 p.m. to 7:00 a.m., except on Tuesdays and Wednesdays, which are reserved for night firing over water. If, however, there is to be night firing over water on Tuesdays or Wednesdays, a red flag will be hoisted at Howell Point Tower on the Eastern Shore, Maryland, at 4:30 p.m., and a siren located at Mulberry Point will be sounded at 4:35 p.m. as a signal to fishermen and others that entrance to the restricted waters of Aberdeen Proving Ground, on those evenings is prohibited.

(f) Entrance at night into restricted waters by the public between dates of January 1st and January 31st and between dates of June 16th and December 31st provided night firing over water is not to be conducted. Between the dates of January 1st and January 31st, both dates inclusive, and between the dates of June 16th and December 31st, both dates inclusive, firing may be conducted on any night except Saturday. However on dates in which night firing is not to be conducted, that portion of the waters of the Chesapeake Bay, Gunpowder River, and Bush River which are included in Aberdeen Proving Ground Reservation are open to the public for fishing and other traffic but not for hunting from 6:00 p.m. to 7:00 a.m. If firing is to be conducted on any night during these periods, a siren located at Mulberry Point will be sounded at 4:35 p.m. and in addition a red flag will be displayed from the staff at Howell Point Tower at 4:30 p.m. on the date the night firing is to be conducted as a signal to fishermen and others that entrance on this date in the waters included in Aberdeen Proving Ground Reservation is prohibited. In the event night firing is to be conducted over a considerable period between the dates specified herein a special notice of such firings and the dates and hours at which time the firing is to be conducted will be published by the Commanding Officer, Aberdeen Proving Ground, and circulated to the Post Offices in the surrounding localities for publication on the bulletin boards thereat. During such periods the provisions contained in these special notices must be complied with by fishermen and all others concerned.

(g) No limitations on dates night firing may be conducted over land. The foregoing provisions and limitations on night firing over water in no way restricts night firing over land which may be conducted on any night of a working day throughout the year.

(h) Permits required from the Commanding Officer to set fixed nets in restricted waters. Fishermen desiring to set fixed nets within the restricted waters of Aberdeen Proving Ground Reservation are required in every instance to have a written permit. A fixed net for the purpose of this paragraph is defined as a pound net, staked gill net, hedge fike net, hoop net, eel pot, and all other types of nets fastened by means of poles, stakes, weights, or anchors. Permits to fish within the restricted waters of Aberdeen Proving Ground may be obtained by written application to the Commanding Officer, Aberdeen Proving Ground, Md. Applicants for permits must state the location at which they desire to set fixed nets and state the period of time for which they desire the permit to cover.

Holders of permits for setting fixed nets must comply with the provisions of this part and also with § 206.50(d). (Fishing and Hunting Regulations—not printed in this Coast Pilot.)

(i) Identification signs required at each location of fixed nets. Fishermen who have been granted permits to fish within the restricted waters of Aberdeen Proving Ground Reservation with fixed nets must at each location have a stake securely driven at the outer end of the line of nets on which is mounted a sign board which contains their name and permit number.

(j) Removal of pound net poles and/or stakes. At the end of the fishing season or upon the expiration of the permit fishermen must remove and haul away from the location all pound nets, poles or stakes used in their operation. Pound net poles or stakes must not be cast adrift after removal.

(k) Restrictions on fishermen. It must be distinctly understood that holders of permits to fish are not authorized to enter the restricted waters of Aberdeen Proving Ground Reservation outside the hours aforementioned. In addition, the privileges granted in this paragraph include no right to land nor to cut or procure pound net poles or stakes on the Aberdeen Proving Ground Reservation.

(l) Fishing with any type of net prohibited in all creeks. Fishing with any type of net is prohibited in all creeks of the Aberdeen Proving Ground Reservation, including Romney Creek.

(m) Compliance with Federal, State and county laws required. The taking of fish in the waters of Aberdeen Proving Ground Reservation and the setting of and location of nets, in a manner not in compliance with Federal, State and county laws is prohibited.

§ 204.32 Chesapeake Bay, in the vicinity of Chesapeake Beach, Md.; firing range, Naval Research Laboratory—(a) The danger zone—(1) Area A. A roughly rectangular area bounded on the north by latitude 38°39′55″; on the south by latitude 38°39′09″; on the

east by longitude 76°31′03″; and on the west by the shore of Chesapeake Bay.

(2) Area B. The sector of a circle bounded by radii of 9,600 yards bearing 31° (to Bloody Bar Light) and 137°30′ (to Buoy N "16 FF"), respectively, from the center at the southeast corner of building No. 3; excluding Area A.

(3) Area C. The segment of a circle inclosed by the arcs of two circles having radii of 9,600 yards and 13,200 yards, respectively, and bounded by the extended radii marking the north and south limits of Area B.

(4) Area D. A roughly rectangular area bounded on the north by an east-west line through Buoy C "1" at the entrance channel to Fishing Creek; on the south by an east-west line through Buoy C "23" northeast from Breezy Point; on the east by the established fishing structure limit line; and on the west by the shore of Chesapeake Bay.

NOTE: All bearings referred to true meridian.

(b) The regulations. (1) No vessel shall enter or remain in Area A at any time.

(2) No vessel shall enter or remain in Area B or Area C between the hours of 1:00 p.m. and 5:00 p.m. daily except Sundays, except that through navigation of commercial craft will be permitted in Area C at all times, but such vessels shall proceed on their normal course and shall not delay their progress.

(3) No fishing structures, other than those presently in established locations, which may be maintained, will be permitted to be established in Area D without specific permission from the Director, Naval Research Laboratory.

(4) The areas will be in use throughout the year, and no further notice is contemplated that firing is continuing.

(5) Prior to the conduct of each firing practice a patrol vessel will patrol the range to warn navigation. "Baker" will be flown from a conspicuous point on the patrol vessel and from a prominent position on shore.

(6) The section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

§ 204.34 Chesapeake Bay, south of Sharps Island, Md.; restricted area, U.S. Navy—(a) The danger zone. The waters within a circle having a radius of 200 yards with its center approximately 300 yards south of Sharps Island at latitude 38°36′53″, longitude 76°21′56″

(b) The regulations. (1) No vessel shall enter or remain in the restricted area at any time except as authorized by the enforcing agency.

(2) This section shall be enforced by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Maryland and such agencies as he may designate.

§ 204.36 Chesapeake Bay, in vicinity of Bloodsworth Island, Md.; shore bombardment, air bombing, air strafing, and rocket firing area, U.S. Navy—(a) The danger zone. All waters of Chesapeake Bay and Tangier Sound within an area bounded as follows: Beginning at latitude 38°08′15″, longitude 76°10′00″; thence to latitude 38°12′00″, longitude 76°10′00″; thence to latitude 38°12′00″, longitude 76°07′00″; thence to latitude 38°13′00″, longitude 76°06′00″; thence to latitude 38°13′00″, longitude 76°04′00″; thence to latitude 38°12′00″, longitude 76°02′00″; thence to latitude 38°12′00″, longitude 76°00′00″; thence to latitude 38°08′15″, longitude 76°00′00″; thence to the point of beginning.

(b) The regulations. (1) No vessel or other craft shall enter or remain in the restricted area when notified by an enforcing authority to keep clear or when firing is or will soon be in progress, except as provided in subparagraph (5) of this paragraph.

(2) Advance notice will be given of the dates and times of all firings and such notice will be published in the local "Notice to Mariners". The area will be in use intermittently throughout the year. On days when firing is conducted, firing will take place normally between sunrise and sunset, except that occasional night firing may be conducted between sunset and 12:00 midnight.

(3) Prior to the commencement of firing each day, surface or air search of the entire area will be made for the purpose of locating and warning all craft and persons not connected with the firing, and a patrol will be maintained throughout the duration of firing.

(4) Warning that firing is or soon will be in progress will be indicated during daylight by a red flag prominently displayed from a tower off Okahanikan Point at latitude 38°11′45″, longitude 76°05′35″, and at night by a searchlight beam pointed into the sky. All persons, vessels, and other craft shall clear the area when these signals are displayed or when warned by patrol vessels or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle.

(5) During hours when firing is in progress and warning signals are displayed, no fishing or oystering vessels or other craft not directly connected with the firing shall navigate within the restricted area, except that deep-draft vessels proceeding in established navigation lanes and propelled by mechanical power at a speed greater than five knots, normally will be permitted to traverse the area. Permission for such deep-draft vessels to enter and traverse the area will be indicated during daylight by dipping the red warning flag to half-mast, and at night by flashing the warning searchlight.

(6) When firing is not in progress and warning signals are not displayed, oystering and fishing boats and other craft may operate within the restricted area.

(7) All projectiles, bombs, and rockets will be fired to land on Bloodsworth Island or Pone Island, but Naval authorities will not be responsible for damage by such projectiles, bombs, or rockets, or by Navy or Coast Guard vessels, to nets, traps, buoys, pots, fish pounds, stakes, or other equipment which may be located within the restricted area.

(8) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

§ 204.40 Potomac River—(a) United States Naval Torpedo Testing Range, Piney Point, Md. [Revoked]

(b) United States Naval Proving Ground, Dahlgren,

Va.—(1) The danger zones—(i) Lower zone. The entire portion of the lower Potomac River between a line from Point Lookout, Maryland, to Smith Point, Virginia, and a line from Blakiston Island Shoal Buoy 4A (off Blaskiston Island) to Hollis Marsh. This zone, in which long-range and aerial machine gun firing is normally conducted at infrequent intervals, embraces the Naval Torpedo Testing Range at Piney Point, Maryland, which is subject to special additional restrictions (see paragraph (a) of this section).

(ii) Middle zone. Beginning at the intersection of the Potomac River Bridge with the Virginia shore; thence to Lower Cedar Point Light; thence to latitude 38°19′06″, longitude 76°57′07″, which point is about 3,300 yards east-southeast of Lower Cedar Point Dredge Channel Range Front Light; thence to Line of Fire Buoy O, about 1,150 yards southwest by west of Swan Point; thence to Line of Fire Buoy M, about 1,700 yards south of Potomac View; thence to Line of Fire Buoy K, about 1,300 yards south by west of the lower end of Cobb Island; thence to Blakiston Island Shoal Buoy 4A, abreast of Blakiston Island abandoned lighthouse; thence southwesterly to a point on the northeast shore of Hollis Marsh at latitude 38°10′; thence northwesterly to Line of Fire Buoy J, about 3,000 yards off Popes Creek, Virginia; thence to Line of Fire Buoy L, about 3,500 yards off Church Point; thence to Line of Fire Buoy N, about 800 yards off Colonial Beach; thence to Line of Fire Buoy P, about 1,000 yards off Bluff Point; thence to the Main Dock at the Naval Proving Ground. Firing is normally conducted in this zone daily except Saturdays, Sundays, and national holidays.

(iii) Upper zone. Beginning at Mathias Point, Virginia; thence north to Mathias Point Shoal Light; thence north by east to Port Tobacco River Flats Light; then east-southeast to Popes Creek Flats Lighted Buoy 26; thence east-southeast to Stone Pile Buoy 24 SP abreast of Popes Creek, Maryland; thence to the Maryland shore on an extension of the line connecting Buoys 26 and 24; thence southerly with the Maryland shore to a line passing through Persimmon Point Shoal Light to the Virginia shore, parallel to the Potomac River Bridge; thence northerly with the Virginia shore to the point of beginning. Aerial bombing and strafing is normally conducted in this zone at infrequent intervals.

(2) The regulations. (i) Firing normally takes place between the hours of 8:00 a.m. and 4:00 p.m. daily except Saturdays, Sundays, and national holidays, with infrequent night firing between 4:00 p.m. and 10:30 p.m. During a national emergency, firing will take place between the hours of 6:00 a.m. and 10:30 p.m. daily except Sundays.

(ii) When firing is in progress, no fishing or oystering vessels shall operate within the danger zone affected unless so authorized by the Naval Proving Ground's patrol boats. Oystering and fishing boats or other craft may cross the river in the danger zone only after they have reported to the patrol boats and received instructions as to when and where to cross. Deep-draft vessels using dredged channels and propelled by mechanical power at a speed greater than five miles per hour, may proceed directly through the danger zones without restriction except when especially notified to the contrary. Small craft traversing the Middle Danger Zone up or down the river during normal firing hours shall proceed outside of the northeastern boundary thereof or as close thereto as safe navigation permits.

(iii) This paragraph shall be enforced by the Captain of the Port and the Commanding Officer of the United States Naval Proving Ground and such agencies as they may designate. Patrol boats and planes will fly or expose a square red flag in clearing a danger zone.

(c) Accotink Bay, Accotink Creek, and Pohick Bay; United States Military Reservation, Fort Belvoir, Va.—(1) The danger zone. The waters of Accotink Bay, Accotink Creek, and Pohick Bay, Virginia, within and adjacent to the target ranges of the United States Military Reservation, Fort Belvoir, as follows: All of Accotink Bay; all of Accotink Creek below the bridge which crosses Accotink Creek approximately 400 yards south of U.S. Highway No. 1; and that portion of Pohick Bay bordering its north shore. The mouth of Accotink Bay and that portion of Pohick Bay within the danger zone will be marked by the Post Commander with suitable warning buoys.

(2) The regulations. (i) When firing affecting the area is in progress, the Post Commander will post guards at such locations that the waters in the danger zone may be observed and arrange signals whereby these guards may stop the firing should any person be seen in the danger zone. When firing is in progress, the Post Commander will cause to be displayed both on the east shore of Accotink Bay at its mouth and near the danger zone boundary on Accotink Creek a red streamer which shall be visible to a person in a boat near those points.

(ii) Persons desiring to cross the waters in the danger zone shall first determine whether a red streamer is displayed on the east shore of Accotink Bay at its mouth or near the danger zone boundary on Accotink Creek. If the red streamer is displayed, it will indicate that firing is in progress and that the waters in the danger zone are covered by rifle fire, and the area shall not be entered until the streamer is lowered.

(iii) The Post Commander is hereby authorized by using such agencies and equipment necessary to stop all boats at the boundary of the danger zone and prohibit their crossing the area until convenient to the firing schedule to do so.

§ 204.42 Chesapeake Bay, Point Lookout to Cedar Point; aerial gunnery range and target areas, U.S. Naval Air Station, Patuxent River, Md.—(a) Aerial gunnery range—(1) The danger zone. The waters of Chesapeake Bay within an area described as follows: Beginning at the easternmost extremity of Cedar Point; thence easterly to the southern tip of Barren Island; thence southeasterly to latitude 38°01′15″, longitude 76°05′33″; thence southwesterly to Kedges Strait Middle Ground Buoy 14 (approximately latitude 37°59′36″, longitude 76°10′30″); thence northwesterly to Fish Net Buoy 20 W (approximately latitude 38°02′20″, longitude 76°17′26″);

thence northerly to Point No Point Light; thence northwesterly to the shore at latitude 38°15′45″; thence northeasterly along the shore to the point of beginning. Aerial machine gun practice will be conducted in this area throughout the year.

(2) The regulations. (i) Through navigation of surface craft will be permitted at all times outside the target areas. Such vessels shall proceed on their normal course and shall not delay their progress.

(ii) Advance notice will be given of the date on which firing practice is to begin and such notice will be published in "Notice to Mariners". The range will be used throughout the year, and no further notice that firing is continuing will be given.

(iii) Prior to firing practice the gunnery range will be patrolled by surface craft or naval aircraft to warn any watercraft likely to be endangered by such firing by means of signals that firing is to take place. Surface craft so used will display a square flag. Naval aircraft will employ a method of warning consisting of repeated shallow dives to a low altitude in the area following each dive with a sharp pull-up.

(iv) Any watercraft under way or at anchor, upon being so warned, shall immediately vacate the area and shall remain outside the area until conclusion of firing practice.

(v) Military and naval vessels will conduct gunnery and training exercises in the aerial gunnery range. When there is apparent conflict between surface craft with attendant planes and planes operating under the control of the Naval Test Center, Patuxent River, Maryland, planes from the Naval Test Center are expected to keep clear.

(vi) Nothing in this section shall prevent oystering or the setting of fishing structures within the range outside the target areas in accordance with approved Federal and State regulations: Provided, that no permanent or semipermanent fishing structures or oyster ground marker shall be placed on the western side of Chesapeake Bay between Point No Point and Cedar Point, without prior written approval of the Commanding Officer, U.S. Naval Air Station, Patuxent River, Maryland.

(vii) When operations are being conducted in the target areas, all projectiles, bombs, and other missiles will be released to fall within the areas, but naval authorities will not be responsible for damage by such missiles or by Naval or Coast Guard vessels to fishing structures or fishing equipment which may be located adjacent to the target areas.

(b) Target areas—(1) Prohibited areas. (i) A circular area with a radius of 400 yards having its center at latitude 38°16′54″, longitude 76°22′00″ (bearing approximately 176° true, 1,870 yards from Cedar Point Light).

(ii) A circular area with a radius of 600 yards having its center at latitude 38°13′00″, longitude 76°19′00″ (bearing approximately 153° true, 11,130 yards from Cedar Point Light).

(2) Restricted area. A circular area with a radius of 600 yards having its center at latitude 38°02′18″, longitude 76°09′26″ (bearing approximately 237°50′ true, 7,000 yards from Holland Island Bar Light).

(3) The regulations. (i) Nonexplosive aerial projectiles will be dropped at infrequent intervals in the areas described in subparagraph (1) (i) and (ii) of this paragraph. The areas shall be closed to navigation at all times except for vessels engaged in operational and maintenance operations as directed by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Maryland. The areas will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the areas. Vessels which have inadvertently entered the danger zones upon being so warned shall leave the areas immediately.

(ii) Nonexplosive aerial projectiles will be dropped and aerial machine gun firing will be conducted in the area described in subparagraph (2) of this paragraph. Operations will be conducted throughout the year from sunrise to sunset daily and no vessel or other craft shall enter or remain in the area during daylight hours, except on prior written approval of the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md. The area will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the area. Vessels which have inadevertently entered the danger zone upon being so warned shall leave the area immediately.

(c) The regulations in this section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

§ 204.44 Chesapeake Bay, in vicinity of Tangier Island; Naval guided missiles test operations area—(a) The danger zone—(1) Prohibited area. A circle 1,000 yards in radius with its center at latitude 37°47′54″, longitude 76°03′48″.

(2) Restricted area. A circle three nautical miles in radius with its center at latitude 37°47′54″, longitude 76°03′48″, excluding the prohibited area.

(b) The regulations. (1) Vessels or other craft shall not enter or remain in the prohibited area at any time unless authorized to do so by the enforcing agency.

(2) Except as otherwise provided in subparagraph (6) of this paragraph, vessels or other craft shall not enter or remain in the restricted area when firing is or will soon be in progress unless authorized to do so by the enforcing agency.

(3) Advance notice will be given of the date on which the first firing is to be conducted and such notice will be published in "Notice to Mariners." Thereafter, the danger zone will be in use intermittently throughout the year and no further notice is contemplated that firing is continuing.

(4) Warning that firing is or will soon be in progress will be indicated by a red flag displayed from one of six dolphin platforms on the perimeter of the prohibited area, and by patrol vessels within the danger zone or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle. Surface or air search of the entire area will be made prior to the commence-

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ment of firing on each scheduled day. During periods of firing a patrol vessel will remain in the approaches to the restricted area and maintain continuous contact with the firing planes to warn when the area is not clear.

(5) Upon observing the warning flag or upon receiving a warning by any of the patrol vessels or aircraft, vessels or other craft shall immediately vacate the restricted area and remain outside the area until the conclusion of firing for the day.

(6) This section shall not deny traverse of portions of the restricted area by commercial craft proceeding in established steamer lanes, but when firing is or will soon be in progress all such craft shall proceed on their normal course through the area with all practicable speed.

(7) All projectiles, bombs and rockets will be fired to land within the prohibited area, and on or in the immediate vicinity of a target in the restricted area located adjacent to the west side of Tangier Island. The Department of the Navy will not be responsible for damages by such projectiles, bombs, or rockets to nets, traps, buoys, pots, fishpounds, stakes, or other equipment which may be located within the restricted area.

(8) The regulations of this section shall be enforced by the Commander, Naval Air Bases, Fifth Naval District, Norfolk, Virginia, and such agencies as he may designate.

§ 204.46 Chesapeake Bay, south of Tangier Island, Virginia; naval firing range—(a) The danger zone. Beginning at latitude 37°46'39'', longitude 75°57'43'', thence to latitude 37°43'42'', longitude 75°55'30''; thence to latitude 37°27'00'', longitude 76°02'48''; thence to latitude 37°27'00'', longitude 76°08'00''; thence to latitude 37°45'00'', longitude 76°09'48''; thence to latitude 37°45'00'', longitude 76°08'51''; and thence along the circumference of a circle of five nautical miles radius whose center is at latitude 37°47'54'', longitude 76°03'48'', to the point of beginning.

(b) The regulations. (1) Any vessel propelled by mechanical means or by sail at a speed greater than five knots may proceed through the danger zone to and from points without, but not from one point to another point within, the area, except when especially notified to the contrary.

(2) All vessels, other than naval craft, are forbidden to anchor within the danger zone except in cases of great emergency. All vessels anchoring under circumstances of great emergency within the area shall leave the area immediately after the emergency ceases or upon notification by the enforcing agency.

(3) Fishing, oystering, clamming, crabbing, and other aquatic activities are forbidden within the limits of the danger zone, except that existing fishing structures licensed by the State of Virginia may be maintained and operated; Provided, The owners thereof obtain written permits from the enforcing agency designated in subparagraph (5) of this paragraph.

(4) Day and night firing over the range will be conducted intermittently by one or more vessels, depending on weather and operating schedules. When firing is in progress, adequate patrol by naval craft will be conducted to prevent vessels from entering or remaining within the danger zone.

(5) This section shall be enforced by the Commandant, Fifth Naval District, U.S. Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§ 204.48 Atlantic Ocean and connecting waters in vicinity of Myrtle Island, Va.; Air Force practice bombing, rocket firing, and gunnery range—(a) The danger zone. The waters of the Atlantic Ocean and connecting waters within an area described as follows: Beginning at latitude 37°12'18'', longitude 75°46'00''; thence southwesterly to latitude 37°08'21'', longitude 75°50'00''; thence northwesterly along the arc of a circle having a radius of three nautical miles and centered at latitude 37°11'16'', longitude 75°49'29'', to latitude 37°10'14'', longitude 75°52'57''; thence northeasterly to latitude 37°14'30'', longitude 75°48'32''; thence southeasterly to 37°13'38'', longitude 75°46'18''; and thence southeasterly to the point of beginning.

(b) The regulations. (1) No vessel shall enter or remain in the danger zone except during intervals specified and publicized from time to time in local newspapers or by radio announcement.

(2) This section shall be enforced by the Commanding General, Tactical Air Command, Langley Air Force Base, Virginia, and such agencies as he may designate.

§ 204.50 Chesapeake Bay off Fort Monroe, Va.; restricted area. U.S. Naval Base and Naval Ordnance Laboratory—(a) The danger zone. Beginning at latitude 37°00'30'', longitude 76°18'05''; thence to latitude 37°00'38'', longitude 76°17'42''; thence to latitude 37°01'00'', longitude 76°17'15''; thence to latitude 37°01'00', longitude 76°16'11''; thence to latitude 36°59'43'', longitude 76°16'11''; thence to latitude 36°59°18'', longitude 76°17'52''; thence to latitude 37°00'05'', longitude 76°18'17''; and thence north along the seawall to the point of beginning.

(b) The regulations. (1) Anchoring, trawling, fishing, and dragging are prohibited in the danger zone, and no object, either attached to a vessel or otherwise, shall be placed on or near the bottom.

(2) This section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§ 204.51 Chesapeake Bay, Lynnhaven Roads; danger zones, U.S. Naval Amphibious Base—(a) Underwater demolitions area (prohibited)—(1) The area. A portion of the restricted area for Navy amphibious training operations described in § 207.157, along the south shore of Chesapeake Bay, bounded as follows: Beginning at a point on the mean low-water line at longitude 76°08'59''; thence 200 yards to latitude 36°55'36'', longitude 76°08'57''; thence 400 yards to latitude 36°55'34'', longitude 76°08'43''; thence 200 yards to a point on the mean low-

water line at longitude 76°08′45″; and thence approximately 400 yards along the mean low-water line to the point of beginning. The area will be marked by range poles set on shore on the prolongation of the lines forming its eastern and western boundaries.

(2) The regulations. Vessels other than those owned and operated by the United States shall not enter the prohibited area at any time unless authorized to do so by the enforcing agency.

(b) Small-arms firing range—(1) The area. Beginning at a point on the mean low-water line at longitude 76°08′32″; thence 4,360 yards to latitude 36°57′26″, longitude 76°07′33″; thence 905 yards to latitude 36°57′17″, longitude 76°07′01″; thence 4,430 yards to a point on the mean low-water line at longitude 76°08′21″; thence along the mean low-water line to the point of beginning.

(2) The regulations. (i) Passage of vessels through the area will not be prohibited at any time, nor will commercial fishermen be prohibited from working fish nets within the area. No loitering or anchoring for other purposes will be permitted.

(ii) A large red warning flag will be flown on shore during periods when firing is in progress. Observers will be on duty and firing will be suspended for the passage of vessels and for the placing and maintenance of fish nets within the area.

(c) This section shall be enforced by the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Virginia.

PART 207—NAVIGATION REGULATIONS:

§ 207.70 Channel of Tuckerton Creek, N.J.; navigation. (a) Power boats or other vessels propelled by machinery shall not proceed at any time within the limits of these waters at a greater speed than 8 statute miles per hour.

§ 207.80 Channel of Christina River, Del.; navigation. (a) That vessels of over 20 tons capacity, propelled by machinery, shall not proceed at any time within the limits of these water at a greater speed than 8 statute miles per hour.

§ 207.90 Delaware River, Pa.; use of Government landing pier at Marcus Hook. (a) This wharf must not be used for storage of material. A clear, unobstructed passageway not less than 14 feet wide must be left at the wharf approach.

(b) The dragging of any heavy articles over or along the wharf is not allowed, nor the dragging of one end of a log or timber the other end of which is carried on trucks.

(c) No load exceeding 1½ tons, exclusive of wagon and team, is allowed to cross the bridge without permission of the officer in charge.

(d) Anyone violating paragraphs (a) to (c) of this section or committing any other acts of carelessness or violence which result in injuring the wharf will be reported to the United States district attorney for prosecution as provided by law.

§ 207.100 Inland waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal); use, administration, and navigation. These regulations are given in the discussion of the canal in Chapter 7 of this Coast Pilot.

§ 207.105 Delaware Bay off Cape Henlopen, Del.; naval restricted area—(a) The area. Beginning at a point on the south shore of Delaware Bay at longitude 75°06′12″; thence to latitude 38°47′25″, longitude 75°06′20″; thence to latitude 38°47′48″, longitude 75°06′00″; thence to latitude 38°50′43″, longitude 75°02′11″; thence to latitude 38°49′16″, longitude 74°59′35″; thence to a point on the shore at latitude 38°46′09″; thence northwesterly and southwesterly along the shore at Cape Henlopen to the point of beginning.

(b) The regulations. (1) Anchoring, trawl fishing, crabbing, dragging, grappling, and towing with hawser on bottom are prohibited in the area and no object attached to a vessel shall be placed on or near the bottom.

(2) This section does not apply to anchored floating navigational aids or to placement or removal of such aids by the Coast Guard.

(3) This section does not apply to vessels engaged in commercial or pleasure boat fishing provided anchors, trawls, and ground tackle are not used.

(4) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

§ 207.109 Chesapeake Bay opposite the mouth of Middle River, Md.; seaplane restricted area—(a) The restricted area. A rectangular area in Chesapeake Bay beginning at a point at latitude 39°15′35″, longitude 76°16′58″; thence to latitude 39°15′40″, longitude 76°16′53″; thence to latitude 39°17′19″, longitude 76°20′46″; thence to latitude 39°17′14″, longitude 76°20′51″; and thence to the point of beginning.

(b) The regulations. (1) No vessels, other than those specifically authorized, shall enter or remain in the restricted area when seaplane operations are in progress. At all other times vessels may use the area without restriction.

(2) Upon being warned by patrol craft, vessels shall immediately vacate the area and remain outside the area during the period of use. Patrol of the area will be accomplished by the user of the area.

(3) The area will be properly buoyed around its perimeter, when seaplane operations are being conducted, during all hours of the day or night.

(4) Seaplane operations will not be conducted in the restricted area on weekends when a regatta is scheduled

to be held in the area, provided that notice of such regattas appears in the "Local Notice to Mariners", published by the U.S. Coast Guard.

(5) Operations and activities of the U.S. Army Ordnance, Aberdeen Proving Ground, Maryland, in or near the area shall have priority and take precedence over any operations and activities involving the testing of seaplanes being built for the U.S. Government.

(6) The Department of the Army will not be held liable for any damages suffered by the user of the restricted area as a result of Aberdeen Proving Ground's activities in or near the area.

(7) The described restricted area shall be used only for the testing of seaplanes being built for the U.S. Government.

(8) The regulations in this section shall be enforced by the Commander, Fifth Coast Guard District, and such agencies as he may designate.

§ 207.110 Magothy River, Md.; speed. No boat shall at any time proceed at a greater speed than eight statute miles per hour in that portion of the Magothy River between Gibson Island Beach and a line extending due north from the most northerly part of Holland Point and crossing the Magothy Narrows.

§ 207.115 Chesapeake Bay near Annapolis, Md.; seaplane restricted areas—(a) The areas—(1) North area. The waters of Chesapeake Bay bounded as follows: Beginning at the southernmost tip of Greenbury Point; thence southerly to Greenbury Point Shoal Light; thence 90° true to longitude 76°25′; thence due north to an east-west line tangent to Hackett Point; thence 270° true along said east-west line to the shore at the Naval Radio Station; and thence southerly along the shore to the point of beginning.

(2) South area. The waters of Chesapeake Bay bounded as follows: Beginning at the easternmost tip of Tolly Point; thence southeasterly to Tolly Point Shoal Lighted Bell Buoy 33; thence 180° true to an east-west line passing through the southeasternmost tip of Thomas Point; thence 270° true along said east-west line to Thomas Point; and thence northeasterly to the point of beginning.

(b) The regulations. (1) Only one of the areas will be used for practice landings during any period. The north area will normally be used except when firing practice is being conducted at the Naval Academy Rifle Range. Such firing practice is generally conducted during the summer months, and at such times the south area will be used for practice landings.

(2) Within the area selected for practice landings, such operations will be confined during any period to a landing strip one mile long and one-fourth mile wide. This landing strip will be laid out, so far as the wind direction will permit, in such manner as to cause the least possible interference with commercial fishing and navigation, and will be patrolled during practice landings.

(3) Vessels will be permitted to pass through either area, including the landing strip, at any time, but they shall give seaplanes using the landing strip the right-of-way. Vessels shall not moor or anchor or otherwise delay their progress within the landing strip when informed by naval personnel assigned to patrol the landing strip that it is in use.

(4) Fixed fishing nets supported on stakes in accordance with Department of the Army regulations governing such structures may be placed in the areas without restriction. Unattended anchored or buoyed nets or other apparatus used for the purpose of taking sea food, except fixed fishing nets supported on stakes, may be placed in or permitted to enter the areas but only at the owners' risk, and the United States shall not be liable for any accidental damage thereto resulting from seaplane operations.

(5) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, United States Naval Academy, Annapolis, Maryland, and such agencies as he may designate.

§ 207.116 Severn River at Annapolis, Md.; experimental test area, U.S. Naval Engineering Experiment Station—(a) The restricted area. The water of Severn River shoreward of a line beginning at the southeasternmost corner of the U.S. Naval Engineering Experiment Station sea wall and running thence southwesterly perpendicular to the main Severn River channel, approximately 560 feet, thence northwesterly parallel to and 50 feet shoreward of the edge of the channel, 1,035 feet, and thence northeasterly perpendicular to the channel, approximately 600 feet, to the shore. Spar buoys will mark the corners of the area adjacent to the channel.

(b) The regulations. (1) No vessel other than specifically authorized military and naval vessels shall enter or remain in the area during its use for experimental purposes. At all other times vessels may use the area without restriction.

(2) The area will be in use intermittently, and this use will be signified by the presence of white-painted boats or floats, which will be lighted at night.

(3) Upon observing the boats or floats referred to in subparagraph (2) of this paragraph, or upon being warned, vessels shall immediately vacate the area and remain outside the area during the period of use.

(4) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, and such agencies as he may designate.

§ 207.120 South River, Md., and its tributaries; speed. No boat shall at any time between May 1 and September 15, inclusive, proceed at a greater speed than eight statute miles per hour in that portion of the South River above the Maryland State Roads Commission bridge at Edgewater, Maryland, or in the tributaries emptying therein, including Warehouse, Gingerville, Beards, and Broad Creeks.

§ 207.125 Patuxent River, Md.; restricted areas, Naval Air Test Center, Patuxent River, Md. (a) Except in the gut off the tip of Point Patience, no craft shall approach closer than 75 yards to the beaches, shoreline, or piers of the area formerly occupied by the United States

Naval Mine Warfare Test Station, or of Naval Air Station property. Civilian craft shall not approach rafts, barges, and platforms closer than 100 yards.

(b) Diving tenders will exhibit two red conical shapes, arranged vertically, base to base, when underwater diving takes place from naval small craft. At such times civilian craft shall stay at least 200 yards clear of these vessels and proceed at a speed not greater than five knots when within 1,000 yards thereof.

(c) On occasions, seaplane landings and takeoffs will be practiced in the seadrome area north of the Naval Air Station, Patuxent River. This area includes those waters of the Patuxent River between Town Point and Hog Point shoreward of a line described as follows: Beginning at a point on the shore just west of Lewis Creek, bearing 161°30′ true, 2,000 yards, from Point Patience Light; thence to a point bearing 130° true, 1,850 yards, from Point Patience Light; thence to a point bearing 247°30′ true, 3,650 yards from Drum Point Light; thence to a point bearing 235° true, 2,060 yards, from Drum Point Light; thence to a point bearing 129° true, 700 yards, from Drum Point Light; thence to a point bearing 137° true, 1,060 yards, from Drum Point Light; and thence to a point on the shore west of Harper Creek entrance, bearing 158°30′ true, 1,900 yards, from Drum Point Light. Operations will be indicated by day by a square white flag with square blue center, and by night by one green light for operations in an easterly direction, or by two vertical green lights for operations in a westerly direction, all signals to be exhibited from Patuxent River Boathouse seawall at the Naval Air Test Center. In addition, crash boats will patrol the landing lanes during the operations, and by night float lights will mark the landing lanes. At such times as the above signals are exhibited the following restriction will apply to boating in the waters adjacent to the Naval Air Station in the area westward of Fishing Point: Boating will be confined to areas not less than 75 yards nor more than 500 yards from the beaches of the Air Center; will proceed across the seaplane operating area only in accordance with instructions from crash boats; will not enter the seaplane basins; and will not use the areas adjacent to seaplane basins (boats may cross entrances when no signal is exhibited).

(d) The regulations in this section shall be enforced by the Commanding Officer, Naval Air Station, Patuxent River, Maryland, and such agencies as he may designate.

§ 207.128 York River, Va.; naval prohibited and restricted areas—(a) The areas—(1) Naval mine service-testing area (prohibited). A rectangular area surrounding Piers 1 and 2, Naval Mine Depot, beginning at a point on the shore line at latitude 37°15′07″ N., longitude 76°32′18″ W.; thence to latitude 37°15′27″ N., longitude 76°31′48″ W.; thence to latitude 37°15′05″ N., longitude 76°31′27″ W.; thence to a point on the shore line at latitude 37°14′51″ W., longitude 76°31′50″ W.; and thence along the shore line to the point of beginning.

(2) Naval mine service-testing area (restricted). A rectangular area adjacent to the northeast boundary of the prohibited area described in subparagraph (1) of this paragraph, beginning at latitude 37°16′00″ N., longitude 76°32′29″ W.; thence to latitude 37°16′23″ N., longitude 76°32′00″ W.; thence to latitude 37°15′27″ N., longitude 76°30′54″ W.; thence to latitude 37°15′05″ N., longitude 76°31′27″ W.; thence to latitude 37°15′27″ N., longitude 76°31′48″ W.; thence to latitude 37°15′24″ N., longitude 76°31′52″ W.; and thence to the point of beginning.

(3) Naval mine-sweeping practice area (restricted). [Revoked]

(4) Naval drill mine field area (restricted). [Revoked]

(5) Naval anchorage area (restricted). Between Tue Marshes Light and Yorktown, beginning at latitude 37°14′57″, longitude 76°23′03.5″, thence to latitude 37°14′27″, longitude 76°23′03″; thence to latitude 37°13′54″, longitude 76°25′39″; thence to latitude 37°13′42.5″, longitude 76°27′40.5″; thence to latitude 37°14′11″, longitude 76°29′11.5″; thence to latitude 37°14′23″, longitude 76°29′11.5″; thence to latitude 37°14′22.5″, longitude 76°25′43.5″; and thence to the point of beginning including an Explosives-Handling Berth (Naval) partially within the limits of the naval anchorage covering a circular area of 600 yards radius with its center at latitude 37°13′56″ N., longitude 76°28′48″ W.

(b) The regulations. (1) All vessels other than naval craft are forbidden to enter the prohibited area described in paragraph (a)(1) of this section.

(2) Trawling, dragging, and net-fishing are prohibited, and no permanent obstructions may at any time be placed in the area described in paragraph (a)(2) of this section. Upon official notification, any vessel anchored in the area will be required to vacate the area during the actual mine-laying operation. Vessels entering the area during mine-laying operations by aircraft must proceed directly through the area without delay, except in case of emergency. Naval authorities are required to publish advance notice of mine-laying and/or retrieving operations scheduled to be carried on in the area, and during such published periods of operation, fishing or other aquatic activities are forbidden in the area. No vessel will be denied passage through the area at any time during either mine-laying or retrieving operations.

(3) [Revoked]

(4) [Revoked]

(5) [Revoked]

(6) The naval anchorage and Explosives-Handling Berth described in paragraph (a)(5) of this section are reserved for the exclusive use of naval vessels and except in cases of emergency no other vessel shall anchor therein without the permission of local naval authorities, obtained through the Captain of the Port, U.S. Coast Guard, Norfolk, Virginia. There shall be no restriction on the movement of vessels through the anchorage or the Explosives-Handling Berth.

(7) Vessels shall not be anchored within 300 yards of the perimeter of the Explosives-Handling Berth when that berth is occupied by a vessel handling explosives.

(8) The regulations of this section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§ 207.128a York River adjacent to Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia; restricted area—(a) The area. The waters of York River bounded as follows: Beginning at a point on shore at Cheatham Annex Depot at latitude 37°17′14″ N, longitude 76°35′38″ W; thence to a point offshore at latitude 37°-17′52″ N, longitude 76°35′20″ W; thence approximately parallel to the shore to a point at latitude 37°17′23″ N, longitude 76°34′39″ W; thence to the shore at latitude 37°16′58″ N, longitude 76°35′03″ W; and thence along the shore at Cheatham Annex Depot to the point of beginning.

(b) The regulations. (1) No loitering will be permitted within the area. Oystermen may work their own leaseholds or public bottom within the area, provided they obtain special permission from the Officer in Charge, Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia.

(2) The regulations in this section shall be enforced by the Officer in Charge, Cheatham Annex Depot, U.S. Naval Supply Center, Williamsburg, Virginia.

§ 207.130 York Spit Channel, Chesapeake Bay; navigation. The use of this channel shall be restricted to vessels and other watercraft passing up or down the bay, and no vessel or other watercraft shall cross the channel or enter it at any point other than at its ends and in the direction of its axis. Any vessel having entered the channel shall follow the course thereof for its entire length.

§ 207.140 Thimble Shoal Channel, Chesapeake Bay; navigation. (a) The use of this channel shall be restricted to vessels, tows, and other watercraft drawing 20 feet or more at the time of navigating the channel: Provided, That this restriction shall not apply to passenger-carrying vessels.

(b) Watercraft permitted to use the channel under paragraph (a) of this section shall proceed through at a reasonable speed so as not to endanger other vessels or interfere with any work in connection with maintaining, surveying, or buoying the channel. Vessels shall not anchor in the channel except in cases of emergency, such as fog or accident, which would render progress unsafe or impossible.

(c) This section shall not be construed as prohibiting necessary use of the channel by Government boats while on Government duty, or its use in emergencies by pilot boats, whether steam or sail, or by police boats.

§ 207.152 James River off the entrance to Skiffes Creek, Va.; Army smallcraft testing area—(a) The restricted area. Beginning at latitude 37°10′00″, longitude 76°37′28″; thence to latitude 37°09′13″, longitude 76°37′-48″; thence to latitude 37°09′13″, longitude 76°38′08″; thence to latitude 37°10′00″, longitude 76°37′55″; and thence to the point of beginning.

(b) The regulations. (1) No vessels other than Department of the Army vessels shall enter the restricted area except as provided in subparagraph (2) of this paragraph.

(2) Nothing in this section shall prevent the setting of fish traps within the restricted area under regulations of the Department of the Army, nor will the passage of fishing vessels to and from authorized traps be unreasonably interfered with or restricted.

(3) Vessels anchored in the area shall be so anchored as not to obstruct the arc of visibility of Deep Water Shoals Light.

(4) This section shall be enforced by the Commanding General, Fort Eustis, Virginia, and such agencies as he may designate.

§ 207.153 Elizabeth River, Southern Branch, Va., naval restricted areas—(a) The areas—(1) St. Helena Annex Area. Beginning at a point at St. Helena Annex of the Norfolk Naval Shipyard, on the eastern shore of Southern Branch of Elizabeth River, at latitude 36°49′43″, longitude 76°17′26.5″; thence in a southwesterly direction to a point on the eastern boundary of Norfolk Harbor 40-foot channel at latitude 36°49′42″, longitude 76°17′33″; thence in a southerly direction along the eastern boundary of Norfolk Harbor 40-foot channel to latitude 36°49′28″, longitude 76°17′27″; thence easterly to the shore at latitude 36°49′28″, longitude 76°17′22″; and thence, northerly along the shore to the point of beginning.

(2) Norfolk Naval Shipyard Area. Beginning at a point on the shore at the northeast corner of the Norfolk Naval Shipyard, at latitude 36°49′43.5″, longitude 76°17′41.5″; thence due east approximately 100 feet to the western boundary of Norfolk Harbor 40-foot channel; thence in a southerly direction along the western boundary of the channel to latitude 36°48′58″, longitude 76°17′-34.5″; thence southwesterly to latitude 36°48′46″, longitude 76°17′43.5″; thence southeasterly to the western boundary of Norfolk Harbor 40-foot channel at the point where it passes through the draw of the Norfolk and Portsmouth Belt Line Railroad bridge; thence in a southwesterly direction along the northerly side of the bridge to the western shore of Southern Branch of Elizabeth River; and thence along the shore in a northerly direction to the point of beginning.

(3) Southgate Terminal Area. Beginning at a point at the northeast corner of Southgate Terminal Annex of Norfolk Naval Shipyard, at latitude 36°48′23″, longitude 76°17′39″; thence east to latitude 36°48′23″, longitude 76°17′29″; thence southerly along the western boundary of Norfolk Harbor 35-foot channel to latitude 36°48′04″, longitude 76°17′33″; thence west to latitude 36°48′04″, longitude 76°17′41″; and thence along the shore in a northerly direction to the point of beginning.

(b) The regulations. (1) No loitering within the areas will be permitted.

(2) This section shall be enforced by the Commander, Norfolk Naval Shipyard, Portsmouth, Virginia.

§ 207.154 Southern Branch of Elizabeth River; speed. In that part of the Southern Branch of Elizabeth River between the junction of the Southern and Eastern Branches of the Elizabeth River and the Norfolk and

Portsmouth Belt Line Railroad Bridge, no vessel shall move at a speed exceeding six knots.

§ 207.155 Hampton Roads off Norfolk Naval Base; Navy restricted areas. (a) The areas. (1) Beginning at a point on the Naval Base shore at latitude 36°56′37.5″, longitude 76°19′44″; thence westerly and northerly along the breakwater to its extremity at a point at latitude 36°56′41.5″, longitude 76°19′54″; thence westerly to latitude 36°56′41.5″, longitude 76°20′05.5″; thence northerly along the eastern limit of Norfolk Harbor Channel to latitude 36°57′52″, longitude 76°20′00″; thence easterly to latitude 36°57′52″, longitude 76°19′35″; thence to latitude 36°57′47.7″, longitude 76°18′57″; and thence southerly to a point on shore at latitude 36°57′21.5″, longitude 76°19′04″.

(2) Beginning at a point on the shore at the Destroyer-Submarine Base (Naval Base) at latitude 36°56′00″, longitude 76°19′30″; thence westerly to latitude 36°-55′59″, longitude 76°20′08.5″; thence northerly along the eastern limit of Norfolk Harbor Channel to latitude 36°56′17.5″, longitude 76°20′07″; and thence easterly to a point on shore at latitude 36°56′19″, longitude 76°19′46.5″.

(b) The regulations. (1) No vessels other than Naval vessels and other vessels authorized to move to and from piers at the Norfolk Naval Base shall enter the restricted areas.

(2) This section shall be enforced by the Commandant Fifth Naval District, and such agencies as he may designate.

§ 207.156 Hampton Roads and Willoughby Bay, Norfolk, Va.; seaplane restricted and prohibited areas—(a) The areas—(1) The restricted area. Beginning on the shore of Willoughby Bay at latitude 36°57′22″, longitude 76°18′02.7″; thence to latitude 36°57′29″, longitude 76°-19′01″; thence to latitude 36°58′41.5″, longitude 76°-18′42″; thence to latitude 36°58′37.5″, longitude 76°-18′16″; thence to latitude 36°58′01″, longitude 76°18′23″; thence to latitude 36°57′48″, longitude 76°18′-07.5″; thence to latitude 36°57′45.5″, longitude 76°17′-58.5″; thence to latitude 36°57′35″, longitude 76°17′08″; thence to latitude 36°57′43″, longitude 76°16′54″; thence to latitude 36°57′42″, longitude 76°16′21.5″, and thence conforming to the shore line to the point of beginning.

(2) The prohibited area. Beginning on the shore of Willoughby Bay at latitude 36°57′22″, longitude 76°18′-02.7″; thence to latitude 36°57′47.7″, longitude 76°-18′57″; thence to latitude 36°57′57.3″, longitude 76°18′-54″; thence to latitude 36°57′22.7″, longitude 76°16′23.8″; thence conforming to the shore line to the point of beginning.

(b) The regulations. (1) No vessel shall enter or remain in the prohibited area, except on prior permission granted by the Commanding Officer, Naval Air Station, Norfolk, Virginia.

(2) Vessels shall not moor or anchor within the restricted area. All vessels moving in the restricted area shall immediately proceed from the area on the approach of seaplanes or when warned by a patrol boat or any other means of warning which may be employed.

(3) Fishing, oystering, clamming, crabbing, and other aquatic activities are prohibited within the areas.

(4) The regulations in this section shall be enforced by the Commandant, Fifth Naval District, Norfolk, Virginia, and such agencies as he may designate.

§ 207.157 Chesapeake Bay, Lynnhaven Roads; Navy amphibious training area—(a) The restricted area. Beginning at latitude 36°55′47″, longitude 76°11′04.5″; thence to latitude 36°59′04″, longitude 76°10′11″; thence to latitude 36°58′28.5″, longitude 76°07′54″; thence to latitude 36°55′27.5″, longitude 76°08′42″; thence westerly along the shore and across the mouth of Little Creek to the point of beginning.

(b) The regulations. (1) No fishpound stakes or structures shall be allowed in the restricted area.

(2) No vessel shall approach within 300 yards of any naval vessel or within 600 yards of any vessel displaying the red "baker" burgee.

(3) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

§ 207.157a Little Creek, Va.; speed. No vessel shall proceed at a speed exceeding five knots in that part of Fishermans Cove (Northwest Branch of Little Creek) between the highway bridge on U.S. Route 60 and the mouth of the Cove.

§ 207.158 Chesapeake Bay entrance; naval restricted area—(a) The area. Beginning at a point on the south shore of Chesapeake Bay at longitude 76°03′06″; thence to latitude 37°01′18″, longitude 76°02′06″; thence to latitude 37°00′18″, longitude 75°55′54″; thence to latitude 36°58′00″, longitude 75°48′24″; thence to latitude 36°-51′48″, longitude 75°51′00″; thence to the shore at longitude 75°58′48″, and thence northwesterly and southwesterly along the shore at Cape Henry to the point of beginning.

(b) The regulations. (1) Anchoring, trawling, crabbing, fishing, and dragging in the area are prohibited, and no object attached to a vessel or otherwise shall be placed on or near the bottom.

(2) This section shall be enforced by Officer in Charge, Harbor Defense Unit, Norfolk, Virginia.

§ 207.900 Restricted areas in vicinity of Maritime Administration Reserve Fleets. (a) The regulations in this section shall govern the use and navigation of waters in the vicinity of the following National Defense Reserve Fleets of the Maritime Administration, Department of Commerce:

(1) Hudson River Reserve Fleet, Jones Point, New York.

(2) James River Reserve Fleet, Fort Eustis, Virginia.

(3) Wilmington Reserve Fleet, Brunswick River near Wilmington, North Carolina.

(4) Mobile Reserve Fleet, Tensaw River near Bay Minette, Alabama.

(5) Beaumont Reserve Fleet, Neches River near Beaumont, Texas.

(6) Suisun Bay Reserve Fleet near Benicia, California.

(7) Astoria Reserve Fleet, Cathlamet Bay near John Day Point, Oregon.

(8) Olympia Reserve Fleet, Budd Inlet at Olympia, Washington.

(b) No vessels or other watercraft, except those owned or controlled by the United States Government, shall cruise or anchor between Reserve Fleet units, within 500 feet of the end vessels in each Reserve Fleet unit, or within 500 feet of the extreme units of the fleets, unless specific permission to do so has first been granted in each case by the enforcing agency.

(c) The regulations in this section shall be enforced by the respective Fleet Superintendents and such agencies as they may designate.

3. SANDY HOOK TO CAPE HENRY

Between New York Bay and Delaware Bay is the New Jersey coast with its many resorts, its inlets, and its Intracoastal Waterway. Delaware Bay is the approach to Wilmington, Philadelphia, and Trenton; below Wilmington is the Delaware River entrance to the Chesapeake and Delaware Canal, the deep inside link between the two great bays. The Delaware-Maryland-Virginia coast has relatively few resorts; the numerous inlets are backed by a shallow inside passage that extends all the way from Delaware Bay to Chesapeake Bay. The last seven chapters, nearly half of this book, are required to describe Chesapeake Bay to Norfolk and Newport News, to Washington and Baltimore, and to Susquehanna River 168 miles north of the Virginia Capes.

A vessel approaching this coast from seaward will be be made aware of its nearness by the number of vessels passing up and down in the coastal trade. The coast of New Jersey is studded with large hotels, prominent standpipes, and elevated tanks. South of Delaware Bay, the principal landmarks are the lighthouses and Coast Guard stations.

The general tendency along this mostly sandy coast is for the ocean beaches and the points on the north sides of the entrances to wash away and for the points on the south sides of the entrances to build out. Protective works have done much to stabilize the New Jersey coast, but several lighthouses have been abandoned between Delaware Bay and Chesapeake Bay because of erosion.

The shores of Delaware Bay and Delaware River are mostly low and have few conspicuous marks, other than lights, below the industrial centers along the river. The shores of Chesapeake Bay are low as far north as Patuxent River, then rise to considerable heights at the head of the bay.

Boundary lines of inland waters.—At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described, **Inland Pilot Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Pilot Rules** apply outside the aids. Specific lines are described in **Part 82,** Chapter 2.

Control over movement of vessels.—See **Part 124,** Chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.

Channels.—The channels into Delaware and Chesapeake Bays are broad and deep. The entrances to the inlets are comparatively shallow and are more or less obstructed by shifting sandbars. Some of the inlets have been improved by dredging and by the construction of jetties. On many of the bars the buoys are moved from time to time to mark the shifting channels. The best time to enter most of the inlets is on a rising tide with a smooth sea.

Anchorages.—Delaware Breakwater, with depths of 15 to 70 feet, is the only protected anchorage between New York Bay and Chesapeake Bay suitable for vessels of all classes. Absecon Inlet, Cape May Inlet, and some of the others can accommodate light-draft vessels such as trawlers and small yachts, but not medium or deep drafts. Small local craft often seek shelter inside the shallower inlets, but entrance is difficult in heavy weather, and the unimproved inlets are often difficult even in good weather, particularly for strangers.

Dangers.—The principal dangers along this coast are the outlying sand shoals, the fogs, and the doubtful direction and velocity of the currents after heavy gales. Depths of 7 fathoms are found as far as 13 miles from shore. There are many wrecks along this coast, but most of them have been blasted off or cleared to safe navigational depths; the others are marked by obstruction buoys.

Gales from northeast to southeast cause heavy breakers on the beaches and outlying shoals; the sea breaks in 4 to 5 fathoms of water, and shoals of that depth or less usually are marked during easterly gales. The bars across the inlets are then impassable and are defined by breakers even in comparatively smooth water with a light swell. The heaviest surf on the beach is on a rising tide near high water springs; the least surf is encountered on a falling tide near low water. A very heavy surf makes on the beaches after a southeasterly gale followed by a sudden shift of wind to northwest.

Fishweirs are numerous along the outside coast and in Chesapeake Bay and tributaries. The stakes often become broken off and form a hazard to navigation, especially at night. Regulations limiting the areas within which fishweirs may be established have been prescribed by the Chief of Engineers, United States Army. The areas within which fishweirs are permitted are shown on the 1200-series charts, and where no such chart covers the area, they are shown on the next larger scale. The exact locations of the weirs within the designated areas are not shown.

Along the outer coasts the limits of fishweir areas are not marked. In Chesapeake Bay and tributaries, black and white horizontal-banded buoys mark the turns of the limits. Strangers should proceed with caution, when crossing areas of possible fishweirs, and should avoid crossing such areas at night.

Tides.—The mean range of tide is 3.5 to 4.5 feet along the coast. In passages away from the inlets, the range may be as little as 0.5 foot. In Delaware River the mean range reaches 6.8 feet at Trenton, while in Chesapeake Bay the mean range is only 1 foot at Baltimore.

Currents.—Rotary currents and Gulf Stream currents could be discussed at considerable length, but the important currents are those in the inlets and the inside

passages; the tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind.

WEATHER.—The Appendix includes climatological tables for 10 Atlantic coast places and a table of fog-signal operation. Also listed are Weather Bureau offices, storm warning stations, and radio stations which transmit weather information.

General.—The area covered in this Coast Pilot is generally low and flat. Long stretches of sandy beaches and tidewater marshes characterize the New Jersey, Delaware, and Maryland ocean coasts. The eastern shore of Chesapeake Bay consists of low, flat, almost featureless plains, with numerous irregularities and small islands. The western shore is a gently rolling upland. Tidewater Virginia encompasses numerous flat peninsulas, wide estuaries, and many swamps. Topography farther inland rises in an irregular pattern of progressively higher northeast-southwest mountain ranges to the main Appalachian Mountains. Although some distance from the ocean, this mountain barrier exerts an important influence on the winter climatic pattern in the coastal area; it partly blocks the cold continental air from the interior, and this combines with the moderating effect of the ocean to produce a more equable climate than is found in continental locations in the same latitudes elsewhere.

The general surface wind pattern along the Atlantic coast is controlled largely by the position and intensity of the Bermuda-Azores high-pressure system. The characteristics and location of this extensive High vary considerably during the year. In the winter, it usually is centered far to the southeast. The major low-pressure storm systems, which develop over the interior, the Gulf of Mexico, and off the southeastern coast, may sweep through the Middle Atlantic States. These extratropical cyclones usually travel between north and east-northeast, and many are intense and severe, accompanied by strong gusty winds and rain or snow.

Highs from the interior usually follow the passage of these Lows, producing a pattern of rapidly changing air masses and variable winter weather conditions. There are marked temperature fluctuations and an alternation of brief stormy periods with clear crisp days and relatively mild weather.

In the spring, the Bermuda-Azores High, although still centered far to the southeast, begins to affect the southeastern States. The Middle Atlantic area usually is located outside the high-pressure circulation, however, and is still subject to the passage of extratropical cyclones, frontal activity, and changing air masses. Warm spells, sometimes with abundant rain, alternate with cool, dry weather.

In the summer, the Bermuda-Azores High reaches its most northerly and westerly position, embracing the entire eastern seaboard within its circulation. The strength of this circulation is moderate put persistent, sufficiently so to hold back the eastward movement of the continental low-pressure system. As a consequence, the daily weather along the coast may not change much for several weeks at a time; it is controlled by the southerly and southwesterly winds bringing moist, warm air from the Gulf. This weather is characterized by frequent instability showers and thunderstorms, uniformally warm temperatures and high humidity, and relatively low wind speeds. However, the summer months also include the beginning of the hurricane season.

In the autumn, the Bermuda-Azores High again shifts southward and eastward, leaving the Atlantic coast in a weak continental high-pressure area. This gradually gives way to the winter weather pattern, bringing increased frontal activity and more frequent passage of cyclones and anticyclones.

Pressure.—The pressure pattern changes considerably from summer to winter. At individual stations along the coast, however, the differences of mean annual pressure are quite small. The highest monthly mean pressure occurs during the winter and the lowest in late spring and early summer. Large short-term variations of pressure are occasionally experienced during tropical cyclones in the late summer and autumn, and during the movement of extratropical cyclones and anticyclones in the winter and spring. The day-to-day changes of pressure in summer are less marked, and average lower than in winter.

Winds.—Prevailing winds at most stations are from northwest during the cooler months, October through March, and from the southwest, May through September. The average wind speeds during the warmer months are generally lower than during the colder seasons, because of the absence of extratropical cyclones. Highest average speeds occur in March and lowest in August.

In the winter, the winds over the open ocean are slightly stronger than those over land. Little difference is apparent in summer. In the warmer season, a daily shift in wind direction occurs when the region is not under the influence of cyclonic storms. During the warmer part of the day winds blow onshore, and during the cooler part, offshore. This land-sea breeze seldom penetrates more than a few miles inland.

Gales (force 8 or higher) are reported in about 10 percent of ships' observations in winter. Gales are generally from the westerly quadrants. Summer gales are rare, but may be encountered during tropical cyclones or local thunderstorms.

Temperatures.—Temperatures along the Middle Atlantic coast are generally moderate. Mean annual temperatures range from 53.4° F. at New York to 59.2° F. at Norfolk. The lowest mean monthly temperature is 32.6° F. at Trenton in January; the highest 78.5° F. at Baltimore in July. January is the coldest month and July the warmest. Over the open water areas, January mean air temperatures may be several degrees warmer than at coastal points, and in July they may be a few degrees cooler. Over land surfaces, the air warms and cools readily, but over water it does so slowly and relatively little. Land surfaces absorb heat in only a thin surface layer and give it up freely, while water absorbs heat to substantial depths and retains it longer.

The daily temperature range averages from 10° to 20° F. throughout the year, and is generally much less over the

water. Readings in the coastal areas rarely exceed 100° F. and the 90° level is reached on only one-third to one-half of the days during summer. Freezing temperatures are probable on one-half or more of the days from November through March, except from Maryland southward where the average is about one in three. Below-zero readings have been recorded during December, January, and February at most stations, except Norfolk where no reading below 2° F. has ever been observed.

Sea-surface temperatures are warmer than air temperatures most of the time, ranging from 4° to 7° F. warmer in winter to about the same temperature in the spring.

Relative humidity.—Relative humidity is high throughout the year, averaging from 68 to 88 percent at 1 a.m. and from 49 to 72 percent at 1 p.m. Humidities usually are higher with onshore winds (blowing from sea toward land) and lower with offshore winds (blowing from land toward sea).

Cloudiness and precipitation.—At sea in winter, overcast conditions (cloud amount 0.8 or more) are recorded in 45 to 50 percent of observations, while clear conditions (0.2 or less) are recorded in about 30 percent. In summer, some 30 to 35 percent of observations show overcast and an equal percent, clear skies. The least cloudiness occurs when the air is dominated by the Bermuda-Azores High in late summer and early autumn, and the greatest cloudiness during the frequent winter cyclones. Overcast ranges from about 40 to 50 percent in winter to about 30 to 36 percent in summer.

Precipitation over the coastal sections is moderately heavy and well distributed. Normal monthly totals vary from 2½ or 3 inches in October to 4 or 6 inches in July or August, and the annual totals between 40 and 45 inches. Summer thunderstorms are most frequent over land and near coastal waters in the afternoon; at night they are more frequent over open water. Thunderstorm rainfall is less intense over the ocean, but can severely restrict visibility. Snow may be expected from November through March, maximum fall being in January and February. Snow usually does not remain on the ground for extended periods. On rare occasions, freezing rain, or glaze, is encountered; if prolonged, it can cause damage to rigging. Snow at sea is little more than a severe restriction to visibility.

Visibility.—Although generally good along these coastal States, visibility at any time can be hampered by smoke, haze, fog, and precipitation. The frequency of days with visibility less than 500 yards is 4 to 12 percent annually, mostly during the winter. Over the ocean areas, the percentage frequency of days with visibility less than 5 miles ranges from 5 to 15 percent in the southerly sections to around 20 to 30 percent in the northerly. Advection sea fog occasionally drifts onshore in the warmer months, burning off from the surface and usually lifting by afternoon. This process is reversed over the water area where fog usually dissipates from the top downward. Very shallow steam fog is sometimes experienced in the winter. This fog type, which occurs only in very cold weather when the air is much colder than the water, may hide the hull of a ship while leaving the masts and upper rigging plainly visible.

Fog is more likely to form with light to moderate winds. The most frequent wind forces accompanying heavy sea fog are 2 to 4. Fog rarely forms or persists with gale force winds.

Tropical cyclones.—Hurricanes and tropical storms occur from June through November in the Middle Atlantic coast area. The centers of these storms generally move through this region on a northward or northeastward direction, either offshore or through the coastal area. As a general rule, tropical cyclones are much more violent than extratropical lows of the same season. Most tropical cyclones begin to acquire extratropical characteristics in this region, so that although the maximum winds near the center may be lower than in more southerly latitudes, the area covered by gale winds may be larger. Considerable damage has been caused to shore property from high tides and winds and to vessels off the coast.

HURRICANES.—Severe tropical cyclones of the North Atlantic Ocean are ordinarily referred to as West Indian Hurricanes, though actually many of these storms form, move, and die far out from the mainland and hundreds of miles from the West Indies. As a general rule these storms move with the prevailing winds of the area. In small hurricanes the diameter of the area of destructive winds may not exceed 25 miles while in some of the greatest storms the diameter may be as much as 400 to 500 miles.

At the center is a comparative calm known as the "eye of the storm." The diameter of this "eye" varies with individual storms and may be as little as 7 miles but is rarely more than 30 miles. The average is 15 to 20 miles. This center is the region of low atmospheric pressure around which winds blow in a more or less circular course, spiraling inward in a counterclockwise direction. Winds at the outer edge of the storm area are light to moderate and gusty, and often increase toward the center to speeds too high for instrument recording. Although the air movement near the center of the hurricane is usually light and fitful, the seas in this area are in most cases very heavy and confused, rendered so by the violent shifting winds which surround it. Furthermore, after the center has passed a vessel, she may expect a sharp renewal of the gales, with winds from a more or less opposite direction. The fully developed tropical cyclone may affect an area covering tens of thousands of square miles.

Tropical cyclones occur over all the tropical oceans except the South Atlantic. They usually form in the tropical regions of the easterly trade winds. In the North Atlantic, hurricanes form over a wide range of ocean between the Cape Verde Islands and the Windward Islands, over the western part of the Caribbean Sea, and the Gulf of Mexico. While some may initially move northward, especially those that form southeast of Bermuda, the majority take a westerly to northwesterly course. Of these, some curve gradually northward, either

east of or above the larger islands of the West Indies, then turn northeastward or eastward for varying distances from the Atlantic coast of the United States. Others pass over or to the south of the larger islands and enter the Gulf of Mexico, then curve northward or northeastward and strike some part of the east Gulf coast. Others may continue westward and strike the west Gulf coast.

The most common path is curved, the storms moving generally in a westward direction at first, turning later to the northwestward and finally to the northeastward. A considerable number, however, remain in low latitudes and do not turn appreciably to the northward. Freak movements are not uncommon, and there have been storms that described loops, hairpin-curved paths, and other irregular patterns. Movement toward the southeast is rare, and in any case of short duration. The entire Caribbean area, the Gulf of Mexico, the coastal regions bordering these bodies of water, and the Atlantic coast are subject to these storms during the hurricane season.

Tropical cyclones can be expected from May through November. However, the months of greatest frequency are August, September, and October, when hurricanes are most likely to be severe. During all of the season the chance of an intense storm developing is great enough to warrant careful watch of the weather elements in this area. The June hurricanes which form in the West Indian region usually move in a direction between west and north while they are south of 25° N. In late September, October, and November, hurricanes of this region are more likely to move in a direction between north and east, passing through the Yucatan Channel, or over Cuba, Florida, or the Bahamas. Of the hurricanes that come from the Atlantic into the West Indies, the majority occur in August and September. They generally move on a west-northwesterly course in low latitudes, some reaching the coast before curving toward the north and northeast. Late in the season, October or November, the movement of hurricanes that form east of the West Indies is often toward the north in the open Atlantic.

The average speed of movement of West Indian Hurricanes in the tropics is about 10 to 15 knots. This speed, however, varies considerably according to the location of the storm, its development, and attendant meteorological conditions. The highest rates of progression usually occur when the storm is moving northward or northeastward in the middle or higher latitudes.

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. In 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 is lacking, there is little cause for anticipating a hurricane.

As the storm center approaches, the barometer continues to fall. The wind increases in speed and blows in heavy squalls, and the changes in its direction become more rapid. When facing the wind, the observer will find that the wind, in general, will back to the left during this time if the center is moving toward his left, or veer to the right if moving toward his right. Rain in showers accompanies the squalls, and when the center comes closer the rain is usually continuous and is attended by furious gusts of wind. The air is thick with rain and spume drift. Objects at a short distance are often hardly visible. If a vessel is on the line of the hurricane's advance, the wind will remain from the same direction, or nearly so, until the center is close to the vessel, or upon her.

Distances of hurricane center.—The distance from the center of a hurricane can be estimated from a consideration of the height of the barometer and the rapidity of its fall, and the velocity of the wind and the rapidity of its changes in direction. If the barometer falls slowly and the wind increases gradually, it may reasonably be supposed that the center is at a considerable distance. With a rapidly falling barometer and increasing winds, it may reasonably be supposed that the center is approaching dangerously near, the more so if the winds blow closely from the direction of the increasing swell.

Bearings of center.—If an observer faces the wind, the storm center will likely be located 8 to 12 points to the right in the northern hemisphere. When the storm is distant it may be 10 to 12 points, and when the barometer has fallen 5 or 6 tenths of an inch it may be nearer 8 points.

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

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 such 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. 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 con-

tinue 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 will subside.

Practical rules.—When there are indications of a hurricane, vessels should remain in port or seek one if possible. Changes in barometer and wind should be carefully observed and recorded, and every precaution should be taken 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 sea room to maneuver so as to avoid the storm track, and should try to make a harbor, or to stand out of the straits to obtain sea room. Vessels unable to reach a port and having sea room to maneuver usually observe the following rules:

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

Ice.—The intracoastal passages of New Jersey, Delaware, and Maryland usually are closed by ice during ordinary winters; the Virginia passages are closed only during severe winters and then only for short periods. Local vessels use all the inlets and adjacent channels from Sandy Hook to Cape Charles all winter, even when through navigation is blocked.

In Delaware River, ice is present in sufficient amounts even in ordinary winters to be of some concern. The Chesapeake and Delaware Canal is kept open as long as possible but may be closed at times. In severe winters, navigation has been interrupted above Chester but ice breakers and large vessels keep the channels open to Philadelphia. Above Philadelphia, the river is closed for extended periods in January and February, and navigation is practically suspended during severe winters.

Ice seldom interferes with navigation of full-powered vessels in Hampton Roads even in severe winters. Large vessels can always pass up and down Chesapeake Bay, but ice jams are of frequent occurrence off Baltimore Harbor, and the harbor itself freezes over; Baltimore ice breakers attempt to keep the channels open but navigation is sometimes blocked for limited periods.

Conditions in other Chesapeake Bay tributaries are somewhat similar to those in the same latitudes along the coast. Ice is not much of a problem in the southerly tributaries, although Rappahannock River is said to freeze almost to the mouth in severe winters. The upper part of Potomac River is closed during severe winters, and Patuxent River is closed nearly to the mouth. Severn River, strangely enough, is said to remain open except for short periods in severe winters. Susquehanna River, at the head of the bay, usually is completely closed for about three months. Ice conditions in the Eastern Shore tributaries correspond roughly to those across the bay.

ROUTES.—Deep-draft vessels should stay outside the lightships except when entering Delaware Bay or Chesapeake Bay. Traffic is heavy along this coast and a sharp lookout must be kept to avoid collision.

Pilotage.—Pilot boats are stationed in the entrances to Delaware Bay and Chesapeake Bay. See Chapters 6, 9, and 15 for additional comment.

Towage.—Tugboats operate out of Philadelphia, Norfolk, and Baltimore and can be ordered to other ports. Arrangements for towage should be made by radio.

Supplies.—All kinds of supplies are available at the three big ports. Gasoline, diesel fuel, fresh water, ice, groceries, and some marine hardware are available at the smaller ports.

Repairs.—Hulls and machinery of medium to large vessels can be repaired at Chester, Philadelphia, Norfolk, Newport News, and Baltimore. Small vessels can be hauled out and repaired at many other places. Wrecking and salvage equipment is available at Philadelphia, Norfolk, and Baltimore.

Standard time.—The region covered by this Coast Pilot uses eastern standard time, which is 5 hours slow of Greenwich mean time. Example: When it is 10 a.m. at Greenwich it is 5 a.m. at Philadelphia.

Daylight saving time.—The clocks are advanced 1 hour on the last Sunday in April and are set back to standard time on the last Sunday in October in New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, and the Virginia shore of Potomac River from Washington to Quantico. The rest of tidewater Virginia does not use daylight saving time.

4. NEW JERSEY COAST

Charts 1215 to 1219.—The coast of New Jersey extends in a general southerly direction for 44 miles from Sandy Hook to Barnegat Inlet, then southwesterly for 66 miles to Cape May Point. From Sandy Hook to Atlantic City the 60-foot depth curve is 5 to 10 miles from shore; off Delaware Bay the distance has increased to 17 miles.

Deep-draft vessels should stand off the coast in depths of 60 feet or more between New York Bay and Delaware Bay. Light-draft vessels can follow the shore more closely if they pay strict attention to the charts for fishweir areas, shoals, wrecks, and other obstructions. Small craft should wait for favorable weather before attempting an outside run along this coast.

The principal shallow-draft entrances are Shark River Inlet, Manasquan Inlet, Barnegat Inlet, Absecon Inlet, and Cape May Inlet. There are several others that are unimproved. The inlets are, or may be, obstructed by shifting bars, and most require local knowledge to carry the best water. The best time to enter is on a rising tide with a smooth sea; passage is hazardous during easterly gales and heavy seas.

The greater part of the New Jersey coast is summer-resort area, and the numerous standpipes and elevated tanks are prominent from seaward. The New Jersey Intracoastal Waterway, an inside passage from Manasquan Inlet to Delaware Bay, is described in Chapter 5.

Chart 1215.—Low **Sandy Hook,** on the south side of the entrance to **New York Bay,** is the most northerly part of the New Jersey coast. **Sandy Hook Light (40°27.7′ N., 74°00.1′ W.),** 88 feet above the water, is shown from an 85-foot stone tower a mile from the north end of the point. The light was established in 1764 and is the oldest in continuous use in the United States.

Sandy Hook Coast Guard Station is 0.7 mile northwest of Sandy Hook Light and near the inner side of the point; see Appendix for **storm warning displays.** A light is shown from a skeleton tower on the inner shore 0.3 mile west of the Coast Guard station; a fog signal is sounded from a building near the outer beach 0.3 mile east of the station. A tall tower and a large standpipe near the Coast Guard station are the most prominent objects on the northern end of Sandy Hook.

Sandy Hook is a Government reservation, and landing is prohibited as far south, approximately, as the bridge over the mouth of Shrewsbury River. Vessels awaiting favorable weather for an outside run can anchor in Sandy Hook Bay south of a line bearing due west from Sandy Hook Light.

Sandy Hook Bay, Navesink River, and **Shrewsbury River** are described in United States Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

The **Highlands of Navesink,** on the northwest side of the approach to Navesink River, are the highest ground along the open Atlantic Coast between Maine and Florida. The 276-foot wooded ridge is 4 miles south of Sandy Hook Light and 0.5 mile back of the outer beach. Abandoned **Navesink Lighthouse** is in a cleared space on the easternmost spur at a ground elevation of 180 feet; the two 73-foot brownstone towers, the north octagonal and the south square, are connected by a dwelling. A **privately-maintained light,** 246 feet above the water, is now shown from the north tower.

There are several summer resorts between Sandy Hook and Shark River Inlet. **Sea Bright** is 6 miles south of Sandy Hook Light.

Shrewsbury Rocks, 7.3 miles south of Sandy Hook Light, extend 1.3 miles from shore and have a depth of 14 feet over them; the outer limits are marked by buoys. **Monmouth Beach Coast Guard Station** is at the shore end of the rocks; see Appendix for **storm warning displays.** For a considerable distance south of Shrewsbury Rocks the 30-foot depth curve is only 0.2 to 0.3 mile off the beach.

Long Branch, 10 miles from Sandy Hook Light, is conspicuous because of its large buildings. See Appendix for **storm warning displays.**

Asbury Park, 14.5 miles south of Sandy Hook Light, is the largest resort along the northern New Jersey coast. **Ocean Grove** adjoins the southern side of Asbury Park, and **Bradley Beach** is 16 miles from Sandy Hook Light.

Chart 795.—**Shark River,** which enters the Atlantic Ocean 17 miles south of Sandy Hook Light, is the only small-craft harbor between Sandy Hook and Manasquan Inlet. The town of **Avon** fronts the ocean on the north side of the river and **Belmar** is on the south side.

Shark River Inlet is protected by jetties, each marked by a light at its outer end. **Shark River Coast Guard Station** is near the beach 0.5 mile north of the inlet; see Appendix for **storm warning displays.**

In June 1960, controlling depths into Shark River were 12 feet to Ocean Avenue Bridge at the inner end of the jetties, thence 6 feet to the upper limit of the Belmar Municipal Boat Basin. New Jersey maintains and marks several small channels through the flats north and west of the boat basin; controlling depths were about 5 feet in June 1960.

The mean range of tide is 4.0 feet in Shark River Inlet. In stormy weather breakers form along the bar off the inlet but entrance can be made in moderately rough weather with some local knowledge. A cross-current, strongest on the ebb, may be encountered at **Ocean Avenue Bridge** at the inner end of the jetties. Vessels for which the closed bridge clearance is insufficient should not attempt entrance until the drawspan is completely open.

Ocean Avenue Bridge has a bascule span with a clearance of 15 feet. The highway bridge 0.7 mile above the jetties has a bascule span with a clearance of 13 feet over

the south channel and a fixed span with a clearance of 8 feet over the north channel. The side-by-side rail and highway bridges 0.8 mile above the jetties have bascule spans with a minimum clearance of 8 feet over the south channel and fixed spans with width of 20 feet and clearance of 8 feet over the north channel. See **203.215**, Chapter 2, for drawspan regulations.

The entrance to privately-maintained Belmar Basin is on the south side of Shark River 0.5 mile above the jetties. **Belmar Municipal Boat Basin** is on the southeast side of the main, or south, channel 1.2 miles above the jetties. Several boatyards, boathouses, and landings for commercial and pleasure craft are located along the lower part of Shark River. Supplies available in Avon and Belmar include gasoline, diesel fuel, fresh water, ice, groceries, and some ship chandlery. Marine travelifts can haul out boats up to 12 tons in weight.

Chart 1215.—Sea Girt Inlet, 3 miles southward of Shark River Inlet, is completely closed to navigation by a barrier beach that has built across the former entrance. **Spring Lake,** on the north side of the former inlet, has two large hotels with cupolas; on the south side is the town of **Sea Girt.**

Sea Girt Light (40°08.2′ N., 74°01.6′ W.), 60 feet above the water, is shown from a white skeleton tower on the beach 20 miles southward of Sandy Hook Light. The **danger zone** of a military firing range extends 3 miles seaward from the beach at Sea Girt; see **204.20,** Chapter 2, for limits and regulations.

Chart 795.—Manasquan Inlet, 22 miles southward of Sandy Hook Light, is the northern terminus of the **New Jersey Intracoastal Waterway,** which is described in Chapter 5. **Manasquan Inlet Coast Guard Station** is on the south side of the inlet, and the jettied entrance is well marked.

Chart 1216.—Bay Head, about 2 miles south of Manasquan Inlet, is marked by a prominent elevated water tank. From Bay Head south, the resorts are more widely spaced on the low, narrow barrier beach which separates the inside waters from the ocean.

Other settlements along the beach and their distances from Manasquan Inlet are **Mantoloking,** 4 miles; **Normandy Beach,** with a water tank, 6 miles; **Chadwick,** 7 miles; **Lavallette,** with a standpipe, 8 miles; **Ortley Beach,** 9 miles; **Seaside Heights,** with a standpipe at the north end, 10 miles; and **Seaside Park,** with a water tank near the south end, 11 miles. **Toms River Coast Guard Station** is near the beach at Seaside Heights.

Barnegat Inlet, 21 miles southward of Manasquan Inlet, is protected by two partly-submerged jetties, each marked by a light at its outer end. Abandoned **Barnegat Lighthouse,** the most prominent landmark in this area, is a 161-foot red-brick tower on the south side of the inlet; the tower is no longer lighted but is maintained by the State of New Jersey as a historical monument.

Barnegat Lightship (39°45.8′ N., 73°56.0′ W.), with red hull and the name BARNEGAT in large white letters on the sides, is moored about 7 miles eastward of the Barnegat Inlet jetties; the light is 65 feet above the water. The vessel has a fog signal and a radiobeacon; see Appendix for **storm warning displays.**

Barnegat Coast Guard Station, 0.4 mile south of the old lighthouse, has a marker radiobeacon; see Appendix for **storm warning displays.** Also on the south side of the inlet is **Barnegat Light,** a summer resort with a permanent settlement of oystermen and fishermen.

The Federal project for the improvement of Barnegat Inlet provides for depths of 8 feet through the inlet and northwestward to **Oyster Creek Channel,** about 3 miles above the jetties; thence through Oyster Creek Channel to the New Jersey Intracoastal Waterway route in Barnegat Bay; and for the same depth southward from the main inlet channel to Barnegat Light. In June 1960, the common controlling depth was about 5½ feet.

Three marinas are located on the east side of the channel that leads southward from Barnegat Inlet; available supplies include gasoline, diesel fuel, fresh water, ice, and some marine hardware. The first marina south of the old lighthouse has a travelift that can haul out boats up to 40 feet in length for hull and engine repairs. The marine railway at the fish-company wharf at the head of the channel can haul out boats up to 45 feet in length but there are no facilities for repairs.

Barnegat Inlet and the inner channels are well marked but are subject to continual change, and the buoys are frequently shifted to conform. Any vessel that is not familiar with the inlet should lay to outside and try to obtain a pilot.

The mean range of tide is 3.1 feet in Barnegat Inlet and 0.6 foot in Oyster Creek Channel. The current velocity is 2.4 knots in the inlet.

Four miles south-southwestward of Barnegat Inlet is a standpipe, and **Harvey Cedars** is a mile farther south. Seven miles from the inlet is **Surf City,** which has a prominent standpipe. South-southwestward of Surf City is an almost continuous line of beach settlements with standpipes or elevated tanks. **Ship Bottom,** 8.5 miles from Barnegat Inlet, has a prominent standpipe.

Beach Haven, a large town 13 miles from Barnegat Inlet, has a standpipe, a stack, and an elevated water tank. **Holgate** is a group of houses around **Bonds Coast Guard Station,** 16 miles from the inlet; see Appendix for **storm warning displays.**

Beach Haven Inlet, about 17 miles south-southwestward of Barnegat Inlet, should not be mistaken for Little Egg Inlet which is close southward. The Coast Guard sounds the channel through Beach Haven Inlet and shifts the buoys to mark the best water. The mean range of tide is 3.7 feet at the inlet. In June 1960, the controlling depth through the inlet was about 6 feet.

Chart 1217.—Little Egg Inlet, about 19 miles south-southwestward of Barnegat Inlet, is used considerably by local pleasure and fishing boats. The depth over the bar is ample for any vessel that can navigate the inside waters, but in very heavy weather breakers form all the way across the bar. The inlet channels and shoreline are

constantly changing; the entrance is well marked but the buoys are not charted because they are frequently shifted in position. **Little Egg Coast Guard Station** is on the north side of the inlet.

Brigantine Inlet, 22 miles south-southwestward of Barnegat Inlet, has shoaled to such an extent that it is unsafe for even the shallowest drafts.

Brigantine Shoal, about 3 miles south of the inlet, is one of the outermost spots with depths of less than 30 feet along this part of the coast. The shoal is 17 feet deep and is marked by a buoy; there are depths of 7 feet between it and Absecon Inlet.

Brigantine is a large beach resort between Brigantine Inlet and Absecon Inlet. The city has two prominent elevated tanks and a large conspicuous hotel.

Absecon Inlet, 28 miles southwest by south from Barnegat Inlet, is on the northeast side of **Atlantic City,** the largest resort on the New Jersey coast. Abandoned **Absecon Lighthouse** is a 170-foot conical brick tower on the southwest side of the inlet; the lower 100 feet of the tower is painted white, and upper 70 feet is divided into three horizontal bands of blue, white, and blue.

Atlantic City Light (39°21.9′ N., 74°24.7′ W.), 70 feet above the water, is shown from a white skeleton tower on the south side of Absecon Inlet. A marker radiobeacon transmits from the Coast Guard lookout tower 0.1 mile north of the light.

The Federal project for Absecon Inlet provides for depths of 20 feet through the entrance, thence 15 feet into Clam Creek. In July 1960, controlling depths were 20 feet through the entrance, thence 9½ feet into Clam Creek.

Both sides of Absecon Inlet have been improved by the construction of jetties and other protective works. The inlet buoys are shifted to mark the best water. The mean range of tide is 4.1 feet in the ocean and 3.6 feet in the inlet gorge. Current velocities are strong in the channel.

Atlantic City is a base, or a point of call, for many boats, both from outside and from points along the inside waters. Supplies of all kinds are obtainable and ordinary repairs can be made to hulls and motors of boats using these passages. The city has rail and highway connections with the mainland and highway connections with Brigantine on the northeast and Ocean City on the southwest. Many of the piers and wharves along Absecon Inlet and Clam Creek are open to public use either free or on payment of moderate charges. There are several places where boats can obtain fuel and other supplies.

Yachtsman's Dock, on the southwest side of the inlet and 0.65 mile north of the old lighthouse, has ample depth along its outer and inner faces for boats using the inlet. Back of the dock is a small basin which shoals gradually to 0 feet at the shore bulkhead; this basin is used only by for-hire fishing boats.

Clam Creek is an extensive basin on the southwest side of the inlet and just above Yachtsman's Dock. On the north side of the entrance is **Atlantic City Coast Guard Station.** Southwestward of the Coast Guard bulkhead are a State-owned basin and the State-operated Atlantic City Marina; there is a fixed charge per linear foot for berthing.

Extending southeastward from the main part of Clam Creek are **Gardner Basin, Snug Harbor,** and **Delta Basin.** Gardner Basin, 60 yards wide and about 700 yards long, has a depth of 8 feet in midchannel to the head and is used by many motorboats, which make fast to the bulkheads. All kinds of supplies are obtainable. Marine railways and machine shops are available; the largest marine railway can haul out vessels up to 100 feet in length. Snug Harbor and Delta Basin have depths of 6 feet or more in their entrances. The Corps of Engineers wharf is in Delta Basin.

Storm warning displays are made at several places along the Atlantic City waterfront; see Appendix.

The highway bridge a mile above the Absecon Inlet jetties has a bascule span with a clearance of 11 feet. Care must be exercised when passing through this bridge because of the strong currents; velocities of 2.5 knots have been reported.

Absecon Island extends southwestward from Absecon Inlet to Great Egg Harbor Inlet. Southwest of Atlantic City are **Ventnor City, Margate City,** and **Longport.** This beach is one of the most intensively developed resort areas in the United States.

Great Egg Harbor Inlet, 7 miles southwest of Absecon Inlet, has a controlling depth of about 6 feet over the bar. The buoys marking the inlet are not charted because they are shifted frequently to mark the best water. The inlet is used by many local fishing and pleasure boats with drafts up to 5 feet. Breakers extend along the bar even in moderate weather and are hazardous to small boats. The mean range of tide is 4 feet in the inlet. The bridges just inside Great Egg Harbor Inlet are described in Chapter 5 in connection with the New Jersey Intracoastal Waterway.

Ocean City, a large summer resort on the southwest side of Great Egg Harbor Inlet, has rail and highway connections with the mainland. Standpipes, tanks, and a stack are prominent. Supplies and facilities are described in connection with the New Jersey Intracoastal Waterway. **Ocean City Coast Guard Station** is in a basin on the inner side of the city; see Appendix for **storm warning displays.**

Corson Inlet, 14 miles southwest of Absecon Inlet, is subject to wide changes in position and depth. The buoys marking the inlet are not charted because they are shifted frequently to mark the best water. The inlet is used by pleasure and fishing craft up to 5 feet in draft. The mean range of tide is 3.9 feet in the inlet.

The fixed bridge over the seldom-used channel from Corson Inlet northward to **Middle Thorofare** has a width of 10 feet and a clearance of 6 feet. The highway bridge over **Main Channel,** which leads southward from Corson Inlet to the Intracoastal Waterway, has a bascule span with a clearance of 15 feet.

Strathmere, on the southwest side of Corson Inlet, has a prominent standpipe. **Corson Inlet Coast Guard Station**

is on the inner side of the barrier beach at Strathmere and about 0.8 mile from the inlet. Gasoline, fresh water, ice, and groceries are available at Strathmere.

Sea Isle City, 4 miles southwest of Corson Inlet, has a standpipe and two church spires. **Ludlam Beach Light (39°09.7′ N., 74°41.0′ W.),** 45 feet above the water, is shown from a 35-foot red skeleton tower near the northeast end of the town. A shoal, covered 16 feet and marked by a buoy, is 3 miles southeast of the light. **Avalon Shoal,** covered 26 feet and marked by a lighted buoy, is 7 miles southeast of the light.

Townsend Inlet, 20 miles southwest of Absecon Inlet, is subject to wide changes in position and depth and is used only by small fishing boats. Channel buoys are not charted because they are shifted frequently to mark the best water. The mean range of tide is 3.8 feet in the inlet. The depth over the bar was 5 feet in July 1960.

Townsends Inlet is a small resort on the northeast side of the inlet. **Townsend Inlet Coast Guard Station** is on the northeast side of the resort; see Appendix for **storm warning displays.**

The highway bridge over Townsend Inlet has a bascule span with a clearance of 23 feet. The route of the New Jersey Intracoastal Waterway is just west of the bridge.

Avalon, a resort on the southwest side of Townsend Inlet, is marked by a standpipe. **Stone Harbor,** with an elevated water tank, is 3.5 miles farther to the southwest.

Hereford Inlet, 28 miles southwest of Absecon Inlet, is subject to rapid change, and although the uncharted buoys are shifted frequently they cannot be relied upon to mark the best water. Breakers form at all times on the shoals and in moderate weather on the bar. The approach to the inlet is extremely dangerous with a following sea. The mean range of tide is 4.1 feet in Hereford Inlet. The depth over the bar was 4 feet in July 1960.

The inlet is used by many fishing boats and a few yachts; passage should not be attempted without local knowledge. **Hereford Inlet Light (39°00.4′ N., 74°47.5′ W.),** 53 feet above the water, is shown from a 55-foot gray shingle tower on the south side of the inlet. **Hereford Inlet Coast Guard Station** is on the north side of the light station.

Nummy Island is on the inner side of Hereford Inlet; the Intracoastal Waterway passes west of the island. The highway that crosses Nummy Island has drawbridges over **Great Channel,** which leads northward from the inlet, and **Grassy Sound Channel,** which leads westward; both bascule spans have a clearance of 15 feet. See **203.225,** Chapter 2, for regulations affecting operation of the Great Channel drawspan.

North Wildwood, a summer resort on the south side of Hereford Inlet, is the base for many fishing boats. A standpipe 0.5 mile southwest of the inlet is prominent.

Beach Creek, on the inner side of North Wildwood, has depths of about 2 feet in the entrance. The fixed bridge 0.4 mile above the entrance has a channel width of 17 feet and a clearance of 6 feet. The lifeboats from Hereford Inlet Coast Guard Station tie up in Beach Creek since the small harbor at the station was closed by a sandbar. A boatyard along Beach Creek can handle vessels up to 30 feet in length for minor engine and hull repairs; available supplies include gasoline, fresh water, and ice.

Wildwood and **Wildwood Crest** are southwest of North Wildwood; standpipes are prominent in both resorts.

Chart 234.—Cape May Inlet is 34 miles southwest of Absecon Inlet and about 5 miles eastward of Cape May Point, the southern extremity of the New Jersey coast. The inlet is protected by jetties, each with a light at its outer end. The light on the west jetty has a marker radiobeacon and a fog signal: this jetty should not be rounded too close because the outer end is submerged. A direction light is shown from a skeleton tower at the head of the inlet channel; the beam is white for a width of about 125 feet between the jetties, red to the eastward, and green to the westward. The red light atop a high slim radio tower about 0.5 mile northeast of the inner ends of the jetties has been seen many miles at sea.

Cape May Harbor is used considerably by fishing vessels and large yachts. Some of these vessels anchor in the west end of the harbor; others go to the wharves on the south side of the harbor or to Schellenger Landing. Many fishing vessels go to the fish wharf on Lower Thorofare.

The town of **Cape May,** southwest of the harbor and 2 miles westward of Cape May Inlet, is a summer resort that fronts the ocean and has several large and prominent hotels. The Public Health Service has an outpatient office in the town.

The Federal project for the improvement of Cape May Harbor provides for depths of 25 feet through the inlet, thence 20 feet to deep water in the harbor. In July 1960, controlling depths were 22 feet through the inlet, thence about 12 feet to the piers in the harbor.

The mean range of tide is 4.4 feet in Cape May Harbor. The current velocity is 2.0 knots in Cape May Inlet.

A water tank is prominent on **Sewell Point,** on the west side of Cape May Inlet. This is the location of the Coast Guard Receiving Center. The **danger zone** of a Coast Guard rifle range extends seaward from Sewell Point; see **204.23,** Chapter 2, for limits and regulations.

Bridges and thorofares northeast of Cape May Harbor are described in Chapter 5, New Jersey Intracoastal Waterway. **Upper Thorofare** and **Skunk Sound,** which empty into the harbor from northward, are crossed by fixed bridges with channel widths of 23 feet and clearances of 6 feet. On the harbor shore between these two tributaries is a yacht basin with depths of 6 to 8 feet; available supplies include gasoline, diesel fuel, fresh water and ice. A marine hoist in the basin can handle vessels up to 50 feet in length. Berthing is available for more than 200 boats.

The Coast Guard piers on the inner side of Sewell Point have depths of 13 to 15 feet alongside and are the largest in Cape May Harbor. The harbor channel is marked by buoys, some of which are lighted.

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Schellenger Creek empties into the west end of Cape May Harbor; **Schellenger Landing** is on the north side of the creek's mouth. On both sides of the mouth are boatyards with marine railways that can haul out vessels up to 110 feet in length. Available supplies include gasoline, diesel fuel, fresh water, groceries, and some ship chandlery. The highway bridge 0.3 mile above the entrance to Schellenger Creek has a 38-foot bascule span with a clearance of 5 feet.

Cape May Canal, which extends northwestward from Cape May Harbor, is part of the New Jersey Intracoastal Waterway and is described in Chapter 5. Cape May Light and the shoals and channels to the southwest are described in Chapter 6.

5. NEW JERSEY INTRACOASTAL WATERWAY

Charts 824 to 827.—The **New Jersey Intracoastal Waterway** is an inside passage that extends 102 miles through bays, lagoons, thorofares, and land cuts from the Atlantic Ocean at Manasquan Inlet to Delaware Bay at a point 2 miles north of Cape May Light.

Note.—**Mileages** in the following text are distances along the waterway from the outer ends of the Manasquan Inlet jetties, which are 40 miles by outside run from the Battery, New York.

Channels.—The Corps of Engineers project for the waterway provides for a channel 12 feet deep and generally 100 feet wide from Manasquan Inlet to Delaware Bay. The immediate goal, in 1961, seems to be a controlling depth of 6 feet. In July 1960, the controlling depth was 4 feet for the entire length of the waterway.

Aids to navigation.—The U.S. Coast Guard maintains the standard aids that mark the inlets and the special aids that mark the Intracoastal Waterway; see CG Light Lists or C&GS Chart 1 for illustrations of special aids.

The Department of Conservation and Economic Development, State of New Jersey, maintains all aids to navigation on the rivers and creeks that empty into the New Jersey Intracoastal Waterway.

Bridges.—Bridge 99.1, which crosses Cape May Canal, has a fixed channel span with a clearance of 55 feet; Bridge 100.1, which also crosses Cape May Canal, has a swing span with a 40-foot channel width. These are the minimums for the 102-mile main route. See **203.220,** Chapter 2, for **regulations** governing operation of the waterway drawspans.

Tides.—In the inland waters, the tides are greatly affected by the winds both in time and height, westerly winds producing low water and easterly winds high water. In Barnegat Bay, northerly and southerly winds drive the water to the ends of the bay. While the normal range of tide is only about 0.5 foot in sections of the waterway removed from the inlets, strong winds of long duration may cause variations in level of as much as 3 feet below mean low water or 3 feet above mean high water. Near the inlets the wind has less effect and the normal range of tide is 3 to 4 feet.

Currents.—Current velocities may reach 3 knots in the inlets and in the narrow channels that connect the inlets with the inside waters.

Ice.—The inside waters are completely closed to navigation by ice during extreme winters. In ordinary winters, some of the channels, especially near the inlets where the currents are strong, remain open most of the time, though ice always forms on the flats. The inlets themselves are rarely closed, but passage is often difficult because of running ice. All the principal inlets and adjacent channels are used in winter by local fishing boats, but through navigation is usually blocked.

Facilities.—At communities along or adjacent to the waterway are numerous piers, wharves, and docks, many of which are open to general public use, and fuel, water, and other supplies are readily available. Public and privately-owned boat basins are located in a number of streams entering the bays and thorofares through which the waterway passes. Boat-repair and storage yards with marine railways are also scattered along the waterway. Facilities for icing, storing, and shipping food fish are available at most of the larger communities.

Chart 825 (see also Chart 795).—**Manasquan Inlet,** 22 miles southward of Sandy Hook Light, is the northern terminus of the New Jersey Intracoastal Waterway. The inlet is protected by stone jetties, each marked by a light at its seaward end; the south light station has a fog signal and a low-power radiobeacon. **Manasquan Inlet Coast Guard Station** is on the south side of the inlet; see Appendix for **storm warning displays.**

Manasquan River has a very large traffic of pleasure boats and commercial fishing craft, and considerable berthing space is available. In hurricane weather, boats usually go south to Bay Head for better protection.

See beginning of this chapter for discussion of main channel. The mean range of tide is 4.0 feet in the inlet and 3.5 feet at Railroad Bridge 0.9. The current velocity is 1.8 knots in the inlet.

Manasquan, on the north side of the inlet, has a large summer colony. **Point Pleasant Beach,** on the south side, is marked by an elevated tank and a standpipe.

Cooks Creek, which is the outlet for **Lake Louise,** empties into Manasquan River from southward at Mile 0.4. The fixed highway bridge over Cooks Creek 0.2 mile above the river has a 28-foot channel span with a clearance of 8 feet. Supplies available north of the bridge include gasoline, diesel fuel, fresh water, and ice.

Crabtown Creek, which empties into the north side of Manasquan River at Mile 0.8, has centerline depths of about 6 feet and the channel is well marked by stakes. The highway bridge 0.4 mile from the river has a 30-foot bascule span with a clearance of 8 feet.

The railroad bridge over Manasquan River at Mile 0.9 has a 48-foot bascule span with a clearance of 3 feet. The highway bridge at Mile 1.1 has a bascule span with a clearance of 30 feet; the overhead power cable on the southwest side of the bridge has a clearance of 107 feet. The current velocity is 2.2 knots at the highway bridge.

Brielle is at Mile 1.1 on the north side of Manasquan River. Supplies available at the Brielle basin, on the west side of the railroad bridge, include gasoline, diesel fuel, fresh water, ice, groceries, and some marine hardware. The basin has a travelift for small craft and a marine railway that can haul out vessels up to 60 feet in

length. The machine shop can repair gasoline and diesel engines. The Brielle Yacht Club is on the east side of the railroad bridge.

The waterway follows a dredged channel southwestward in Manasquan River to Mile 2.3 where it turns south into the Bay Head–Manasquan Canal. A New Jersey Project provides for depths of 6 feet in Manasquan River for 2.5 miles northwestward of the canal entrance. The highway bridge over the State channel a mile from the canal has a bascule span with a clearance of 15 feet. The State channel is well marked and had a controlling depth of 6 feet in June 1960.

The **Bay Head–Manasquan Canal** is a narrow land cut with bulkheaded sides. Vessels are required to navigate at a safe speed through the canal so as to avoid damage by suction or wave wash to structures or other boats.

The highway bridge over the canal at Mile 2.6 has a 47-foot bascule span with a clearance of 13 feet; the overhead power cable on the south side of the bridge has a clearance of 72 feet. The current velocity is 1.9 knots at the bridge. A second highway bridge at Mile 3.4 has a swing span with a channel width of 45 feet and a clearance of 15 feet. The State of New Jersey operates a marina on the west side of the canal just north of the second bridge.

From Mile 3.9 at the south end of the canal the route of the waterway is through **Barnegat Bay**, which has a north-south length of about 25 miles. The western half of the bay has general depths of 5 to 10 feet; the eastern half is mostly extensive flats. The usual draft of boats seen in the bay is 2 to 5 feet.

Bay Head, at the north end of Barnegat Bay and at Mile 4.0 on the east side of the waterway, is a summer resort with a large year-round settlement. Many boats use the well-sheltered harbor. The public dock has berthing space for more than 100 boats, and other large berthing areas are available for transients. A yacht club is on the north side of the harbor.

Supplies available at Bay Head include gasoline, diesel fuel, fresh water, ice, groceries, and some marine hardware. The harbor has several boatyards that can make repairs of all kinds; the largest railway can haul out vessels up to 90 feet in length. The mean range of tide is 0.5 foot at Bay Head. See Appendix for **storm warning displays.**

Beaverdam Creek empties into the west side of Barnegat Bay at Mile 4.2. The marked channel into the creek had a controlling depth of 4 feet in June 1960. The highway bridge 0.4 mile from the mouth of the creek has a swing span with a 40-foot channel width and a clearance of 14 feet; see **203.225**, Chapter 2, for drawspan regulations. The overhead power cable on the east side of the bridge has a clearance of 62 feet. There are several repair yards west of the bridge; the largest can haul out vessels up to 45 feet in length. Gasoline engines can be repaired, and available supplies include gasoline, fresh water, ice, and some marine hardware.

Metedeconk River, separated from Beaverdam Creek by **Wardells Neck**, flows eastward into Barnegat Bay. The northern approach to the river is the same as for Beaverdam Creek; the southern approach is a marked passage between **Herring Island** and **Metedeconk Neck.** The controlling depth into the river is about 4 feet; depths above the entrances are 5 to 8 feet for about 3 miles.

Laurelton, 4 miles up Metedeconk River from the Intracoastal Waterway, has facilities for small craft. Under average conditions, boats drawing as much as 3 feet can maneuver the shallow channel to Laurelton; the mean range of tide is almost negligible, and the wind has much more effect than the tide.

The highway bridge over Barnegat Bay at Mile 5.5 has a bascule span with a clearance of 14 feet. On the south side of the bridge is **Mantoloking**, a summer resort on the barrier beach east of Mile 5.7. The public pier at Mantoloking has depths of 5 feet at the outer end; some supplies are available in the resort. A yacht club is on the south side of the Mantoloking end of the bridge.

At the west end of Bridge 5.5 is a marine railway that can handle vessels up to 65 feet in length. Hull and engine repairs can be made, and available supplies include gasoline, diesel fuel, fresh water, ice, and marine hardware.

Kettle Creek flows southeastward into Barnegat Bay opposite Mile 8.7. The creek has depths of 4 feet to the forks 1.4 miles above the mouth. A boatyard on the south side of Kettle Creek has a travelift that can haul out vessels up to 40 feet in length for engine and hull repairs; available supplies include gasoline, fresh water, and some marine hardware.

Goose Creek, on the west side of Barnegat Bay opposite Mile 10.7, has a landlocked yacht basin on the north side of the entrance. Boats up to 32 feet in length can be hauled out and engines can be repaired. Berthage is available, and there is a restaurant on the premises. Available supplies include gasoline, fresh water, ice, and some marine hardware. In June 1960, the controlling depth was 6 feet into the basin.

Lavallette is a small resort on the barrier beach east of Mile 10.7. A 6-foot channel follows the inner side of the barrier beach from Lavallette to Seaside Heights and is marked by daybeacons. There is a yacht club at the north end of Lavallette, and a marine basin is just south of the fixed bridge from Lavallette to **West Point Island**; the bridge has a channel width of 31 feet and a clearance of 10 feet. The marine basin has facilities for hauling out vessels up to 60 feet in length. Gasoline and fresh water are available in the basin; ice, groceries, and other supplies can be obtained ashore.

The highway bridge over Barnegat Bay at Mile 12.3 has a bascule span with a clearance of 32 feet. **Pelican Island**, crossed by the eastern part of the bridge, has a large permanent settlement. A marine railway on the island, just south of the bridge, can haul out boats up to 30 feet in length; available supplies include gasoline, fresh water, ice, and some marine hardware.

Seaside Heights is a beach resort at the east end of Bridge 12.3; the bridge has a fixed span with a clearance of 15 feet over the passage between Pelican Island and

the beach. The public pier on the inner side of Seaside Heights should be approached from the south. In June 1960, the pier had depths of about 7 feet at the face.

Toms River, which empties into the west side of Barnegat Bay at Mile 12.7, has midchannel depths of 5 to 7 feet. The mean range of tide is 0.6 foot in the river. The channel is well marked by lights, daybeacons, and buoys.

The town of **Island Heights** is on the high wooded point on the north side of Toms River 1.7 miles above Barnegat Bay. A public pier at the town has depths of about 5 feet alongside. Gasoline and some other marine supplies can be obtained in the town. The largest of the boatyards at Island Heights can haul out vessels up to 50 feet in length; depths at the yards are 2 to 3 feet.

The town of **Toms River,** 4 miles upriver from Barnegat Bay, is at the head of river navigation. The town bulkheads provide public berthage; year-round berthage also is available at the local yacht club. The larger of the two boatyards at Toms River can haul out vessels up to 50 feet in length for hull and engine repairs; gasoline, fresh water, and marine hardware are available at the yards, and diesel fuel can be delivered. In June 1960, the controlling depth was 5 feet to Toms River.

Seaside Park, on the beach side of Barnegat Bay east of Mile 13.9, has a public wharf and a yacht-club wharf with depths of about 4 feet at their outer ends. The Berkeley yacht basin has facilities for hauling out vessels up to 45 feet in length; available supplies include gasoline, fresh water, and some marine hardware. The depth in the basin was 4 feet in June 1960.

Cedar Creek, which empties into the west side of Barnegat Bay at Mile 17.2, has depths of 3 to 4 feet. There is a light on the south side of the entrance, and the interior channel is marked by daybeacons. The boatyards along the 1.4-mile navigable length of Cedar Creek have travelifts that can handle vessels up to 45 feet in length; available supplies include gasoline, fresh water, ice, and some marine hardware.

On the west side of Barnegat Bay opposite Mile 18.6 is the north end of a **measured statute mile.** The rear ranges are on shore. The front ranges are black piles, in depths of about 7 feet, with square white signs that read, "State of New Jersey, Bureau of Navigation, North (South) End of Measured Mile."

Forked River, on the west side of Barnegat Bay opposite Mile 20.4, has a controlling depth of about 5 feet to the head of navigation at the town of **Forked River,** 1.7 miles above the bay. The river forks into three branches about halfway between the bay and the town, which is on the north side of **North Branch.**

On the opposite side of North Branch from Forked River is the **Marine Terminal,** which is maintained by the State of New Jersey. The terminal has more than 100 slips and can accommodate vessels up to 60 feet in length and 6 feet in draft. The water in the basin is brackish. Available supplies include gasoline, diesel fuel, and some marine hardware.

There is also a public dock on the Forked River side of North Branch, but all the slips usually are leased to permanent residents. When slips are vacant, transient vessels may tie up overnight without charge. Depths are 3 to 4 feet at the outer ends of the slips.

The largest of the several boatyards along Forked River can haul out vessels up to 60 feet in length.

Oyster Creek, on the west side of Barnegat Bay opposite Mile 21.5, has a navigable length of about 1 mile. The entrance is marked by a light and the 3½-foot channel is marked by buoys. There are berths for more than 100 boats along Oyster Creek. The larger of the two boatyards can haul out vessels up to 42 feet in length; available supplies include gasoline, fresh water, and some marine hardware.

At Mile 22.6, **Oyster Creek Channel** leads eastward to **Barnegat Inlet.** The channel and the inlet were discussed in Chapter 4.

Waretown Creek, west of Mile 22.6, is a sheltered basin which had a controlling depth of 4 feet in June 1960. The entrance is marked by a light. Gasoline and fresh water are available at the public wharf, which has a 200-foot face.

Waretown, west of Mile 22.9, is on the bay shore south of Waretown Creek. Supplies available at Waretown include gasoline, fresh water, ice, and some marine hardware. The boat basin on the south side of the town has an entrance depth of 3 feet.

Double Creek, southwest of Mile 24.5, is protected on the north side of its entrance by a jetty which has a light on its outer end. The creek has channel depths of 4 feet to the fixed highway bridge 0.7 mile above Barnegat Bay. Gasoline and fresh water are available at the public wharf, and groceries can be obtained in limited quantities.

Harvey Cedars is a resort on the barrier beach southeast of Mile 29.3. The public wharf has a depth of about 2 feet at its face. Gasoline, fresh water, and some marine hardware are available at the resort.

Fixed Highway Bridge 32.4 crosses the intracoastal route through **Manahawkin Bay** and also crosses the marshy islands on the eastern side of the bay. The main-channel span is 0.5 mile from the northwestern shore and has a clearance of 60 feet. The span over the channel between the islands and the barrier beach has a clearance of 15 feet.

Ship Bottom is on the barrier beach a mile south of Bridge 32.4. Depths of 4 feet can be carried to a Ship Bottom yacht basin where berthage is available. Gasoline, fresh water, and marine hardware can be obtained in the basin; diesel fuel and ice can be delivered, and groceries are available in Ship Bottom. A marine railway in the basin can haul out vessels up to 40 feet in length; facilities are available for repairs to hulls and gasoline engines.

Westecunk Creek, 2 miles northwest of Mile 37.0, has depths of 4 feet to the public landing 2.5 miles above the mouth; the town of **West Creek** is 0.3 mile west of the landing. A marine railway on the southwest side of the creek entrance can haul out vessels up to 35 feet in length. Gasoline, fresh water, ice, and groceries are available along the creek.

Beach Haven Terrace is on the barrier beach southeast of Mile 37.2. The fuel dock has depths of about 3½

feet at the face; available supplies include gasoline, fresh water, ice, and some marine hardware. The marine lift at the dock can handle boats up to 30 feet in length, and engine repairs can be made.

Little Egg Harbor has general depths of 4 to 6 feet in its northwestern part; in the southern part of the harbor is a large group of marshy islands surrounded by a shallow area with depths of 1 to 3 feet. Between some of these islands are narrow unmarked channels which begin and end abruptly in the shallow areas. The Intracoastal Waterway continues southward along the inner side of the barrier beach.

Parker Cove is on the north side of Little Egg Harbor about 3 miles northwest of Mile 38.0. **Parker Run,** which empties into the northwest corner of the cove, has depths of about 4 feet to a public dock on the north side 0.3 mile above the entrance. Berthage is available at the dock, and gasoline can be obtained.

Beach Haven is on the barrier beach southeast of Mile 39.4. The town has a public dock and two yacht clubs. Controlling depths are 5 to 6 feet to the principal docks. Two boatyards in Beach Haven can handle hull and engine repairs on vessels up to 46 feet in length; available supplies include gasoline, diesel fuel, fresh water, ice, and marine hardware.

Tuckerton Creek empties into the west side of Little Egg Harbor about 4 miles northwest of Mile 42.0. A dredged approach, marked by lights, extends 1.6 miles southeastward from the mouth of the creek to the north end of **Story Island Channel.** In July 1960, controlling depths were 4 feet from Story Island Channel to **Scow Landing,** 1.6 miles above the mouth of the creek, and thence 3 feet to the milldam at Tuckerton, 1.8 miles from the mouth.

The mean range of tide is 2.4 feet throughout the Tuckerton Creek channel. Cross currents may be experienced in the approach channel. A **speed limit** of 8 statute miles per hour is prescribed for the channel by **207.70,** Chapter 2.

Supplies available along Tuckerton Creek include gasoline, fresh water, ice, groceries, and marine hardware. Vessels up to 58 feet in length can be hauled out, and repairs can be made to hulls and engines.

Chart 826.—At Mile 42.0, the route of the Intracoastal Waterway is 0.3 mile from the inner side of the barrier beach. At Mile 42.5, **Marshelder Channel,** with depths of 7 feet or more, makes northward and around the southwest side of **Story Island** for 2.5 miles to Little Egg Harbor and the dredged approach to Tuckerton Creek.

There are several thorofares through the marsh area south and west of Marshelder Channel, but **Little Sheepshead Creek** is the only one of any importance. This 2-mile winding passage from Mile 43.3 of the Intracoastal Waterway to the eastern side of Great Bay has a controlling depth of about 3 feet and is used extensively. The fixed highway bridge over Little Sheepshead Creek has an 18-foot channel span with a clearance of 14 feet.

The waterway route skirts the inner ends of the shoals in **Beach Haven Inlet** and **Little Egg Inlet,** both mentioned in Chapter 4, and continues westward through **Shooting Thorofare** and along the south side of **Great Bay,** which has general depths of 4 to 7 feet. The middle of Great Bay is opposite Mile 47.0.

Mullica River, which empties into the northwestern part of Great Bay, is navigable to a milldam 20 miles above the bay. A depth of about 4 feet can be carried across the Great Bay flats to the mouth of the river. Once inside the river, the water is deep and the midchannel is clear for a long distance.

Depths of 8 feet can be carried from the mouth of Mullica River to Bridge 6.5, thence 5 feet to Bridge 13.0, thence 4½ feet to Bridge 16.0, and thence 2½ feet to within a mile of the milldam. A lighted cutoff 3 miles above the mouth has ample depth and reduces distances to points on the upper river by about 2 miles.

The navigation of Mullica River is fairly easy in the lower reaches, but the chart should be followed closely to avoid the unmarked 3-foot shoals in the entrance. The last few miles to the milldam are shallow and difficult. The river is marked by lights and stake daybeacons as far as the first bridge; stake daybeacons mark the reaches above the bridge.

Nacote Creek empties into the southwest side of Mullica River 4 miles above the mouth. In July 1960, controlling depths were 5 feet from Mullica River to the highway bridge 1.6 miles above the mouth of the creek, and thence 3 feet to **Port Republic,** at the head of navigation 3.6 miles from the mouth. The bridge has a 30-foot bascule span with a clearance of 5 feet; the overhead power cable on the east side of the bridge has a clearance of 65 feet. A marine railway east of the bridge can haul out vessels up to 50 feet in length; hull and engine repairs can be made, and available supplies include gasoline, fresh water, and some marine hardware. A boatbuilding yard is on the west side of the bridge.

Bass River, which empties into the north side of Mullica River 5 miles above the mouth, has depths of 5 feet to **New Gretna,** 2.4 miles above Mullica River. The fixed highway bridge over Bass River at New Gretna has a clearance of 20 feet.

The fixed highway bridge 6.5 miles above the mouth of Mullica River has a clearance of 30 feet; the overhead power cable 500 feet above the bridge has a clearance of 67 feet. On the west side, about 0.5 mile below the bridge, is a boatyard with a travelift that can handle vessels up to 35 feet in length.

Wading River, which empties into the north side of Mullica River 7.5 miles above the mouth, has depths of 4 feet to the highway bridge 4 miles upstream. The bridge has a 30-foot bascule span with a clearance of 5 feet.

The highway bridge 13 miles above the mouth of Mullica River has a 30-foot bascule span with a clearance of 6 feet. The highway bridge 16 miles above the mouth has a 30-foot bascule span with a clearance of 5 feet.

Mott Creek, on the west side of Great Bay, is marked by a light and has depths of about 4 feet to a bulkhead landing 1.5 miles above the mouth; supplies available at

the landing include gasoline, fresh water, ice, and groceries. The 2-mile thorofare that winds northward through the marshes from the Mott Creek landing to the mouth of Nacote Creek had a controlling depth of 2 feet in July 1960.

Oyster Creek, on the west side of Great Bay 0.7 mile south of Mott Creek, is marked by a light and has depths of 4 feet to the small fishing village of **Oyster Creek,** 0.3 mile from the mouth, and 0.2 mile beyond to a public landing where gasoline, fresh water, and ice are available.

The Intracoastal Waterway leaves Great Bay at Mile 48.9 and follows **Main Marsh Thorofare** to **Little Bay,** which is entered at Mile 49.6. The route follows the western side of Little Bay across the mouths of **Hammock Cove** and **Perch Cove** and westward of **Shad Island.**

At Mile 51.7, an alternate route swings eastward in **Brigantine Channel,** which leads to **Brigantine Inlet,** mentioned in Chapter 4. About 1.3 miles along the channel, the alternate route turns southward and follows **Obes Thorofare** along the inner side of Brigantine. The overhead power cable that crosses Obes Thorofare 1.3 miles from Brigantine Channel has a clearance of 47 feet.

Baremore Quarters, a cove on the inner side of Brigantine, is 2.3 miles along Obes Thorofare from Brigantine Channel. The cove has depths of 12 feet or more and is a good harbor of refuge. A boatyard in the cove can haul out vessels up to 35 feet in length for hull and gasoline-engine repairs. Marine supplies are available at the yard; gasoline, fresh water, and ice can be obtained nearby.

From Baremore Quarters, the alternate route follows **Bonita Tideway** along the city waterfront, then swings westward through **Golden Hammock Thorofare** and rejoins the main route at Mile 55.0. The total length of the alternate route is 7 miles. There is fairly deep water in the main part of Brigantine Channel and in the thorofares along the inner side of Brigantine, but the channels shoal as they near the main route and can be navigated only by very shallow drafts.

The main route of the waterway leaves Little Bay at Mile 51.7 and continues along the northwestern side of **Grassy Bay,** a shoal area mostly bare at low water, to **Meadow Cut.** From this short land cut the route follows the southeastern side of **Reed Bay** to and through **Gull Island Thorofare,** across the mouth of **Broad Creek,** through **Middle Thorofare,** where it is rejoined by the alternate route from Brigantine, and into Absecon Channel at Mile 55.3.

Absecon Channel extends southeastward to **Absecon Inlet** and northwestward to Absecon Bay. The inlet and the lower part of the channel were described in Chapter 4. The route of the waterway follows Absecon Channel southeastward to Mile 55.9, then turns sharply westward into **Beach Thorofare.**

Passage can be made northwestward in Absecon Channel from Mile 55.3; another approach is from Mile 56.1 in Beach Thorofare, thence northward through **Point Bar Thorofare,** and thence along Absecon Channel to the beginning of the dredged cut across Absecon Bay, a total distance of 2 miles. The centerline depth was 4 feet in July 1960.

Absecon Bay is shallow and bares in some places at low water. **Absecon Creek** empties into the northwest side of the bay. A Federal project provides for depths of 5 feet across the flats in Absecon Bay from the head of Absecon Channel to the mouth of the creek, a distance of about 1 mile, thence 5 feet in the creek to the highway bridge at **Absecon,** 1.5 miles above the mouth. In July 1960, the controlling depth was 3 feet to Absecon.

The mean range of tide is 3.6 feet at the mouth of Absecon Creek. There are several wharves, landings, and berthing areas along the creek. A public concrete launching ramp is 0.5 mile above the mouth, and a marine railway a mile above the mouth can haul out vessels up to 30 feet in length for hull and engine repairs. Gasoline can be obtained along the creek, and marine supplies are available in Absecon.

The Intracoastal Waterway follows Beach Thorofare along the northwest side of **Atlantic City.** The highway bridge over the thorofare at Mile 57.4 has a bascule span with a clearance of 20 feet.

The railroad bridge over Beach Thorofare at Mile 58.8 has a swing span with a clearance of 5 feet. The overhead power cables 200 yards north of the bridge have a clearance of 110 feet. Caution is advised in the vicinity of the bridge because some pilings may still remain from the bridge which formerly crossed 150 yards to the north and 50 yards to the south.

The route of the waterway leaves Beach Thorofare at Mile 59.3 and continues along the inner side of Atlantic City by way of **Inside Thorofare.** Albany Avenue Bridge, which crosses Inside Thorofare at Mile 59.8, has a bascule span with a clearance of 10 feet. On the southeast side of the bridge is a fuel pier that offers overnight docking, shore electricity, fresh water, ice, groceries, and marine hardware.

The highway bridge over the waterway at Mile 61.0 connects **Ventnor Heights,** on the northwest side, with **Ventnor City,** on the beach; the bridge has a bascule span with a clearance of 9 feet. A boatyard south of the bridge has a marine railway that can haul out vessels up to 42 feet in length for hull and engine repairs; available supplies include gasoline, fresh water, ice, and marine hardware.

The waterway turns sharply northwestward at Mile 61.1 and follows **West Canal** along the southwest side of Ventnor Heights to Mile 62.1, where it rejoins Beach Thorofare and continues southwestward.

From Mile 63.1 southwest of **Shelter Island,** a marked channel with a controlling depth of about 3 feet leads northward along the eastern shores of **Shelter Island Bay** and **Lakes Bay** to **West Atlantic City,** 2.2 miles from the waterway. The channel continues along the north shore of Lakes Bay to the municipal boat basin and adjacent yacht club at **Pleasantville,** 3.4 miles from the waterway. Gasoline, fresh water, ice, and shore electricity are available.

The 6-mile circuit of Lakes Bay is completed by a further continuation, marked with daybeacons, that extends southward along the west shore of the bay from Pleasantville to and between the islands in the southern

part of the bay, then rejoins the Intracoastal Waterway at Mile 63.5. Signs on the daybeacons say the controlling depth is 2 feet, but depths of 1 foot were found in the area northwest of **Alex Island** in July 1960.

The highway bridge over Beach Thorofare at Mile 63.7 has a bascule span with a clearance of 14 feet. **Margate City** is on the beach south of the bridge. The Margate City basins can supply gasoline, fresh water, ice, and some marine hardware. One of the basins has a crane that can handle boats up to 12 tons in weight; hull and engine repairs can be made, and there is a machine shop on the premises.

At mile 65.1, **Risley Channel** and **Dock Thorofare** lead northward for 2.2 miles to a marine basin near **Northfield.** Available facilities and supplies include berthage, gasoline, fresh water, ice, groceries, and marine hardware. Vessels up to 65 feet in length can be hauled out, and there is a machine shop on the premises.

The highway bridge over the Intracoastal Waterway at Mile 65.4 has a 45-foot bascule span with a clearance of 9 feet. **Longport** is on the barrier beach at the eastern end of the bridge. Just south of the bridge is a boatyard that can handle hull and engine repairs on vessels up to 40 feet in length. Available supplies include gasoline, fresh water, and some marine hardware.

Chart 827.—The intracoastal route leaves the Longport waterfront and crosses **Great Egg Harbor Inlet** to the inner side of Ocean City. Currents are strong at the inlet crossing, and the route is exposed to heavy easterly seas. The highway bridge over the inlet at Mile 67.0 has a bascule span with a clearance of 18 feet.

Ship Channel extends northwestward from Bridge 67.0 to Great Egg Harbor Bay. **Bass Harbor,** a narrow channel leading northward from Ship Channel 1.7 miles from the inlet bridge, has depths of about 10 feet in the entrance; the fixed highway bridge 0.3 mile north of the entrance has a 13-foot channel span with a clearance of 5 feet.

Somers Point, on the north side of Ship Channel 2 miles from the inlet bridge, is a summer resort with wharves that have depths of 2 to 5 feet at their outer ends. The largest of the boatyards at Somers Point can handle hull and engine repairs on vessels up to 50 feet in length. Facilities include berthage, and available supplies include gasoline, fresh water, ice, and marine hardware; groceries can be obtained in the town.

A 2-mile combination of highway bridges and causeways extends southeastward over the channels and islands in **Great Egg Harbor Bay** from Somers Point to Ocean City. The bascule span over Ship Channel has a clearance of 15 feet. The bascule span over the Intracoastal Waterway at Mile 68.6, on the inner side of Ocean City, also has a clearance of 15 feet.

The fixed highway bridge that crosses Great Egg Harbor Bay 1.7 miles west of Bridge 68.6 has a central-span clearance of 50 feet. An older highway bridge, 0.2 mile to the westward, has a bascule span with a clearance of 14 feet.

Patcong Creek empties into the north side of Great Egg Harbor Bay 2.1 miles above Bridge 68.6. The depth over the bar at the entrance to the creek was 3 feet in July 1960. The highway bridge 0.5 mile from the mouth of the creek has a swing span with a channel width of 34 feet and a clearance of 6 feet; the eastern opening should be used because the channel veers sharply to the eastward and passes close to the inner side of the first bend. See **203.225,** Chapter 2, for drawspan regulations.

The fixed highway bridge 2.3 miles above the entrance to Patcong Creek has a channel span with a clearance of 8 feet. Another fixed highway bridge 3.0 miles above the entrance has a 30-foot channel span with a clearance of 7 feet; about 100 yards below this bridge, the decomposed piles of a former dam extend westward of midstream and are extremely dangerous.

Tuckahoe River empties into the south side of Great Egg Harbor Bay 2.7 miles westward of Bridge 68.6. In July 1960, depths were 2 feet across the flats at the entrance to the river, thence 3 feet to the town of Tuckahoe, 7 miles upriver. The overhead power cable 3 miles from the entrance has a clearance of 100 feet; the power cable a mile below Tuckahoe has a clearance of 41 feet. The highway bridge at Tuckahoe has a 30-foot bascule span with a clearance of 9 feet; see **203.225,** Chapter 2, for drawspan regulations. The overhead power cable at the bridge has a clearance of 40 feet. The Tuckahoe marina and yacht club is just below the highway bridge; gasoline and fresh water are available.

Cedar Swamp Creek empties into the south side of Tuckahoe River 4.3 miles above the river mouth. The creek has depths of about 4 feet to a highway culvert 2.5 miles from the river. A marine railway just below the culvert can haul out vessels up to 25 feet in length.

Great Egg Harbor River is a northwestward continuation of Great Egg Harbor Bay; the dividing line is about 3 miles westward of Bridge 68.6. In July 1960, the controlling depth was 4 feet from Great Egg Harbor Bay to Mays Landing, at the head of river navigation. The overhead power cables that cross the river between the bay and Mays Landing have clearances of 65 feet or more. The mean range of tide is 4.0 feet at Mays Landing.

Middle River empties into the southwest side of Great Egg Harbor River 0.5 mile above the bay. Depths of 4 feet can be carried up Middle River for 2 miles. The overhead power cable a mile above the entrance has a clearance of 50 feet.

Powell Creek empties into the east side of Great Egg Harbor River 5 miles above the bay. In July 1960, the narrow, crooked channel in the creek had depths of 2½ feet to a boatyard a short distance upstream. The yard builds boats and makes all kinds of repairs; the marine railway can haul out vessels up to 42 feet in length. Gasoline and fresh water are available at the yard.

South River is a shallow stream that empties into the west side of Great Egg Harbor River 9 miles above the bay. Just south of the South River entrance, a marina on Great Egg Harbor River has berthing facilities and can supply gasoline and fresh water. The marina also has

an asphalt-loading ramp. Depths at the fuel pier were 3½ feet in July 1960.

Mays Landing, at the head of navigation on Great Egg Harbor River, is 12 miles from Great Egg Harbor Bay. The river water is nearly fresh at the town. In July 1960, the town bulkhead had depths of 5 feet alongside. Fresh water is available at the bulkhead, gasoline is available on the waterfront just upstream from the bulkhead, and other supplies can be obtained in the town. A marine railway at the town can handle vessels up to 50 feet in length.

Returning to the Intracoastal Waterway, the southward route follows the inner side of **Ocean City** from Bridge 67.0 to and through Bridge 68.6; both bridges have already been described. The lagoons at Ocean City can accommodate boats up to 5 feet in draft. Supplies available along the waterfront include gasoline, diesel fuel, fresh water, ice, groceries, and marine hardware. Local boatyards can haul out vessels up to 75 feet in length and can handle all kinds of hull and engine repairs.

The waterway follows **Beach Thorofare** to **Peck Bay;** the mud flats bordering the channel through the bay are visible in some places at low water. The highway bridge over the head of the bay at Mile 71.8 has a swing span with a channel width of 48 feet and a clearance of 6 feet; the east opening should be used. In 1961, a replacement bridge was being constructed 50 yards north of the existing Bridge 71.8.

From Peck Bay, the route follows **Crook Horn Creek.** The railroad bridge over the creek at Mile 73.6 has a swing span with a clearance of 2 feet. The west opening should be used because the other is obstructed. The swing span moves slowly.

The waterway enters **Middle Thorofare** at Mile 74.7. The route is then by way of **Ben Hands Thorofare** to Mile 76.4 in **Main Channel** which leads eastward and northward for 2 miles to **Corson Inlet;** see Chapter 4 for previous discussion of Corson Inlet and Main Channel.

The waterway follows Main Channel southwestward and enters shallow **Ludlam Bay** at Mile 77.5. The route leaves the bay at Mile 78.8 and enters **Ludlam Thorofare.** The highway bridge over Ludlam Thorofare at Mile 79.4 has a 48-foot bascule span with a clearance of 10 feet.

Sea Isle City, on the barrier beach at the southeast end of Bridge 79.4, has several basins with depths of 3 to 6 feet in the entrances and slightly more water inside. In the cove just south of the bridge is a marine railway that can handle vessels up to 65 feet in length for hull and engine repairs. Available supplies include gasoline, fresh water, ice, groceries, and marine hardware. There is a yacht club at the entrance to the cove.

The waterway route enters **Townsend Channel** at Mile 81.0 and follows the inner side of the resort known as **Townsends Inlet.** Facilities and supplies available at the resort include berthage, gasoline, fresh water, and some marine hardware.

At Mile 82.2, the waterway is 300 yards west of the highway bridge over **Townsend Inlet,** which was described in Chapter 4. **Avalon,** on the southwest side of the inlet, is separated from the waterway's **Ingram Thorofare** by a wide marsh area.

Cornell Harbor is a 2-foot channel that leads southeasterward through the marsh from Mile 82.5 to Avalon and thence along the inner side of the resort. There is a yacht club at the entrance to Cornell Harbor, and the boatyard at the Avalon end can handle hull and engine repairs on vessels up to 40 feet in length. Gasoline, fresh water, and ice are available at the boatyard.

The highway bridge that crosses Ingram Thorofare to Avalon at Mile 83.0 has a swing span with a 49-foot channel width and a 6-foot clearance.

Pennsylvania Harbor is a 2-foot channel to Avalon along the north side of Bridge 83.0, and Princeton Harbor is a 1-foot channel along the south side of the same bridge. The fixed bridges over the Avalon channel at the inner ends of the two harbors restrict passage between them or to the southwest to an overhead clearance of 4 feet. The public wharf at the Avalon end of Princeton Harbor has depths of 3 feet at the outer end.

From Bridge 83.0, the waterway follows Ingram Thorofare westward to **Paddy Thorofare,** thence into shallow **Great Sound** at Mile 85.0. At Mile 86.1, the route leaves Great Sound and follows **Gull Island Thorofare** southward to the Stone Harbor waterfront.

Stone Harbor is a resort on the northeast side of Hereford Inlet. The highway bridge that crosses the Intracoastal Waterway to Stone Harbor at Mile 88.4 has a bascule span with an 11-foot clearance.

There are several privately-dredged basins along the Stone Harbor waterfront. The Stone Harbor municipal marina is in **North Basin,** 0.7 mile northeastward of Bridge 88.4; available supplies include gasoline, fresh water, ice, and marine hardware. The boatyard in North Basin can handle hull and engine repairs on vessels up to 40 feet in length.

The waterway follows **Great Channel** southwestward along the Stone Harbor waterfront, then turns sharply westward at Mile 89.4 and follows the northwestern shore of **Nummy Island.** The bridge over the channel that leads along the east side of Nummy Island to **Hereford Inlet** was described in Chapter 4.

At Mile 90.9, the waterway route through **Grassy Sound Channel** is joined by the main channel from Hereford Inlet. The bascule bridge over the inlet channel was described in Chapter 4.

The highway bridge over the waterway at Mile 91.4 has a bascule span with an 8-foot clearance. The route enters **Grassy Sound** at Mile 91.9 and follows a well-marked channel. The railroad bridge over the waterway at Mile 93.2, the southwestern end of Grassy Sound, has a bascule span with a 6-foot clearance; the overhead power cable at the bridge has a 100-foot clearance.

East of Bridge 93.2, a 2-foot channel leads along the northeast side of **West Wildwood** for 0.8 mile to the inner waterfront of **Wildwood.** Passage is limited by the 5-foot

clearances of the fixed bridges that connect the two communities.

At Mile 94.2, **Post Creek** extends eastward from the waterway and widens into a small bay between Wildwood and West Wildwood. **Ottens Harbor,** a dredged slip that extends 0.5 mile southeastward from the mouth of Post Creek, can accommodate vessels up to 150 feet in length. In July 1960, the harbor had a depth of 10 feet. Supplies available in the harbor include gasoline, fresh water, ice, and marine hardware. A local marine railway can haul out vessels up to 80 feet in length.

The highway bridge over the waterway at Mile 94.4 has a bascule span with a 25-foot clearance. The large yacht basin on the south side of the southeast end of the bridge has facilities for hull and engine repairs to vessels up to 70 feet in length; available supplies include gasoline, diesel fuel, fresh water, ice, and marine hardware.

Sunset Lake, a comparatively deep basin on the inner side of **Wildwood Crest,** can be entered from either Mile 94.8 or Mile 95.4 of the intracoastal route. The controlling depth is 4 feet in the entrances. Gasoline, fresh water, ice, and marine hardware can be obtained along the waterfront of Wildwood Crest. There is also a yacht club at Wildwood Crest.

The waterway continues southward through **Jarvis Sound** and **Middle Thorofare.** The highway bridge over Middle Thorofare at Mile 97.4 has a bascule span with a clearance of 23 feet.

Just north of Bridge 97.4, **Lower Thorofare** leads eastward from the waterway for 0.3 mile, then turns northward. There is a long marginal fish wharf on the east side of Lower Thorofare; supplies available on the wharf include gasoline, diesel fuel, fresh water, ice, and some marine hardware.

The waterway route crosses the inner end of **Cape May Inlet** at Mile 97.7 and continues westward through **Cape May Harbor;** the inlet and the harbor were described in Chapter 4.

Cape May Canal is entered at Mile 98.9. Vessels transiting the canal should limit their speed to 5 knots and should proceed with special care in the vicinities of the bridges; passage of barge tows may be delayed because of tide and current conditions.

The mean range of tide is between 4 and 5 feet in Cape May Canal. The current velocity is 1.9 knots at the east end and 0.9 knot at the west end. In July 1960, the controlling depth was 5 feet.

The fixed highway bridge over Cape May Canal at Mile 99.1 has a clearance of 55 feet. The railroad bridge at Mile 99.9 has a swing span with a clearance of 4 feet. The highway bridge at Mile 100.1 has a swing span with a 40-foot channel width and a 10-foot clearance.

At **Mile 102.0,** Cape May Canal enters Delaware Bay between stone jetties which are 2 miles north of Cape May Light. The outer ends of the jetties are marked by lights, and there is a fog signal at the north light station. The Coast Guard has a 50-foot skeleton tower, with white lookout house on top, at the inner end of the north jetty; see Appendix for **storm warning displays.**

6. DELAWARE BAY

Chart 1219.—Delaware Bay and Delaware River form the boundary between the State of New Jersey on the east and the States of Delaware and Pennsylvania on the west. The bay is only an expansion of the lower part of Delaware River; the arbitrary dividing line, 42 miles above the Delaware Capes, extends from Liston Point, Delaware, to Hope Creek, New Jersey. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Cape May on the northeast and Cape Henlopen on the southwest. Medium-draft vessels can enter from Chesapeake Bay on the south by way of the Chesapeake and Delaware Canal which is described in Chapter 7. The bay is the approach to Wilmington, Chester, Marcus Hook, Philadelphia, Camden, Trenton, and many lesser ports.

Note.—Many of the distances in this chapter are stated in miles above the **Delaware Capes,** or the **Capes,** which is a short way of referring to a line from Cape May Light to the tip of Cape Henlopen.

The approaches to Delaware Bay have few off-lying dangers. An obstruction, unproved as to position and depth, is shown on Chart 1109 at 38°40′ N., 73°52′ W., about 58 miles eastward of Cape Henlopen; the obstruction is said to be only 5 fathoms deep, and the area should be avoided.

The 100-fathom curve is 50 to 75 miles off Delaware Bay, and the 20-fathom curve is about 25 miles off. Depths inside the 20-fathom curve are irregular, and in thick weather a deep-draft vessel should not approach the coast closer than depths of 12 fathoms until sure of its position; the safest approach or passing courses would be outside Five Fathom Bank and/or Delaware Lightships.

Cape May is the extensive peninsula on the northeast side of the entrance to Delaware Bay. **Cape May Light (38°56.0′ N., 74°57.6′ W.),** 165 feet above the water, is shown from a 170-foot white tower on Cape May Point. A tall brick stack is about 0.7 mile northward of the light.

The shoals off Cape May are mixed clay and sand and have the consistency of hardpan; the ridges run in approximately the same directions as the currents. **Cape May Channel,** a mile southwest of the cape, is the principal buoyed passage between the shoals; the controlling depth is about 13 feet.

The channels have strong currents, and many tide rips form near **Prissy Wicks Shoal,** which has depths as little as 2 feet about 2 miles south of Cape May Light. In Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb.

Overfalls Shoal has a depth of 6 feet about 5 miles souhtwestward of Cape May Light. The 30-foot curve extends 3 miles farther in the general direction of Cape Henlopen and has a depth of 19 feet at its outermost limit.

McCrie Shoal, 7 miles southeast of Cape May Light, has a least charted depth of 18 feet; a lighted buoy is moored on the east side of the shoal.

Five Fathom Bank has a least charted depth of 17 feet about 15 miles eastward of Cape May Light. The area inclosed by the 30-foot curve is about 9 miles long, north to south, and about 2 miles wide. The greater part of Five Fathom Bank is within authorized fishtrap limits. Several buoys are moored around the bank.

Five Fathom Bank Lightship (38°47.3′ N., 74°34.6′ W.), with red hull and the name FIVE FATHOM in large white letters on the sides, is moored about 20 miles east-southeast of Cape May Light; the light is 65 feet above the water. The vessel has a fog signal and a radiobeacon; see Appendix for **storm warning displays.**

Cape Henlopen (see also Chart 411), on the southwest side of the entrance to Delaware Bay, is marked by a number of towers and buildings. About 0.5 mile southward from the tip of the cape is a station from which vessels are reported to the Philadelphia Maritime Exchange; see Appendix for **storm warning displays. Cape Henlopen Radiobeacon (38°47.6′ N., 75°05.5′ W.)** is 100 yards northeast of the station. A group of sandhills about 70 feet high is 1.5 miles from the tip of the cape.

A naval **restricted area** extends northeastward from Cape Henlopen to Overfalls Shoal; see **207.105,** Chapter 2, for limits and regulations.

Hen and Chickens Shoal extends southeastward from the tip of Cape Henlopen. The shoal has depths of 5 feet a mile from the tip and 9 feet 2 miles farther to the southeastward. The southern limit of the 30-foot curve is marked by a lighted buoy which is 7 miles from Cape Henlopen and 3.5 miles off Rehoboth Beach.

Delaware Lightship (38°27.2′ N., 74°35.1′ W.), with red hull and the name DELAWARE in large white letters on the sides, is moored about 32 miles southeastward of Cape Henlopen; the light is 66 feet above the water. The vessel has a fog signal and a radiobeacon; see Appendix for **storm warning displays.**

Boundary lines of inland waters.—The lines established for Delaware Bay Entrance are described in **82.25,** Chapter 2.

Channels.—Delaware Bay is shallow along its northeastern and southwestern sides and there are extensive shoal areas close to the main channel. The bay has natural depths of 50 feet or more for a distance of 5 miles above the Capes; thence a 40-foot channel has been dredged to the Philadelphia Naval Shipyard.

Anchorages.—Delaware Breakwater, northwest of Cape Henlopen, is one of the most important anchorages along the Atlantic Coast and is used extensively by vessels of all drafts. Deep-draft vessels also anchor in various

places along the dredged channel through the lower bay but usually continue to more sheltered places in the upper bay and river. Defined **anchorage areas** in Delaware Bay and Delaware River are shown on the charts; see **202.157,** Chapter 2, for limits and regulations.

Tides.—The mean range of tide is 4.1 feet in Breakwater Harbor, 5.5 feet at Reedy Point, 5.6 feet at Marcus Hook, 5.9 feet at Philadelphia, and 6.8 feet at Trenton. See the Tide Tables for daily predictions for Breakwater Harbor, Reedy Point, and Philadelphia.

Currents.—The current velocity is 1.8 knots in Delaware Bay Entrance; see the Tidal Current Tables for daily predictions. The Tables also list current differences and other constants for about 50 other places in Delaware Bay and River.

The Tidal Current Charts, Delaware Bay and River, present a comprehensive view of the tidal-current movement in the bay and river, and provide a means of readily determining the direction and velocity of the current at various places throughout the waterway. The charts may be used for any year and are referred to daily predictions for Delaware Bay Entrance.

Weather.—Fogs are most frequent along this part of the Atlantic Coast during the months of December, January, and February, but may be encountered at other times during the year. The fogs come in with easterly winds and are cleared away by westerly and notherly winds. In the late fall, dense fogs are liable to occur and may last through the forenoons for two or three days in succession. Autumn fogs nearly always clear away before noon.

Ice.—In ordinary winters there is usually sufficient ice in Delaware Bay and River to be of some concern to navigation. Thin ice has been known to form early in December between Chester and Philadelphia, but the heavier ice usually does not begin to run before January. The tidal currents keep the ice in motion, except where it packs in the narrower parts of the river; ice breakers from Philadelphia keep these parts of the river open. The ice usually packs heavier than elsewhere at Ship John Shoal, at Pea Patch Island, at Deepwater Point, and below Gloucester City. Ice is rarely encountered after the early part of March.

In severe winters, navigation has occasionally been interrupted above Chester, but the powerful vessels employed in the foreign and coasting trade to Philadelphia keep the channel fairly open. The greatest danger is to wooden vessels, which are liable to be cut through on the waterline if they encounter thin ice.

Freshets.—Freshets are of rare occurrence, except in the vicinity of Trenton, and do not interfere with navigation unless accompanied by ice. Freshets and ice above Philadelphia are discussed further in the latter part of this chapter.

Pilotage.—Pilotage on Delaware Bay and Delaware River is provided by the Pilots Association for the Bay and River Delaware, whose office is in Philadelphia. Pilots for incoming vessels are furnished from the association's pilot boats which cruise off the Delaware Capes.

Every ship arriving from or bound to a foreign port is obliged to receive a pilot. Vessels employed in or licensed for the coasting trade are exempt from pilotage if they have on board a pilot duly licensed by the Federal Government to operate in these waters.

Towage.—A large fleet of tugs, operating out of Philadelphia, is available at any time of the day or night for any type service required. Most of the tugboat companies will dispatch their vessels to any place in Delaware Bay or its tributaries. Some of the companies also have tugs available for deep-sea towing.

Quarantine.—All inbound vessels subject to quarantine inspection and destined to points above Marcus Hook, Pennsylvania, are required to stop off the Marcus Hook boarding station and may not proceed until granted clearance. The Marcus Hook station is equipped to handle detention cases.

Customs and Immigration.—The Bureau of Customs and the Immigration and Naturalization Service have district headquarters in Philadelphia.

Supplies.—Bunker oil is available in quantity at Philadelphia and at several other places, including Delaware City, on the north side of the entrance to the Chesapeake and Delaware Canal. Many vessels are bunkered from barges alongside. Fresh water is unlimited in the larger ports. Small craft can obtain gasoline, diesel fuel, fresh water, ice, groceries, and marine hardware not only in the larger ports but at many of the smaller cities and towns along the river and bay.

Repairs.—The largest shipyards along Delaware River are at Chester, Pennsylvania, but repairs can be made to hulls and machinery of medium-size vessels at Philadelphia and Camden. Many of the other cities and towns have boatyards that can handle the smaller craft.

Chart 411.—Delaware Breakwater is the popular name for the anchorage areas behind the outer and inner breakwaters north and west of Cape Henlopen. Harbor of Refuge is the outer and deeper of the two areas; Breakwater Harbor is the inner area.

Harbor of Refuge is behind the breakwater that begins 0.7 mile north of Cape Henlopen and extends 1.3 miles in a north-northwestward direction. A line of ice breakers extends 0.4 mile farther northwestward, then turns and extends a like distance west by south onto the **Shears. Harbor of Refuge Light (38°48.9′ N., 75°05.6′ W.)**, 72 feet above the water, is shown from a white conical tower on a brown cylindrical substructure near the south end of the breakwater; the light station has a fog signal. A low-power light marks the north end of the breakwater.

The harbor has depths of 15 to 70 feet between the breakwater and a shoal ridge, 8 to 12 feet deep, a mile to the southwestward. The deepest water is behind the Harbor of Refuge Light. The entrance from southeastward is deep and clear, while that from northwestward across the Shears has depths of 10 feet or less. Harbor of Refuge affords good protection for deep-draft vessels during easterly gales.

Northeast of the Harbor of Refuge breakwater is a

measured course 6,123 feet long on bearing **141°30′**. The front range markers are on the breakwater. The northwesterly rear marker is on the shore west of Roosevelt Inlet, and the southeasterly rear marker is the light on the west end of the inner breakwater.

Breakwater Harbor, between the inner breakwater and the shore, is excellent for light-draft vessels in all weather except heavy northwesterly gales and even then affords considerable protection.

The inner breakwater begins 0.3 mile southwest of the tip of Cape Henlopen and extends 0.8 mile in a west-northwest direction. **Delaware Breakwater Light (38°47.8′ N., 75°06.0′ W.),** 61 feet above the water, is shown from a brown conical tower on the east end of the breakwater; the light station has a fog signal. A low-power light, 56 feet above the water, is shown from a black skeleton tower on the west end of the breakwater.

A Federal project provides for a channel depth of 15 feet into Breakwater Harbor from the tip of Cape Henlopen to a large fish pier a mile southwest of Breakwater Harbor Light. In March 1960, the controlling depth was 8 feet in the channel.

Breakwater Harbor has depths of 7 to 11 feet between the inner breakwater and the project channel. The harbor is usually crowded during heavy weather, and vessels drawing more than 7 feet should then anchor northwest of the breakwater where depths are 16 to 25 feet, mud bottom, in an extensive area sheltered from southeasterly and northeasterly winds.

Channel depths can be carried to most of the several piers along the shore of Breakwater Harbor. **Lewes Coast Guard Station,** 1.3 miles southwest of Breakwater Harbor Light, has a pier with depths of about 8 feet at the outer end.

Roosevelt Inlet, 3 miles west of Cape Henlopen, is the Delaware Bay entrance to the **Lewes and Rehoboth Canal,** which is described in Chapter 8. The jettied entrance is well marked.

Chart 1218—The low, marshy southwestern shore of Delaware Bay has few prominent marks above Delaware Breakwater. There are scattered groups of houses, a few observation towers, and the lights and ranges of the tributaries.

The tributaries are narrow and crooked and vessels have difficulties in making some of the turns. These streams are little used except by local fishing boats and by vessels carrying petroleum products to the towns along the banks. Strangers seldom attempt to enter. When entering or leaving these tributaries, allowance should be made for the bay currents which set across the entrances and have considerable velocity at times.

There are many shoal spots with depths as shallow as 2 to 6 feet between Delaware Breakwater and Bombay Hook Point. Most of the spots are unmarked and are subject to some change, both in depth and position. Strangers should proceed with caution in any of the passages southwest of the ship channel.

A line of fairway buoys marks a passage along the southwestern side of Delaware Bay from a point about 8 miles northwest of Cape Henlopen and 3 miles offshore to the lighted bell buoy 1.5 miles off the entrance to Murderkill River. The passage is used by most vessels entering or leaving the tributaries, and is said to lead clear of dangers if the buoys are followed closely, but it is close to the shoal spots in some places. The many fish and oyster stakes in the area also are to be avoided. The passage should not be attempted at night.

Vessels entering the southwestern passage from northward usually leave the main ship channel about 2.5 miles below Ship John Shoal Light, pass close eastward of the buoy 2 miles off the entrance to Leipsic River, and steer approximately due south for the vicinity of the lighted bell buoy off Murderkill River. A 4-foot spot is about midway along a direct course between the two buoys, but a depth of about 7 feet can be carried by shifting course toward Little River when nearing the shoal.

Mispillion River empties into Delaware Bay from westward 13 miles northwest of Cape Henlopen. The river is used by pleasure and fishing craft, and by oil and fertilizer barges bound for Milford. The controlling depth in the dredged channel in 1957 was reported to be 5 feet to the highway bridge 0.5 mile below Milford, and thence 4½ feet to **Milford,** 10 miles above the mouth.

The entrance is protected by jetties, about 200 feet apart, which extend about a mile southeastward from shore. The southwest jetty end is marked by a light. The mean range of tide is 4.6 feet in the entrance. The current velocity is 1.5 knots on the flood and 1.0 knot on the ebb. Gasoline and water can be obtained at a small landing just inside the mouth of the river. The fertilizer, oil, and powerplant wharves have depths of 5 to 7 feet alongside, mud bottom.

The highway bridge about 0.5 mile below Milford has a bascule span with a width of 45 feet and a clearance of 5 feet. Just below the Milford fixed highway bridge, which is the head of navigation, is a marine railway that can haul out boats up to 55 feet in length. Depth at the landing is about 6 feet. Dockage, hull and engine repairs, and a full line of marine supplies are available. Just below the first highway bridge, 0.5 mile below Milford, there is a marine railway that can haul out boats up to 47 feet in length, for hull and engine repairs. Some marine supplies are available, and boats can be stored.

Murderkill River, 21 miles northwestward of Cape Henlopen, has a dredged entrance channel which had a controlling depth of 3½ feet, in 1959. The mean range of tide is 4.8 feet in the entrance.

A lighted range marks the entrance to Murderkill River, and a lighted bell buoy about 1.5 miles offshore is near the intersection of this range and the range for entering St. Jones River, to the northward.

Bowers (P.O.), a village and summer resort on the north side of the entrance to Murderkill River, is fairly prominent from offshore. Gasoline, water, ice, and provisions are available. A marine railway across the river from Bowers can haul out boats up to 50 feet in length, for engine and hull repairs. The wharves along Mur-

derkill River are used extensively by fishing and oyster boats. The overhead power cable crossing the river at Bowers has a clearance of 58 feet.

St. Jones River, 0.5 mile north of Murderkill River, leads to the city of **Dover,** the capital of the State of Delaware. The river is used mostly by shell fishermen. Reported depths in 1957 were 3 feet across the bar, thence 5 feet to Lebanon, and thence 3½ feet to Dover. A lighted range marks the approach to St. Jones River from the buoy previously mentioned in the discussion of the approach to Murderkill River. The mean range of tide is 4.8 feet in the entrance.

A highway bridge over St. Jones River at **Barkers Landing,** 3 miles above the mouth, has a bascule span with a clearance of 5 feet. The cannery wharf at the landing is in ruins. One mile inland southwestward of the bridge is the village of **Magnolia.** A highway bridge over the river at **Lebanon,** 6 miles above the mouth, has a swing span with a width of 30 feet and a clearance of 6 feet; see **203.237,** Chapter 2, for **drawspan regulations.** The overhead power cable at the drawbrige has a clearance of 50 feet. The fixed highway bridge 9 miles above the mouth has a clearance of 13 feet. Navigation ends below the lower bridge at Dover, which is 10 miles above the mouth of the river. There are no landings at Dover.

Little River, 6 miles northward of Murderkill River, is navigable to the highway bridge at the village of **Little Creek,** 2 miles above the mouth. The controlling depth was ½ foot from Delaware Bay to Little Creek, in 1956. A lighted range marks the entrance. The mean range of tide is 5.4 feet in the entrance.

Mahon River, 7.5 miles northward of Murderkill River, is marked by a light, which is on the south side of the river and 0.2 mile above the mouth. The river has depths of 5 feet across the bar at the mouth with considerably deeper water inside, and is used extensively by shell fishermen. Gasoline, diesel fuel, water, and some groceries can be obtained at a landing 0.8 mile above the mouth.

Leipsic River, 11 miles northward of Murderkill River, is used considerably by shell fishermen. The controlling depth in 1957 was 5 feet from Delaware Bay to Leipsic, 7 miles above the mouth. The entrance is marked by a lighted range. The mean range of tide is 5.4 feet in the entrance, 3.5 feet at Leipsic, and 2.5 feet at the head of navigation. The wharves at **Leipsic** have depths of 5 to 8 feet alongside; gasoline, fresh water, and groceries are available. The fixed highway bridge at Leipsic has a clearance of 13 feet.

Smyrna River, 9 miles northwestward of Leipsic River and 3 miles southeastward of Liston Point, is navigable to **Smyrna Landing,** about 8 miles above the mouth and 1 mile from the town of **Smyrna.** Reported depths in 1959 were 2 feet from Delaware Bay for 3 miles above the mouth of the river to Flemings Landing, thence 1½ feet to Smyrna Landing.

The entrance to Smyrna River is protected by jetties, the southeasterly of which extends about 0.5 mile from shore and is marked at its outer end by a light. The entrance also is marked by a lighted range. The prolongation of the range line leads across a shoal, with depths of 5 feet, about 1 mile offshore. Local vessels usually enter near high water when the shoal can be crossed on the range. If entering at low water, they pass well southward of the shoal and then steer northwestward behind it until on the range, but some local knowledge is required to carry the best water. Within the river the best water generally follows a midchannel course or favors the ebb-tide bends.

The mean range of tide is 5.8 feet in the entrance to Smyrna River and 3.5 feet at Smyrna Landing. The current velocity is 1.4 knots in the entrance. The highway bridge at **Flemings Landing,** 3 miles above the mouth, has a swing span with a width of 36 feet and a clearance of 5 feet; the bridge is seldom opened as the river is little used above the bridge. A small marine railway at Flemings Landing can haul out boats up to 35 feet in length.

The New Jersey side of Delaware Bay is low, with few prominent marks. The principal tributaries are Maurice and Cohansey Rivers, which have considerable trade; there are also many small creeks used mostly by fishing boats. General depths along this side of the bay are 7 to 15 feet, but there are many spots with depths of less than 6 feet. The shoals generally are not marked and some local knowledge is needed to avoid them. Most of the creeks have bars across their mouths.

The channels have strong currents, and many tide rips form near Prissy Wicks Shoal. In Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb. In the channel immediately northwestward of Overfalls Shoal, the velocity is 1.1 knots on the flood and 1.6 knots on the ebb.

Cape May Canal, 2 miles northward of Cape May Light, is described in Chapter 5 in connection with the New Jersey Intracoastal Waterway. Farther north are several creeks, the first of any importance to navigation being **Bidwell Creek,** a drainage canal 12 miles north-northeastward of Cape May Light. The canal has depths of about 3 feet at the jettied entrance and deeper water inside to the fixed highway bridge 1.5 miles above the jetties.

Deadman Shoal, 6 miles west-southwestward of Bidwell Creek and 10 miles north-northwestward of Cape May Light, has a minimum depth of 3 feet and is marked by buoys. A ridge with depths of 5 to 7 feet begins a mile westward of Deadman Shoal and extends southward about 3 miles.

Dennis Creek, 14 miles north-northeastward of Cape May Light, has depths of about 2 feet over the flats at the mouth and much deeper water inside to **Jakes Landing,** about 3 miles upstream. The creek is navigable for a considerable distance, but has no commerce and is little used.

Maurice River flows into the northeast corner of **Maurice River Cove** 17 miles north-northwestward of Cape May Light. The dome of a white abandoned lighthouse is prominent on **East Point,** on the east side of the entrance. The landings near the mouth of Maurice River comprise the center of a large shellfish industry, and a considerable

tonnage of logs is handled on the upper river. There is also a grain elevator at Millvale. The reported depths in 1957 were 8 feet through the marked bar channel and up Maurice River to the town of Bivalve, thence 5 feet to the town of Millvale. The main channel is west of an island in midentrance and is marked by a lighted range, lights, and buoys. An unmarked channel on the opposite side of the island has depths of 2½ feet and is much used by local boats.

For about 15 miles above the mouth the channel in **Maurice River** has ample width and is easily followed; without local knowledge it is safer to navigate this part of the river on a rising tide and to proceed with caution. The upper part is narrow, but is marked by buoys which are not charted; towboats bound to or from this part of the river usually run with the current.

The mean range of tide is 5.7 feet in the entrance to Maurice River and 6.0 feet at Millville; high and low waters at Millville are about 2 hours later than at the entrance. The current velocity is 1.0 knot in the entrance and 2.3 knots at Mauricetown; at Millville, the flood is very weak and the ebb velocity is 0.4 knot.

Bivalve, on the west bank 3 miles above the mouth, is an important oyster-shipping point. Available supplies include gasoline, groceries, and water. See Appendix for **storm warning displays.**

The town of **Maurice River,** on the opposite side of the stream from Bivalve, has an oyster-packing plant. **Shell Pile (South Port Norris),** on the west bank 3.5 miles above the mouth, has several oyster-packing plants; the wharves have deep water alongside. **Leesburg,** on the east bank 7 miles above the mouth, has a boatyard that can haul out vessels up to 120 feet in length, for hull and engine repairs. Available supplies include gasoline, water, and marine hardware. **Dorchester,** on the east bank 9 miles above the mouth, has a boatyard that can haul out vessels up to 160 feet in length; marine supplies are available at the yard. The wharves have relatively deep water alongside. **Mauricetown,** on the west bank 10 miles above the mouth, has a marine railway that can haul out boats up to 65 feet in length; boat owners must make their own repairs. The highway bridge over the river at Mauricetown has a swing span with a clearance of 3 feet; the overhead power cable on the south side of the bridge has a clearance of 67 feet.

Port Elizabeth, on the east bank 12 miles above the mouth, has a yard that can haul out craft up to 45 feet in length; an outboard motor shop and marine supplies are available. About 1.5 miles above the town is another yard that can haul out boats up to 40 feet in length, for hull and engine repairs; marine hardware is available.

The overhead power cable about a mile south of Millville has a clearance of 67 feet.

Millville, on the east bank 20 miles above the mouth, is the site of several factories. Gasoline and groceries can be obtained. The highway bridge here has a swing span with a width of 36 feet and a clearance of 5 feet; see **203.225, Chapter 2, for drawspan regulations.** Just below the bridge is a yard that builds yachts but will make emergency repairs on boats up to 55 feet in length. The head of navigation is a mill dam a mile above the bridge.

Egg Island Point 17 miles north-northwest of Cape May Light, is marked by a light. Southward of the point are **Egg Island Flats,** which have depths as little as 3 feet; the shallowest parts are marked by buoys. The flats are thick with oyster-bed stakes. Between Egg Island Point and the inner end of the flats is a slough, with depths of 7 feet, used by local boats.

Fortescue Creek, 4 miles north-northwestward of Egg Island Point, has a light on the south side of the entrance. The creek is reported to have depths of 3 feet to the highway bridge at **Fortescue** (P.O.), a small village and summer settlement on the south side 0.4 mile above the entrance. Gasoline, water, and ice can be obtained at a Fortescue dock, and food stores are within 0.5 mile. Near the bridge are two marine railways that can haul out boats up to 45 feet in length; a nearby machine shop can make hull and gasoline engine repairs.

Nantuxent Point, 8 miles northwestward of Egg Island Point, is on the southeast side of the entrance to **Nantuxent Cove.** A light marks the point and a buoy marks the outer limit of the 5- and 6-foot spots that extend a mile off.

Nantuxent Creek, on the northwest side of Nantuxent Point, has depths of about 5 feet in the mouth and is navigated at high water by local oyster boats for about 5 miles to within a mile of the village of **Newport.** At **Money Island,** the town about 1.2 miles above the mouth, there are several marine railways that can haul out boats up to 50 feet in length.

Back Creek, 2 miles northwestward of Nantuxent Point, is used by local boats only as an anchorage. The creek has depths of about 5 feet over the flats at the entrance and good depths for about 3 miles above.

Ben Davis Point, 2 miles west-northwestward of Nantuxent Point and 10 miles northwestward of Egg Island Point, is on the northwest side of the entrance to Nantuxent Cove. It is marked by a light. Shoals to be avoided are the 1-foot spot a mile southwest of the point and 5-foot **Ben Davis Point Shoal,** which is 2.5 miles south by west of the point and within 0.7 mile of the main channel through the bay.

Cohansey River empties into the northeast side of Delaware Bay 14 miles northwestward of Egg Island Point. The water-borne commerce is mostly in petroleum products, but sizable tonnage of shellfish, shells, and fertilizer also are transported on the river.

Cohansey Light (39°20.5′ N., 75°21.7′ W.), 42 feet above the water, is shown from a skeleton tower on a concrete foundation on the south side of Cohansey River near the natural entrance. A dredged cut through the narrow neck of land on which the light stands gives a more direct approach to the river; the cut, 0.3 mile northwest of Cohansey Light, is marked on its west side by lights at the inner and outer ends. Reported depths in 1957 were 11 feet in the entrance and to Greenwich Pier, thence 6 feet to Fairton, and thence 2½ feet to Bridgeton. The usual approach to Cohansey River is along the axis

of the dredged cut, but the natural channel eastward of Cohansey Light is sometimes used; the latter has a controlling depth of about 7 feet, and unmarked shoals with depths of 4 to 6 feet must be avoided on either side. Within the river, the natural channel has ample width and depth to within a mile of Bridgeton; thence to Bridgeton is a dredged channel which requires some local knowledge to follow.

The mean range of tide is 6.0 feet in the entrance to Cohansey River and 6.5 feet at Bridgeton; high water at Bridgeton is about 2 hours later than at the entrance. The current velocity is 1.3 knots a half mile above the entrance and less than 0.5 knot at Bridgeton.

Greenwich Pier, a shipping point for seafood, is on the northwest bank of Cohansey River 4 miles above the entrance. Gasoline, water, and groceries can be obtained at the oyster pier. The larger of two marine railways at Greenwich Pier can haul out boats up to 80 feet in length, for hull and engine repairs. A machine shop in Bridgeton is associated with this yard. **Fairton** is a village on the southeast bank of Cohansey River 14 miles above the entrance. The largest of several marine railways at the village can haul out boats up to 50 feet in length.

Bridgeton, 17 miles above the entrance, is an important manufacturing town and rail center. Depths at the main wharves are 8 to 12 feet. Available supplies include gasoline, groceries, marine hardware, and water. About 0.2 mile below the Board Street bridge is an overhead power cable with a clearance of 44 feet. The bridge has a 40-foot bascule span with a clearance of 6 feet; see **203.225,** Chapter 2, for **drawspan regulations.** The limiting clearance of two fixed bridges above that is 5½ feet.

Chart 294.—Bay Side, about 3 miles northwestward of Cohansey Light, is a fishing resort on the east side of the entrance to **Stow Creek.** The latter creek has some traffic for about 10 miles to Stow Creek Landing. Gasoline, water, and ice are available at Bay Side.

The dividing line between **Delaware River** and Delaware Bay is 42 miles above the Delaware Capes. The line, defined arbitrarily by the legislatures of Delaware and New Jersey, extends from a monument on **Liston Point,** Delaware, to a similar monument on the south side of the entrance to **Hope Creek,** New Jersey.

From **Stony Point,** 1 mile northwest of Hope Creek, a large filled area extends, behind dikes and bulkheads, a mile westward, thence 2.5 miles northward inclosing the shallowest part of **Baker Shoal,** and thence southward and eastward to the original shore. The fill is referred to by the Corps of Engineers as **Artificial Island.**

Alloway Creek empties into Delaware River from eastward 3.5 miles above Hope Creek and behind the north end of the Baker Shoal fill. The controlling depth was 3 feet to Quinton in 1959; the creek is not used above Hancocks Bridge. The approach to Alloway Creek is unmarked, and the shoals on either side of the mouth must be avoided. Above the mouth the best water is not always in midstream, and some local knowledge is needed to follow it. The mean range of tide is 5.5 feet in the entrance and 4.0 feet at Quinton. The current velocity is 2.1 knots 0.2 mile above the entrance and 1.4 knots at New Bridge.

Hancocks Bridge, 4 miles above the mouth of Alloway Creek, has a swing span with a width of 40 feet and a clearance of 4 feet; the best water is in the north opening. Gasoline can be obtained at small bulkhead landings at Hancocks Bridge and groceries in the settlement. **New Bridge,** 5.5 miles above the mouth, has a swing span with a width of 35 feet and a clearance of 3 feet. The highway bridge at **Quinton,** 8 miles above the mouth of the creek, has a swing span with a width of 30 feet and a clearance of 3 feet. See **203.225,** Chapter 2, for **drawspan regulations.**

Salem River flows into **Salem Cove** from eastward, 51 miles above the Delaware Capes and on the opposite side of Delaware River from the entrance to the Chesapeake and Delaware Canal. Commerce on Salem River is almost entirely in petroleum products. The approach channel follows the southeast side of Salem Cove for about 2 miles to the mouth of the river; it is marked by buoys and a lighted range. Within the river, the channel enters a land cut 0.8 mile above the mouth and returns to the river 1.3 miles from the mouth; the river channel is marked by buoys as far as the cut. Controlling depths in 1957 were 9 feet across Salem Cove, thence 10 feet through the cutoff to the drawbridge at Salem.

The mean range of tide is 5.6 feet in the entrance and at Salem; the tides at Salem are about 20 minutes later than at the entrance. The current velocity is 1.6 knots in the entrance.

The highway bridge 1.8 miles above the mouth of Salem River has a 60-foot bascule span with a clearance of 7 feet; the overhead power cable at the bridge has a clearance of 64 feet. On the south shore just below the bridge is a marine railway that can haul out boats up to 48 feet in length for repairs and storage; gasoline and groceries are available.

Appoquinimink River is on the west side of Delaware River, 3 miles above Liston Point. The river has no commerce, and is little used except by pleasure craft and a few fishing boats. Controlling depth to Odessa was reported to be 2 feet, in 1957. The mean range of tide is 5.7 feet in the entrance; the current velocity is 1.1 knots. The highway bridge 3 miles above the mouth has a swing span with a width of 39 feet and a clearance of 7 feet; see **203.236,** Chapter 2, for **drawspan regulations.** The swing bridge at **Odessa,** 5.5 miles above the mouth, has a clear opening 40 feet wide and a clearance of 5 feet, but has not been opened for many years.

Reedy Island, 6 miles northward along Delaware River main channel from Liston Point and midway between the channel and the western shore, is the site of a former Federal quarantine and detention station. The pier on the channel side of the island has a depth of 10 feet at the outer end; the current velocity is 2.5 knots off the pier. A dike extends 3 miles southward from Reedy Island and roughly parallels the western shore; the dike is marked by lights, and a buoy is moored off the submerged southern end.

Port Penn is a village on the western shore opposite

Reedy Island. The best approach to the village is through an opening in the Reedy Island dike; the opening is 0.2 mile south of the island, is 5 feet deep and 150 feet wide, and marked on each side by a daybeacon. Approaches to the village from north of Reedy Island or from south of the dike are over flats with depths of 2 feet. Anchorage depths off Port Penn are 15 feet or more, but depths at the piers are relatively shallow.

The **Chesapeake and Delaware Canal** extends westward from a point on the main channel of Delaware River 51 miles above the Delaware Capes. The canal is described in Chapter 7.

Pea Patch Island, in midriver 53 miles above the Delaware Capes, is on the west side of the main channel. The low island is the site of old **Fort Delaware.** The Fort Delaware wharf, on the main channel side of the island, is marked by a light. A dike, mostly submerged at high water, extends northward along Bulkhead Shoal for about 3 miles from Pea Patch Island; the dike is marked by lights, one of which is on the south side of a shallow opening a mile from the island. The current velocity is 2.1 knots in the main channel east of the island.

Delaware City is on the southwest side of Delaware River opposite Pea Patch Island. **Delaware City Branch Channel,** which extends southward from the riverfront of the town to the Chesapeake and Delaware Canal, is described in Chapter 7. Depths alongside the Delaware City bulkhead range from 6 feet to 2 feet.

Bulkhead Shoal Channel, with natural depths of 15 feet or more, extends northwestward between Pea Patch Island and Delaware City, thence northward between Bulkhead Shoal and the western shore. The current velocity is 2.3 knots in the channel.

A dredged cut, marked by a privately maintained lighted range bearing 306°, extends northwestward through Bulkhead Shoal Channel from Delaware River main channel to the oil-refinery wharves on the northwest side of Delaware City. Fresh water is available on the wharves, and vessels can be bunkered at the rate of 6,000 barrels an hour. In 1957, the controlling depth was 27 feet in the refinery cut.

New Castle, on the west bank of Delaware River 57 miles above the Delaware Capes, has little water-borne commerce. The principal public wharf has depths of 15 feet alongside. The yacht basin is reported to go dry at low water and with adverse winds. Several stone fenders that stand about 5 feet above high water protect the wharves from drifting ice.

Pennsville is on the east bank of Delaware River 58 miles above the Delaware Capes. The principal pier, with a depth of 10 feet at the outer end, is used by excursion boats from Wilmington and Philadelphia during the summer. A mile northeast of the Pennsville docks, a dike extends out from shore and parallels at a distance of 0.3 mile for about 0.7 mile toward the docks.

Delaware Memorial Bridge, 60 miles above the Delaware Capes, has a suspension channel span with a clearance of 166 feet.

Salem Canal, just north of the eastern end of the bridge, once gave access to the upper part of Salem River, described earlier. The route is now blocked in several places, the first being at a dam about 300 yards above the mouth.

Deepwater Point, 0.6 mile above the New Jersey end of the Memorial Bridge is the site of a large chemical plant and has a long main wharf and a railroad car-float bridge. The main wharf has depths of 30 feet at the face.

Pigeon Point, 0.6 mile above the Delaware end of the Memorial Bridge, has a railroad car-float bridge and a coal pier for bunkering light-draft vessels. The coal pier has depths of 12 feet at the face.

Christina River empties into the west side of Delaware River 61.5 miles above the Delaware Capes. The river is the approach to the city of Wilmington and to the towns of Newport and Christiana. A steel sheet-pile jetty 0.4 mile long is on the south side of the entrance to Christina River.

The entrance and first reach of the river channel are marked by lights and a lighted range.

Wilmington Marine Terminal, 0.7 mile above the mouth of Christina River, provides depths of about 34 feet alongside its bulkheaded waterfront facilities, and can accommodate at one time several vessels of any draft able to come through the entrance channel. The terminal has rail and highway connections, modern storage facilities, and mechanical freight-handling equipment.

Lobdell Canal, on the south side of Christina River 0.9 mile above the mouth, is used by towboats and barges and has depths of about 8 feet alongside the bulkheads.

Brandywine Creek on the northeast side of Christina River 1.6 miles above the mouth, has depths of about 4 feet to the railroad bridge 1 mile above its mouth. The channel is rocky above the railroad bridge, but depths of 1 to 2 feet can be carried 0.7 mile to Market Street bridge, above which there are rapids. The river is used mostly for anchorage and storage of pleasure boats.

Wilmington, on the north side of Christina River 2.5 miles above the mouth, has large manufacturing interests and considerable water-borne commerce. At the city, both sides of the river are lined with wharves which will accommodate the drafts using the channels.

Newport, on the north side of Christina River 8 miles above the mouth, is at the head of practical navigation.

Channels.—A Federal project provides for a channel 35 feet deep from Delaware River to Lobdell Canal, thence 21 feet to the former pulp works 3.7 miles above the mouth, thence 10 feet to the railroad bridge 3.8 miles above the mouth, and thence 7 feet deep to Newport. In March 1961, project dimensions obtained to Lobdell Canal; above that, in 1960, the centerline depths were 14 feet to Market Street, thence 13 feet to the former pulp works, and thence 6 feet to the railroad bridge 3.8 miles above the mouth.

Anchorages.—Vessels must not anchor in Christina River channel within the city limits of Wilmington or tie up at any wharf more than two abreast without per-

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mission of the harbor commissioners. An anchorage area is off Deepwater Point, south of the river entrance; see **202.157**, Chapter 2, for limits and regulations.

Bridges.—There are no bridges over the deep-water section of Christina River. From the railroad bridge 1.4 miles above the mouth to the highway bridge at Newport, 8 miles above the mouth, all the bridges have drawspans. Minimum clearance is 2 feet at the railroad bridge, 5 miles above the mouth, which has a drawspan with a width of 37 feet which is the minimum width. See **203.235**, Chapter 2, for **drawspan regulations.** Clearances of the overhead cables are: 140 feet just above the first bridge, 80 feet at the railroad bridge 3.8 miles above the mouth, and 64 feet at Newport.

Over Brandywine Creek, the highway bridge 0.1 mile above the mouth has a swing span with a width of 48 feet and a clearance of 10 feet. The railroad bridge about a mile above the mouth has a swing span with a width of 48 feet and a clearance of 21 feet. See **203.230**, Chapter 2, for **drawspan regulations.**

The power cable over Brandywine Creek on the lower side of the first bridge has a clearance of 59 feet.

Tides and currents.—The mean range of tide is 5.7 feet at Wilmington. The current velocity is 0.8 knot.

Local magnetic disturbance.—Differences of as much as 2° to 5° from normal variation have been observed along the channel from Artifical Island to Marcus Hook.

Quarantine.—The quarantine station is at Marcus Hook, 7 miles up Delaware River from Wilmington. The Public Health Service has an outpatient office in Wilmington.

Customs.—Wilmington is a Customs port of entry at which marine documents are issued.

Immigration and naturalization.—At the port of Wilmington inbound vessels carrying aliens are boarded at their docks by immigration inspectors from Philadelphia or Reedy Island, who will, after examining passengers, either grant them entry or direct the vessel to hold them for further examination.

Harbor regulations.—The speed of vessels in Christina River is limited to 8 statute miles per hour; see **207.80**, Chapter 2.

Supplies.—At the Wilmington Marine Terminal, vessels can be furnished pure water from pipe connections with the city mains. The nearest coal-bunkering facilities for large vessels are at Philadelphia; the Wilmington Marine Terminal offers its facilities for bunkering purposes but, as it maintains no stocks of coal, special orders must be placed for delivery at shipside. Towboats and other light-draft vessels can secure bunker coal at Pigeon Point. The nearest facilities for supplying deep-draft vessels with bunker oil are at Marcus Hook. Light-draft vessels can obtain bunker oil at a wharf on the south side of Christina River just above the second bridge; the depth at the wharf is about 8 feet.

Repairs.—Wilmington has several marine railways; the largest can haul out vessels up to 85 feet in length. A barge-building company has several cranes of 15 to 30 tons capacity, machine shops, and a floating drydock that can take steel hulls up to 115 feet in length.

Communications.—Wilmington is served by three railroads. The principal airport serving the area is the New Castle County Airport, 5 miles southwest of Wilmington; regular scheduled passenger service is maintained.

Chart 295.—**Carney Point,** across Delaware River from Christina River, is the site of a powder factory. A tank and a stack are prominent.

Penns Grove is a railroad terminus on the east side of Delaware River 63 miles above the Delaware Capes. The wharf at the town has a depth of about 12 feet at the outer end.

Edgemoor is directly across Delaware River from Penns Grove. The two Government piers at Edgemoor have depths of 17 feet at their outer ends and 15 feet in the basin between them. The Corps of Engineers has a suboffice at the basin. About 400 yards to the southwestward is a wharf with depths of 16 feet alongside.

The Corps of Engineers has requested masters to limit the **speed** of their vessels to 6 knots when passing piers and wharves along Delaware River, in order to avoid damage caused by excessive wave action.

A dike with its outer end submerged extends 0.3 mile offshore from **Oldmans Point,** on the eastern shore of Delaware River 2 miles above Penns Grove. About 0.3 mile southward of the dike are the ruins of a long pier.

Oldmans Creek, on the southeast side of Delaware River 67 miles above the Delaware Capes, is the approach to **New Bridge (Nortonville), Pedricktown,** and **Auburn.** There is very little traffic on the creek. In 1957, the controlling depth was 3 feet in the entrance, and thence 1½ feet to Auburn. The approach channel is marked by buoys. The mean range of tide is 5.6 feet in the entrance.

The limiting clearance of the three drawbridges over the creek is the 2 feet of the railroad swing span, about 2.4 miles above the mouth. The minimum width of openings is 36 feet. See **203.225**, Chapter 2, for **drawspan regulations.** The overhead cable near Auburn has a clearance of 64 feet.

Marcus Hook, Pennsylvania, on the northwest bank of Delaware River 69 miles above the Delaware Capes, is an important center at which large quantities of crude oil are received and refined. The oil companies at Marcus Hook have wharves with depths of 30 to 34 feet at their faces, where vessels can be bunkered at the rate of 1,500 to 1,800 barrels per hour. The companies also operate barges for bunkering in the streams or alongside other wharves.

A Federal **quarantine and detention station** for Delaware River ports is maintained at the foot of Market Street in Marcus Hook by the U.S. Public Health Service. The station wharf has a depth of 14 feet at the outer end. **Regulations** governing use of the wharf are given in **207.90**, Chapter 2.

A daytime **reporting station** of the Philadelphia Maritime Exchange is on the Sun Oil Wharf at the lower end of the city waterfront.

On the southeast side of the main ship channel opposite Marcus Hook is a **preferential anchorage ground** for ves-

sels awaiting quarantine inspection; see **202.157**, Chapter 2, for limits and regulations. The current velocity is 1.7 knots.

Raccoon Creek, on the southeast side of Delaware River 70 miles above the Capes, is the approach to the towns of Bridgeport and Swedesboro. The creek carries some traffic in fertilizers and fertilizer materials. The approach to Raccoon Creek is a channel that extends west-southwestward through the shallow flats for 1.1 miles from the mouth. Reported depths in 1957 were 4 feet to Bridgeport, and thence 3 feet to Swedesboro.

The approach channel is marked by buoys, and a light marks the outer end of the rock jetty on the south side of the entrance. The mean range of tide is 5.7 feet in the entrance.

The highway bridge over Raccoon Creek at **Bridgeport,** 1.5 miles above the mouth, has a vertical-lift span with clearances of 6 feet down and 64 feet up. The railroad bridge 0.3 mile above the highway bridge has a swing span with a width of 38 feet and a clearance of 7 feet. A boatyard on the east side just south of the highway bridge can make minor repairs.

The landings between Bridgeport and Swedesboro are in ruins. The overhead power cable 5.5 miles above the mouth has a clearance of 75 feet. The highway bridge 6.7 miles above the mouth has a swing span with a clearance of 6 feet. The fixed railroad bridge at **Swedesboro,** 7.1 miles above the mouth, has a width of 33 feet and a clearance of 21 feet. The fixed highway bridge 0.3 mile above the railroad bridge has a clearance of 8 feet.

An overhead power cable across Delaware River near the northeast end of Marcus Hook Range has a clearance of 210 feet.

A ferry landing on the southeast side of Delaware River, 0.7 mile above Raccoon Creek, serves the cross-river passenger and vehicular ferry to Chester. The ferry landing is connected with the town of Bridgeport by a highway.

Chester, on the northwest side of Delaware River 72 miles above Delaware Capes, is an important manufacturing center, and many of its industries use the wharf facilities along the 3-mile waterfront. The nearest designated anchorage is off Marcus Hook. Chester is a **customs** port of entry.

The majority of the wharves at Chester have depths of 15 to 20 feet at their faces; some have as little as 5 feet, and the **Chester Tidewater Terminal,** near the lower end of the waterfront, has 35 feet. There are storage facilities, mechanical transfer equipment, and rail and highway connections.

Water is piped to the principal wharves. None of the wharves have facilities for coal or oil bunkering. One of the largest shipyards and ship-repair plants along the Atlantic seaboard is at Chester; each of its two floating drydocks has a capacity of 10,000 tons.

Chester Creek empties into Delaware River about at the mid-point of the city waterfront. The railroad bridge just above the mouth has a swing span with a clearance of 1½ feet; see **203.229**, Chapter 2, for **drawspan regulations.** Above that point, navigation is restricted by the 6-foot minimum clearance of the 8 fixed bridges.

There is little waterborne traffic in Chester Creek, and what there is goes only as far as Second Street Bridge. The mean range of tide is 5.7 feet in the entrance. In 1957, the controlling depth was 2 feet to Second Street Bridge.

Eddystone, on the northwest side of Delaware River 74 miles above the Delaware Capes, has about 1.5 miles of waterfront. Most of the wharves have depths of about 8 feet at their faces. Off Eddystone, the current velocity is 1.7 knots on the flood and 2.2 knots on the ebb.

Darby Creek, about a mile above Eddystone, had controlling depths in 1957 of 20 feet to the second highway bridge about 1.5 miles above the mouth, and thence about 7 feet to Norwood. Oil barges and small tankers go to the wharf, which has depths of 9 feet alongside, on the east side just below the railroad bridges. Above the wharf, the creek is used only by small pleasure boats.

The railroad bridges 0.3 mile above the mouth have bascule spans with minimum clearances of 3 feet; see **203.228,** Chapter 2, for **drawspan regulations.** The fixed highway bridge just above the railroad bridges has a clearance of 22 feet.

Essington, on the north side of Delaware River 75 miles above the Capes, is the center and fitting-out point for the majority of the yachts in the Philadelphia area. Between Essington and Delaware River main channel is marshy **Little Tinicum Island,** which is about 2 miles long. There is a dike along the north shore of the passage east and north of Little Tinicum Island. An unmarked channel parallel to and about 450 feet from the centerline of the dike had a controlling depth of 5½ feet in 1957; shoals are on both sides of the channel. Local vessels usually pass around the west end of the island where the controlling depth is about 9 feet.

A special small-craft anchorage area is between the Essington waterfront and Little Tinicum Island; see **202.1, 202.67,** Chapter 2, for limits and regulations. Depths are 9 to 16 feet in the anchorage. The current velocity is 1.3 knots. Available supplies include gasoline, diesel fuel, water, ice, provisions, and marine hardware. One shipyard on the waterfront has four railways, the largest of which can haul out vessels up to 125 feet in length; the yard has a well-equipped machine shop.

A railroad car-float bridge is on **Thompson Point** on the New Jersey side of Delaware River opposite the west end of Little Tinicum Island. Between Thompson Point and **Crab Point,** 0.5 mile to the eastward, are the large buildings of a chemical plant. The principal wharves on Crab Point have depths of 32 feet at their faces. A general anchorage area is between the two points and the south side of the main channel; see **202.157,** Chapter 2, for limits and regulations. The current velocity is 2.0 knots a half mile east of Crab Point.

Bramell Point, on the south side of Delaware River 76.5 miles above the Capes, is the site of a large oil refinery. The bulkhead wharf is 2,500 feet long and has depths of 35 feet at the face. Vessels can be bunkered at the rate of 3,700 barrels per hour. There are two oil

piers between Bramwell Point and Billingsport; vessels are not bunkered at these piers.

Billingsport, 1.2 miles eastward of Bramell Point, has an oil pier with depths of 35 feet alongside. Vessels can be bunkered at the rate of 2,500 barrels per hour.

Mantua Creek, on the southeast side of Delaware River 78 miles above the Delaware Capes, is the approach to the town of **Paulsboro** and to the villages of **Mount Royal** and **Mantua.** The creek has considerable traffic in chemicals and fertilizers as far as the Paulsboro bridges, above which it is little used except by small boats.

Controlling depths in June 1960 were 13½ feet to the chemical plant, and thence 5½ feet to Friars Landing, and 2½ feet to Parkers Landing.

The outer ends of the jetties are marked by lights and the channel within Mantua Creek is marked by buoys to the fertilizer wharf 0.3 mile up. The mean range of tide is 5.7 feet in the entrance.

The Pennsylvania Railroad bridge over Mantua Creek at Paulsboro, 1.3 miles above the mouth, has a swing span with a width of 32 feet and a clearance of 1 foot. The highway bridge 0.2 mile above the railroad bridge has a vertical-lift span with clearances of 5 feet down and 65 feet up; the overhead power cable about 250 yards above the bridge has a clearance of 66 feet. The fixed highway bridge 2.4 miles above the mouth has a clearance of 25 feet. About 3.1 miles above the mouth is an overhead power cable with a clearance of 50 feet. There is very little traffic above this point, and the fixed bridges restrict navigation to clearances of 13 feet as far as Mantua.

The fertilizer wharf 0.3 mile above the mouth of Mantua Creek has a depth of about 20 feet at the face. One of the wharves at the chemical plant, 0.7 mile above the mouth, has a depth of 14 feet at the face. The wharves between the Paulsboro bridges have depths of 5 to 7 feet, and the wharves above the highway bridge have depths of 10 to 12 feet at their faces.

The **Hog Island** wharf, on the northwest side of Delaware River 78 miles above the Capes, is 0.6 mile long and has depths of 32 feet alongside. A general **anchorage** area is on the opposite side of the main channel; see **202.157,** Chapter 2, for limits and regulations. The current velocity is 2.0 knots in the channel southeast of Hog Island.

Old **Fort Mifflin** is on the northwest side of Delaware River 79.5 miles above the Delaware Capes. The Corps of Engineers wharves at Fort Mifflin have depths of 28 feet at the outer ends. The oil wharf 0.5 mile below the Engineers wharves has a 300-yard face with depths of 30 feet or more alongside.

Woodbury Creek, on the southeast side of Delaware River 79.5 miles above the Capes, has no commercial traffic. In 1957, reported depths were 4½ feet in the entrance and thence 6 feet to the first highway bridge. The entrance is marked by buoys, but some local knowledge is needed to carry the best water. The approach must be made from the northeast or west-southwest because of the 2-foot shoal directly off the creek. At low water the channel within the creek is well defined.

The highway bridge 0.8 mile above the mouth of Woodbury Creek has a swing span with a width of 39 feet and a clearance of 5½ feet. The fixed highway bridge 1.5 miles above the mouth has a clearance of 15 feet. The Broad Street bridge at **Woodbury,** 2.7 miles above the mouth, has a fixed span with a clearance of about 10 feet.

The mean range of tide is 5.7 feet in the entrance to Woodbury Creek.

Chart 280.—Philadelphia, Pennsylvania, one of the chief ports of the United States, is at the junction of Delaware and Schuylkill Rivers. The mid-harbor point along Delaware River is at Chestnut Street, 86.5 miles above the Delaware Capes.

The Port of Philadelphia, as defined for Customs purposes, comprises such waters of the Delaware and Schuylkill Rivers bordering on the Municipality as are navigable; the municipal limits on Delaware River extend from Fort Mifflin on the south to Poquessing Creek on the north, a distance of about 20 miles.

Principal imports are crude petroleum, raw sugar, molasses, chrome ore, and manganese ore. Exports are chiefly bituminous and anthracite coal, wheat and wheat flour, and refined petroleum products. Coastwise receipts are mostly crude petroleum, and shipments are mostly refined petroleum products.

Channels.—The main channel in Delaware River as far as the Philadelphia Naval Shipyard was covered at the beginning of the chapter. The Federal project provides for dredging depths of 37 feet to Allegheny Avenue. The channel from Allegheny Avenue to Trenton is discussed later.

Note.—In the Philadelphia-Trenton section of the river, masters are especially requested to limit speed of their vessels when passing wharves and piers so as to avoid damage by suction or wave wash to property or persons.

Anchorages.—See **202.157,** Chapter 2, for limits and regulations.

Bridges.—Walt Whitman Bridge, a highway suspension bridge that connects Philadelphia with Gloucester City, 84 miles above the Capes, has a clearance of 150 feet at the center of the main span, and minimum clearance of 137 feet under the full width of the main span. The **Benjamin Franklin Bridge,** 0.3 mile above Chestnut Street and 86.8 miles above the Capes, has a suspension span with a clearance of 135 feet.

Tides.—The mean range of tide is 5.9 feet at Philadelphia; see the Tide Tables for daily predictions.

Towage.—A large fleet of tugs is available at Philadelphia, day or night, for any type service required. As a general rule, tugs are not required by vessels moving between Philadelphia and the sea; most vessels traverse this distance under their own power.

Quarantine.—The national quarantine station at Marcus Hook is maintained by the U.S. Public Health Service primarily as a boarding station. The detention quarters are at Marcus Hook and the administrative offices and an outpatient clinic for merchant seaman are in Philadelphia.

Customs.—Philadelphia is a Customs district headquarters. Marine documents are issued.

Immigration.—The Immigration and Naturalization Service maintains a district office and an entry and departure office in Philadelphia.

Harbor regulations.—Local rules and regulations are enforced by the Navigation Commission for the Delaware River (Pennsylvania). The authority of the Commission extends from the Pennsylvania-Delaware boundary line on the south to the head of the navigable water of Delaware River on the north.

Wharves.—Philadelphia has more than 160 piers, wharves, and docks along its Delaware River front. Practically all of the piers between Greenwich Point, 3 miles below Chestnut Street, and Port Richmond, 2.5 miles above, have direct connections with the railroads. Cranes and derricks with lift capacities ranging up to 100 tons are available for public use at several piers, and arrangements for use of a 350-ton crane may be made with the Philadelphia Navy Yard on League Island. The port has two modern grain elevators, each with a storage capacity of more than two million bushels, one along Schuylkill River and the other at Port Richmond. Facilities for public storage of goods received or to be shipped by water include numerous warehouses.

Supplies.—An unlimited supply of water is available for drinking and use in boilers.

Bunker and cargo coal are handled at the Greenwich Point and Port Richmond tipples; the rate of delivery is up to 2,500 tons per hour at Greenwich Point and 1,700 tons per hour at Port Richmond. Bunker oil can be obtained at the terminals along the Schuylkill River and at Petty Island, N.J.; one terminal pumps at a rate of 1,000 barrels per hour through a 4-inch line and 1,500 barrels per hour through a 6-inch line. Many vessels receive bunker oil from barges alongside. Other oil terminals are at Marcus Hook, Pennsylvania, and at Bramell Point and Billingsport, Paulsboro, New Jersey.

Repairs.—A shipyard 1.3 miles above Chestnut Street has a complete plant, including various types of shops, for repairing vessels. The graving dock can handle vessels up to 640 feet in length, 70 feet in beam, and 32 feet in draft. Other repair facilities and marine railways are in Camden and Chester.

Communications.—Philadelphia is served by the Pennsylvania Railroad, the Baltimore and Ohio Railroad, and the Reading Railway. More than 50 steamship lines operate to and from the port. Several major airlines provide frequent scheduled services between **Philadelphia International Airport,** 5.5 miles southwest of City Hall, and domestic and overseas points.

Schuylkill River, which empties into the north side of Delaware River 80.5 miles above the Delaware Capes and 6 miles below Chestnut Street, is navigable for 7.3 miles to **Fairmount Dam** and is an important outlet for a part of the commerce of Philadelphia.

The Federal project provides for a channel 33 feet deep to Passyunk Avenue bridge, 3.1 miles above the mouth, thence 26 feet deep to Gibson Point, 4 miles above the mouth, and thence 22 feet deep to University Avenue bridge, 5.3 miles above the mouth. In 1960, the controlling depths were 30 feet to Passyunk Avenue bridge, thence 24 feet to Gibson Point, and thence 12 feet to the head of the project at University Avenue bridge. Above that point, most of the wharves have depths of about 12 feet at their faces.

A light marks the outer end of a sunken jetty on the east side of the entrance to Schuylkill River and a fog signal is on the west side. Lights, ranges, and buoys mark the channel within the river as far as the railroad bridge 4.5 miles above the mouth.

Within its project limits, Schuylkill River is crossed by five bridges, the first of which, the Penrose Avenue highway bridge 1.3 miles above the mouth, has a fixed span with a clearance of 135 feet. The others, all drawbridges, have minimum clearance of 22 feet. Above University Avenue, the limiting clearance of fixed bridges is 16 feet at the Pennsylvania Boulevard bridge, 6.5 miles above the mouth. See **203.227,** Chapter 2, for **drawspan regulations.**

The overhead power cable 250 yards below the Passyunk Avenue bridge has a clearance of 137 feet. The power cables 100 yards above the railroad bridge 5.6 miles from the mouth have a clearance of 100 feet.

The mean range of tide is 5.7 feet in Schuylkill River. The current velocity is 0.5 knot in the entrance.

The shores of Schuylkill River have become the center of the petroleum industry at the port of Philadelphia. Many piers and wharves along the river are controlled by oil companies. Vessels can obtain bunker oil at terminals on the north bank 1 mile above the mouth of the river, on the west bank 1.8 miles above the mouth, and at **Point Breeze,** 3 miles above the mouth. The **Girard Point** grain elevator on the north bank 0.7 mile above the mouth has a storage capacity of more than two million bushels. Depths at the faces of the bunkering and grain-elevator terminals are about 30 feet. Most of the other wharves along the river have depths of 9 to 12 feet at their faces.

League Island, now a part of the mainland at the junction of Delaware and Schuylkill Rivers, is the site of the **Philadelphia Naval Shipyard.** The reservation has a frontage of 0.6 mile on the east side of Schuylkill River and 2 miles on the north side of Delaware River. **Reserve Basin,** in the northwest part of the reservation, has depths of about 20 feet in the entrance and as much as 30 feet inside; the vertical-lift bridge 0.2 mile above the entrance has clearances of 7 feet down and 127 feet up. The wharves in Reserve Basin and along Delaware River will accommodate any draft navigating the channels. A ferry operates across Delaware River from midway along the League Island waterfront to **National Park,** New Jersey.

Big Timber Creek, on the southeast side of Delaware River 83 miles above the Capes, had a controlling depth of 5 feet in the entrance, in January 1960; deeper water is farther upstream. The channel through the flats at the entrance is marked by buoys; local knowledge is needed for navigating the channel beyond the buoys.

The three fixed bridges over Big Timber Creek at **Westville,** a mile above the mouth, have minimum clearance of 14 feet. The overhead cable about 2.1 miles above the mouth has a clearance of 50 feet.

The oil and chemical wharves on the northeast side of the entrance to Big Timber Creek have depths of about 12 feet at their faces. Above here, the creek is little used except by pleasure craft. Several repair yards are along the creek, the largest of which can haul out boats up to 48 feet in length, for hull and engine repairs. Available supplies include gasoline, water, and ice.

Gloucester City, on the east side of Delaware River 83.5 miles above the Delaware Capes, is the site of large manufacturing plants. The waterfront is 1.3 miles long and the depths at most of the wharves range from 5 to 15 feet, but there are wharves with depths of 30 feet or more at the faces. A **Coast Guard Base** is about midway along the waterfront. The current velocity is 2.1 knots off Gloucester City.

Newton Creek, on the east side of Delaware River 84 miles above the Capes, forms the boundary between Gloucester City and Camden. Navigation is blocked 500 yards above the mouth by low fixed bridges. The creek has depths of 30 feet or more between the wharves of a shipbuilding plant on each side.

Camden, New Jersey, on the east bank of Delaware River 86.5 miles above the Delaware Capes, is an important manufacturing and shipbuilding center directly opposite Philadelphia, with which its industrial and shipping activities are closely allied. The South Jersey Port Commission, with headquarters at Camden, has jurisdiction over the New Jersey ports bordering Delaware River from Trenton to the ocean. **Quarantine, customs,** and **immigration** are handled from the Philadelphia offices.

The Federal project provides for depths of 18 feet in front of the Camden waterfront from Petty Island to just south of Newton Creek entrance, with depths of 37 feet in front of the Camden Marine Terminals. In 1959, controlling depths were 8 feet near the **Cooper Point** end, 23 feet in front of the terminal, and project depth elsewhere.

A few of the wharves below Berkeley Street have depths of 30 feet or more at their faces; most of the others have depths ranging from 14 to 25 feet. From Berkeley Street to Cooper Point, the maximum depth at any of the wharf faces is about 15 feet; most have depths between 6 and 10 feet, and some of the bulkheads are dry, or nearly dry, at low water.

Fresh water is piped to the principal Camden wharves. Bunker oil can be obtained at Petty Island. Two floating drydocks, one at Cooper Point and one back of Petty Island, have lift capacities of 1,000 tons. The largest of several marine railways available for general use is at Cooper Point and can haul vessels up to 208 feet long; the shipyard can make any type of repairs to hulls of wood or steel vessels and to engines and boilers. Camden is served by the Pennsylvania Railroad and the Reading Railway.

The lower end of **Petty Island,** Camden, is on the southeast side of Delaware River 88 miles above the Capes. The island, 1.5 miles long, is the site of a coal-storage yard and an oil refinery. Bunker oil can be obtained at a marginal wharf, with depths of about 30 feet at the face, on the main-channel side of the island.

The channel between Petty Island and the New Jersey mainland has a controlling depth of about 12 feet from end to end, and is used principally by vessels bound to or from Cooper River; both entrances are marked by buoys. The railroad bridge over the northeastern end of the channel has a bascule span with a clearance of 12 feet; see **203.225,** Chapter 2, for **drawspan regulations.**

Cooper River empties into the south side of the channel back of Petty Island 0.6 mile above the southwest entrance. The lower part of the river carries a substantial traffic in petroleum products and sand and gravel, and crushed rock. In June 1960, the controlling depth was 6½ feet in the dredged channel from the entrance to the head of the project. The channel through the flats at the mouth is marked by buoys.

Four drawbridges cross the river between the mouth and the head of the project. Minimum clearance is 4 feet, at the two bridges about a mile above the mouth; minimum width is at the highway bridge about 0.4 mile above the mouth where the swingspan has a width of 20 feet in the east draw.

The mean range of tide is 5.9 feet in the entrance to Cooper River. The principal wharves along the river have depths of 6 to 12 feet alongside. Two marine railways are just inside the mouth of the river. The railway on the east bank can haul out boats up to 50 feet in length; storage can be arranged and gasoline and fresh water are available. The railway on the west bank can handle boats up to 60 feet in length; gasoline, diesel fuel, and fresh water are available.

The **Cramer Hill** shipyard wharves on the mainland side midway along the channel back of Petty Island have depths of about 15 feet alongside. The larger of the two floating drydocks at the yard has a lifting capacity of 1,000 tons; repairs can be made to hulls of wood and steel vessels and to engines, boilers, and dynamos.

Chart 296.—The Federal project provides for dredging depths of 37 feet to Bristol, and thence 25 feet to the Trenton Marine Terminal. Between that terminal and the railroad bridge the project depth is 12 feet. The channel reaches are marked by lighted ranges and buoys to Trenton.

The mean range of tide is 6.0 feet at Bridesburg and 6.8 feet at Trenton. Above Philadelphia the river usually is closed by ice for extended periods during January and February, and in severe winters navigation is practically suspended during these months; ice seldom forms before January.

During March and April, freshets 10 to 20 feet in height above mean low water may be expected at Trenton. The highest level is reached during the ice break-up in the spring; heavy rains do not ordinarily raise the level to more than 9 feet above mean low water. Freshets usually are not dangerous to shipping unless accompanied by ice. The 1903 freshet, highest on record, reached heights above low water of 21½ feet at Trenton, 19½ feet at Bordentown, and 13 feet at Bristol.

The **Pennsylvania Railroad Bridge,** which crosses Dela-

ware River from Bridesburg, Philadelphia, to Delair, New Jersey, 90.5 miles above the Delaware Capes, has a vertical-lift span with clearances of 49 feet down and 135 feet up. The wharves at Bridesburg and Delair have depths of 8 to 15 feet at their outer ends. The current velocity is 1.6 knots at the bridge.

Pennsauken Creek, on the New Jersey side of the river a mile above the railroad bridge, is very shallow at the mouth and navigation is limited by fixed bridges.

The highway bridge that crosses Delaware River from Tacony, Philadelphia, to Palmyra, New Jersey, 93 miles above the Capes, has a bascule span with a clearance of 53 feet. The wharves at **Tacony** have depths of 9 to 12 feet at their outer ends.

Pennypack Creek, on the Philadelphia side of Delaware River 95 miles above the Capes, is very shallow and can be navigated only at high water. The Philadelphia House of Correction is on the lower side of the creek and the city filter plant is on the upper side.

Dredge Harbor, on the New Jersey side of Delaware River 95.5 miles above the Capes, is a base for sand and gravel dredging equipment, and yachts. The harbor has depths of about 9 feet in the entrance and 5 to 15 feet inside; the entrance channel is well marked, and the shallow spots inside, some bare at low water, are marked by private buoys. The sand and gravel wharves on the northeast side of the harbor have depths of 8 to 10 feet at their outer ends. The yacht basin on the south side just inside the entrance to Dredge Harbor has floats with depths of 5 to 9 feet alongside. The boatyard can haul out and make hull and engine repairs to vessels up to 40 feet in length; a stiff-leg derrick is used. Gasoline, diesel fuel, water, and marine hardware are available.

Rancocas Creek, on the New Jersey side of Delaware River 96.5 miles above the Delaware Capes, has some tug and barge traffic as far as the first bridge; above the bridge the creek is used only by pleasure boats. In 1957 reported depths were 8½ feet to the railroad bridge and thence 5 feet to Bridgeboro. The channel is narrow and crooked above Bridgeboro, and in general follows the ebb-tide bends back and forth between shoals; navigation is difficult without local knowledge. The entrance to Rancocas Creek is marked by buoys. The current velocity is 1.0 knot in the entrance.

Riverside, on the south side of Rancocas Creek 1 mile above the mouth, has several factories. The coal wharf just below the highway bridge has depths of about 10 feet at the face. **Delanco,** directly across Rancocas Creek from Riverside, has wharves on both the creek and Delaware River waterfronts, but they are in poor condition and little used. A marine railway at Delanco can haul out boats up to 50 feet in length.

The highway bridge 1.3 miles above the mouth has a swing span with a clearance of 4 feet. The railroad bridge 0.2 mile above the highway bridge has a swing span with a width of 42 feet and a clearance of 3 feet; see **203.225,** Chapter 2, for **drawspan regulations.**

The highway bridge at **Bridgeboro,** on the south side 2.6 miles above the mouth, has a bascule span with a clearance of 8 feet; just below this bridge is an overhead cable with a clearance of 160 feet. **Centerton Bridge,** 6 miles above the mouth, has a swing span with a width of 48 feet in the south opening and a clearance of 6 feet; see **203.225,** Chapter 2, for **drawspan regulations.** Above this point navigation is limited by fixed bridges, the least clearance being that of 6 feet at the Mt. Holly bridge, about 11.5 miles above the mouth.

Poquessing Creek, on the Pennsylvania side of Delaware River 97 miles above the Capes, forms the upper boundary of the city of Philadelphia. The yacht club at **Torresdale,** a part of the city on the lower side of the creek, has a float landing where gasoline, diesel fuel, and water can be obtained; depths at the float are 10 to 14 feet.

Mud Island, just above Poquessing Creek, is a flat that is partly submerged at high water and is covered with marsh grass in the summer. The channel between Mud Island and the Pennsylvania mainland has a controlling depth of about 7 feet. The lower part of the channel is used considerably as a small-boat anchorage.

Andalusia, on the Pennsylvania side of Delaware River 98 miles above the Capes, is a suburban residential community with a few industries along the waterfront. The yacht club at **Cornwells Heights,** on the upper side of Andalusia, has a float landing with depths of about 10 feet alongside; gasoline, diesel fuel, and water are available.

Beverly is a town on the New Jersey side of Delaware River 99.5 miles above the Capes. **Edgewater Park** is a settlement of summer residences along the high bank a mile above Beverly; there are no wharves except for small motorboats.

Neshaminy Creek, on the Pennsylvania side of Delaware River 100 miles above the Capes, has depths of about 7 feet to the fixed bridge 0.7 mile above the mouth, thence 3 feet to the fixed railroad bridge 1.2 miles above the mouth. The fixed highway bridge has a clearance of 9 feet. The boatyard on the east side 300 yards below the highway bridge has a marine railway that can haul out boats up to 50 feet in length. Gasoline, diesel fuel, water, and some hardware can be obtained. The marina can accommodate 120 boats in dry storage. A boatyard above the bridge can handle boats up to 30 feet in length.

The power cable over Delaware River 101.5 miles above the Capes has a clearance of 140 feet.

A highway bridge over Delaware River 102 miles above the Capes has a vertical-lift span with clearances of 62 feet down and 134 feet up; see **203.227,** Chapter 2, for **drawspan regulations.**

Burlington is on the New Jersey side of Delaware River 102.5 miles above the Capes. Part of the city fronts on the main channel of Delaware River and part on the auxiliary channel southeast of Burlington Island. Several industries are located at Burlington and its suburb, **East Burlington,** which is centered a mile along the auxiliary channel.

The lower end of **Burlington Island** is 103 miles above the Delaware Capes. The island is a mile long and 0.5 mile in greatest width, and is partly wooded.

The Delaware River main channel continues along the northwest side of Burlington Island, and the 20-foot

project auxiliary channel extends along the southeast side for 1.2 miles to a turning basin at the upper end of the U.S. Pipe and Foundry Company property. In 1957, it was reported that the auxiliary channel had a controlling depth of 19 feet. Eastward of the turning basin the back channel has natural depths of 12 feet for about 0.5 mile, but shoals to about 2 feet in the narrow northeast entrance.

The overhead power cable about 0.3 mile northeast of the turning basin has a clearance of 45 feet.

The current velocity is 1.4 knots in the main channel west of Burlington Island. In the back channel east of the island, the velocity is 0.9 knot on the flood and 1.8 knots on the ebb.

The public utilities wharf at the lower end of Burlington has depths of 25 feet at the face; other wharves have depths ranging from 7 to 12 feet. The foundry wharf at East Burlington has depths of about 20 feet at the face and the oil wharf above the turning basin has depths of about 12 feet at the outer face.

Bristol is on the Pennsylvania side of Delaware River 103.5 miles above the Capes. The town was the terminus of the **Delaware and Lehigh Canal,** which was abandoned in 1931; the former Bristol entrance from the river is filled in. The public wharf at the lower end of the town has depths of about 6 feet at the face, and an industrial wharf in poor condition near the upper end has face depths of about 8 to 13 feet. A yacht club near the upper end of Bristol has two float landings with reported depths of about 9 feet, and gasoline and water are available; members or guests may use the club railway to haul out boats up to 38 feet in length, but must make their own repairs.

The fixed highway bridge about 105 miles above the Delaware Capes has a clearance of 135 feet.

Florence, on the New Jersey side of Delaware River 107 miles above the Capes, is the site of a pipe foundry. The foundry wharf, at the lower end of the town, has depths of about 12 feet off the face.

Roebling, on the New Jersey side of Delaware River 108.5 miles above the Capes, is a privately owned port of the John A. Roebling Sons Company, which operates an extensive wire-cable plant. The main wharf has depths of about 12 feet at the face.

The lower end of **Newbold Island** is about 150 yards off the New Jersey mainland just above the Roebling main wharf. The island is 1.5 miles long, with a greatest width of 0.7 mile. The main channel of Delaware River is along the north side of Newbold Island.

The back channel between Newbold Island and the New Jersey mainland has a controlling depth of about 9 feet from the upstream end of the island to the salvage yard about 0.3 mile inside. West of the yard, the channel is impassable except for small boats at high water.

On the Pennsylvania side of Delaware River across from Newbold Island, and 109 miles above the Capes, is a basin where sand and gravel are handled. The wharves have depths of about 8 feet at their faces.

An unloading slip of the **Fairless Works, U.S. Steel Company,** extends northward into the Pennsylvania shore opposite Newbold Island and 109.5 miles above the Capes. The slip can accommodate the deepest draft navigating the river.

Fieldsboro, on the high New Jersey side of Delaware River 110.5 miles above the Capes, is chiefly a residential community, but there are some industrial activities along the waterfront. The current velocity off Fieldsboro is 1.4 knots on the ebb; the flood current is weak and of short duration.

Crosswicks Creek, on the New Jersey side of Delaware River 111.5 miles above the Capes, is used extensively by pleasure craft. One of the two yacht clubs along the creek has gasoline and lubricants available.

Bordentown, on the high bank on the southeast side of the entrance to Crosswicks Creek, was the terminus of the **Delaware and Raritan Canal,** which was abandoned in 1933.

Along the New Jersey shore between Bordentown and Trenton there are several yacht clubs and marinas where fuel, water, and some supplies are available and minor small-craft repairs can be made.

On **Duck Island,** on the New Jersey side 113 miles above the Capes, there are two oil-receiving piers that have depths of about 12 feet at their outer ends; however, they are shoreward of an extensive shoal east of the channel. Oil tankers usually wait till high water, when the controlling depth is 7 feet, to bring their deliveries across the shoal cautiously on a heading of about 045° for the southerly pier.

About 114 miles above the Capes there is an overhead power cable with a clearance of 160 feet.

Trenton, the capital of New Jersey, is on the east bank of Delaware River. The railroad bridge, which is the head of powerboat navigation on the river, is 116 miles above the Delaware Capes. The city is an important manufacturing center.

Trenton Marine Terminal is a mile below the railroad bridge. Depths at the terminal wharf range from 15 to 21 feet. The terminal has dockside rail connections, two traveling steam gantry cranes of 25-ton capacity, and modern unloading equipment.

Just below the railroad bridge there is an oil receiving wharf with depths of 8 to 12 feet alongside, and about 0.7 mile below the bridge a small-boat float landing that has gasoline and oil and a hoist with a 2-ton capacity.

7. CHESAPEAKE AND DELAWARE CANAL

Chart 570.—The Chesapeake and Delaware Canal is a sea-level waterway that extends from Delaware River at Reedy Point, Delaware, to **Back River** at Chesapeake City, Maryland, thence down Back River to Elk River and Chesapeake Bay. The Reedy Point entrance is 51 miles above the Delaware Capes, 35.5 miles below Philadelphia, 62 miles from Baltimore, and 185 miles from the Virginia Capes. **Miles** in the following text are the distances along the canal from the middle of Delaware River. **Reedy Point,** at Mile 0.7 on the north side of the Delaware entrance, is jettied and is marked by a light; the jetty on the south side is similarly marked.

Navigation regulations.—The following regulations are from the Code of Federal Regulations, Title 33, Navigation and Navigable Waters:

§ 207.100 Inland waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal); use, administration, and navigation—(a) Applicability. This section is applicable to that part of the Inland Waterway from Delaware River to Chesapeake Bay, Delaware and Maryland, between the Delaware River and Elk River, including the Chesapeake and Delaware Canal and the Delaware City Branch Channel which extends from the Delaware River at Delaware City to its junction with the Canal about 1.5 miles west of Reedy Point.

(b) Supervision. The District Engineer, Corps of Engineers, Philadelphia, Pennsylvania, has administrative supervision over the waterway and is charged with the enforcement of this section. The District Engineer from time to time will prescribe the dimensions of vessels which may transit the waterway, and the special conditions which shall govern the movements of vessels using the waterway. This District Engineer's representative is the Canal Superintendent. All orders in aiding and directing traffic and in enforcing this section will be issued by the Superintendent through the dispatcher and the patrolmen on duty.

(c) Safe navigation required. Permission for any vessel to enter or pass through any part of the waterway will be contingent on the vessel's being properly equipped in personnel, machinery, and operative devices for safe navigation. In the event of question as to the ability of any vessel to navigate the waterway in safety, a ruling thereon will be made by the dispatcher. An appeal from the dispatcher's ruling may be taken by the owner, agent, master, or other person in charge of the vessel concerned to the District Engineer whose decision shall be final. The granting of permission for any vessel to proceed through the waterway shall not relieve the owners, agents, and operators of the vessel of full responsibility for its safe passage.

(d) Anchorage, mooring, and wharfage facilities. The anchorage basin on the south side of the waterway at Chesapeake City, mooring basins and tie-up dolphins on the north side of the waterway at Reedy Point and in Back Creek about one mile west of Chesapeake City, and free wharfage facilities on the west side of the anchorage basin at Chesapeake City and on the north side of the Branch Channel at Delaware City, are of limited capacity, and permission to occupy them for periods exceeding 24 hours must be obtained in advance from the dispatcher at Chesapeake City. The mooring dolphins provided on each side of the vertical lift bridges shall be used for mooring in emergencies only. Any craft using these anchorage, mooring, and wharfage facilities must have on board at all times a crew adequate to care properly for the vessel, and the United States assumes no responsibility for damages which may be sustained while using such facilities.

(e) Projections from vessels. No vessel carrying a deck load which overhangs or projects beyond the sides of the vessel will be permitted to enter or pass through the waterway. Vessels carrying rods, poles, or other gear extending above the top of the vessel's mast will be required to lower such equipment to a level with the top of the mast before entering the waterway.

(f) Speed. No vessel in the waterway or approaches shall be raced or crowded alongside another vessel, or be moved at such speed as will cause excessive swells or wash. Speed shall be kept at a minimum consistent with safe navigation. All vessels, when passing other vessels, mooring dolphins, wharves, landings, dredging plant, or other working craft, shall proceed with caution to avoid wave or suction damage. When approaching any bridge the speed of vessels shall be so regulated that they will be under full control and, in the event the span cannot be raised immediately, be able to stop and tie up at the emergency dolphins.

(g) Tows. All ships or tugs engaged in towing vessels not equipped with a rudder, whether light or loaded, shall use two towlines or a bridle on one towline. If the vessel in tow is equipped with a rudder one towline without a bridle may be used. All towlines must be hauled as short as practicable for safe handling of the tows. No towboat will be permitted to enter the waterway with more than two loaded, or three light, barges. Two or more barges or other vessels, not self-propelled, shall be towed abreast and not in tandem, using two towlines unless the towboat is made fast alongside the tow. Such tows shall have a combined beam of not more than 105 feet, including the towboat if made fast alongside.

(h) Right of way. All vessels proceeding with the current shall have the right of way over those proceeding against the current. Vessels up to 150 feet in length shall

be operated so as not to interfere with the operation of vessels of greater length at bridges and bends. Large vessels or tows must not overtake and attempt to pass other large vessels or tows in the waterway.

(i) Traffic lights. (1) Navigation in and through the waterway shall be governed by the following system of traffic control lights. These lights, which are of fixed type, are located on the outer end of the north jetty at the eastern entrance to the waterway, at Lorewood Grove about one mile east of the Pennsylvania Railroad bridge, on the north bank of the waterway about 1 mile west of the Pennsylvania Railroad bridge (visible only to eastbound traffic), and on the south bank of the waterway about one mile west of Chesapeake City. (NOTE: Item (i) amended by Notice to Mariners issued by Philadelphia District Engineer on March 25, 1960.)

(i) Green light. Waterway open to navigation. Vessel may proceed.

(ii) Amber light. Caution. Traffic restricted.

(iii) Red light. Waterway closed to traffic. Vessel must stop.

(2) In addition to the above system of lights, navigation shall be governed by the lights installed at the drawbridges crossing the waterway as described in paragraph (j) of this section. Traffic lights controlling the approach of eastbound or westbound ships to Chesapeake City are located at the Chesapeake City Suboffice. Normally the green light will be showing. Flashing amber and flashing red lights mean the same as those at the drawbridges.

(j) Drawbridges. (1) The signal for the opening of a drawbridge shall be three blasts of a whistle or horn blown by the vessel or craft desiring to pass. If the drawspan is to be opened immediately the bridge tender will reply with one blast of a whistle or horn. If the drawspan is not to be opened immediately the bridge tender will reply with two blasts of a whistle or horn; thereafter four blasts of a whistle or horn will be blown by the bridge tender to indicate that the bridge is open to navigation and that the vessel may proceed.

(2) The foregoing horn or whistle signals by the bridge tender will be supplemented by the following lights shown at the center of the drawspan in addition to and above the navigation lights referred to in subparagraph (3) of this paragraph:

(i) Flashing red light. Vessel must stop and tie up before reaching bridge.

(ii) Flashing amber light. Delay approach until vessel coming from opposite direction clears bridge.

(3) The following navigation lights prescribed by the Coast Guard will be shown at the center of the drawspan below the lights referred to in subparagraph (2) of this paragraph:

(i) Fixed red light. Bridge closed to navigation. Vessel unable to pass under closed drawspan must be kept under control so it can be stopped if necessary.

(ii) Fixed green light. Bridge open to navigation. Vessel may proceed.

(4) The drawbridge crossing the Branch Channel at Delaware City will be opened for the passage of vessels only between 8:00 a.m. and 4:00 p.m. Whenever a vessel, unable to pass under the closed bridge, desires to pass through the draw, at least two hours' advance notice of the time the opening is required shall be given to the dispatcher at Chesapeake City.

(k) Stopping in waterway. Whenever a vessel stops in the land cut elsewhere than at the mooring dolphins, it shall be fastened securely to one bank and only at such place and under such conditions as will not obstruct the passage of other vessels or craft. When thus tied up all vessels must be moored by not less than two lines each, and no vessel shall be tied up abreast of another. Sufficient crew to care properly for such vessels shall remain on board at all times. Vessels that have been tied up or anchored in or at the entrance to the waterway shall not proceed until given clearance by the dispatcher. Stoppages in the improved portions of the waterway shall be only for such periods as may be necessary, and no vessel or craft will be allowed to use such portions of the waterway as a permanent or semipermanent place of mooring without the permission of the District Engineer. Vessels may anchor in Elk River, but they shall not anchor in the channel, and during the night they shall display lights as required by the Federal Pilot Rules.

(l) Refuse. The placing of any ashes, refuse, or other material likely to cause an obstruction in the waterway or upon the banks or rights of way thereof is prohibited.

(m) Trespass upon or injury to waterway property. Trespass upon the waterway property or injury to the waterway, lands, banks, bridges, jetties, piers, fences, houses, trees, telephone lines, or any other property of the United States pertaining to the waterway is prohibited.

(n) Fish and game. The fish and game laws of the United States and of the States of Delaware and Maryland, within their respective bounds, will be enforced upon the waters and lands pertaining to the waterway owned by the United States. The use of traps and nets upon the property is forbidden except on written permission from the District Engineer.

(o) Grounded, wrecked, or damaged vessels. In the event a vessel is grounded or wrecked in the waterway or is so damaged by accident as to render it likely to become an obstruction in the waterway, the District Engineer shall supervise and direct all operations that may be necessary to float the vessel, clear the wreckage, or move the damaged vessel to a safe locality.

(p) Commercial statistics. Masters or pursers of vessels shall furnish the District Engineer or his authorized representative, on each passage through the waterway, such written statement of passengers, freight, and vessel data as may be indicated by blank forms furnished for this purpose. Failure to furnish this statement will result in denial to the offending vessel of the privilege of using the waterway. Blank forms may be obtained from the following:

(1) District Engineer, Philadelphia District, Corps of Engineers, P.O. Box 8629, Philadelphia 1, Pa. (NOTE: Changed to present address.)

(2) District Engineer, Baltimore District, Corps of Engineers, 24th Street and Maryland Avenue, Baltimore 18, Md.

(3) Resident Engineer, Chesapeake City Suboffice, Philadelphia District, Corps of Engineers, Chesapeake City, Maryland.

(4) Patrol boats in the waterway.

(5) Pilots.

Local regulations.—The following general instructions governing traffic in the canal were issued by the Philadelphia District Engineer on June 18, 1959, to supplement the rules and regulations in § **207.100,** above, governing the use, administration, and navigation of the waterway.

1. Ships and large tows intending to transit the canal shall not enter the canal until they have been given clearance by the patrol boat stationed at the entrance.

2. Vessels of 25-foot draft or less may transit the canal at any time under the following conditions:

(a) The maximum overall length of vessels which may transit the canal is limited to 650 feet during daylight hours and to 600 feet during darkness and periods of poor visibility.

(b) Vessels under 275 feet overall length may transit the canal without prior arrangements.

(c) Vessels 275 feet overall length and over must make prior arrangements with the Canal Dispatcher for specific trips.

(d) Vessels 375 feet overall length or over will not pass each other in the canal between Reedy Point and the tieup dolphins west of Chesapeake City.

(e) No vessel having a greater draft forward than aft will be allowed to enter the canal.

(f) Dead vessels and all vessels observed by the pilot in charge to be difficult to handle or known to have handled badly on previous trips must transit the canal during daylight hours and must have tug assistance. Such vessels must obtain permission from the Dispatcher to enter the canal and must be provided with the number of tugs sufficient to afford safe passage. Agents must make their own arrangements for tug assistance. Such eastbound vessels must clear Reedy Point Bridge and such westbound vessels the Chesapeake City Bridge before dark.

3. The maximum length of pontoon rafts using the canal will be limited to 600 feet, and the maximum width to 100 feet. Pontoon rafts exceeding 200 feet in length will be required to have an additional tug on the stern to insure that the tow is kept in line. The tugs used must have sufficient power to handle the raft safely.

4. The granting of permission for any vessel to proceed through the canal, either by day or night, with or without tug assistance, shall not relieve the owner, agents or operators of the vessel of full responsibility for its safe passage.

5. Vessels requiring a pilot under existing State laws or Coast Guard regulations may be handled through the canal by any pilot duly licensed for this waterway by the Office of Marine Inspection, U.S. Coast Guard and approved for the District Engineer by the Canal Superintendent. Pilots will be approved upon satisfactory completion of at least three trips through the canal during the preceding 12 months.

6. The Master of every vessel 200 feet overall length and over shall report to the Dispatcher the name of the pilot handling the vessel through the canal.

7. The patrol boats stationed at the ends of the canal are used for traffic control, the collection of commercial statistics, and for the identification of vessels transiting the canal. Masters or pursers of commercial vessels shall furnish, on each passage through the waterway, written statement of passengers, freight, and vessel data in accordance with the provisions of the regulations. Although pleasure craft are not generally required to give any information to the patrol boats, such craft shall, upon their first passages through the canal or when they are not recognized, furnish such information as may be requested by the patrol boats.

8. Vessels of all types, including pleasure craft, are required to travel at all times at a safe speed throughout the canal and its approaches so as to avoid damage by suction or wave wash to wharves, landings, or other boats, or injury to persons. All pilots transiting the canal and its approaches are warned that violation of this rule may result in their suspension for 30 days as canal pilots, and flagrant or repeated offenses will be followed by their citation to the Coast Guard for reckless navigation. Passages of all vessels through the canal will be recorded and determination will be made of those vessels which appear to travel at excessive speeds, without waiting for investigation of specific cases where damage by suction or wave wash does occur.

9. Owners of yachts, motorboats, rowboats and other craft moored or anchored in the canal or its approaches are cautioned to secure their vessels in such manner as will avoid damage from the passages of ships at reasonable speed.

10. Water skiing in the canal is prohibited between the Delaware River and Welch Point, Maryland.

11. The lights along the northerly bank of the canal between Reedy Point and Chesapeake City have been provided to promote safe navigation through the canal at night. All vessels should keep clear of the poles and power lines supplying those lights.

Channels.—The Federal project for the canal provides for dredging depths of 27 feet from Delaware River to deep water in Chesapeake Bay. The channel is well marked by lights.

In addition to the navigational aids, the north bank of the canal between Mile 1.5 and Mile 12.7 is lighted at night by mercury vapor lights 500 feet apart to illuminate the bank at the water's edge to assist ships navigating the canal.

The **Delaware City Branch Channel** extends northward from the canal at Mile 2.5 for 1.5 miles to Delaware River at Delaware City; the controlling depth was 3 feet in October 1960. Delaware City has been described in Chapter 6.

Anchorages.—An anchorage basin is provided on the south side of the canal at Mile 12.8 opposite Chesapeake City; the controlling depth was 5½ feet in the entrance

with deeper water inside the basin, in October 1960. Free wharfage is available at the Government wharf on the west side of the basin.

Mooring basins are provided on the north side of the canal west of Reedy Point at Mile 1.4, and west of Chesapeake City at east end of Back Creek, Mile 13.7; each basin is 1,700 feet long and is provided with tie-up dolphins spaced 50 feet on centers. Controlling depths were 16½ feet in the Reedy Point basin and 27 feet in the Back Creek basin, in November 1960.

Regulations for the use of the anchorage and mooring basins are given in **207.100,** referred to previously in this chapter.

A special **small-vessel anchorage,** with depths of 3 to 4 feet, is on the southeast side of the canal at Mile 16.4, northeastward of Courthouse Point; see **202.1** and **202.70,** Chapter 2, for limits and regulations.

Bridges.—The canal is crossed by two vertical-lift bridges and three high-level fixed bridges. The Reedy Point highway bridge at Mile 1.7 has a vertical-lift span with clearances of 6 feet down and 135 feet up. The fixed highway bridge at **St. Georges,** Mile 5.0, has a clearance of 135 feet.

The Pennsylvania Railroad bridge at **Canal Station,** Mile 7.6, has a vertical-lift span with clearances of 46 feet down and 135 feet up. The overhead pipeline a mile west of the bridge at Mile 8.6 and the overhead power cable 300 feet west of the pipeline have a minimum clearance of 135 feet.

The fixed highway bridge just west of **Summit** at Mile 9.3 has a clearance of 135 feet for the southerly 230 feet of the 250-foot channel. Overhead power cables between this bridge and Chesapeake City, at Mile 10.0 and Mile 11.2, have minimum clearances of 142 feet.

The fixed highway bridge at **Chesapeake City,** Mile 13.0, has a clearance of 135 feet.

The highway bridge over Delaware City Branch Channel a mile northward of the canal has a bascule span with a clearance of 6 feet. The overhead power cable 500 feet north of the bridge has a clearance of 64 feet.

Operation regulations for the bridges with drawspans are given in **207.100,** referred to previously in this chapter.

Tides.—The normal range of tide is 5.5 feet at the Delaware River end of the canal and 2.6 feet at the Chesapeake City end. High and low waters in Delaware River are about 2 hours later than in Elk River. The heights of high and low waters are greatly affected by the winds; northeast storms raise the level and westerly storms lower it. See the Tide Tables for daily predictions for Reedy Point.

Staff gages, with zeroes set at **canal datum,** are at numerous places along the canal, including the bridges and both ends. The datum is 2 feet below local mean low water at the mouth of Back Creek and about ½ foot below at Delaware River.

Currents.—The current velocity is 2.4 knots at the Reedy Point bridge and 2.0 knots at the Chesapeake City bridge; see the Tidal Current Tables for daily predictions for Chesapeake City. Storms may increase these velocities to 3.0 knots or more; at such times, tows usually have difficulty in making headway against the current.

See Appendix for **storm warning displays.**

Ice sufficient to interfere with the navigation of small craft may be expected at any time between December and April and is worst during January and February. The canal is kept open as long as possible. During mild winters, local vessels use the canal throughout most of the season, but strangers should make inquiries before attempting passage. Wooden vessels passing through thin ice are liable to be cut through at the waterline.

Pilotage through the canal from Delaware River to Chesapeake City is provided by the Philadelphia pilots; see Chapter 6. Pilotage from Chesapeake City to points along Chesapeake Bay is provided by the Maryland pilots; see Chapter 15.

Supplies and repairs.—Small vessels can obtain gasoline, diesel oil, water, ice, groceries, and marine hardware at Chesapeake City. The principal wharves have depths of 7 to 20 feet at their faces.

The largest marine railway in the area is on the north side of the canal at Mile 13.5, 0.5 mile west of the Chesapeake City bridge. The railway can handle vessels up to 125 feet in length; repairs are made on shafts, wheels, and gasoline and diesel engines.

A travel lift on **Courthouse Point,** on the south side of the west entrance to Back Creek at Mile 16.7, can haul out boats up to 27 feet in length; gasoline, water, and some marine hardware are available. Gasoline, water, and other supplies are also available at a marina 0.5 mile west of the point.

For discussion of Elk River and the upper part of Chesapeake Bay, see Chapter 15.

8. DELAWARE-MARYLAND-VIRGINIA COAST

Charts 1219 to 1222.—The coast extends southward for 21 miles from Cape Henlopen to the Delaware-Maryland boundary line, thence south-southwestward for 27 miles to the Maryland-Virginia boundary, and thence 63 miles to Cape Charles. The low sand beaches are backed by bays, rivers, and creeks which are bordered by marsh and woodland. Broken ground fringes the coast, and depths of 36 feet or less are found as far as 12 miles from shore.

Visible from seaward are the summer resorts of Rehoboth Beach, Bethany Beach, and Ocean City, all within 30 miles of Cape Henlopen. The most prominent marks south of Ocean City are the light structures and the Coast Guard stations.

The bays and connecting channels back of the barrier beaches form a continuous inside passage from Delaware Bay to Chesapeake Bay, but Assawoman Canal and Little Assawoman Bay are now navigable only for rowboats and outboards.

There are no harbors of refuge for deep-draft vessels along this coast. The inlets are subject to frequent change and their navigation requires local knowledge.

Fishtraps along the coast from Cape Henlopen to Cape Charles are limited by Federal regulations to certain areas which are shown on the charts. Numerous pile remains of former traps are said to menace inshore navigation.

Navigational aids.—Most of the navigable inlets are marked by buoys, but the channels shift and the buoys cannot always be depended upon to mark the best water. Breakers form on the shoals even in ordinary weather and are good marks. Some of the interior channels are marked by daybeacons and lights, but others are marked only by bush stakes. The channels through the flats can be followed best at low water when the flats are visible.

Tides.—The mean range of tide varies from 3.5 to 4.4 feet along the coast; high and low waters occur at about the same time as at Sandy Hook. Levels in the inside waters are greatly affected by winds, westerly winds producing low water and easterly winds high water. In Assawoman, Isle of Wight, Sinepuxent, and Chincoteague Bays, northerly and southerly winds drive the water to the ends of the bays. With strong winds of long duration, depths may be as much as 3 feet above or below the normal level.

Currents.—The currents have considerable velocity in the inlets and in the narrow channels connecting the inlets with adjacent bays and sounds. Velocities of as much as 3 knots may be encountered at times in places where the currents are strongest.

Ice.—The inside waters north of Chincoteague Bay usually are closed by ice during ordinary winters. The tributary waters south of the bay are closed during severe winters but remain so only for short periods. The principal inlets are rarely closed and are used by local boats throughout the winter.

Chart 411.—**Cape Henlopen,** on the southwest side of the entrance to Delaware Bay, was described in Chapter 6. **Rehoboth Beach** is a widely-known summer resort 5 miles south of the cape; prominent marks are a large hotel, a standpipe, and a water tank. **Dewey Beach** is a smaller resort on the south side of Rehoboth Beach.

The **danger zone** of an antiaircraft firing area extends offshore from a point about 9 miles south of Cape Henlopen; see **204.25,** Chapter 2, for limits and regulations.

Roosevelt Inlet, 3 miles west of Cape Henlopen, is the Delaware Bay entrance to the Lewes and Rehoboth Canal and to Broadkill River. The inlet is protected by jetties, each marked by a light on its outer end; a fog signal operates at the southeast light, and a lighted range marks the centerline of the entrance channel. The mean range of tide is 4.4 feet in Roosevelt Inlet; the current velocity is 0.9 knot. In July 1960, the controlling depth was 8 feet between the jetties.

The Coast Guard has a buoy depot at the head of Roosevelt Inlet. Gasoline, diesel fuel, and fresh water are available at a small oil wharf just inside the inlet; the depth at the wharf is reported to be 6 feet.

Broadkill River is entered by way of an inside passage that extends northwestward for 2 miles from the Roosevelt Inlet jetties to the old mouth of the river; thence the river extends 9 miles westward to the town of **Milton.** The river has very little traffic. In August 1960, centerline depths were 6 feet from Roosevelt Inlet to the old mouth of the river, thence 3 feet to Milton.

Overhead power cables, with clearances of 50 feet, cross the Broadkill approach near Roosevelt Inlet. The highway bridge over Broadkill River 7 miles from the jetties has a 43-foot bascule span with a clearance of 3 feet; the overhead power cable at the bridge has a clearance of 64 feet. Above the bridge the river has numerous snags and there is much floating debris.

The **Lewes and Rehoboth Canal** is a tidal waterway that extends southeastward and southward for 8 miles from Roosevelt Inlet to Rehoboth Bay. The canal passes northeastward of Lewes and westward of Rehoboth Beach; the entrance to Rehoboth Bay is between stone jetties a mile southwest of Dewey Beach. The mean range of tide in the canal is 3.6 feet at Lewes and 0.5 foot at Rehoboth Beach. In August 1960, centerline depths were 8 feet from Roosevelt Inlet to the Lewes bridge, thence 4½ feet to Rehoboth Bay.

Lewes is a town with rail connections 1.7 miles along the canal from the Roosevelt Inlet jetties. The Public Health Service maintains an outpatient office in Lewes.

Supplies available at Lewes include gasoline, fresh water, ice, groceries, and marine hardware. A marine railway at the town can haul out boats up to 65 feet in length; the machine shop repairs engines and does hull work.

The highway bridge over the canal at Lewes has a 46-foot bascule span with a clearance of 6 feet. The overhead power cable 0.2 mile southeastward of the bridge has a clearance of 68 feet. The posted **speed limit** in the canal is 4 miles per hour.

The highway bridge over the canal at **Rehoboth Beach,** 6.5 miles from Roosevelt Inlet, has a 49-foot bascule span with a clearance of 16 feet; the overhead power cable on the north side of the bridge has a clearance of 80 feet. The highway bridge 0.3 mile farther southward has a bascule span with a clearance of 14 feet; the overhead power cable on the south side of the bridge has a clearance of 80 feet. Gasoline, fresh water, and groceries are available at Rehoboth Beach.

Rehoboth Bay has depths of 3 to 7 feet. The 5-mile route down Rehoboth Bay from the Lewes and Rehoboth Canal to Indian River Bay is marked by lights and daybeacons. In August 1960, controlling depths were 5 feet for about 4 miles, thence 3 feet between the islands separating the two bays.

Love Creek, at the northwest corner of Rehoboth Bay, is navigable for small craft to a milldam near **Robinsonville,** 4 miles above the mouth. The fixed highway bridge 2.3 miles above the mouth has an 18-foot channel span with a clearance of 7 feet. Above the bridge are berthing facilities and a launching ramp in depths of 1 to 2 feet. In August 1960, the controlling depth was 2½ feet from Rehoboth Bay to the bridge.

Herring Creek, at the southwest corner of Rehoboth Bay, has depths of 3 to 5 feet to the forks 2 miles above the mouth, thence 1 to 3 feet for 0.5 mile up the northern prong and 3 to 5 feet for a mile up the southern prong. The creek is little used except by local residents.

Indian River Inlet, 12 miles south of Cape Henlopen, is the first opening in the barrier beach south of Delaware Bay. The entrance is marked by buoys; lights are on the jetties. Prominent at the inlet are the Coast Guard lookout tower on the north side and two high transmission towers, one on either side. **Indian River Coast Guard Station** is on the beach 1.5 miles north of the inlet. See Appendix for **storm warning displays.**

A channel leads from Indian River Inlet through Indian River Bay and up Indian River to Millsboro, a distance of 12 miles. The controlling depth was 7 feet to **Burton Island,** on the north side of the channel a mile inside the entrance, thence 4 feet to Millsboro, in August 1960. Buoys mark the shifting channel between the entrance and Burton Island, and daybeacons mark the remainder of the channel.

The mean range of tide is 3.8 feet at the ocean end of Indian River Inlet and 2.6 feet at the highway bridge over the inlet. The current velocity is 2 knots.

The highway bridge over Indian River Inlet 500 yards from the outer end of the jetties has a swing span with a clearance of 14 feet in the south draw; the north draw is closed to navigation; see **203.239,** Chapter 2, for **drawspan regulations.** A Coast Guard wharf is on the north side of the inlet 0.8 mile above the jetties.

About 0.9 mile above the jetties, a 0.2-mile dredged cut with a depth of 6 feet leads northeastward to a private basin between Burton Island and the barrier beach that has berthing facilities for boats up to 65 feet in length. Available supplies include gasoline, diesel fuel, water, and ice; a marine railway can haul out boats up to 50 feet in length for hull repairs.

A special small-vessel **anchorage area** is on the south side of Indian River Inlet 1.2 miles above the jetties; see **202.1** and **202.65,** Chapter 2, for limits and regulations.

Indian River Bay, a shallow lagoon with depths of 1 to 6 feet, extends for about 5 miles west of Indian River Inlet, then becomes **Indian River** which is navigable for an additional 7 miles to Millsboro. The 5-mile route down the bay from Rehoboth Bay to Assawoman Canal is marked by daybeacons; the controlling depth is about 2 feet.

Pepper Creek, on the south side of Indian River Bay near its western end, has depths of 6 to 3 feet to a marine railway, about 2 miles above the mouth, that can haul out craft up to 60 feet in length for hull and engine repairs; gasoline is available. **Oak Orchard,** on the north side of the entrance to the river 5.5 miles above the inlet jetties, has numerous small piers; groceries are available, and gasoline can be obtained at **Frames Cove,** about a mile westward.

Millsboro, on the south side of Indian River at the head of navigation, has a small-boat launching ramp and town bulkhead; available supplies include gasoline and groceries. About 100 yards below the causeway at Millsboro there is an overhead power cable with a clearance of 43 feet. The town has railroad freight service.

White Creek is on the south side of Indian River Bay 1.5 miles back of the outer beach. A 2-foot channel marked by daybeacons passes through the bay and creek to Assawoman Canal and **Ocean View** where gasoline, water, and groceries are available.

Chart 1219.—Assawoman Canal, a 3-mile land cut that connects White Creek with the north end of Little Assawoman Bay, had a controlling depth of 2½ feet in August 1960. Three fixed highway bridges over the canal have a minimum width of 14 feet and clearance of 4 feet. The power cable over the canal has a clearance of 36 feet.

Bethany Beach is a summer resort 4 miles south of Indian River Inlet. A privately dredged channel with a depth of about 1 foot leads eastward from Assawoman Canal to a point near the outer beach.

The **danger zone** of an antiaircraft artillery firing area extends 16 miles offshore from a point about 6 miles south of Indian River Inlet; see **204.25,** Chapter 2, for limits and regulations.

Little Assawoman Bay, behind the barrier beach of **Fenwick Island,** is 3 miles long and extends southward almost to Fenwick Island Light. The bay has depths of

2 to 4 feet in some places but is bare in others and is seldom used. The only route markings are random stakes set by local residents.

Chart 1220.—Fenwick Island Light (38°27.1′ N., 75°03.3′ W.), 83 feet above the water, is shown from an 87-foot white tower, about 0.3 mile back of the beach. The tower, just north of the Delaware-Maryland boundary line, is 9 miles south of Indian River Inlet and 21 miles south of Cape Henlopen. **Maryland Beach** is a small summer resort just south of the light.

Fenwick Shoal, 6 miles eastward of Fenwick Island Light, has a least depth of 14 feet but the westerly of two wrecks near the crest of the shoal is covered only 6 feet. A lighted whistle buoy marks the southwest end of the shoal and another is moored 8 miles east by south of the shoal. Deep-draft vessels normally pass to eastward of the outer buoy.

Isle of Wight Shoal, 7 miles southeastward of Fenwick Island Light, has a depth of 21 feet and is marked on its west side by a buoy. A 24-foot shoal is about midway between Isle of Wight Shoal and Fenwick Shoal.

A narrow thorofare, 0.4 mile west of Fenwick Island Light, links Little Assawoman Bay with Assawoman Bay. The controlling depth was 2 feet in August 1960, and is navigable by small boats with local knowledge. The fixed highway bridge near the north end of the thorofare has a width of 37 feet and a clearance of 11 feet.

Assawoman Bay and **Isle of Wight Bay** form a continuous lagoon that extends from the vicinity of Fenwick Island Light to Ocean City. The bays have depths of 4 to 6 feet along their western sides and are frequented by boats from Ocean City.

Ocean City Inlet, between Fenwick Island and Assateague Island, is 29 miles south of Cape Henlopen and is the only break in the barrier beach between Indian River Inlet and Chincoteague Inlet. The entrance is between stone jetties, but the north jetty and the outer end of the south jetty are covered at high water. About 400 yards from the north jetty is a high pier that extends about 300 yards into the ocean; the pier has a depth of 8 feet at the outer end but there are no landing facilities. **Ocean City Coast Guard Station** is on the beach 0.5 mile north of the inlet; see Appendix for **storm warning displays.**

Little Gull Bank, 3 miles southeastward of Ocean City Inlet, has a depth of 15 feet and is marked at its southwest end by a buoy. **Great Gull Bank,** 5 miles southeastward of the inlet, has a depth of 17 feet at its southwest end and is marked at its northern end by a lighted whistle buoy. Midway between the two banks is a wreck covered 26 feet.

Ocean City is a summer resort on the north side of Ocean City Inlet. Two elevated tanks and several hotels are prominent landmarks. The resort is visited by many small boats during the summer, and is the shipping point for a large amount of seafood and produce.

In August 1960, controlling depths were 14 feet in Ocean City Inlet to the inner end of the jetties, thence 8½ feet in the channel to Commercial Fish Harbor; the channel northward along the inner side of Ocean City had a depth of 7 feet to North Eighth Street, 0.5 mile above the highway bridge, thence 2 feet in the channel leading to deeper water in Isle of Wight Bay.

The entrance to Ocean City Inlet is marked by a fog signal and radiobeacon near the outer end of the north jetty, a light atop the lookout tower inshore, and lighted buoys that are shifted in position with changing channel conditions. Lights and daybeacons mark the channel to Isle of Wight Bay. The mean range of tide is 3.4 feet.

The highway bridge over Isle of Wight Bay from the mainland to Ocean City, 0.9 mile above the entrance jetties, has a bascule span with a clearance of 18 feet. Pile remains of an abandoned highway bridge are 0.2 mile south of the bridge.

There are numerous privately owned pile and timber piers and bulkhead wharves on the inner side of Ocean City. The **Commercial Fish Harbor,** on the mainland side a mile directly back of the inlet, has a 1,000-foot public bulkhead landing and several private bulkhead wharves open to the public for transaction of business with the owners.

On the west side of Ocean City, 1.2 miles northward of the highway bridge, is a small-boat basin; in August 1960, a depth of 2½ feet could be carried into the basin from the channel in Isle of Wight Bay.

Available supplies at Ocean City include gasoline, diesel fuel, water, ice, groceries, and marine hardware. The largest boatyard is in Commercial Fish Harbor; a marine railway can handle boats up to 65 feet in length; gasoline and other supplies are available.

Buses operate to and from Ocean City. The Baltimore and Eastern Railroad has a freight siding at the Commercial Fish Harbor.

Sinepuxent Bay, narrow and mostly shoal, is behind the northern end of Assateague Island, and extends 9 miles southward from Ocean City Inlet to Chincoteague Bay. It is used by fishing and pleasure boats. The inside passage channel through the bay, marked by lights, buoys, and daybeacons, had a controlling depth of 4 feet in August 1960. The overhead power cable across the bay, 0.7 mile southward of Ocean City Inlet, has a clearance of 52 feet; the one 8 miles below the inlet has a clearance of 61 feet.

Chincoteague Bay, extending for 20 miles inside the barrier beach from Sinepuxent Bay to Chincoteague Inlet, has general depths of 4 to 7 feet along its western side, but is shoal along its eastern side. A large number of boats up to 4 feet in draft engage in oystering, clamming, and fishing in the bay.

Snow Hill Landing, on the mainland side of Chincoteague Bay 15 miles from Ocean City Inlet, has a public wharf, private landings, and fish docks; all have depths of 4 feet alongside. A highway leads westward from the landing to **Snow Hill** on Pocomoke River. A small-boat basin with depths of 3 feet and a launching ramp is entered just north of the piers; gasoline is available.

Greenbackville (P.O.), a village on the mainland side of Chincoteague Bay just south of the Maryland-Virginia boundary line and 4 miles north of Chincoteague, has a

substantial trade in shellfish. The channel into the harbor, marked by lights, had a controlling depth of 4 feet in August 1960. The mean range of tide is 1 foot. A boatyard in the harbor can haul out boats up to 45 feet in length for hull repairs; gasoline and groceries are available.

A depth of 4 feet can be carried through Chincoteague Bay with local knowledge to the vicinity of **Killick Shoal,** in the southern part of the bay, thence 2 feet through a shifting channel to Chincoteague. Several of the critical points along the inside passage are marked by lights, and the channel at Killick Shoal is marked by lights and daybeacons.

There are other passages from Chinoteague Bay to Chincoteague Inlet between the marshy islands west of Chincoteague Island, but they are used only by small oyster boats. **Wire Narrows,** the easternmost of these passages, has depths of 1 foot or less. **Queen Sound** and **Cockle Creek,** the middle and western passages, are shallow at the north entrances, but have depths of 4 feet or more through them. The five fixed bridges over these passages have clearances of 4 to 12 feet.

Assateague Light (37°54.7′ N., 75°21.4′ W.), 154 feet above the water, is shown from a 142-foot red conical tower 3 miles from the south end of Assateague Island. The light stands well above the surrounding trees and is the most prominent mark in the vicinity of Chincoteague Inlet.

Winter Quarter Shoal, 11 miles east-northeast of Assateague Light, has depths of 10 to 17 feet, but a wreck just west of the highest part is covered only 5 feet; a buoy is on the west side of the wreck. An unlighted buoy and a lighted whistle buoy are off the east side of the shoal area.

Blackfish Bank, about 6 miles eastward of the south end of Assateague Island, has several depths of 13 to 16 feet along its 5-mile length, and near its southwest end is a depth of 11 feet over a wreck. A bell buoy is 0.6 mile south of the wreck. A 25-foot shoal 2.5 miles east of the wreck is marked on its east side by a lighted whistle buoy. Coasting vessels seeking protection from westerly weather pass westward of Blackfish Bank.

Chincoteague Shoals, extending about 3 miles east and south of the lower end of Assateague Island, have depths of 5 to 18 feet. An unlighted buoy and a lighted bell buoy are near the 5-fathom curve southerly of the shoals.

Chincoteague Inlet, between Assateague Island and **Wallops Island,** is 30 miles south-southwestward from Ocean City Inlet. The inlet is marked but should not be entered without local knowledge because of the shifting channel. The narrow entering channel usually is along and close to **Fishing Point,** the hook-shaped sandspit at the south end of Assateague Island, thence northwesterly through a narrow passage 0.5 mile northeastward of **Chincoteague Point,** the southern end of Chincoteague Island, thence northeastward in **Chincoteague Channel** to Chincoteague. The controlling depth by this route is about 9 feet; the channel is marked by buoys that are shifted in position with changing conditions, and by lights.

Assateague Cove, behind the Fishing Point spit, is about 1.5 miles in diameter and has depths of 7 to 15 feet. The narrow entrance channel, close to the point, has a controlling depth of about 8 feet; the channel is dangerous in heavy weather. The wharf and boathouse of **Assateague Beach Coast Guard Station** are on the south side of the cove. The Coast Guard lookout tower and a light on the barrier beach south of the wharf are visible from seaward. Oyster boats operate in the cove.

Chincoteague is a town on the west side of **Chincoteague Island,** which is about 7 miles long and is between the mainland and the south end of Assateague Island. The most prominent mark is an elevated tank near the highway bridge over Chincoteague Channel; the bridge has a swing span with a clearance of 16 feet. The town is an oystering and fishing center; several wharves along the waterfront have depths of 3 to 10 feet alongside. Available supplies include gasoline, diesel fuel, groceries, and some marine hardware. Marine railways can haul out vessels up to 65 feet in length for hull repairs; mechanics can be called in to make engine repairs.

Assateague Channel, between Chincoteague and Assateague Islands, has a shifting entrance, but depths of 2 feet or more can be carried through the unmarked channel into **Assateague Bay,** at the north end of the channel, and thence northward into Chincoteague Bay. The fixed highway bridge just north of Assateague Light has a clearance of 10 feet. Gasoline is available at the Chincoteague Yacht Club pier on the west side of the channel, 2.5 miles north of Fishing Point.

Chart 1221.—The 35-mile stretch of coast between Chincoteague Inlet and Great Machipongo Inlet is formed by six islands of about equal length. The islands are separated from each other by narrow inlets and from the mainland by marsh and flats through which are numerous sloughs and channels.

Wallops Island, northernmost of the six, is on the south west side of Chincoteague Inlet.

Assawaman Inlet, the ocean entrance between Wallops Island and **Assawaman Island,** is very shallow and is little used. The changing entrance is usually marked by breakers. A channel marked by lights and a daybeacon with depths of 5 feet or less leads from the inlet through **Hog Creek** into Assawaman Creek.

Gargathy Inlet is the ocean inlet separating Assawaman Island and **Metomkin Island.** The changeable inlet is unmarked and is used occasionally by local small boats. **Gargathy Creek,** which leads westward from the inlet to Gargathy Bay and then north, is navigable at high water by small craft for about 4 miles to within a mile of the village of **Modest Town.**

Metomkin Inlet, the ocean entrance between Metomkin Island and **Cedar Island,** is used by some small local fishing and oyster boats. The changeable entrance channel is marked, but it should not be entered without local knowledge. **Metomkin Inlet Coast Guard Station** is on the north end of Cedar Island.

Porpoise Banks, about 10 miles offshore from Metomkin

Inlet, have irregular bottom with depths of 34 to 40 feet.

Wachapreague Inlet, between Cedar Island and **Parramore Island,** is marked by a lighted bell buoy and unlighted buoys that are shifted in position with changing channel conditions. The controlling depth was 8 feet over the bar and through the channel on the north side of Parramore Island in August 1960. The inlet is used by many fishing boats and by some boats seeking shelter, but should be entered only with local knowledge because of the shifting channel. The best anchorage is in **Horseshoe Lead,** southwest of the entrance, where there are depths of 20 to 30 feet west of the middle ground. **Parramore Beach Coast Guard Station** is on the inner side of Parramore Island 0.5 mile south of the inlet.

Parramore Banks extend about 8 miles offshore from Wachapreague Inlet. The area is lumpy and has numerous depths of 18 to 30 feet. A lighted whistle buoy is east of the banks.

Wachapreague (P.O.), a town on the mainland about 4 miles west-northwest of Wachapreague Inlet, is an oystering and fishing center, and is a base for some pleasure boats during the summer. A depth of about 6 feet can be carried from Wachapreague Inlet through **Hummock Channel** and **Wachapreague Channel,** marked by lights, to the wharves at the town. Available supplies include gasoline, diesel fuel, water, and groceries. A marine railway can haul out boats up to 45 feet in length.

Little Machipongo Inlet, the ocean entrance between Parramore Island and **Hog Island,** has a fan of breakers across the entrance. The inlet is marked but should not be used without local knowledge. The controlling depth was 2½ feet over the bar in August 1960.

Little Machipongo Light (37°27.2′ N., 75°40.5′ W.), 54 feet above the water, is shown from the lookout tower of **Little Machipongo Inlet Coast Guard Station** on the inner side of the north end of Hog Island.

Quinby (P.O.) is a village on the mainland about 6 miles northwest of Little Machipongo Inlet. A channel to the village marked by lights follows **Sandy Island Channel** to **Upshur Bay,** thence through a slough in the mud flats to a dredged channel leading to a basin that has a public terminal and landing. The controlling depth was 7 feet in February 1961.

Great Machipongo Inlet, the ocean entrance between Hog Island and **Cobb Island,** has breakers that form on the shoals on either side of the entrance at all times but on the bar only in heavy weather. The inlet is marked by buoys that are shifted in position with changing channel conditions. The controlling depth was 12 feet over the bar in August 1960; boats with drafts up to 8 feet use the inlet.

Great Machipongo Channel extends northwestward through Hog Island Bay from the inlet to the mainland where it continues as **Machipongo River. Willis Wharf** (P.O.) is a town on the west bank of **Parting Creek,** about a mile above the junction with Machipongo River. The controlling depth was 10 feet or more to Parting Creek, thence 6 feet in the dredged channel to Willis Wharf in August 1960. An overhead power cable across Machipongo River just above the junction with Parting Creek has a clearance of 43 feet.

Chart 1222.—Sand Shoal Inlet, the ocean entrance between Cobb Island and **Wreck Island,** may be entered through three channels. **Northeast Channel,** protected by extensive shoaling to northward and marked by buoys shifted in position with changing channel conditions, leads along the south end of Cobb Island; the controlling depth is about 9 feet over the bar. **Southeast Channel** is straight but the bar breaks in heavy weather; the controlling depth is about 9 feet over the bar about 3 miles southeast of the light on the south end of Cobb Island. **South Channel,** east of Wreck Island, has a controlling depth of about 10 feet. The latter two channels are not marked and should not be used by strangers.

Cobb Island Coast Guard Station is on the inner side of Cobb Island near the south end. A good fair-weather anchorage for vessels with drafts up to 8 feet is in the channel near the station.

Sand Shoal Channel extends westward from Sand Shoal Inlet for about 6 miles where it joins a dredged channel to the waterfront at **Oyster** (P.O.) on the mainland. The controlling depth was 4½ feet to Oyster in August 1960.

There are several privately owned wharves and a public bulkhead at Oyster. The village is the shipping point for a large amount of seafood. Available supplies include gasoline, diesel fuel, water, and groceries; a marine railway can haul out boats up to 45 feet in length for general repairs.

New Inlet, the ocean entrance between Wreck Island and **Ship Shoal Island** 9 miles northeast of Cape Charles Light, is shallow, unmarked, changeable, and seldom used even by local boats.

Ship Shoal Inlet, the ocean entrance between Ship Shoal Island and **Myrtle Island,** is shallow and unmarked; it is used only by local oyster boats. There is deep water back of the inlet but the channels to the inside passages are shallow and tortuous.

The **danger zone** of a bombing and gunnery range is centered on Myrtle Island, 6 miles northeastward of Cape Charles Light; see **204.48,** Chapter 2, for limits and regulations.

Little Inlet, between Myrtle Island and Smith Island, is shallow and is little used. Small boats can connect with the inside passage at high water.

Cape Charles and the islands on the north side of the entrance to Chesapeake Bay are described in Chapter 9.

Smith Island Inlet, between Smith Island and Fisherman Island, is fairly wide but the narrow, changeable channel lies between sandbars and breakers. The inlet is used by many local boats with drafts of 3 to 4 feet, but it is unmarked and should not be used by strangers. The controlling depth over the bar is said to be 1½ feet.

Charts 1220 to 1222.—The Waterway on the Coast of Virginia lies between the barrier beach along the Atlantic Ocean on the east and the Virginia portion of the main-

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land peninsula on the west. It extends from the south end of Chincoteague Bay for 72 miles through creeks, thorofares, and bays to enter Cheseapeake Bay at Cape Charles.

The Federal project for the waterway provides for a channel 6 feet deep. The controlling depth in midchannel was 2 feet in August 1960. The inside passage is marked by lights and daybeacons. The only fixed bridge and cable over the waterway are across Cat Creek about 8 miles southwestward of Chincoteague; the minimum clearance is 40 feet.

The mean range of tide varies from 2.5 to 4.5 feet in the inlets along the Virginia coast; greater fluctuations in the water level in the inside waters are caused by high winds and storms. Boats making the passage south from Chincoteague can carry the best water by leaving on the last of the falling tide, but little protection is afforded small boats from easterly winds by the narrow barrier beach.

Gasoline and other supplies are available and repairs can be made at Wachapreague, 29 miles south of Chincoteague and 43 miles north of Cape Charles, and at Oyster, 60 miles south of Chincoteague and 12 miles north of Cape Charles.

From Chincoteague, the inside passage follows Chincoteague Channel across Chincoteague Inlet to **Walker Point,** thence through **Ballast Narrows, Island Hole Narrows,** the dredged cut in **Bogues Bay,** and **Cat Creek** to the sloughs marked by lights and daybeacons back of Assawaman Inlet, 10 miles southwestward of Chincoteague. The fixed highway bridge over Cat Creek has a clearance of 40 feet. The overhead power cable just north of the bridge has a clearance of 60 feet. A depth of 1½ feet can be carried to **Wishart,** a mainland town on the west side of Bogues Bay.

From a mile back of Assawaman Inlet, the inside passage continues through **Northam Narrows,** thence through dredged cuts in **Kegotank Bay** and back of Gargathy Inlet to **Wire Passage,** 15 miles southwestward of Chincoteague.

From Gargathy Inlet, the inside passage goes through Wire Passage into a dredged cut in **Metomkin Bay** and enters Folly Creek westward of Metomkin Inlet. **Folly Creek,** which leads westward from the south end of Metomkin Bay, has a depth of 1 foot to the landing at its head, 3 miles above the mouth.

The passage continues through a landcut from Folly Creek into **Longboat Creek,** thence through cuts in **Cedar Island Bay, Teagles Ditch,** and **Burtons Bay** into Wachapreague Channel which leads to Wachapreague, 29 miles southward of Chincoteague. Supplies and repair facilities are available at Wachapreague; refer to previous discussion in this chapter.

From Wachapreague Channel, the passage continues through a cut in **Bradford Bay,** a part of **Millstone Creek,** a cut in **Swash Bay,** a part of **The Swash,** and **Little Sloop Channel** to Sandy Island Channel, 3 miles inside Little Machipongo Inlet and 36 miles southward of Chincoteague.

The passage southward of Little Machipongo Inlet follows **Sloop Channel** and a dredged cut into **Cunjer Channel,** thence westward in **North Channel** at the north end of **Hog Island Bay** to Great Machipongo Channel, 43 miles southward of Chincoteague.

After passing through Great Machipongo Channel to a point 2 miles inside Great Machipongo Inlet, the route goes westward through **Gull Marsh Channel,** thence southwestward through a natural channel and cut in **Outlet Bay** and **Spidercrab Bay** to **Eckichy Channel,** thence southeastward to Sand Shoal Channel, 1.5 miles inside Sand Shoal Inlet, 56 miles southward of Chincoteague.

There are several alternate routes that lead southwestward from Great Machipongo Channel through **The Deeps, The Outlet,** and **Ramshorn Channel,** which is the northern part of a waterway known as **The Thorofare.** These deep passages are difficult to find as they are not well marked and most of the mud flats they traverse do not uncover at low water; they should be avoided without local knowledge.

Supplies and repair facilities are available at Oyster on the mainland west of Sand Shoal Inlet, 60 miles south of Chincoteague; refer to previous discussion in this chapter.

From inside of Sand Shoal Inlet, the passage continues westward through Sand Shoal Channel and southward through **Mockhorn Channel,** the southern part of The Thorofare, to Magothy Bay. A bare rock in midchannel about halfway in Mockhorn Channel is marked by a daybeacon.

Magothy Bay, which extends southward from The Thorofare to Smith Island Inlet, is shallow except in the well marked inside passage which passes through the bay to Cape Charles. **Magotha,** a village on the west side of the bay, 3.5 miles northwestward of Cape Charles Light, handles oysters at the wharves; a depth of about 2 feet can be carried to the village.

From the southern part of Magothy Bay, the passage continues southwestward through a dredged cut across Cape Charles into deep water in Chesapeake Bay. The controlling depth from Sand Shoal Channel through the southern part of The Thorofare and Magothy Bay to Chesapeake Bay was 5 feet in August 1960.

9. CHESAPEAKE BAY ENTRANCE

Chart 1222.—Chesapeake Bay, the largest inland body of water along the Atlantic coast of the United States, is 168 miles long from the Virginia Capes to the mouth of Susquehanna River. The bay is the approach to Norfolk, Newport News, Baltimore, and many lesser ports. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Cape Charles on the north and Cape Henry on the south. Medium-draft vessels can enter from Delaware Bay on the north by way of the Chesapeake and Delaware Canal, and light-draft vessels can enter from Albemarle Sound on the south via the Intracoastal Waterway.

Note.—Many of the distances in this and later Chesapeake Bay chapters are stated in miles above the **Virginia Capes,** or the **Capes,** which is a short way of referring to a line from Cape Charles Light to Cape Henry Light.

Chesapeake Lightship (36°58.7′ N., 75°42.2′ W.), with red hull and the name CHESAPEAKE in large white letters on the sides, is moored about 15 miles eastward of Cape Henry Light; the light is 66 feet above the water. The vessel has a fog signal and a radiobeacon; see Appendix for **storm warning displays.**

Cape Charles, on the north side of the entrance to Chesapeake Bay, is low and bare but the land back of it is high and wooded. **Wise Point** is the most southerly mainland tip of the cape.

The southwest end of **Smith Island** is 2 miles eastward of Wise Point; the island is 6 miles long, is low and sparsely wooded, and is awash at half tide midway along its length.

Cape Charles Light (37°07.4′ N., 75°54.4′ W.), 180 feet above the water, is shown from a 191-foot octagonal, pyramidal skeleton tower, upper part black and lower part white, on the southwestern part of Smith Island. The ruins of the old lighthouse are in shallow water 0.7 mile eastward of the light.

Low **Fisherman Island** is a mile south of Wise Point. The route of the **Chesapeake Bay Bridge-Tunnel** is from Wise Point to Fisherman Island, thence southwestward across the bay to a point 6 miles west of Cape Henry Light. The 15-mile crossing, scheduled for completion in 1962, will have tunnels under Main and Thimble Shoal Channels, bridges over secondary channels and causeways over the flats.

Smith Island Shoal, which breaks in heavy weather, has depths of 21 feet 7.5 miles east by south of Cape Charles Light. Depths less than 40 feet extend another 5 miles northeastward. Outer limits of the shoal area are marked by a lighted buoy.

Nautilus Shoal, which extends 4 miles southeastward from Fisherman Island, has patches with depths of 6 to 11 feet. The buoyed channel along the southwest side of Nautilus Shoal, thence northward between Fisherman Island and **Inner Middle Ground,** has a controlling depth of about 18 feet; the channel is used by local vessels drawing up to 12 feet but is not recommended for strangers.

Cape Henry, on the south side of the entrance to Chesapeake Bay, has a prominent range of sand hills about 80 feet high.

Cape Henry Light (36°55.6′ N., 76°00.4′ W.), 164 feet above the water, is shown from a 163-foot octagonal, pyramidal tower, upper and lower half of each face alternately black and white, on the beach near the turn of the cape; the light station has a radiobeacon and a fog signal. This particular station also is equipped for special radio-direction-finder calibration; see Light List for operational information.

The gray octagonal, pyramidal tower 110 yards southwest of Cape Henry Light is the abandoned 1791 lighthouse. At the signal tower 0.3 mile northwest of the light, the Hampton Roads Maritime Exchange maintains a **reporting station** from which vessels are reported to Norfolk and Baltimore; vessels can communicate with the station by flag hoist or signal light in International Code, and messages from or to vessels can be relayed by the station. See Appendix for **storm warning displays.**

A **naval restricted area** extends northward and eastward from Cape Henry; see **207.158,** Chapter 2, for limits and regulations.

Virginia Beach is a summer resort 5 miles south of Cape Henry Light. The buildings are conspicuous, the most prominent being the Cavalier Hotel which is distinguished by its size and its cupola. **Virginia Beach Coast Guard Station** is a mile south of the hotel.

Boundary lines of inland waters.—The lines established for Chesapeake Bay Entrance are described in **82.30,** Chapter 2.

Channels.—The deep channel into Chesapeake Bay is close to Cape Henry. A direct course from Chesapeake Lightship to abeam of the cape has a controlling depth of about 34 feet. Deep-draft vessels should approach through the 50-foot natural channel that extends southeastward from the cape. The 60-foot curve should be followed when rounding the cape to insure passing at a safe distance of 1 mile; depths near 100 feet should be avoided because they are dangerously close to the shoal 2.5 miles northeast of the cape. A Federal project provides for main-channel depths of 39 feet from the Virginia Capes to Baltimore; the well-marked channel extends north-northwestward from Cape Henry and is discussed further in Chapters 11 to 15.

Tides.—The mean range of tide is 2.8 feet at Cape Henry.

Currents.—The current velocity is 1.2 knots in Chesa-

peake Bay Entrance; see the Tidal Current Tables for daily predictions.

Pilotage.—Virginia and Maryland pilot boats are stationed in Chesapeake Bay Entrance. Virginia pilots are taken to any port in Virginia and Maryland pilots are taken to any port in Maryland, but vessels bound up Potomac River may take either. Whistle signals are one long and one short blast for a Virginia pilot and three longs and one short for a Maryland pilot.

Every ship arriving from or bound to a foreign port is obliged to receive a pilot. Vessels employed in or licensed for the coasting trade are exempt from pilotage if they have on board a pilot duly licensed by the Federal Government to operate in these waters.

Chart 481.—Thimble Shoal Channel, the improved approach to Hampton Roads, begins 2 miles northwest of Cape Henry Light and extends 10 miles west-northwestward; a Federal project provides for main-channel depths of 40 feet. See **207.140,** Chapter 2, for **navigation regulations.**

Naval and merchant-vessel **anchorages** have been established south of Thimble Shoal Channel; see **202.168,** Chapter 2, for limits and regulations.

Lynnhaven Roads, an open bight westward of Cape Henry, is protected from southerly winds and is sometimes used as an anchorage. The former dumping-ground area in the western part of the bight has shoals and obstructions with depths as little as 12 feet; elsewhere, general depths are 20 to 28 feet. Eastward of Lynnhaven Inlet the 18-foot curve is no more than 0.3 mile from shore; westward of the inlet the shoaling is gradual and depths of 18 feet can be found 0.8 mile from shore.

Lynnhaven Inlet, 4 miles westward of Cape Henry Light, has depths of 1 foot over the bar and is marked by several buoys. The channel is subject to continuous shoaling despite occasional dredging. Boats drawing 3 feet should enter the inlet at high water. The fixed highway bridge over the inlet has a clearance of 35 feet. **Lynnhaven Bay,** south of the inlet, has depths of 2 to 10 feet.

Long Creek, which leads eastward from Lynnhaven Inlet to **Broad Bay,** has depths as little as 1 foot and has many unmarked shoals in the deeper sections. Gasoline is available at piers on the north side of the entrance to Long Creek. The fixed highway bridge 1.2 miles from the inlet bridge has a 40-foot channel span with a clearance of 20 feet. Berthing is available at a marina on the west side of the bridge; available supplies include gasoline, fresh water, ice, and some groceries.

Broad Bay Canal is a privately-dredged cut that provides a more direct route from Lynnhaven Inlet to Broad Bay; the cut leaves Long Creek a mile from the inlet and leads eastward to the bay. The fixed highway bridge over the cut has a clearance of 35 feet. In November 1960, the controlling depth was 3 feet.

The Cavalier Yacht and Country Club (see Chart 1222) is back of Virginia Beach and is about 5 miles from Lynnhaven Inlet by way of Long Creek, Broad Bay Canal, Broad Bay, the **Narrows,** and **Linkhorn Bay.** Depths are about 7 feet in Broad Bay, 4 feet in the Narrows, and 10 feet in Linkhorn Bay. The club is on the south side of the entrance to **Little Neck Creek,** which is the southeast arm of Linkhorn Bay; the pier has depths of about 9 feet at the face. Gasoline, fresh water, and ice are available on the pier, and groceries can be delivered. A marine railway a mile up Little Neck Creek can haul out boats up to 40 feet in length.

Little Creek is entered between jetties 8 miles westward of Cape Henry Light. A Federal project provides for depths of 20 feet to the Pennsylvania Railroad terminals, 1.2 miles south of the jetties. Lights mark the outer ends of the jetties, and a polychrome directional light is shown from a skeleton tower at the head of the channel. See Appendix for **storm warning displays.**

The town of **Little Creek** has rail and highway connections with Norfolk. The Pennsylvania Railroad operates car floats to the town of Cape Charles on the Delmarva Peninsula. Automobile and passenger ferries operate to Kiptopeke Beach, also on the peninsula. There are several Government installations in Little Creek; **Little Creek Coast Guard Station** is about 200 yards eastward of the railroad pier.

Fishermans Cove, on the west side of the main Little Creek basin, has marinas on the north and south sides. Available supplies include gasoline, fresh water, ice, and some marine hardware. Vessels up to 75 feet in length can be hauled out for hull and engine repairs. A **speed limit** of 5 knots is prescribed for Fishermans Cove; see **207.157a,** Chapter 2.

Navy **danger zones** and **restricted areas** extend northward from the vicinity of Little Creek to the edge of Thimble Shoal Channel; see **204.51** and **207.157,** Chapter 2, for limits and regulations.

Chart 400.—Hampton Roads, at the southwest corner of Chesapeake Bay 16.5 miles westward of the Virginia Capes, is the approach to Newport News and James River and to Elizabeth River and the cities of Norfolk and Portsmouth. The harbor is one of the most important along the eastern seaboard. Bituminous coal, petroleum products, sand and gravel, and fertilizers constitute more than 90 percent of the heavy traffic movement by water.

Channels.—The approach to Hampton Roads through 40-foot Thimble Shoal Channel was discussed earlier. There are natural depths of 20 to 80 feet in the harbor, but it has been necessary to dredge deep channels to the big ports.

A Federal project provides for depths of 40 feet from Hampton Roads to the junction of Eastern and Southern Branches of Elizabeth River; the improved section begins 16 miles from the Virginia Capes and extends southward for about 10 miles along the waterfronts of Norfolk and Portsmouth. A similar Federal project provides for depths of 40 feet from Hampton Roads to deep water in James River; the improved section begins 18 miles from the Virginia Capes and extends westward for 4 miles to the waterfront of Newport News.

Anchorages.—Numerous anchorages have been es-

tablished in Hampton Roads and Elizabeth River; see **202.168,** Chapter 2, for limits and regulations. The areas are shown on Charts 400 and 452.

Tides.—The mean range of tide is 2.5 feet in Hampton Roads. See Tide Tables for daily predictions of tides at Sewells Point.

Currents.—Information for several places in Hampton Roads and Elizabeth River is given in the Tidal Current Tables. The currents are influenced considerably by the winds and at times attain velocities in excess of the tabular values. The current velocity is 1.1 knots in Hampton Roads and 0.6 knot in Elizabeth River.

Ice.—Hampton Roads generally is free of ice, and navigation is never obstructed for full-powered vessels. In severe winters, the upper part of Southern Branch, Elizabeth River, is sometimes closed for short periods.

Pilotage at Hampton Roads ports is performed exclusively by the Virginia Pilot Association and is compulsory for all vessels excepting those engaged in coastwise trade and those exempted by United States statute.

Towage.—Vessels usually proceed from Cape Henry to points in the Hampton Roads port area under their own power and without assistance. A large fleet of tugs is available at Norfolk to assist in docking or undocking and in shifting within the harbor.

Quarantine.—The quaratine station is at Fort Monroe on Old Point Comfort. Arriving vessels subject to quarantine and bound for Hampton Roads ports or Richmond must remain at the Old Point Comfort quarantine anchorage until granted clearance. The U.S. Public Health Service Hospital is on Hampton Boulevard, Norfolk, and the U.S. Naval Hospital is in Portsmouth. There are numerous private hospitals.

Customs.—Hampton Roads is a port of entry with customhouses at Norfolk and Newport News. Marine documents are issued.

Immigration.—Vessels are boarded by immigration officers upon arrival at Norfolk and Newport News, and all crew members are subject to inspection before landing. All passengers, stowaways, and workaways must be entered on alien passenger manifests and safely detained aboard until instructions are issued by the immigration officer for their disposal. Vessels from foreign ports bound direct for Richmond are required to stop at Newport News for immigration inspection.

Harbor Regulations.—Port regulations are principally concerned with grain and coal handling, port charges, pilotage and stevedoring. **Anchorage regulations** are covered in **202.168,** Chapter 2.

Wharves.—The Hampton Roads area has more than 200 piers and wharves along more than 30 miles of improved waterfront. Included are coal piers; oil-storage and bunkering facilities; general-cargo, grain, and ore piers; and marine railways and drydocks. Available depths are 30 to 35 feet at the general-cargo, ore, and grain piers; 35 to 36 feet at the coal piers; and 30 to 45 feet at the oil-storage and bunkering facilities.

Supplies.—The principal coal-handling and bunkering piers are those of the Norfolk and Western Railway at Sewells Point and Lambert Point, Norfolk, and of the Chesapeake and Ohio Railway at Newport News. Bunker oil is available at Sewells Point and in Southern Branch, Elizabeth River, or can be delivered from barges in the stream. Fresh water is available on the principal piers and can be supplied from barges. The area also has numerous ship chandlers and marine suppliers.

Repairs.—Hampton Roads has extensive facilities for drydocking and hauling out. The largest floating drydock at Norfolk has a capacity of 15,000 tons, and the largest marine railway can handle 5,500 tons. The shipyard at Newport News is one of the largest and best-equipped in the United States; the principal graving dock has a length of 775 feet on the keel blocks. There are many other yards that are especially equipped to handle small vessels.

Wrecking and salvage work is not a specialty of the Hampton Roads shipyards, but they have the equipment for such service if the need arises. Additional gear can also be brought in from New York.

Communications.—The Hampton Roads ports are served by several large railroads and by a terminal beltline; most of the roads operate waterfront terminals which are reached directly over their own rails. More than 60 steamship lines connect Hampton Roads with the principal United States and foreign ports; most of the lines have regular sailings and the others maintain frequent but irregular service. Three airlines offer prompt air-freight, express, and passenger service from Norfolk and Newport News to major United States airports where connections can be made for overseas destinations.

Thimble Shoal Light (37°00.9′ N., 76°14.4′ W.), 55 feet above the water, is shown from a red conical tower on a brown cylindrical pier on the eastern edge of the shoal; a fog signal is sounded from the light station. The light is 12.3 miles from the Virginia Capes. Thimble Shoal is the southern edge of the **Horseshoe,** which is described in Chapter 11.

The entrance to Hampton Roads is between Willoughby Spit and Old Point Comfort, 2 miles to the northward; the midchannel point is 0.5 mile from Old Point Comfort and 15.5 miles from the Virginia Capes.

Old Point Comfort is the site of **Fort Monroe** and the quarantine station for the Hampton Roads port. The Vanderbilt-Chamberlin Hotel is an excellent landmark. **Old Point Comfort Light (37°00.1′ N., 76°18.4′ W.),** 54 feet above the water, is shown from a white tower. A fog signal is sounded from the knuckle of the seawall about 200 yards eastward of the light. See Appendix for **storm warning displays.** Only government craft can tie up at the wharf on the south waterfront of Old Point Comfort.

A Naval Ordnance Laboratory **restricted area** extends eastward and southward of Old Point Comfort; see **204.50,** Chapter 2, for limits and regulations.

Hampton Bar begins about 200 yards southwestward of Old Point Comfort and extends 2 miles southwestward; depths on the bar are 1 to 5 feet. The bar is marked by two lights and by buoys along its southern edge. These lights together with one on Hampton flats aid vessels in

mooring in the Naval and other anchorages northward of the main channel. A Federal project provides for a channel 12 feet deep from Hampton Roads to the Phoebus waterfront. The channel is buoyed and was at project depth in November 1960. The wharves at Phoebus have depths of 8 to 12 feet at their outer ends but are in poor condition. Small craft can anchor in depths of 8 to 20 feet along the sides of the channel. The Fort Monroe yacht piers are on the east side of the channel 0.4 mile above Old Point Comfort.

Mill Creek, back of Old Point Comfort and just eastward of the Phoebus wharves, has several narrow channels through extensive areas that bare at low water. The three fixed bridges over the entrance have a channel width of 10 feet and a clearance of 4 feet. The creek is little used.

Hampton River is on the north side of Hampton Roads 1.5 miles northwest of Old Point Comfort and 17.5 miles from the Virginia Capes. A Federal Project provides for a channel 12 feet deep from the vicinity of Old Point Comfort across Hampton Flats and up the river to the highway bridge at Hampton. In November 1960, the controlling depth was 10 feet to Hampton. The channel is well marked and easy to follow. The river may be approached from either end of Hampton Bar, but the larger craft use the dredged channel.

The residential and commercial areas of Hampton are on the west side of Hampton River; **Hampton Institute** and a Veterans Hospital are on the east side. The town is headquarters for numerous oyster and fishing boats. Some supplies, including gasoline, water, and ice, are available at marine service stations on the west side of the entrance to Hampton River. Depths at the fuel piers are 7 to 10 feet. The fixed highway bridge 0.7 mile above the mouth of the river has a channel width of 26 feet and a clearance of 10 feet; only very small boats navigate above the bridge. The principal commercial wharves are just below the bridge and have depths of 7 to 12 feet at their faces. The public landing 500 yards below the bridge has depths of 8 feet at the face; small boats anchor between the public landing and the bridge. The Hampton Yacht Club and two marine service stations are on the west side halfway between the mouth and the bridge. The piers have 5 to 10 feet at their outer ends.

Available supplies include gasoline, diesel fuel, fresh water, ice, and groceries. Marine railways along Hampton River can haul out vessels up to 100 feet in length; mechanics can be called in to repair engines.

Jones Creek, on the east side of Hampton River 300 yards above the mouth, has depths of 11 feet. The bulkheads have depths of 3 to 7 feet alongside and are controlled by the Veterans Hospital on the south and Hampton Institute on the north.

Sunset Creek is on the west side of Hampton River 400 yards above the mouth. A Federal project provides for a channel 12 feet deep to the bulkhead 0.5 mile above the entrance. In November 1960, the controlling depth was 11 feet. The wharves along the creek have depths of 4 to 9 feet at their outer ends. The creek is marked by two lights and a buoy. A marina on the south side of the entrance has a travelift that can handle vessels up to 45 feet in length. Available supplies include gasoline, diesel fuel, fresh water and ice.

Salters Creek, about 3 miles southwestward of Hampton River, has a narrow unmarked approach channel with depths of 2 feet. The fixed highway bridge over the entrance to the creek has a channel width of 28 feet and a clearance of 9 feet. Above the bridge is a basin with depths of 5 to 6 feet in which numerous small craft moor. There is a launching ramp in the basin.

The 40-foot-project channel to Newport News was discussed earlier. Depths along the edges of the dredged section are 19 to 25 feet. The currents do not always set fair with the channel, especially with strong winds, and deep-draft vessels sometimes find it difficult to stay in the channel.

Newport News Middle Ground Light (36°56.7′ N., 76°23.5′ W.), 52 feet above the water, is shown from a brown conical tower on a black cylindrical pier in 15 feet of water near the western end of the shoal; a fog signal is sounded from the light station. The light is 0.6 mile south of Newport News Channel and 21.5 miles from the Virginia Capes.

Newport News Point, on the north side of the entrance to **James River,** is 22.5 miles from the Virginia Capes. The city of **Newport News** extends several miles along the northeast bank of James River.

Newport News Creek, just west of Newport News Point, is a city-improved small-boat harbor. A Federal project provides for a channel 12 feet deep to the head of the harbor, 0.6 mile above the mouth; the controlling depth was 11 feet in November 1960. A privately-maintained light marks the west side of the entrance. The bulkheads in the harbor have depths of 7 to 12 feet alongside. Available supplies include gasoline, diesel fuel, fresh water, and marine hardware. The marine railways on the west side of the harbor can haul out vessels up to 90 feet in length for hull and engine repairs.

The Chesapeake and Ohio Railway coal piers 0.3 mile westward of Newport News Point have depths of 35 feet alongside; vessels can be loaded at the rate of 7,500 tons per hour. The general-cargo piers 1.1 miles northwest of the point have depths of 34 to 38 feet alongside. Vessels can load bunker oil directly from pipelines on the coal piers.

The facilities of the Newport News Shipbuilding and Drydock Company begin 1.7 miles northwest of Newport News Point and extend a mile upriver; depths at the piers are about 35 feet. The largest graving dock has a length of 775 feet on the keel blocks and a depth of 30 feet over the sill. The largest semisubmerged shipway is 1,000 feet long, 140 feet wide, and has a depth of 35 feet over the sill. Two graving docks, 1,000 feet and 960 feet in length, respectively, are also used for ship construction. The outfitting piers have cranes with capacities up to 140 tons, and the yard has floating cranes with capacities up to 100 tons.

Willoughby Spit, on the south side of the entrance to Hampton Roads, is a narrow barrier beach 1.3 miles long

in an east-west direction. About midway between the spit and Old Point Comfort, on the opposite side of the entrance, is **Fort Wool,** which is on the south edge of the main ship channel; a light, 25 feet above the water, is shown from the north searchlight tower on the fort.

Willoughby Bank, with depths of 3 to 7 feet, extends east-northeastward along the edge of the main channel for about 2.5 miles from Fort Wool.

Willoughby Bay, on the inner side of Willoughby Spit, has general depths of 7 to 12 feet. On the south side of the bay are the prominent buildings of the Norfolk Naval Base and the Naval Air Station. A Federal project provides for a channel 10 feet deep from deep water 0.4 mile westward of Fort Wool to the abandoned ferry slip behind the hook of Willoughby Spit. The controlling depth was 10 feet in November 1960. The Willoughby channel is well marked. The wharf west of the old ferry slip has depths of 11 feet at the face, and vessels up to 40 feet in length can be accommodated; available supplies include gasoline, diesel fuel, fresh water, ice, and marine hardware. A marine railway at the wharf can haul out vessels up to 40 feet in length for hull and engine repairs. A large concrete public launching ramp is immediately west of the railway.

The greater part of Willoughby Bay and approaches is a seaplane **restricted area**; see **207.156,** Chapter 2, for limits and regulations. The northern part of the bay has been designated as a **yacht anchorage**; see **202.168,** Chapter 2, for limits and regulations.

Charts 400, 452.—Norfolk Harbor comprises a portion of the southern and eastern shores of Hampton Roads and both shores of Elizabeth River and its Eastern, Southern, and Western Branches, on which the cities of Norfolk, Portsmouth, South Norfolk, and West Norfolk are located.

Norfolk Harbor extends from the 40-foot depth contour off Sewells Point, at the entrance to Elizabeth River, to a point 0.4 mile south of the Norfolk and Western Railway Bridge at Mile 5.5 over Southern Branch, a total distance of 14 miles; it extends 1.5 miles up Western Branch to a point 0.5 mile above the West Norfolk highway bridge, and up Eastern Branch for 2.5 miles to the Norfolk and Western Railway Bridge.

The main part of Norfolk is on the east side of Elizabeth River north of Eastern Branch, with Berkley, a subdivision, to the southward between Eastern and Southern Branches. South of Berkley is the city of South Norfolk. Portsmouth, the seat of Norfolk County, is opposite Norfolk and its waterfront extends along the west shore of Southern Branch and the south shore of Western Branch. These cities form practically a single community because they have the same commercial interests and are served by the same ship channel.

Chart 400.—Sewells Point, on the east side of the entrance to Elizabeth River, is 18 miles from the Viriginia Capes. A breakwater, marked by a light on its outer end, extends about 0.3 mile westward from the point. The piers of the **Norfolk Naval Base** and its annex extend southward from the breakwater along the east bank of the river. Depths at the Naval piers are 24 to 40 feet. A jettied basin at the base affords protection for small Naval vessels in depths of 24 to 30 feet.

Sewells Point Spit, covered 3 to 6 feet, extends north-northeastward from the point for about 2 miles to the outer end of Willoughby Channel.

A channel has been dredged eastward and southward through Sewells Point Spit for about 1.2 miles to an enclosed boat basin. The channel is buoyed. In November 1960, the controlling depth was 8 feet in the channel. The basin, which is used only by small Naval boats, has depths of 5 to 7 feet.

The approach to the Naval piers is a **restricted area**; see **207.155,** Chapter 2, for limits and regulations.

The Norfolk and Western Railway coal piers south of Sewells Point have depths of 36 feet alongside; vessels can be loaded at the rate of 5,000 tons per hour. About 1.9 miles south of Sewells Point is a modern grain elevator with a capacity of 2,000,000 bushels; in 1959, depths in the elevator berths were 35 feet.

Lafayette River, which empties into the east side of Elizabeth River 4 miles south of Sewells Point and 22 miles from the Virginia Capes, is much travelled by small pleasure boats. The entrance is between **Tanner Point** and Lambert Point, 1.5 miles to the southward. The river has natural depths of 4 to 6 feet in the entrance, thence 6 to 20 feet for 3.5 miles to the forks, thence 2 to 4 feet up either fork. The dredged section in the entrance to Lafayette River is marked by lights and daybeacons; in November 1960, the controlling depth was 8 feet. The dredged channel turns sharply at the light off **Lawless Point,** a mile above the entrance, and vessels must be on the alert to avoid grounding. Defined **anchorage areas** extend up Lafayette River to the first bridge; see **202.168,** Chapter 2, for limits and regulations.

Hampton Boulevard Bridge, 1.5 miles above the entrance to Lafayette River, has a fixed channel span with a clearance of 29 feet. The Norfolk Yacht and Country Club, just below the north end of the bridge, has depths of 12 to 15 feet at the pier faces; available supplies include gasoline, diesel fuel, fresh water, and ice.

Knitting Mill Creek, on the south side of Lafayette River 3 miles above the mouth, has depths of 3 feet to the head. Marine supplies, including gasoline and water, are available within the creek. A travelift can haul out craft up to 65 feet in length for general repairs.

Granby Street Bridge, 3.5 miles above the entrance to Lafayette River, has a 40-foot bascule span with a clearance of 20 feet. The yacht basin 200 yards below the south end of the bridge has slips for more than a hundred boats; the finger pier extends out to the channel. Gasoline, water, and ice are available at the pier.

Just above Granby Street Bridge, Lafayette River divides into two forks, both unmarked. A fixed highway bridge over the mouth of the north fork has a channel width of 30 feet and a clearance of 10 feet. A fixed highway bridge over the south fork a mile from Granby Street Bridge has a channel width of 27 feet and a clearance of 9 feet; another fixed highway bridge 0.3 mile

farther up the south fork has a channel width of 28 feet and a clearance of 3 feet.

Chart 452.—Craney Island, now a part of the mainland, is on the west side of Elizabeth River 4.5 miles south of Sewells Point. The low and thinly-wooded area is the site of a Navy fuel depot, and the docks and piers, all on the eastern side, are used only by Government vessels. A light, 34 feet above the water, is shown from a white skeleton structure on piles off the northeast corner of Craney Island; the light station has a fog signal. The wharves have depths of 28 to 39 feet alongside. A submerged water main crosses from Craney Island to the north side of Lambert Point; vessels are cautioned not to anchor in the vicinity of the lighted range that marks the crossing.

Lambert Point is on the east side of Elizabeth River 5.4 miles south of Sewells Point. The Norfolk and Western Railway coal piers on Lambert Point have depths of about 34 feet alongside, and vessels can be loaded at the rate of 5,000 tons per hour.

Western Branch empties into the southwest side of Elizabeth River 6 miles south of Sewells Point and 24 miles from the Virginia Capes. A Federal project provides for depths of 24 feet from Elizabeth River to the highway bridge a mile above the mouth, thence 18 feet to a point 0.5 mile above the bridge; the controlling depth is about 14 feet. Lights and daybeacons mark the channel as far as the bridge. Above the dredged channel, Western Branch has depths of 9 to 19 feet in a narrow unmarked channel for a mile; thence 6 to 19 feet to **Drum Point,** 4.3 miles above the entrance. Small boats can navigate about 3 miles farther.

The highway bridge a mile above the entrance to Western Branch has a swing span with a clearance of 4 feet; the channel is through the north opening. **West Norfolk** is at the north end of the bridge.

The West Norfolk shipyard, just above the bridge, can haul out vessels up to 280 feet in length for any hull or engine repairs. The yacht-service pier 0.2 mile above the bridge has depths of 6 feet at the face; available supplies include gasoline, diesel fuel, fresh water, and ice.

Churchland fixed highway bridge, 2.3 miles above the entrance to Western Branch, has a clearance of 38 feet. The overhead power cable on the upper side of the bridge has a clearance of 45 feet; the transmission towers are marked by lights.

The Atlantic Coast Line Railroad Bridge at **Bruce,** 4 miles above the entrance, has a swing span with a clearance of 4 feet. **Hodges Ferry** highway bridge, 4.7 miles above the entrance, has a 32-foot bascule span with a clearance of 5 feet; see **203.245,** Chapter 2, for drawspan regulations. The overhead power cable on the upstream side of the Hodges Ferry bridge has a clearance of 37 feet.

Pinner Point is on the southwest side of Elizabeth River 6.8 miles from Sewells Point and 24.5 miles from the Virginia Capes. The northwesternmost pier has depths of 28 feet alongside; the other piers have depths ranging from 15 to 20 feet. Most of the piers are controlled by the Southern Railway or the Atlantic Coast Line Railroad and are used for transfer of general cargo.

Scott Creek is on the southwest side of Elizabeth River 7.3 miles from Sewells Point. A Federal project provides for a channel 12 feet deep to a point 100 feet above the railroad bridge; the controlling depth was 8 feet in November 1960. Daybeacons mark the improved channel. The Atlantic Coast Line Railroad Bridge 0.5 mile above the entrance has a hand-operated swing span with a channel width of 34 feet and a clearance of 3 feet; the channel is through the northwest opening. The fish wharves in the cove just above the south end of the bridge have depths of 6 to 9 feet at their faces.

Hospital Point, on the southwest side of Elizabeth River 7.6 miles from Sewells Point, is the site of a U.S. Naval Hospital. The main hospital building is the largest structure along the southwest side of Elizabeth River and is visible for many miles. The hospital landing has depths of about 18 feet at the face.

Norfolk, or parts of it, has been discussed at some length in the preceding text. The midpoint of the downtown section can be taken as the **City Wharf (36°50.9′ N., 76°17.9′ W.)** at the foot of West Main Street, which is on the northwest side of Elizabeth River 8 miles from Sewells Point and 25.6 miles from the Virginia Capes. City Wharf has depths of 15 feet at the face but is in poor condition. The wharves northwest and southeast of West Main Street have depths of 14 to 20 feet alongside.

Smith Creek, 0.3 mile north-northwestward of West Main Street, has depths of 7 to 10 feet and is used by motorboats, oyster and fish boats, and sand and gravel barges; motorboats anchor in the northwest arm. **Anchorage areas** have been defined for Smith Creek; see **202.168,** Chapter 2, for limits and regulations. The highway bridge over the entrance to the creek has a swing span with a channel width of 49 feet and a clearance of 5 feet; the northwest opening is used.

A marine service pier below the northwest end of Smith Creek bridge has depths of 8 to 15 feet at the face. Available supplies include gasoline, diesel fuel, fresh water, and ice. The **Norfolk Ship Base** of the Coast and Geodetic Survey is on the southeast side of the entrance to Smith Creek.

The piers in Smith Creek have depths of 5 to 8 feet at their faces. The Hague Marina, in the west arm, is a favorite overnight stop for yachts running the inland waterway; available supplies include gasoline, diesel fuel, and fresh water. The Hague is a landlocked anchorage basin that is completely protected from the wash of river traffic.

Eastern Branch empties into the east side of Elizabeth River 8 miles from Sewells Point and 26 miles from the Virginia Capes. A Federal project provides for a channel 25 feet deep to the Norfolk and Western Railway Bridge, 2.5 miles above the entrance. The channel is maintained at or near the project dimensions and is marked at the critical points. Above the bridge, the natural channel has depths of 10 to 18 feet to the forks 3.3 miles from the entrance and usually is marked by bush stakes.

Anchorage areas have been established in Eastern Branch; see **202.168,** Chapter 2, for limits and regulations.

Downtown Norfolk is on the north side of Eastern Branch, and **Berkley,** a subdivision, is on the south side. Traffic is fairly heavy as far as Campostella Bridge. Depths at most of the piers on both sides of the branch range from 14 to 25 feet.

The highway bridge 0.4 mile above the entrance to Eastern Branch has a bascule span with a clearance of 48 feet; see **203.349,** Chapter 2, for drawspan regulations. The Norfolk and Western Railway Bridge 1.0 mile above the entrance has a bascule span with a clearance of 4 feet; the overhead power cable 200 yards east of the bridge has a clearance of 150 feet.

Campostella Bridge, 1.4 miles above the entrance to Eastern Branch, has a bascule span with a clearance of 14 feet; see **203.245,** Chapter 2, for drawspan regulations. The Norfolk and Western Railway Bridge 2.5 miles above the entrance has a swing span with a clearance of 6 feet.

There are several shipyards along Eastern Branch; the largest can handle vessels up to 500 feet in length.

Southern Branch, which is merely a continuation of Elizabeth River south of the junction with Eastern Branch, is the approach to the **Intracoastal Waterway** route southward to Albemarle Sound. The waterway is described at length in United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

The Federal project for Southern Branch provides for a channel 40 feet deep to the Belt Line Railroad bridge, thence 35 feet deep to the Norfolk and Western Railway bridge at Mile 5.5. The channel is maintained at or near project dimensions and is well marked.

A **speed limit** of 6 knots is prescribed by **207.154,** Chapter 2, for the part of Southern Branch between Eastern Branch and the Belt Line Railroad bridge.

Portsmouth, on the west side of the entrance to Southern Branch, has been partly described in some of the preceding paragraphs. The commercial wharves extend 0.5 mile southward along the branch and have depths of 15 to 30 feet at their faces. Beyond the commercial wharves is the **Norfolk Naval Shipyard,** which occupies about 2 miles of the Portsmouth waterfront. There are **naval restricted areas** along this reach; see **207.153,** Chapter 2, for limits and regulations.

Depths at the Berkley wharves, on the east side of the entrance to Southern Branch, range from 20 to 40 feet, the later being at the shipyard 0.7 mile south of the entrance. The yard has a floating drydock, with a capacity of 15,000 tons, that has handled vessels up to 500 feet in length.

Bunker oil is available at several oil plants in **South Norfolk,** on the east side of Southern Branch about 2 miles from the entrance and 28 miles from the Virginia Capes. Depths at the wharves are 30 to 40 feet, and oil can be loaded at the rate of 2,000 barrels per hour.

The Belt Line Railroad bridge 1.8 miles south of the entrance to Southern Branch is at Mile 2.2 from the foot of West Main Street, Norfolk, which is **Mile 0.0** of Intracoastal Waterway distances south. The bridge has a vertical-lift span with clearances of 6 feet down and 142 feet up.

The highway bridge at Mile 2.5 has a vertical-lift span with clearances of 15 feet down and 145 feet up. The railroad bridge at Mile 3.2 has a swing span with a clearance of 9 feet.

The highway bridge and the Norfolk and Western Railway bridge at Mile 5.5 have bascule spans with clearances of 7 feet; large vessels must exercise caution when making the turns to these bridges because of the current. The overhead power cable at Mile 6.1 has a clearance of 145 feet.

10. CHESAPEAKE BAY, JAMES RIVER

Charts 529 to 531.—James River empties into the west side of Hampton Roads 22.5 miles by main channel from the Virginia Capes. Richmond, 78 miles above the mouth, is the head of practical navigation. Traffic on James River consists chiefly of petroleum products, sand and gravel, some chemicals, and shellfish. Drafts of vessels using the river above Newport News generally do not exceed 15 feet, but vessels drawing 24 feet or more navigate it occasionally.

Channels.—The Federal project for improvement of James River provides for a channel 25 feet deep to Richmond Deepwater Terminal, 74 miles above the mouth, thence 18 feet deep to Richmond Lock at Richmond, 78 miles above the mouth. The dredged cuts are maintained at or near project depths, and are well marked.

Anchorages.—Defined anchorage grounds extend for about 7 miles above the mouth; see **202.168,** Chapter 2, for limits and regulations.

Dangers.—Numerous stakes, piling, wrecks, and other obstructions are on both sides of the main channel in James River.

Tides.—The mean range of tide is 2.6 feet at Newport News and Hopewell, and 3.5 feet at Richmond.

Currents.—The currents in James River follow the general direction of the channel except between Hog Island and Jamestown Island, 25 miles above the mouth, where they set across Goose Hill Flats. In the lower reaches the velocity of flood is about equal to that of ebb. Near Richmond the drainage flow predominates and the current seldom if ever sets upstream. These normal conditions are subject to change by wind and freshets.

During severe winters some drift **ice** appears, and at times the river freezes over, but navigation to Richmond hardly ever is suspended more than two days at a time because of ice.

Freshets occur irregularly in the fall, winter, and spring; their height at Richmond ranges from 6 to 32 feet, though the latter is exceptional. The maximum freshet heights usually occur between the middle of March and the middle of April; the freshets occurring at other times usually reach heights not greater than about 6 feet above the normal high water. The number of freshets that cause the water to rise above the level of the wharves along the main channel at Richmond averages about one per year; the water seldom rises above the level of the city wharf. The flood heights diminish rapidly below Richmond; the extreme is about 11 feet less at Dutch Gap, and the rise is not felt at Hopewell. The cutoffs have reduced the freshet height at Richmond about one foot.

Pilotage to ports on James River is provided by the Virginia Pilot Association. Pilotage information for the Hampton Roads ports is given in Chapter 9.

The principal places for **supplies** above Newport News are Suffolk, Hopewell, and Richmond. **Repair** facilities are extremely limited; small marine railways operate in Chuckatuck Creek, Pagan River, and in the Dutch Gap bend.

Chart 529.—The entrance to James River is between Pig Point and **Newport News Point,** 3.6 miles to the north-northeastward; the midchannel point is 22.5 miles from the Virginia Capes and is close to the Newport News wharves, described in Chapter 9.

Nansemond River empties into the mouth of James River between Pig Point and **Barrel Point,** 2 miles to the west-by-northward. Traffic on Nansemond River consists chiefly of clays and earths, sand and gravel, concrete and clay products, and petroleum products. The river is used considerably by vessels with drafts of 9 feet and has been navigated with drafts of as much as 11 feet.

A narrow channel, which in April 1960 had a controlling depth of 12 feet, leads to Suffolk, 15 miles above the mouth of Nansemond River. It is well marked with lights and buoys to Western Branch, 10 miles above the mouth. Local knowledge is necessary to navigate the narrow unmarked channel above Western Branch. A dam 0.5 mile above the bridge in Suffolk is the head of navigation.

The mean range of tide in Nansemond River is about 2.8 feet at the entrance and 3.8 feet at Suffolk. The current velocity is 1.0 knot and follows the general direction of the channel.

Pig Point, on the south side of the entrance to James River and the east side of the entrance to Nansemond River, is the site of an inactive Marine Corps Supply depot. The unmarked channel to the wharf had a controlling depth of about 4 feet, in April 1960. The twin tanks 0.4 mile east of the wharf are prominent. The remains of an old wharf extend northward 0.7 mile from the vicinity of the tanks and are marked at their outer end by a light.

From Pig Point to Hollidays Point, 6.5 miles upstream, Nansemond River is wide but the channel is crooked and leads between extension shoals that are almost bare at low water in some places. There are many fish stakes on the shoals near the mouth. Above Hollidays Point, the river is narrow and crooked, but the midchannel is clear to Suffolk.

The highway toll bridge over Nansemond River at **Town Point,** on the south side 2.4 miles above the mouth, has a bascule span with clearance of 20 feet. Just east of the bridge, a buoyed channel leads southward into **Bennett Creek,** which had a controlling depth of 7 feet through the narrow channel, in April 1960. The channel is marked by buoys and bush stakes. The creek has deeper water inside to the highway bridge which has a swing span with a clearance of 8 feet.

Great Shoal, on the northwest side of the channel a

mile upriver from the bridge, has an oyster bar that bares ½ foot at low water. The shoal is marked by bush stakes.

The highway toll bridge over the river at **Hollidays Point,** on the north side 6.5 miles above the mouth, has a swing span with a clearance of 7 feet. The dredged basin to a sand and gravel plant, 0.2 mile west of Hollidays Point, had depths of about 5 feet, in April 1960.

Western Branch, which empties into the west side of Nansemond River 10 miles above the mouth, has depths of about 10 feet to the bridge at **Reids Ferry,** 1.6 miles above the mouth. A marina, 0.7 mile from the main Nansemond channel, has a pier with a depth of about 10 feet at the face; available supplies include gasoline, water, and electricity. A 1½-ton hoist and concrete launching ramp are also available. The highway bridge at Reids Ferry has a swing span with a width of 35 feet and a clearance of 9 feet through the south opening. The draw will not be opened for the passage of vessels; see **203.245,** Chapter 2.

Suffolk is an important rail center on the south side of Nansemond River 15 miles above the mouth. Fuel and other suplies are available in the city. A marina on the north side of the river just below the bridge has gasoline, water, electricity, and other supplies. The depth at the face of the pier was 7 feet in April 1960. The highway bridge over the river at Suffolk has a bascule span with a width of 40 feet and a clearance of 4 feet. The overhead power cable at the bridge has a clearance of 55 feet. The oil wharves just above and below the bridge have main-channel depths at their faces.

Batten Bay, on the west side of James River just north of Nansemond River, has general depths of 2 to 6 feet. **Ragged Island Creek,** which empties into the north side of the bay, is shallow and little used.

Chuckatuck Creek, which empties into Batten Bay from southwestward, has depths of about 5 feet in the approach through the bay and deeper water inside for about 1.7 miles. The channel through the bay is marked by lights and daybeacons which must be followed closely to carry the best water; the channel edges usually are marked by bush stakes.

The highway bridge over Chuckatuck Creek 0.8 mile above the mouth has a bascule span with a clearance of 21 feet; see **203.245,** Chapter 2, for **drawspan regulations.** One of the two boatyards at **Crittenden,** the village at the south end of the bridge, has a marine railway with a hauling capacity of 22 tons. The oyster-house wharf at Crittenden has depths of 5 feet at the face; the smaller landings have depths of 3 to 5 feet at the outer ends. The gasoline wharf between Crittenden and the mouth of the creek has depths of 6 feet alongside. Diesel fuel, water, electricity, and some other supplies are available at the wharves in Crittenden.

James River Bridge is 4 miles above the mouth and extends 4 miles from shore to shore in a northeast-southwest direction. The main-channel vertical-lift span, 1 mile from the northeast, or Newport News, end, has clearances of 50 feet down and 145 feet up; at night, red lights show when the lift span is down and green lights when it is up. A fixed span midway between the two shores has a clearance of 25 feet.

A **Mariners' Museum** is on the east side of James River 6 miles above the mouth at the easterly end of **Lake Maury.**

White Shoal, on the southwest side of James River main channel 7 miles above the mouth, is marked near its southeast end by the tower of an abandoned lighthouse. The secondary channel on the opposite side of the shoal from the main channel also is marked.

Pagan River empties into the southwest side of James River 8 miles above the mouth. Traffic on the river consists chiefly of shellfish, some petroleum products, sand, and gravel. Drafts of vessels using the river are mostly 6 feet or less, but drafts up to 9 feet use it. The dredged channel to Smithfield had a controlling depth of 7 feet, in April 1960.

The approach to Pagan River, from southeast of White Shoal, is well marked by buoys and lights. The channel in the river is also marked by buoys and lights to within a mile of Smithfield. The mean range of tide is 2.6 feet at the entrance.

Jones Creek, on the south side of Pagan River 0.7 mile above the mouth, has dredged depths of 4 feet or more across the flats at the entrance and upstream as far as the second bridge 2.5 miles above the mouth. The fixed highway bridge, 0.6 mile above the mouth, has a width of 30 feet and a clearance of 10 feet. There is a yacht basin just below the bridge and a fish pier with a supplies include gasoline, diesel fuel, electricity, water, and electricity are available. The depth at the face of the pier was 11 feet, in April 1960. The railway can haul out boats up to 45 feet in length for repairs. The fixed highway bridge, 2.5 miles above the mouth, has a width of 40 feet and a clearance of 7 feet.

Battery Park (P.O.), on the south side of Pagan River a mile above the mouth, has two boatyards. Available supplies include gasoline, diesel fuel, electricity, water, and groceries. One of the yards has a marine railway that can haul out vessels up to 60 feet in length for repairs. The depth at the gasoline pier was 8 feet, in April 1960.

Cypress Creek, on the south side of Pagan River 4 miles above the mouth, has depths of 4 feet or more for 2 miles. The landing on the east side of the entrance has depths of 6 feet at the outer end. The highway bridge over the entrance has a 40-foot bascule span with a clearance of 4 feet. About 0.8 mile above the bridge an overhead power cable has a clearance of 40 feet.

Smithfield, on the southwest side of Pagan River 4.5 miles above the mouth, is famous for its hams. Gasoline, electricity, groceries, and fresh water are available at a boatyard just west of the junction of Cypress Creek and Pagan River. The depth at the face of the wharf was

5 feet, in April 1960. The fixed highway bridge just above the town wharves has a width of 30 feet and a clearance of 15 feet.

Deep Creek empties into the northeast side of James River 9 miles above the mouth. Traffic on the creek consists of some shellfish, sand, and gravel. The creek is used as an overnight anchorage by many oyster boats with drafts up to 6 feet. The dredged channel, marked by lights, a lighted range and daybeacons, had a controlling depth of 7 feet to the harbor opposite Menchville, in April 1960.

Menchville is on the northwest side of the entrance to Deep Creek. The landings at the town have depths of about 5 feet alongside. Gasoline and other supplies are available.

Numerous pleasure craft use Deep Creek during the summer. Small-boat facilities available include gasoline, water, electricity, marine hardware, surfaced launching ramps, and marine railways adequate for craft up to 60 feet in length.

Warwick River, which empties into the northeast side of James River just above Deep Creek, has depths of 4 feet or more to Fort Eustis, 7 miles above the mouth. An Army-maintained pier at Fort Eustis has depths of 5 feet at the face, but boats may dock overnight only in an emergency. Gasoline and water are available. The mouth of the river is sometimes used as an anchorage by small oyster boats.

Point of Shoals is an extensive shallow area in **Burwell Bay,** on the southwest side of James River main channel 12 miles above the mouth. There are also wide areas of unmarked shoals between the channel and the northeastern shore. The main channel formerly passed southward and westward of Point of Shoals, but is now through the dredged cut known as **Rocklanding Shoal Channel.** The old channel has shoaled but is still buoyed; the current velocity is 0.8 knot. The several small landings along the shore of Burwell Bay have depths of about 4 feet at their outer ends.

Burwell Bay is used as an anchorage for a Maritime Administration Reserve Fleet; see **207.900,** Chapter 2, for regulations **restricting navigation** in the vicinity of the decommissioned ships.

The long wharf on the east side of James River 16 miles above the mouth is the landing for **Fort Eustis,** and has depths of 19 feet at the outer end. A marked dredged channel leads along the south side of the wharf to a boat basin at the inner end. Controlling depths were 17½ feet in the channel and 16 feet in the basin, in April 1960. Decommissioned ships are moored on either side of the main channel off the Fort Eustis wharf.

Deep Water Shoals Light (37°08.9′ N., 76°38.2′ W.), 34 feet above the water is shown from a white hexagonal house on brown piles, in depths of 2 feet, on the east side of James River main channel 17 miles above the mouth; a fog signal is at the light.

Skiffes Creek empties into the east side of James River 18 miles above the mouth. A well marked dredged channel at the entrance to the creek leads to a pier and boat basin. The controlling depths were 17½ feet to the pier and 16 feet in the turning basin to the northward, in April 1960. See Appendix for **storm warning displays.**

An Army small-craft **testing area** is at the entrance to the Skiffes Creek channel; see **207.152,** Chapter 2, for limits and regulations.

Hog Point, on the south side of James River 23 miles above the mouth, is low and has scattered clumps of trees. The pile remains of a wharf are at **Homewood** on the east side of the point.

College Creek, across the river from Hog Point, has depths of 1 foot across the flats at the mouth, 4 feet inside for 2 miles, thence 2 feet for 0.5 mile to **Williamsburg Landing,** a mile from the town of Williamsburg. The creek is difficult to navigate without local knowledge. The fixed highway bridge across the mouth of the creek has a clearance of 10 feet.

Cobham Bay, a wide bight on the south side of James River 26 miles above the mouth, has general depths of 5 to 7 feet. **Cobham Wharf,** and another wharf 0.2 mile to the eastward, are on the northwest side of the entrance to the bay.

Jamestown Island is on the north side of James River across from Cobham Bay. Historic **Jamestown** is on **Church Point,** at the northwest end of the island, 28.5 miles above the mouth of the river. The Jamestown white monument is prominent; the ruins of the old church are hidden by trees.

The Thorofare, between the northeast side of Jamestown Island and the mainland, is a shallow bay with depths of 2 or more feet in the eastern part and a narrow 2-foot channel through extensive mud flats in the western part.

Mill Creek, which empties into the north side of The Thorofare, has a depth of 1 foot at the entrance and 2 or more feet to a landing 1.5 miles above the mouth. Above the landing the creek is foul with snags and obstructions. The fixed highway bridge across the mouth of the creek has a width of 48 feet and a clearance of 10 feet.

Back River is a 2-mile passage from the head of The Thorofare northward of Jamestown Island to James River. The passage has depths of 4 or more feet to the fixed highway bridge at the west end, thence about 2 feet over the bar to deep water in James River. An overhead power cable reported over the passage has a clearance of about 30 feet. The bridge at the west entrance has a width of 48 feet and a clearance of 12 feet.

Powhatan Creek, which empties into the north side of James River just westward of Back River, is used by fishermen and trappers. The creek has depths of 2 feet at the mouth, thence 4 feet or more to a yacht basin 1.7 miles upstream. Gasoline, water, ice, and electricity are available; a marine railway can haul out boats of 30 feet in length. The depth at the wharf at the yacht basin was 2½ feet, in April 1960. The numerous snags along the banks can be avoided by staying in midstream, and the island 0.3 mile above the mouth should be left to northward. The fixed highway bridge about 0.5 mile above the mouth has a width of 25 feet and a clearance

of 12 feet. The best approach to the creek is from a point about 15 yards off the shore at the entrance to Back River.

Chart 530.—Scotland, on the southwest side of James River 27.5 miles above the mouth, is the mainland terminus of the Jamestown ferry, which operates to **Glass House Point,** 1 miles northwest of the monument at Jamestown, across the river. The two ferry slips have depths of about 11 feet on the Scotland side and 20 feet on the Jamestown side. The pier at Scotland extends channelward for 700 feet, and at Glass House Point for 1,600 feet. The partly submerged remains of the old Scotland wharf are about 100 yards southeast of the slips.

Grays Creek, on the southwest side of James River 28.5 miles above the mouth, is entered through a shallow bay. An overhead power cable at the entrance has a clearance of 42 feet. On the north side of the entrance to the creek is a small private landing. The creek has depths of 2 feet in the approach and 6 or more feet for 3 miles above the mouth; it has many snags and obstructions and is little used.

Chickahominy River empties into the north side of James River 33 miles above the mouth. The controlling depth of the entrance channel is 6 feet, but depths of 10 feet or more are available in the river to the head of tidewater naviagtion at a dam, 19 miles above the mouth. The lock in the dam has a length of 60 feet, a width of 15 feet, and a depth of 4 feet over the sill. The lock gates are hand operated; there is no tender.

Buoys mark the entrance to Chickahominy River and the critical points along the channel inside. The river is used only by a few local fishermen and pleasure boats. The mean range of tide is about 2 feet at the entrance.

Wharf ruins extend out about 200 yards from shore 0.5 mile above **Barrets Point,** on the east side of the entrance to Chickahominy River. A sunken barge lies on the eastern edge of the channel 0.8 mile above the point.

Barrets Ferry highway bridge, 1.3 miles above the mouth fo Chickahominy River, has a swing span with a clearance of 12 feet. A pier with a depth of 7 feet at the face extends 100 yards into the river from the east bank just north of the bridge. Available supplies include gasoline, electricity, and water.

Shipyard Landing, on the east side of Chickahominy River 6.5 miles above the mouth, has a fish wharf with 10 feet at the face; the buildings at the wharf are prominent from downstream. A State concrete launching ramp is located on the north side of the river opposite **Watts Point,** 2 miles above Shipyard Landing. The overhead power cable upstream from Watts Point has a clearance of 44 feet.

A cut through the bend of Chickahominy River, 10 miles above the mouth, has a controlling depth of 5 feet. Small boats able to pass through the cut can save 1.2 miles.

A pier on the west side of Chickahominy River 11 miles above the mouth, just north of **Mt. Airy,** has a depth of 9 feet at the face. Available supplies include gasoline, electricity, and water.

Lanexa, on the east side of Chickahominy River 15 miles above the mouth, has a landing in poor condition with depths of about 5 feet alongside.

Claremont (P.O.) is a village on the southwest side of James River 37.5 miles above the mouth. The Claremont wharf on **Sloop Point** is in ruins; the bottom in the vicinity is foul with wire rope. The landing about 0.6 mile southeastward of Sloop Point is also in ruins. The abandoned ferry landing 0.2 mile westward of Sloop Point and the abandoned ferry slip and fish packing plant wharf across James River at **Sandy Point** wharf are in ruins.

Upper Chippokes Creek empties into the southwest side of James River 39 miles above the mouth. The little-used creek has depths of 5 feet for 3 miles, thence 2 feet for 1 mile to the head of navigation. The channel into the creek is close along the south bank. A wreck off the entrance to the creek is close to the southwest side of James River main channel and is marked by a light; the wreck extends about 2 feet above high water.

Brandon wharf, on the west side of James River 39.5 miles above the mouth, has depths of about 20 feet at the face.

Sturgeon Point, on the north side James River 42.5 mlies above the mouth, is the site of an abandoned brickyard. The point is marked by a light.

Wards Creek empties into the south side of James River 46 miles above the mouth. A depth of 2 feet can be carried across the mud flats at the entrance by following the east bank at a distance of about 75 yards. Above the mouth depths in the creek are 4 to 10 feet for 1.7 miles. The creek is an excellent storm anchorage for any boat able to enter. **Pope Wharf** on the south side of the James River, west of Wards Creek entrance, has depths of 5 feet at the face.

Fort Powhatan, on the southwest side of James River 47 miles above the mouth, is marked by a light.

Ruffins Wharf, on the east side of James River 48.5 miles above the mouth, has depths of about 16 feet at the face but is in poor condition.

Wilcox Wharf, on the north side of James River 50 miles above the mouth, is in poor condition. The far end of the pier is in ruins.

Westover landing, on the north side of James River 53 miles above the mouth, has depths of 12 feet at the face.

Powell Creek, on the south side of James River 53 miles above the mouth, has depths of 7 feet through a narrow channel across the mud flats at the entrance and for 2 miles upstream. The creek is a good storm anchorage.

Jordan Point is on the south side of James River 56.5 miles above the mouth. The rear light of Jordan Point Range is on the outer end of the point. The privately marked channel for the vehicular ferry that operates between Jordan Point and the north side of the river has a depth of about 10 feet; depths in the ferry slips are about 12 feet.

Chart 531.—Hopewell, on the southwest side of James River 59 miles above the mouth, has several industries

and is the terminus of a branch railroad to Petersburg. The principal wharves along James River south of **City Point** can accommodate any vessel able to negotiate the river channel. Supplies may be obtained in the city.

Appomattox River, which empties into the west side of James River 59.5 miles above the mouth, is navigable to Petersburg, 10 miles above the entrance. The controlling depth was 7 feet to the first fixed bridge at Petersburg, in April 1960. The difficult part of the channel through the flats at the mouth is marked by lights and daybeacons. A general midchannel course is best through the remainder of the narrow channel. The mean range of tide is 2.9 feet at Petersburg.

The highway bridge 1.2 miles above the mouth of Appomattox River has a swing span with a clearance of 11 feet. The Hopewell Yacht Club, on the south side 0.2 mile west of the bridge, has a small-boat basin with depths of about 6 feet off the T-pier; available supplies include gasoline, oil, water, and electricity. A marine railway can haul out boats up to 50 feet in length; repairs can be made to engines and hulls.

The railroad bridge 2.4 miles above the mouth of Appomattox River has swing span with a clearance of 10 feet; see **203.245,** Chapter 2, for **drawspan regulations.** An overhead power cable 0.8 mile above the bridge has a clearance of 100 feet.

A yacht basin with berths and a gravel launching ramp is on the east bank of Appomattox River 8 miles above the mouth. The depth at the face of the pier is 6 feet; available supplies include gasoline, water, ice, and electricity. Diesel fuel can be brought to the pier by truck. Boat repairs can be made.

The channel in Appomattox River is blocked at the first fixed highway bridge east of Petersburg by silt from construction work. An overhead power cable 0.2 mile below the bridge has a clearance of 51 feet.

Petersburg, at the head of tidewater navigation 10 miles above the mouth of Appomattox River, is an important rail center and a **customs** port of entry. The bulkheads at the city are in poor condition. Supplies are not available at the waterfront, but all kinds may be obtained in the city.

Above its junction with Appomattox River, James River becomes narrow and winding. The bends are often referred to as the **Curles of the River,** and the 14-mile section from Hopewell to Wilton has been called **The Corkscrew.**

Turkey Island Bend, 2 miles north of Hopewell, has depths of 10 to 30 feet around its 6-mile length, but is seldom used except by pleasure boats because the main channel is now northwestward through Turkey Island Cutoff; most of the landings along the bend are in ruins. The north and west sections of the bend are excellent anchorages because the river current has been greatly diminished by the cutoff and winds from any direction have little effect; the bottom is mostly soft mud.

Turkey Island Cutoff is about a mile long and is well marked by lights and buoys. A cable **ferry** crosses the lower part of the cutoff 61.5 miles above the mouth of James River; vessels must proceed with caution when the ferry is underway, as the cable comes to the surface. **Jones Neck Cutoff** begins about 64 miles above the river mouth and extends about a mile northward and westward; the cutoff is well marked by lights. The old river bend that extends northward around **Jones Neck** and back to the main channel has depths of 13 to 44 feet along its 4.5-mile length, but is now little used; most of the landings are in ruins.

Dutch Gap is 66.5 miles above the mouth of James River. The main channel extends west-northwestward through **Aiken Swamp-Dutch Gap Cutoff,** which is about a mile long and is marked by lights at both ends. There is a gravel basin in **Hatcher Island,** on the north side of the cutoff.

The old river bend, that extends northward from Dutch Gap, around Hatcher Island, and back to the main channel at the west end of the cutoff, has depths of 7 to 25 feet along its 2-mile length. **Richmond Yacht Basin,** north of Hatcher Island, has piers with depths of about 12 feet at their outer ends; the small marine railway can haul out boats up to 40 feet in length for repairs. There is a gasoline pump on one of the piers. A fixed highway bridge over the western entrance to the bend has a width of 41 feet and a clearance of 24 feet.

The old channel that extends southward from Dutch Gap has depths of 10 feet or more for over a mile to the gravel basin in **Farrar Island.**

A concrete and steel wharf of the Virginia Electric and Power Company is on the south side of James River at the western end of Aiken Swamp-Dutch Gap Cutoff; the wharf is 67.5 miles above the mouth of the river and has main-channel depths at the face. A privately maintained light is shown from the end of the wharf. The overhead cable that crosses James River just above the wharf has a clearance of 165 feet. About 300 yards west of this cable is another with a clearance of 166 feet.

The oil wharf at **Drewrys Bluff,** on the southwest side of James River 72 miles above the mouth, is of concrete construction and has main-channel depths at the face. The wharf is marked by lights and has mooring dolphins.

Richmond Deepwater Terminal at **Warwick,** on the west side of James River 74 miles above the mouth, has a turning basin and 1,200 feet of berthing space with depths of 20 feet at the face of the piers. The terminal has transit sheds and warehouses, good rail and highway connections, and is used for receipt and shipment of general cargo. An electric gantry crane on the wharf has a 10-ton capacity. Fresh water is available in quantity. There is a small-boat landing at the north end of the wharf with depths of 13 feet at the face.

Richmond, the capital of Virginia, is on the east side of James River 78 miles above the mouth. Traffic to and from the city consists chiefly of petroleum products, sand and gravel, sulfur, sugar, and newsprint. Commercial navigation in the river proper ends at the city wharves, but small boats can go a mile farther. The Turnpike fixed highway bridge just below Mayos Island has a clearance of 40 feet.

General cargo for Richmond is handled at the wharves

on the east side of the river at Upper Municipal Terminal with a 700-foot pier and a 400-foot turning basin. The depth at the face was 18 feet, in April 1960. Several oil wharves are on the west side. Some of the wharves have rail connections, and most have main-channel depths at their faces. Fresh water is available between 8 a.m. and 5 p.m., Monday through Friday. All tyes of fuel can be obtained by truck delivery and supplies can be delivered from the city.

Richmond is a **customs** port of entry, and the U.S. Public Health Service has an **outpatient office** in the city. The **harbormaster** at Richmond Deepwater Terminal assigns berths and anchorages; the city has a tugboat.

The **Kanawha Ship Canal,** at the north end of the Richmond waterfront, is reached through a masonry lock with a length of 168 feet, a width of 35 feet, and a vertical lift of 15 feet; the lock is operated by hand, from 8 a.m. to 5 p.m., Monday, Wednesday, and Friday. A 48-hour advance notice to the harbormaster is required. The canal is said to have depths of about 12 feet but is now little used except by small private boats. The railroad bridge about 150 yards above the lock has a 30-foot bascule span with a clearance of about 2 feet; eight hours advance notice to the harbormaster is required to open the span.

11. CHESAPEAKE BAY, YORK AND RAPPAHANNOCK RIVERS

Charts 1222, 1223.—From Old Point Comfort to Potomac River, the western shore of Chesapeake Bay is mostly low. The principal tributaries are Back River, Poquoson River, York River, Mobjack Bay, Piankatank River, Rappahannock River, and Great Wicomico River. York River and Rappahannock River are broad and deep at their entrances and are navigable for long distances. **Fish traps** are thicker in this area than in any other part of the bay. **Ice** is seldon encountered this far south in the bay, but may be found in the upper parts of some of the tributaries.

Chart 1222.—The Federal project for Chesapeake Bay provides for a dredging depth of 39 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore. There are two dredged sections in the lower Chesapeake Bay, one off Cape Henry just above the Virginia Capes, and the other off York Spit; they are well marked with lighted and unlighted buoys. The dredged sections in the upper bay are discussed in Chapter 15.

York Spit Channel begins 14.5 miles above the Capes and extends northward 5.5 miles; see **207.130,** Chapter 2, for navigation **regulations** of the channel. The current velocity is about 1.0 knot in the channel.

The **Horseshoe** is a shoal that extends several miles out from the shore between Old Point Comfort and Back River 6.5 miles to the northward. The southern edge of the shoal lies along the north side of the main channel into Hampton Roads; the eastern half has depths of 13 to 18 feet, and the western half has 6 to 11 feet. Local vessels drawing 7 feet or less use the lanes through the fish traps on the Horseshoe when navigating between Hampton Roads and York River or Mobjack Bay. The tidal current velocity is 0.5 knot over the Horseshoe and is rotary, turning clockwise.

Buckroe Beach is a summer resort 2.5 miles north-northeastward of Old Point Comfort. The lights of the resort are conspicuous during the summer, and an outstanding landmark is the radio tower about 0.8 mile west of Buckroe Beach.

Chart 494.—Back River empties into the west side of Chesapeake Bay 7 miles northward of Old Point Comfort between **Northend Point** and **Plumtree Point,** a mile to the northward. Daytime hazards from an aerial bombing and gunnery range exist in the vicinity of Plumtree Point, and unexploded bombs or ammunition may be found at any time in these waters. Mariners are advised to use caution when necessary to navigate in this area. The approach to Back River is from southeastward through a lane in the fish traps, and is well marked by lights and buoys. The mean range of tide is 2.3 feet at the mouth of the river.

About 2 miles above the mouth, Back River divides into **Northwest Branch** and **Southwest Branch,** which have general depths of 2 to 5 feet. The **Langley Field** hangars, water tanks, and wind tunnel back of **Willoughby Point,** between the branches, can be seen for many miles. The dredged channel that extends 3 miles from the mouth of the river to the Langley Field fuel pier on the west side of Southwest Branch has a controlling depth of about 13 feet. The Langley Yacht Club, just south of the fuel pier, has gasoline, water, electricity, and marine supplies; the depth in the basin was 4 feet, in May 1960. A side channel to the Langley Field boathouse, on the south side of Northwest Branch 3 miles above the river mouth, had a controlling depth of 8 feet in 1960. Both channels are well marked by lights and buoys.

A marina on the south side of Back River, just east of **Windmill Point** a mile above the mouth, has gasoline, water, electricity, and marine supplies; marine railways can haul out boats up to 55 feet in length. The depth to the marina is about 3 feet.

Harris River, on the south side of Back River west of Windmill Point, has depths of 3 feet and more for a mile to **Fox Hill,** a village on the east side. A small marina with gasoline, water, and electricity is on the west side of the river mouth.

Gasoline can be obtained at the fish wharf on **Messick Point,** on the north side of Back River 1.5 miles above the mouth.

The side-by-side highway and rail bridges over Southwest Branch, 1.5 miles above Willoughby Point, have fixed spans with a minimum width of 14 feet and a clearance of 6 feet.

Between Back River and Poquoson River are shoals that extend 1 to 3 miles from shore; on the shoals are scattered oyster rocks that bare, or nearly bare at low water. Strangers should stay outside the 6-foot curve.

Poquoson River, which empties into Chesapeake Bay 5 miles northwest of Back River and about 4 miles south of York River, has depths of 7 feet to the village of **Yorkville,** on the west side 2.5 miles above the mouth. The approach to the river is from northeastward, and is clear of fish traps for a width of 400 yards. There is a light on either side of the entrance. The mean range of **tide** is 2.4 feet.

Bennett Creek, which empties into the southeast side of Poquoson River mouth, has depths of 6 feet or more for 1.3 miles to **Easton Cove,** which makes off to the eastward. Lights mark the entrance. Gasoline can be obtained at a small fish wharf at the entrance to the cove. **White House Cove,** on the west side of Bennett Creek 0.8 mile above the mouth, has depths of 2 to 7 feet for 0.7 mile above its mouth. A platform with a depth of

5 feet alongside and hoist in the cove can haul out boats up to 60 feet in length for repairs. Groceries can be delivered from **Poquoson** (P.O.), a village about a mile from the platform.

Chisman Creek, which empties into the north side of Poquoson River mouth, has depths of 9 feet or more in a narrow channel for 1.3 miles above the mouth. A marine railway on the north side a mile above the mouth can haul out boats up to 60 feet in length, for hull and engine repairs. Another marine railway, on the south side of the creek 1.3 miles above the mouth, can haul out boats up to 90 feet in length, for hull repairs.

Back Creek, which flows eastward into Chesapeake Bay about 1.5 miles south of York River, has depths of 7 feet or more for 2 miles. The entrance is marked by a lighted buoy, lights, and daybeacons. The creek is used by oystering and fishing boats. A State-owned wharf on the south side, 1.4 miles above the mouth, had a depth of 9 feet at the face, in May 1960. Gasoline is available at a fishhouse on the south side 1.8 miles above the mouth.

Passage northward from Back Creek to York River can be made through the **Thorofare,** about 0.8 mile from the mouth of Back Creek. The dredged channel is marked by lights and daybeacons, and had a controlling depth of 7 feet in May 1960.

Charts 494, 492, 495, 496.—York River, formed by the junction of Mattaponi and Pamunkey Rivers 29 miles above the mouth, empties into Chesapeake Bay 15 miles northward of Old Point Comfort and 26 miles by channel from the Virginia Capes. Traffic on York River consists chiefly of pulpwood, petroleum products, and shellfish. Drafts of vessels using the river are mostly 18 feet or less, but deep-draft vessels navigate the lower reaches.

York River has a broad and fairly straight channel, is well marked and easily followed. Depths are as much as 80 feet off Yorktown, and the controlling depth to West Point is about 19 feet. Vessels can anchor in the wider parts of York River channel aside from the Naval areas discussed later.

The mean range of tide is 2.4 feet at the entrance to York River and at Yorktown, and 3 feet at West Point. The currents in York River follow the general direction of the channel except in the narrowest parts where there is a tendency to set a vessel onto the shoals. The velocity varies throughout the river; the times of slack water and strengths of current become later going up the river. These normal conditions are subject to change by winds and freshets.

Ice sometimes interferes with navigation of York River for short periods during severe winters, but in ordinary winters there is no interruption below West Point.

Pilotage is compulsory in Chesapeake Bay proper but not in York River. Pilotage information for Hampton Roads ports is given at the beginning of Chapter 9.

Supplies are available at Yorktown, West Point, and at other places discussed in this chapter. Repairs can be made to small vessels in Perrin River, Sarah Creek, and at other places discussed in this chapter.

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Chart 494.—York Spit extends outward along the northeast side of the York River approach channel for about 7 miles from Guinea Marshes; the inner half of the spit has depths of 1 to 6 feet, and the outer half has 10 to 20 feet.

York Spit Light (37°12.6′ N., 76°15.3′ W.), 37 feet above the water, is shown from a white hexagonal tower on brown piles, in depths of 12 feet near the outer end of the spit; a fog signal is sounded at the light. The light is 5 miles due west of a point 17.5 miles along Chesapeake Bay main channel from the Virginia Capes.

The York River Approach Channel, extending from about 7 miles southeast of York Spit Light to about 3 miles northwest of the light, had a controlling depth of 37 feet, in May 1960, and is well marked by lighted and unlighted buoys. There are natural depths in excess of 37 feet from the upper end of the dredged section to a point about 11 miles above the river mouth.

About 1.5 miles northwest of York Spit Light, a buoyed lane extends northeastward through the fish traps. The lane has depths of 15 feet or more and can be used by medium-draft vessels approaching York River from northward.

The swash channel through York Spit about 5 miles northwest of York Spit Light has a controlling depth of about 8 feet; it is marked by a light and buoys. The channel shows up well on a bright day.

Naval restricted areas extend several miles up York River from the mouth; see **207.128** and **207.128a,** Chapter 2, for limits and regulations. Naval authorities have reported the loss of buoy anchors in the blue mud bottom of this area, and fishermen have lost their anchors in this same type of bottom for lack of retrieving power.

Chart 492.—The entrance to York River is between **Tue Point** and **Guinea Marshes,** 2.5 miles to the northeastward; the midchannel point is 6 miles west-northwest of York Spit Light and 26 miles (14 miles northwest of the 12-mile point in the bay channel) from the Virginia Capes.

Tue Marshes Light (37°14.1′ N., 76°23.2′ W.), 41 feet above the water, is shown from a white square house on brown piles, in depths of 4 feet 0.3 mile north of Tue Point; a fog signal is sounded at the light.

Perrin River, on the north side of York River 2 miles above the mouth, has depths of 6 feet or more in the approach and through a narrow channel to the wharf at **Perrin,** on the north side 0.3 mile above the entrance. A marine railway at the wharf can handle vessels up to 100 feet in length; a machine shop is available. Gasoline can be obtained at the oysterhouse wharves, with 4 to 7 feet alongside, on the east side of the river entrance.

An oil company pier on the south side of York River 3.3 miles above the mouth has depths of 40 feet or more along the outer face, and is marked by a light. The intake for an electric power plant, on the south side of the river 4.2 miles above the mouth, is marked by two privately maintained lights. The plant's high stack is conspicuous.

Wormley Creek and **West Branch** have a common entrance on the south side of York River 4.5 miles above the mouth. A narrow 4-foot entrance channel is marked by

stakes along the east bank. A pier with gasoline and launching ramp is on the west side of Wormley Creek just above the entrance. The two creeks have depths of about 2 feet nearly to their heads, but are little used except by oyster boats. The Coast Guard T-piers on the south side of York River 5 miles above the mouth have depths of 35 feet or more at the outer ends.

Sarah Creek, on the north side of York River 6 miles above the mouth, has depths of 7 feet through the entrance and for about 0.8 mile up both its branches; lights and daybeacons mark the entrance. A boatyard on the west side 0.3 mile above the entrance can haul out vessels up to 70 feet in length for repairs; the yard has a well-equipped machine shop. Available supplies include gasoline, diesel fuel, water, and ice. There are many finger piers for yachts and smaller craft. Depth was 7 feet at the gasoline pier, in May 1960. A marine railway about 0.8 mile up the western branch can haul out vessels up to 60 feet in length, for hull repairs.

Yorktown is on the southwest side of York River 6.7 miles above the mouth. High on the bluff in the southerly part of the town is the **Yorktown Monument,** and a group of buildings is prominent on the shore back of the wharves. The main part of the town is not visible from the river. **George P. Coleman Memorial Bridge,** which crosses the river from Yorktown to Gloucester Point, has twin spans with clearance of 60 feet; the two spans open clockwise simultaneously. The public wharf at the Yorktown end of the bridge has depths of 6 feet at its face, but depths of 20 feet or more are only 5 feet off of it. The post office is at the wharf. Available supplies include gasoline, diesel fuel, fresh water, ice, and groceries.

Gloucester Point is a village at the northeast end of Coleman Bridge. There are several wharves and buildings and some conspicuous oil tanks on the low point, and the red brick building of the Virginia Commission of Fisheries is about 500 yards northeastward. The oil wharf has depths of about 12 feet at the outer end, and an abandoned ferry slip and pier, in poor condition, has about 16 feet at the face. The pier at the Virginia Fisheries Laboratory had 6 feet at the face, in May 1960.

The **Naval Mine Depot** piers on the southwest side of York River 8 miles above the mouth have depths of about 39 feet at their outer ends. Off the piers is a **restricted area** for mine service testing; see **207.128,** Chapter 2, for limits and regulations. A **naval anchorage area** begins off the Naval Mine Depot piers and extends upriver about 4 miles; see **202.166,** Chapter 2, for limits and regulations.

The **Naval Supply Depot** wharves at **Cheatham Annex,** on the southwest side of York River 11.5 miles above the mouth, had depths of 30 feet and more at the southeasterly T-pier and 35 feet and more at the northwesterly L-pier, in May 1960.

Chart 495.—Queen Creek, on the southwest side of York River 13 miles above the mouth, has depths of 2½ feet across the flats at the entrance, and deeper water inside for 4 miles to a fixed highway bridge 1.5 miles from the town of **Williamsburg.** Stakes on either side of the entrance mark the limits of Virginia Commission of Fisheries experimental oyster beds. The channel is difficult to navigate in some places.

Clay Bank (P.O.) is on the northeast side of York River 15 miles above the mouth. The wharf is in poor condition but is used by local fishermen; depths at the face were 15 feet, in May 1960.

Allmondsville is on the northeast side of York River 18 miles above the mouth. A light marks the outer end of the pile remains of the former wharf.

Poropotank Bay, on the northeast side of York River 22 miles above the mouth, has depths of about 5 feet at the entrance; the best water favors the eastern side which is marked by bush stakes. From the entrance, depths of about 5 feet can be carried about 4 miles through **Morris Bay** and **Poropotank River** to **Miller Landing.** There are several other landings along the river. The channel is usually marked by bush stakes, but it is crooked and narrow in some places and is difficult to navigate without local knowledge.

West Point, at the junction of Mattaponi and Pamunkey Rivers 29 miles above the mouth of York River, has little waterborne trade other than the pulpwood brought down the two tributaries. The town is a terminus of a Southern Railway branch line. The pulp-mill wharves just above the Pamunkey River bridge have depths of 13 to 17 feet alongside.

At West Point the current velocity is about 1.4 knots in Mattaponi River, and about 1.8 knots in Pamunkey River.

A public launching ramp and pier are at the mouth of Mattaponi River, at the southeast end of West Point. The boat club just south of the Mattaponi River bridge has depths of about 13 feet at the face of the gasoline pier; the oil wharf has depths of 15 feet alongside. Only burned piling remain of the former railroad wharf at the southwest end of the town. Available supplies include diesel fuel, water, and groceries.

Chart 496.—Mattaponi River is the easterly of the two tributaries that combine to form York River. Traffic on Mattaponi River consists chiefly of pulpwood, but petroleum products are brought up the river. Drafts of vessels using the river above West Point usually do not exceed 10 feet.

Controlling depths in Mattaponi River were as follows, in May 1960: 12 feet to **Courthouse Landing,** 13 miles above the mouth; thence 9 feet for 10 miles to **Locust Grove;** and thence 2 feet to **Aylett,** 32 miles above the mouth. Above Aylett, fallen trees have partially blocked the channel, but depths of 2 feet can be taken an additional 2 miles to the remains of a bridge at **Dunkirk,** 35 miles above the mouth.

The channel in Mattaponi River is unmarked and is difficult to navigate without local knowledge. The mean range of tide is 3 feet at West Point and 3.9 feet at Walkerton. Freshets occur at irregular intervals, being more severe in March and April, and have reached a height of 17 feet above low water at Aylett, though this is exceptional; the freshet rise is negligible at and below West Point.

The highway bridge over Mattaponi River at West

Point has a swing span with a clearance of 12 feet; the eastern opening is used as there are no fenders on the westerly opening. About a mile above West Point is an overhead power cable with a clearance of 62 feet. The **Walkerton** highway bridge, 24.5 miles above the mouth, has a swing span with a clearance of 6 feet through the southerly opening which has fenders. The Aylett highway bridge, 32 miles above the mouth, has a fixed span with a clearance of 20 feet. About half a mile below it is an overhead power cable with a reported clearance of 20 feet.

Pamunkey River, the westerly of the two tributaries that combine to form York River, has many landings along its banks. Traffic on the river consists chiefly of pulpwood, but petroleum products are brought up it. Vessels with drafts up to 12 feet navigate the river above West Point.

Controlling depths on Pamunkey River were 12 feet from the mouth to **Cumberland Landing,** 19 miles above the mouth, thence 8 feet to **White House,** 30 miles above the mouth, and 4 feet to **Manquin Bridge,** 46 miles above the mouth, in May 1960. The mean range of tide is 2.7 feet at **Sweet Hall Landing,** 15 miles above the mouth, and 3.3 feet at **Northbury,** 34 miles above the mouth. Freshets occur at irregular intervals, being more severe in March and April.

Pamunkey River is easy to navigate as far as **Brickhouse Landing,** 15.5 miles above the mouth; farther up, navigation is difficult without local knowledge. Fresh water is available at some of the landings, and the river water is fresh above Cumberland Landing. Several narrow cutoffs have depths enough for small boats, but their use requires local knowledge. Above **Retreat,** 37 miles above the mouth, the river is covered with floating debris and snags.

The highway bridge over Pamunkey River at West Point has a swing span with a clearance of 10 feet; the southwest opening is preferred, as there are no fenders along the northeast opening. A small-boat opening just west of the swing span has a width of 18 feet and a clearance of 11 feet. The power cable 1.2 miles above the bridge has a clearance of 60 feet. The railroad bridge at White House has a swing span with a clearance of 4 feet; the easterly opening is used.

Chart 494.—Mobjack Bay, which is entered between Guinea Marshes at the shore end of York Spit, and New Point Comfort, marked by a light 4 miles east-northeastward, has several tributaries, the most important being East, North, Ware, and Severn Rivers. The bay is obstructed by extensive shoals but has depths of 22 feet in the entrance and 15 feet for considerable distances into the tributaries. Many of the shoals are marked by lights and buoys.

The only prominent marks in the approach to Mobjack Bay are York Spit Light on the south and New Point Comfort Light on the north. The approach channel extends between fish trap buoys; numerous crab pots exist shoreward of these buoys. Good anchorage, sheltered from all but southerly and southeasterly winds, can be found in the bay. Small craft find safe anchorage in the bight westward of New Point Comfort and in the rivers and creeks. The mean range of tide is 2.3 feet at the entrance.

Monday Creek, a thorofare that leads from Mobjack Bay to York River back of Guinea Marshes, has depths of about 2 feet and is used extensively by small local craft. The creek is marked by random bush stakes.

New Point Comfort is the south end of a low, partly wooded island which is separated from the mainland by **Deep Creek,** a crooked and unmarked natural channel with depths of about 2 feet; the creek is impassable at low water because of grass. The pile remains of **Bayside wharf,** visible at high water 1.5 miles northwest of New Point Comfort, extend about 0.4 mile channelward.

Davis Creek, 1.6 miles northwest of New Point Comfort, has a dredged channel to the public landing in the western arm about 0.8 mile above the entrance. The channel is marked by lights and a daybeacon, and had a controlling depth of 7 feet in May 1960. The depth at the face of the public landing is about 12 feet; no services are available. Several fish houses are on shore near the upper part of the creek.

Pepper Creek, about 3 miles northwest of New Point Comfort, has depths of 4 feet for about 0.7 mile above the entrance. The approach is marked by lights.

East River, which empties into Mobjack Bay from northward about 5 miles northwest of New Point Comfort, has a narrow channel with depths of 15 feet for 3.5 miles above the entrance, and thence 4 feet for another 2 miles to the head. The entrance is marked by lights and buoys. Shoals, sometimes marked by bush stakes, extend for some distance off many of the points above the entrance, but the midchannel is clear.

Diggs Wharf, on the east side of East River just inside the entrance, has depths of 9 feet off the face, but is in poor condition. Across the river at the village of **Mobjack** is **Philpots Wharf,** which has a depth of 8 feet at the outer face. Available supplies include gasoline, diesel fuel, water, and groceries. An oil company receiving dock and storage depot are at Mobjack.

Williams Wharf, on the northeast side of East River about 2.5 miles above the entrance, had depths of 8 feet alongside the oyster-house bulkhead in 1960. The oil wharf is used only for discharging petroleum products; a depth of 12 feet is at the outer end. There is no pump on the wharf, but fuel can be brought in by truck. An oyster house and landing are on the western shore opposite Williams Wharf.

North River, which empties into the head of Mobjack Bay from northward, is wide, but has long shoals making off from many of the points. The channel has depths of 12 feet for 4 miles and is well marked; depths of 7 feet can be carried 2 miles farther. **Blackwater Creek** empties into North River 3 miles above the mouth. Depths of 7 feet can be carried for a half mile to a boatyard just inside the entrance of **Greenmansion Cove;** gasoline, water, and electricity are available. The depth at the face of the dock is 5 feet. A marine railway can haul out boats 50 feet in length for engine and hull repairs.

Ware River, which empties into the head of Mobjack Bay from northwestward, has depths of 15 feet to the mouth of **Wilson Creek,** on the west side 3 miles above the entrance, and 7 feet for another 2 miles. Long shoals, some of which are marked by lights and daybeacons, extend off many of the points. The only commercial landing on Ware River is the Texas Oil Company wharf, on the east side about 4 miles above the entrance, which has a depth of about 5 feet off the end; available supplies include gasoline, diesel fuel, and lubricants, but no fresh water. **Schley** (P.O.), 0.5 mile inland from the wharf, has a store.

Severn River, which flows into the Mobjack Bay from the westward, has depths of 18 feet to the junction of **Northwest** and **Southwest Branches,** 8 feet for 1.3 miles in Southwest Branch, and 8 feet for 1.8 miles in Northwest Branch. The most prominent shoals are marked by lights and daybeacons.

A wharf at **Glass** (P.O.), on the north side of Southwest Branch 1.1 miles above the fork, has depths of about 7 feet to the outer end. Gasoline is pumped at the wharf, and diesel fuel is trucked in; fresh water, electricity, groceries, and marine hardware are available. A railway can haul out boats 90 feet in length for engine and hull repairs. The pier at **Brays Landing** on Northwest Branch has 5 feet at the face.

Browns Bay, on the west side of Mobjack Bay a mile south of Severn River, is marked by lights at the entrance and by bush stakes inside. Gasoline is available at a wharf, with a depth of 4 feet at the end, at the head of the bay. A store is at **Severn** (P.O.), about a mile westward of the wharf.

Dyer Creek, which empties into Chesapeake Bay 2 miles north of New Point Comfort, has depths of 3 feet in the entrance and 4 to 5 feet inside. The creek is bush-staked, but local knowledge is essential.

Horn Harbor is entered through a dredged channel marked by lights 2.4 miles northward of New Point Comfort. The controlling depth was 7 feet in the entrance channel, in May 1960, with depths of 8 to 5 feet for 3.5 miles above the entrance. Depths of 5 feet are available to the wharf at **New Point,** 0.7 mile above the entrance. A cluster of submerged piling of a former fish house is on the east side of the channel about a mile above the entrance.

Traffic in Horn Harbor consists chiefly of fish and shellfish. On the north side near the head is a small boatyard that can haul out vessels up to 80 feet in length for most general repairs; a small machine shop is nearby. Depths off the end of the dock are about 6 feet; gasoline and water are obtainable.

Winter Harbor is entered through a dredged channel marked by lights and daybeacons 4.3 miles northward of New Point Comfort. The controlling depth was 8 feet to the public landing 1.5 miles above the entrance, in May 1960. The depths at the landing are about 11 feet; no services are available. Traffic in the harbor consists chiefly of fish and shellfish.

Wolf Trap, the area of broken ground about 6 miles northward of New Point Comfort, has numerous shoal spots 5 to 10 feet deep which extend as much as 3 miles from the western shore of Chesapeake Bay. All the shoal area lies in the fish-trap limits. **Wolf Trap Light (37°23.-4′ N., 76°11.4′ W.),** 52 feet above the water, is shown from an octagonal red-brick dwelling with a square tower on a brown cylinder, in depths of 16 feet near the outer end of the shoal area; a fog signal and radiobeacon are at the light. Wolf Trap Light is 3 miles due west of a point 28.5 miles along Chesapeake Bay main channel from the Virginia Capes.

Chart 1223.—The **danger zone** of a naval firing range begins about 4 miles north-northeastward of Wolf Trap Light and extends northward to Tangier Sound Light; see **204.46,** Chapter 2, for limits and regulations.

The control house of a former degaussing range is 3.5 miles due east of a point 29.5 miles along Chesapeake Bay main channel from the Virginia Capes and 4 miles off the eastern shore; the obstruction is marked by lighted buoys.

Chart 534.—Piankatank River empties into the west side of Chesapeake Bay 11 miles northward of Wolf Trap Light. The entrance is between **Cherry Point,** at the north end of **Gwynn Island,** and **Stingray Point** 2.5 miles to the northward. **Stingray Point Light (37°33.7′ N., 76°16.2′ W.),** 34 feet above the water, is shown from a white hexagonal house on brown piles in depths of 6 feet 1.3 miles east of the point; a fog signal is sounded at the light. Stingray Point Light is 6 miles due west of a point 39 miles along Chesapeake Bay main channel from the Virginia Capes.

Traffic on Piankatank River consists of fish and shellfish, petroleum products, shells, and pulpwood. Drafts of vessels using the river are mostly 6 feet, but drafts up to 11 feet are on record. The river has depths of about 16 feet in the approach from northeastward through a buoyed lane in the fish traps, 16 feet or more to the fixed bridge 9 miles above the mouth, and 8 feet to Freeport, 13.5 miles above the mouth. Lights and buoys mark the lower 6 miles of the river channel.

The mean range of tide is 1.5 feet in the lower part of Piankatank River. During severe winters, the river is closed by ice for short periods. Repairs can be made to medium-size vessels in Fishing Bay.

Jackson Creek, on the north side of Piankatank River a mile above the mouth, has a dredged entrance channel marked by a light and daybeacons. The controlling depth was 5½ feet in the channel in June 1960 to natural depths of 8 to 10 feet inside the entrance. Stakes usually define the channel edges.

The gasoline pier at the bend in the entrance channel had a depth of 5 feet at the face, in May 1960, and the town wharf on the north side of the westerly arm had depths of 10 feet at the outer end. Just westward of the wharf is a small marine railway that can haul out boats up to 50 feet in length; gasoline and some other supplies

are available. The small landing on the point of land between the west and north arms has a depth of 5 feet at the outer end.

Deltaville (P.O.), at the head of the north arm of Jackson Creek, has a marina with a marine railway that can haul out craft up to 60 feet in length; gasoline, water, and electricity are available. Depths at the face of the pier are about 9 feet.

Hills Bay, on the south side of Piankatank River 2 miles above the mouth, has general depths of 14 to 20 feet, and is the approach to Queens Creek and Milford Haven.

Queens Creek, which flows eastward into the head of Hills Bay, has a bar across the mouth with a depth of 2 feet. Grass makes the entrance impassable at low water. The few broken piles that remain of the wooden jetty on the north side of the entrance are marked at the outer end by a light.

Milford Haven, the strait between Gwynn Island and the mainland to the southwestward, is entered from the head of Hills Bay. Traffic on the waterway consists chiefly of fish and shellfish carried in vessels drawing up to 7 feet. A dredged channel with a controlling depth of 12 feet in May 1960 leads from Hills Bay to natural depths of 15 to 8 feet in Milford Haven.

The jetty on **Narrows Point,** at the north side of the Hills Bay entrance to Milford Haven, is marked by a light. The channel through Milford Harbor is marked by lights and daybeacons. The highway bridge from the mainland to Gwynn Island, 0.3 mile from the jetty, has a swing span with a clearance of 12 feet in the north opening; see **203.343,** Chapter 2, **for drawspan regulations.**

Callis Wharf at **Grimstead,** on the Gwynn Island side of Milford Haven 0.7 mile from the jetty, has depths of 9 feet at the face. Gasoline and some other supplies are available. A pier 0.2 mile eastward of the Callis Wharf has depths of 8 feet at the face; gasoline is available. A small marine railway on the southeast side of the entrance to **Edwards Creek,** 0.4 mile eastward of Callis Wharf, can haul out boats up to 30 feet in length.

A wharf at **Cricket Hill,** on the mainland side of Milford Haven 0.8 mile from the jetty, has depths of 8 feet at the face; gasoline and diesel fuel are available. There is an ice plant back of the wharf.

Milford Haven can also be entered directly from Chesapeake Bay at the south end of Gwynn Island. This passage, known as **Hole in the Wall,** has a controlling depth of about 3 feet and is used by small local boats, but it is exposed to heavy seas. A light marks the south side of the entrance.

Stutts Creek (Chart 494) enters the southern part of Milford Haven from the southwestward. There are depths of 6 feet or more from Milford Haven to a pier on the north side of Stutts Creek, 1.8 miles above the mouth; gasoline, water, and electricity are available.

Fishing Bay, on the north side of Piankatank River 4 miles above the mouth, has depths of 12 to 30 feet. On the east side of the bay is narrow 1-mile long **Stove Point Neck.** A private 700-foot long pier with a depth of 8 feet at the outer end extends westward from the middle of the neck. Two boatyards are at the north end of the bay. Gasoline, diesel fuel, water, and electricity are available at the westerly yard, and its largest marine railway can haul out boats 120 feet in length.

Dixie, a village on the south side of Piankatank River 9 miles above the mouth, has gasoline, diesel fuel, and some groceries. The oil wharf has depths of about 10 feet off its outer end. The fixed highway bridge just west of the village has a clearance of 43 feet.

A pier at **Freeport,** on the south side of the river 13.5 miles above the mouth, has depths of 6 feet at the face.

Charts 534, 535, 536.—Rappahannock River empties into the west side of Chesapeake Bay 45.5 miles by channel from the Virginia Capes. Fredericksburg, 93 miles above the mouth, is the head of practical navigation.

Traffic on Rappahannock River consists chiefly of petroleum products, pulpwood, shellfish and shells, chemicals, and some sand and gravel. Drafts of vessels using the river seldom exceed 11 feet and are mostly 6 feet or less.

Rappahannock River has natural depths of 22 feet or more for 24 miles, thence 14 feet or more to Tappahannock, 37 miles above the mouth. Above this point, a Federal project provides for dredging of the bars to provide a channel 12 feet deep to Fredericksburg; the controlling depth was about 9 feet in 1960.

In general, vessels can anchor anywhere near the channel of Rappahannock River where the bottom is soft and the depth suitable. Deep-draft vessels will find good anchorage 3 to 5 miles from the mouth. Carter and Urbanna Creeks are used extensively as harbors by small craft.

The channel from the mouth of Rappahannock River to Tappahannock is comparatively straight, but gradually decreases in width and leads between shoals that make out from both banks. The principal dangers are marked. Strangers can take a draft of 10 feet to Tappahanncock by day with the aid of the chart, but navigation of the narrow, crooked channel farther up requires local knowledge. There are rocks in places on both sides of the channel for 4 miles below Fredericksburg, and the shores should be given a good berth. Strangers can safely carry a draft of 5 feet to Fredericksburg with the aid of the chart.

See **203.340,** Chapter 2, for **drawspan regulations** of bridges crossing Rappahannock River.

The mean range of tide is 1.2 feet at the mouth of Rappahannock River, 1.6 feet at Tappahannock, and 2.8 feet at Fredericksburg. The river water is fresh above Port Royal but is not suitable for boiler use.

The currents follow the general direction of the channel. The velocities throughout the river are usually weak, averaging less than 1.0 knot. Times of slack water and strength of current become later going upriver. These normal conditions are subject to change by winds and changes in drainage flow.

During severe winters, ice closes the river nearly to its mouth, but in ordinary winters the channels are usually kept open by the river traffic. Ice sufficient to interfere

with navigation of small craft will usually be encountered in January and February, particularly above Port Royal.

Freshets occur during the spring and fall, but are of short duration and ordinarily are not dangerous to shipping. The highest level on record was 33 feet above low water at Fredericksburg, but the usual height due to freshets is not more than 9 to 12 feet and only occasionally rises above the wharves. The freshet effect on the water level decreases rapidly below Fredericksburg and is ordinarily negligible 11 miles down river.

The principal places along Rappahannock River for supplies and small-vessel **repairs** are Broad Creek, Carter Creek, and Urbanna Creek.

Chart 534.—The entrance to Rappahannock River is between Stingray Point and **Windmill Point**, 3 miles to the northward; the midchannel point is 1.5 miles northwest of Stingray Point Light, 2.7 miles west-southwest of Windmill Point Light, and 45.5 miles (7 miles west by north of the 38.5-mile point in the bay channel) from the Virginia Capes. The shores on both sides of the entrance are wooded; the two lights are the most prominent landmarks.

Rappahannock Spit extends southeastward from Windmill Point for about 4 miles, and has depths of 4 to 18 feet. **Windmill Point Light (37°35.8′ N., 76°14.2′ W.)**, 36 feet above the water, is shown from a white hexagonal house on brown piles, in depths of 12 feet on the spit 2.2 miles from the point; a fog signal is sounded at the light. Windmill Point Light is 4 miles due west of a point 41 miles along Chesapeake Bay main channel from the Virginia Capes.

Depths of 10 feet can be carried across Rappahannock Spit anywhere outside Windmill Point Light. About 0.4 mile outside the light, a buoyed lane that extends northeastward through the fish traps is a short cut for light-draft vessels approaching the river from northward.

Broad Creek, on the south side of Rappahannock River a mile above the mouth, is used by oystermen, fishing boats, and yachts. The controlling depth was 4 feet in the entrance channel in June 1960 with natural depths of 5 to 9 feet inside; a light and daybeacons mark the channel. The boatyards on the northwest side of the creek can haul out craft up to 120 feet in length; available supplies include gasoline, diesel oil, lubricants, water, and electricity.

Mill Creek, on the south side of Rappahannock River 5 miles above the mouth, is entered through a narrow channel marked by two lights. The controlling depth of the channel leading to the wharf with a large boathouse on the south side of the entrance to the creek was 11 feet, in June 1960. A depth of 7 feet is at the face of the wharf. Ruins of former wharves are nearby.

Locklies Creek, on the south side of Rappahannock River 6 miles above the mouth, has depths of about 5 feet. The creek has some traffic in sand and gravel. A marine railway on the creek can haul out craft up to 40 feet in length. Available supplies include gasoline, water, electricity, and groceries.

A dredged channel thorofare between Mill and Locklies Creeks behind Parrott Island had a controlling depth of 4 feet, in June 1960.

A fish factory and wharf with depths of 18 feet at the face are on **Cherry Point**, on the north side of Rappahannock River 6 miles above the mouth. The elevator on the point is prominent.

A fixed highway bridge crosses Rappahannock River between a point about 0.7 mile northwestward of Cherry Point and **Grey Point** on the south side, 7 miles above the mouth; the channel span has a clearance of 110 feet.

Carter Creek, on the north side of Rappahannock River 8 miles above the mouth, is the approach to the villages of **Weems** on the west side and **Irvington** on the east side. Traffic on the creek consists chiefly of petroleum products, sand and gravel, shellfish and shells. Drafts of vessels using the creek seldom exceed 11 feet and are mostly 6 feet or less.

Controlling depths of the channels in Carter Creek were the following in June 1960: 15 feet in the entrance; 12 feet in Eastern Branch to the wharves at Irvington; and 9 feet in **Carter Cove**, the western branch. The entrance is marked by lights and buoys. The mean range of tide is 1.4 feet. Near the head of Eastern Branch is a fixed highway bridge with a width of 24 feet and a clearance of 17 feet.

There are several oyster houses and yacht facilities in Carter Creek. Most vessels go alongside the wharves, but the creek is used also as an anchorage. Available supplies at both Weems and Irvington include diesel fuel, gasoline, water, electricity, ice, and groceries. There are several marine railways on the creek; the largest one is at Weems and can handle vessels up to 150 feet in length. A machine shop makes hull and engine repairs. Depths of 8 feet are alongside the landings at Weems and Irvington.

Corrotoman River, on the north side of Rappahannock River 9.5 miles above the mouth, has depths of 18 feet or more for 4 miles to the junction of Eastern and Western Branches. The river channel is obstructed by shoal spits and middle grounds, but the principal shoals as far as the fork, and for 0.5 mile above in Western Branch, are marked by lights and buoys. The mean range of tide is 1.3 feet in the river.

Whitehouse Creek, on the west side of Corrotoman River 0.8 mile above the mouth, has depths of 7 feet to the landing at **Bertrand**, on the north side 0.5 mile from the entrance. **Taylor Creek**, on the east side of Corrotoman River 2.5 miles above the mouth, has depths of 5 feet for about a mile above the entrance; a line of poles, about 50 feet high, crosses the entrance, but in June 1960 there were no wires strung between them. **Myer Creek**, on the west side 3 miles above the river mouth, has depths of 8 feet for a mile to a wharf on the north side where gasoline is available. Gasoline can also be obtained on the south side at the entrance.

Eastern Branch of Corrotoman River has depths of 13 feet for 1.4 miles, thence 8 feet for 1.5 miles. **Western Branch** has depths of 12 feet or more for 2.5 miles, thence 5 feet for 2 miles. A cable ferry operates, daytime only,

from **Ottoman Wharf**, on the southwest side of Western Branch 1.3 miles above the fork, to **Merry Point**, on the opposite side.

Whiting Creek is on the south side of the Rappahannock River, 10.5 miles above the mouth. The entrance channel, marked by daybeacons, had a controlling depth of 3 feet in June 1960.

Chart 535.—Urbanna Creek empties into the southwest side of Rappahannock River 13.5 miles above the mouth. The town of **Urbanna** is on the west side, near the entrance. Drafts of vessels using the creek seldom exceed 8 feet and are mostly 4 feet or less.

The controlling depth in the dredged channel was 9 feet, in June 1960. Above the wharf, depths are 6 feet or more for about 0.7 mile, and small craft can go about another mile upstream. The entrance is protected by a riprap jetty on the north. The channel is marked by lights and daybeacons. The mean range of tide is 1.6 feet.

Many small vessels harbor in Urbanna Creek. The wharves at Urbanna have depths of 7 to 14 feet alongside. Available supplies include gasoline, diesel fuel, water, ice, groceries, and marine hardware. Marine railways and lifts have hauling capacities up to 50 tons and handle vessels up to 70 feet in length; the machine shop repairs hulls and engines.

The highway bridge over the creek 0.7 mile above the entrance has a fixed span with a width of 40 feet and clearance of 21 feet.

Robinson Creek, on the west side of Rappahannock River 14 miles above the mouth, has depths of 5 feet in the entrance and to the head. **Remlik Wharf**, just south of the creek, is about 300 yards long and has depths of about 6 feet at the outer end.

Lagrange Creek, on the west side of Rappahannock River 15 miles above the mouth, has depths of 7 feet in the entrance and 4 feet for a mile to a boatyard on the southwest side. A marine railway can haul out craft up to 50 feet in length; a machine shop is available. Gasoline, water, electricity, ice, groceries, and some other supplies are obtainable. The wharf has depths of 4 feet at the outer end.

Greenvale Creek, on the east side of Rappahannock River 17 miles above the mouth, has depths of 3 feet across the shoals at the entrance. The channel is marked by bush stakes and closely follows the east bank to a landing 0.3 mile above the mouth. During the winter months, with northwest winds, depths less than 1 foot are common. The oyster-house landings on the west side have depths of 4 feet alongside; small amounts of gasoline and water are available. The long wharf 0.6 mile northwest of Greenvale Creek has depths of about 5 feet at the outer end, and is in poor condition.

Monaskon is on the east side of Rappahannock River 18.5 miles above the mouth. The wharf is in ruins; the remains are barely visible at low water.

Parrotts Creek is on the southwest side of Rappahannock River 20 miles above the mouth. A dredged channel marked by lights and daybeacons extends from the entrance to the public landing at **Waterview**, 0.5 mile above the mouth. The controlling depth was 4½ feet, in June 1960. Oyster wharves near the entrance have depths of 5 to 8 feet at their faces; gasoline and water are available.

Deep Creek, on the east side of Rappahannock River 20.5 miles above the mouth, has depths of 2 feet across the flats at the entrance and 4 to 6 feet into the several branches. The creek usually is bush-staked. The overhead power cables have minimum clearance of 30 feet. Gasoline is available at the fish house at the village of **Boer** on the east side of the entrance.

Mulberry Creek, on the northeast side of Rappahannock River 22 miles above the mouth, has depths of 6 feet in the dredged cut at the entrance, and 4 feet for a mile upstream. A light marks the west side of the entrance, and a shell islet awash at high water is at the inner end of the channel cut. Gasoline and groceries are obtainable at **Morattico**, on the northwest side of the entrance.

Lancaster Creek, on the northeast side of Rappahannock River 23.5 miles above the mouth, has depths of 5 feet in the entrance, and thence from 4 to 2 feet for 4 miles to **Woodhouse Landing**. About 2 miles above the entrance the creek is crossed by an overhead power cable with clearance of 27 feet. A boatyard on the west side of the entrance has about 3 feet in its basin; gasoline is available. A marine lift on the west side, a mile above the entrance, can haul out craft up to 40 feet in length. **Morattico Creek**, which empties into the north side of Lancaster Creek 0.7 mile above the entrance, has depths of 3 feet at the entrance and 2 feet to near the head. Gasoline is available at a pier on the east shore about 0.2 mile upstream. The overhead power cable 0.5 mile above the mouth has a clearance of 17 feet.

Bayport is on the southwest side of Rappahannock River 23.5 miles above the mouth; the wharf is in ruins. **Butylo**, a mile northwestward of Bayport, has a wharf with depths of 5 feet at the outer end; water, electricity, and gasoline are available.

Farnham Creek, on the northeast side of Rappahannock River 26 miles above the mouth, has depths of 2½ feet in the entrance and for 1.3 miles upstream. A fixed highway bridge in ruins 0.7 mile above the entrance has a width of 6 feet and a clearance of 6 feet. The deepest water is through the center of the bridge. The overhead power cable below the bridge has a clearance of about 30 feet.

Sharps is on the northeast side of Rappahannock River 27 miles above the mouth. The wharf is in ruins. Storage tanks at the shore end of the wharf are prominent.

A small-boat harbor marked by a light and daybeacon on the ends of the entrance 300-foot jetties is at **Wildwood Beach** on the southwest side of Rappahannock River 27.5 miles above the mouth. The controlling depth into the harbor is about 5 feet, and the depth at the face of the pier is 4 feet. Gasoline, water, and electricity are available; diesel fuel is trucked in. A marine railway can haul out boats 50 feet in length for engine and hull repairs; a 1½-ton hoist and launching ramp are available.

Bowlers Rock Light (37°49.5′ N., 76°44.0′ W.), 23 feet above the water, is shown from a black skeleton tower

on a cylindrical base in depths of 6 feet on the southwest side of Rappahannock River channel 28 miles above the mouth; a fog signal is sounded at the light. **Bowlers Rock,** covered 7 feet and buoyed, is on the east side of the channel 500 yards east-southeastward of the light. A submerged wreck is on the southwest edge of the channel 100 yards north-northeastward of the light; and foul ground extends upriver along the southwest edge of the channel for 1.3 miles from the light. **Bowlers Wharf,** on the southwest shore, is in ruins.

Totuskey Creek empties into the northeast side of Rappahannock River 31 miles above the mouth. A channel marked by range lights, buoys, and daybeacons leads to a turning basin below the Totuskey Bridge, 3.5 miles above the mouth; the controlling depth at the mouth bar was 6½ feet, in June 1960, with deeper water inside. The channel is narrow in places and difficult to follow without local knowledge. A timber-and-bush dike on the northeast side of the channel, 2.5 miles above the entrance, is barely visible.

Totuskey Bridge, 4 miles above the entrance, is a fixed concrete span with a width of 24 feet and a clearance of 10 feet. A good landing on the southeast bank just below the bridge has depths of 10 feet at the face and is used by small oil tankers. Barges load pulpwood at a landing on the opposite shore about 0.2 mile below the bridge.

Wellford is on the northeast side of Rappahannock River 32 miles above the mouth; only the outer piling of the former wharf show above high water. The piling remains of **Wares Wharf** are directly across the river from Wellford; there are storage tanks on the shore.

Piscataway Creek, on the southwest side of Rappahannock River 35 miles above the mouth, has depths of 4 feet in the entrance with greater depths for 5 miles upstream. A highway bridge, 4 miles above the entrance, has a fixed span with a width of 30 feet and a clearance of 8 feet. Overhead power cables between the entrance and the bridge have minimum clearance of 16 feet.

Hoskins Creek empties into the southwest side of Rappahannock River 36.5 miles above the mouth. A channel marked by range lights, a buoy, and daybeacons extends from the entrance of the creek to the highway bridge, 0.6 mile above the mouth; the controlling depth was 10 feet in the entrance channel, in August 1960, and 7 feet inside. The highway bridge has a fixed span with a width of 34 feet and a clearance of 8 feet.

A marina is on the north side of Hoskins Creek about 0.2 mile above the entrance. Available supplies include gasoline, water, ice, and marine hardware; diesel oil is trucked in. A two-ton crane and a small marine railway are at the marina.

Tappahannock is on the southwest side of Rappahannock River 37 miles above the mouth. A wharf, just below the bridge, has depths of 5 feet at the outer end but is in poor condition. Just south of this wharf are mooring dolphins to which tankers tie up; depths at the dolphins are about 9 feet. A public concrete launching ramp is about 0.2 mile below the bridge.

The highway bridge over the river at Tappahannock has a swing span with a clearance of 10 feet; the northeast opening is used. In 1961, a new bridge was under construction parallel to the existing structure which it will replace.

Mount Landing Creek, on the southwest side of Rappahannock River 38.5 miles above the mouth, has depths of 3 feet across the flats at the entrance and deeper water inside for 3.5 miles. A highway bridge near the entrance has a fixed span with a width of 30 feet and a clearance of 9 feet. The overhead power cable just north of the bridge has a clearance of 18 feet. The creek is used by fishermen.

Cat Point Creek, on the east side of Rappahannock River 39 miles above the mouth, has depths of about 4 feet across the bar at the entrance and deeper water inside for 7 miles. A highway bridge over the entrance to the creek has a retractile span with a width of 31 feet and a clearance of 4 feet. An overhead power cable about 200 yards above the bridge has a clearance of 21 feet. The cutoff, 1.7 miles above the mouth, has depths of 4 feet. The highway bridge, 6 miles above the entrance, has a swing span with a width of 31 feet and a clearance of 4 feet; see **203.245,** Chapter 2, for **drawspan regulations. Naylors,** on the north side of the entrance to Cat Point Creek, has many conspicuous houses; the landing is in ruins.

Occupacia Creek, on the west side of Rappahannock River 44 miles above the mouth, has depths of 3 feet across the bar at the entrance and 4 feet for 6 miles up the middle branch; an overhead cable 2.5 miles above the entrance has a clearance of 35 feet, and the overhead cable 6 miles above the entrance has a clearance of about 30 feet. **Bridge Creek,** the eastern branch, has depths of 2 feet to a fixed bridge a mile above its entrance.

Carter Wharf is on the east side of Rappahannock River 47 miles above the mouth, 10 miles above Tappahannock Bridge. The landings are in ruins. **Layton,** on the west bank 50 miles above the mouth, has two wharves; the lower is in fair condition and the upper is in ruins. **Leedstown** is on the north bank 52 miles above the mouth. The landings are in ruins.

Chart 536.—Camden is a village on the south side of Rappahannock River 66 miles above the mouth. The landings are in poor condition.

Port Royal is on the southwest side of Rappahannock River 67.5 miles above the mouth; the pier is in ruins. The highway bridge that crosses the river from Port Royal to **Port Conway** has a swing span with a clearance of 8 feet; the northeast opening is used.

Newton Rock, on the southwest side of Rappahannock River 91 miles above the mouth, is 50 feet from shore and is almost awash at high tide; the best water is 100 feet off the rock, which is marked by a buoy.

Fredericksburg, the city on the west side of Rappahannock River 93 miles above the mouth, has some trade by water, mostly in motor vessels and barges drawing 8 to 10 feet. Practical navigation terminates at the wharf at the southern end of the city, but small boats can go about a mile farther upriver. Anchorage space is limited, so vessels usually make fast to the wharf, which has 7 feet at the face and is in poor condition. The fixed rail-

road bridge just above the wharf has a clearance of 37 feet. The fixed highway bridge, 700 yards farther up, has a clearance of 50 feet.

Chart 534.—Fleets Bay, on the west side of Chesapeake Bay just northward of Rappahannock River Entrance, is the approach to Little Bay and Antipoison Creek, and to Tabbs, Dymer, and Indian Creeks.

Depths of 8 feet can be taken through **Little Bay,** on the south side of Fleets Bay, westward in a narrow channel into **Antipoison Creek** and upstream for a mile. The bay and creek are used by boats with drafts up to 6 feet. A fish factory on the south side of Antipoison Creek 0.6 mile above the entrance has a wharf with depths of 10 feet at the face; another fish factory and ice plant directly across the creek has a wharf with depths of 6 feet at the face. **Harpers Creek,** on the south side of Antipoison Creek 0.7 mile above the entrance, has depths of 5 feet to a yard that can haul out and repair boats up to 30 feet in length.

Tabbs Creek, on the west side of Fleets Bay 1.5 miles northward of Antipoison Creek, has depths of 2 feet over the bar at the entrance, thence 7 feet or more for about a mile. The creek and its approach are unmarked.

Dymer Creek, on the west side of Fleets Bay 2 miles northward of Antipoison Creek, has 13 feet for a mile and 8 feet for another mile. The approach through Fleets Bay is well marked by lights and buoys. The fish factory on the south side of the creek a mile above the entrance has a wharf with depths of 14 feet along the west side; the area along the east side is awash at low water. The boatyard in **Poplar Neck Creek,** just below the fish factory, makes hull and engine repairs; the larger of the two railways can haul out vessels up to 85 feet in length.

Indian Creek, at the northwest corner of Fleets Bay 3 miles northward of Antipoison Creek, has depths of 16 feet in the approach, thence 11 feet for 2 miles above the entrance, and then shoals to 6 feet 0.8 mile farther up. Traffic on the creek consists chiefly of pulpwood, petroleum products, shellfish and shell. Drafts of vessels using the creek seldom exceed 9 feet and are mostly 6 feet or less. The approach through Fleets Bay and the channel in the creek are well marked.

A country club pier is about a mile above the mouth of Indian Creek, on the northeast side in a cove. Available supplies include gasoline, water, and electricity. The pier has depths of about 9 feet at the face. **Kilmarnock Landing,** on the west side 2 miles above the entrance, is at the foot of a paved road that leads 1.5 miles inland to the town of **Kilmarnock.**

Depths of 12 feet are at the dock and boat basin landing; available supplies include gasoline, diesel fuel, water, ice, and electricity. There are oil wharves just above and below the basin. General boat repairs can be made at the landing; the marine railway can haul out vessels up to 40 feet in length. Depths of 6 feet can be carried 0.5 mile up the western branch above Kilmarnock Landing to a marine railway that can haul out boats 50 feet in length, for engine and hull repairs. A Public Health Service **outpatient office** is at Kilmarnock.

Dividing Creek empties into the west side of Chesapeake Bay about 8 miles north-northwestward of Windmill Point Light. The creek has depths of 14 feet in the approach, thence 13 feet for a mile above the entrance, and then shoals gradually to depths of 8 feet 1.5 miles farther up. The creek is used by boats with drafts of 5 feet or less. The approach between the shoals off the entrance is well marked by lights and buoys.

Chart 1223.—In addition to the danger zone of a naval firing range that extends from north of Wolf Trap Light to south of Tangier Sound Light, previously described, several danger areas are in Chesapeake Bay between Windmill Point Light and Smith Point Light.

San Marcos Wreck, 10.5 miles northeast of Windmill Point Light, is covered by about 20 feet of water, but the depth over it is subject to change because of shifting steel. The wreck is marked by two buoys.

The **danger zone** of a naval guided missiles test operations area is centered 14.5 miles northeasterly of Windmill Point Light; see **204.44,** Chapter 2, for limits and regulations. Sunken ships and other obstructions are within the area.

Chart 534.—Great Wicomico River empties into the west side of Chesapeake Bay 13 miles northward of Windmill Point Light. The entrance is between **Dameron Marsh** and **Bull Neck,** 1.7 miles to the northward. The principal marks for the entrance are Great Wicomico River Light and the buildings at Fleeton, on Bull Neck.

Great Wicomico River Light (37°48.2′ N., 76°16.1′ W.), 42 feet above the water, is shown from a white hexagonal house with brown piles and roof, in depths of 9 feet 0.6 mile southeast of Bull Neck; a fog signal is sounded at the light. Great Wicomico River Light is 4.5 miles due west of a point 53.5 miles along Chesapeake Bay main channel from the Virginia Capes.

Great Wicomico River has depths of 17 feet or more for 5.5 miles above the entrance, and thence 9 feet or more for 3 miles. The river is navigable for small craft for another 2 miles. Vessels entering the river for shelter usually anchor in depths of 15 to 20 feet off and in the entrance to Cockrell Creek. Fish traps usually will be found on the shoals at the entrance to the river; the approach can be made on a due west course between the buoys marking the limits of the designated trap areas.

The channel in Great Wicomico River is marked by lights for 4 miles from the entrance. The mean range of tide is 1.1 feet at the entrance. Ice does not close the river to navigation except in severe winters, and then only for brief periods; Cockrell Creek is considered a secure harbor from ice.

Cockrell Creek, on the northeast side of Great Wicomico River a mile above the mouth, has depths of 15 feet for 1.5 miles above the entrance, then shoals gradually to 6 feet a mile farther up. Traffic on the creek consists chiefly

of animal and petroleum products, fish, and shellfish. Numerous fish factories operate along its shore. Drafts of vessels are mostly 12 feet and under, but drafts up to 14 feet use the creek. There are depths of 8 to 15 feet at the faces of the wharves.

Fleeton is on the southeast side of the entrance to Cockrell Creek. The dock of a marine service station has 14 feet at its face; available supplies include gasoline, diesel oil, electricity, groceries, and ice.

Reedville, on the east side of Cockrell Creek 1.5 miles above the entrance, is a **customs** port of entry at which marine documents are issued, and has a Public Health Service **outpatient office.** Available supplies include gasoline, diesel fuel, water, ice, groceries, and marine hardware.

The boatyards along Cockrell Creek can handle vessels up to 100 feet in length.

Mill Creek, on the southwest side of Great Wicomico River entrance, has depths of 12 feet or more through a crooked channel across the flats and for a mile above the entrance, thence 8 to 10 feet for another mile.

Cranes Creek is on the west side of Great Wicomico River 1.5 miles above the mouth. The entrance channel marked by daybeacons has a controlling depth of 6 feet; greater depths are inside the entrance. Several small privately owned wharves along the banks of the creek are used by boats drawing up to 5 feet.

Mila, on the west side of Great Wicomico River 3.5 miles above the mouth, has a landing with a depth of 5 feet at the outer end.

The highway bridge over Great Wicomico River 6 miles above the mouth has a swing span with a clearance of 9 feet in the north opening; see **203.245,** Chapter 2, for **drawspan regulations.** The overhead power cable 50 yards above the bridge has a clearance of 40 feet. The small landings on the east side of **Glebe Point,** at the north end of the bridge. have depths of 5 to 8 feet at the outer ends; gasoline is available. A marine railway here can haul out craft up to 45 feet in length.

12. CHESAPEAKE BAY, POTOMAC RIVER

Charts 557 to 560.—Potomac River empties into the west side of Chesapeake Bay 66 miles by channel from the Virginia Capes. The river is the boundary between Virginia on the west and Maryland on the east; the District of Columbia occupies a 10-mile stretch on the Maryland side at the head of tidewater.

Hains Point, Washington, D.C., at the junction of Anacostia River, Washington Channel, and Virginia Channel, is 94 miles above the mouth of Potomac River. The head of tidewater navigation is at Chain Bridge, Washington, 101 miles above the mouth. The greatest width, 6.4 miles, is between Thicket Point, Virginia, and Kitts Point, Maryland, 11 miles above the mouth (see chart 557).

Traffic on Potomac River consists chiefly of petroleum products; sand, gravel, and crushed rock; and some newsprint and fertilizers. Drafts of vessels navigating the river usually do not exceed 20 feet.

Channels.—Potomac River has channel depths of 39 to 92 feet for 20 miles, thence 24 feet or more to the first bar cut 32 miles above the mouth. The Federal project provides for a channel 24 feet deep between the mouth and Hains Point; the dredged cuts are well marked.

Anchorages.—Vessels bound up or down Potomac River anchor anywhere near the channel where the bottom is soft; vessels sometimes anchor in Cornfield Harbor or St. Marys River (see chart 557). Above Alexandria, vessels usually go to the wharves; there is little or no anchorage for anything but small craft. Near the mouth of the river, small craft can find secure anchorage in most of the tributaries; Smith Creek (see chart 557) is said to have best protection from all winds.

Fish-trap areas extend upriver from the mouth to Blakiston Island. Limits of the areas are marked by buoys and are shown on charts 557 and 558.

Danger zones.—Potomac River is used extensively by the military establishments for testing operations and gunnery practice. Limits of the danger areas and regulations governing them are given in **Chapter 2.**

Tides.—The mean range of tide is about 1.3 feet at the mouth of the river, 1.9 feet in the vicinity of Blakiston Island, 1.1 feet at Maryland Point, 1.7 feet at Indian Head, and 2.9 feet at Washington. Above Washington, the river is tidal as far as Chain Bridge. The tides are influenced by the force and direction of the wind and by freshet conditions, and may at times vary considerably. Daily predictions for Washington are given in the Tide Tables.

Currents.—The currents in Potomac River follow the general direction of the channel. The velocities vary throughout the river and are influenced by wind and freshets. There may be little or no flood current during freshets.

The current velocity is weak in the lower part of the river between the entrance and Piney Point, averaging less than 1.0 knot.

Ice.—During severe winters the tributaries of the Potomac are closed by ice and the river is frozen over to Cedar Point; the upper part is then closed to navigation. During ordinary winters the powered vessels plying the river keep the channel open.

Freshets occur at irregular intervals, but usually do not interfere with navigation below Alexandria unless accompanied by floating ice.

Pilotage is compulsory on the Potomac for foreign vessels and American vessels in the foreign trade. Virginia pilots take vessels to Virginia ports and Maryland pilots take vessels to Maryland ports; pilots from either state take vessels to Washington.

Chart 557.—The entrance to Potomac River is between Smith Point and Point Lookout, 10 miles to the north-northeastward; the width normal to the channel is about 5 miles. The midchannel point in the entrance is 6.6 miles northwest of Smith Point Light and 66 miles (7 miles northwest of the 59-mile point in the bay channel) from the Virginia Capes.

The **fish-trap areas** in the lower river are marked by buoys and are shown on the chart. **Danger zones** for military testing operations extend from the mouth of the river to the upper limits of the chart; limits and regulations are given in **204.40,** Chapter 2.

Smith Point, on the south, or Virginia, side of the entrance to Potomac River, is low and inconspicuous. A shoal area that extends eastward from the point has depths as little as 8 feet 2 miles from shore; a buoy marks the northeast edge of the shoal.

Smith Point Light (37°52.8′ N., 76°11.0′ W.), 52 feet above the water, is shown from a white square tower and octagonal dwelling on a brown cylindrical pier about 2.5 miles east by south of the point; a radiobeacon and fog signal are at the light. There are depths of 13 feet 200 yards east of the light. Smith Point Light is 1 mile due west of a point 58 miles along Chesapeake Bay main channel from the Virginia Capes.

Little Wicomico River empties into Potomac River at Smith Point. The Federal project provides for an entrance channel 8 feet deep for about 0.8 mile inside the jetties. Controlling depth was 4 feet in June 1960. Lights mark the entrance channel and daybeacons the upper reaches. The river is used by local fishermen and pleasure craft.

Gasoline, diesel fuel, water, and some other supplies are available at a marina in **Tabs Creek,** about a mile inside the entrance of Little Wicomico River. **Sunnybank (P.O.),** a village about 1.5 miles above the entrance, has

gasoline and some groceries. A vehicular **ferry** crosses the river at Sunnybank. The largest marine railway, 3.5 miles above the entrance, can haul out boats up to 90 feet in length, for hull and engine repairs.

Point Lookout, on the north, or Maryland, side of the entrance to Potomac River, is low, but is well marked by a light, a water tank, and several buildings. The shoal that extends about 1 mile southward from the point is marked at its outer extremity by a bell buoy. **Point Lookout Light (38°02.3′ N., 76°19.3′ W.),** 41 feet above the water, is shown from a white dwelling, 41 feet high, on the point; a fog signal is at the light. Point Lookout Light is 5 miles due west of a point 68 miles along Chesapeake Bay main channel from the Virginia Capes.

Cornfield Harbor, between Point Lookout and **Cornfield Point** 2 miles to the northwestward, is sheltered from northerly and northeasterly winds; vessels bound up and down the bay frequently use it as an anchorage for the night. The shoaling is gradual, except off Cornfield Point and at the south end of the shoal that extends southward from Point Lookout; at these places the hard sand bottom drops off abruptly. An 18-foot spot and rocks covered by 17 feet are about 0.7 mile westward from Point Lookout, and a 10-foot spot, marked by a buoy, lies between them and the Point Lookout shore. A wharf just west of the light extends 330 feet out from shore and has a depth of 11 feet at its outer end.

Coan River, on the Virginia side of Potomac River 8 miles above the mouth, has depths of 13 to 7 feet for 4.5 miles to within 0.5 mile of the head. The river is used mostly by local oyster and fish boats. A 500-yard lane in the approach is kept clear of fish traps; the initial course through the lane is **230°.** The entrance to Coan River is marked by buoys and a light, and is easy to navigate; the channel above is marked at the critical points by daybeacons and bush stakes. The mean range of tide is 1.4 feet at the entrance.

Kingscote Creek, on the north side of Coan River 0.6 mile above the mouth, has depths of 8 feet for most of its 1-mile length. A shoal extends halfway across the entrance from the point on the west side. **Lewisetta** (P.O.), on the east side of Kingscote Creek 0.3 mile above the entrance, has a store and pier where gasoline, diesel fuel, water, and some other supplies may be obtained.

The Glebe, on the west side of Coan River 0.7 mile above the mouth, has depths of 9 to 13 feet to the forks 1.5 miles above the entrance; the south fork has depths of 9 to 7 feet for 0.6 mile. The channel in The Glebe is clear except for a shoal that extends well off from the point on the south side 0.6 mile above the entrance.

Stephens (Stevens) Point is on the west side of Coan River a mile above the mouth. The boatyard on the south side of the point can haul out craft up to 50 feet in length, for hull and engine repairs; gasoline is available.

The wharf at **Bundick,** on the west side of Coan River 3.4 miles above the mouth, has depths of 9 feet at the outer end, but is in poor condition; gasoline and some supplies are obtainable at a nearby store. **Coan** wharf, directly across the river from Bundick, is in ruins. The overhead power cable that crosses the river from Coan to Bundick has a clearance of 60 feet.

Smith Creek, on the Maryland side of Potomac River 10 miles above the mouth, is used by many small fishing and pleasure boats, and has the best protection along this part of the river from all winds. The depth over the bar is about 10 feet, and the same depth can be carried 1.5 miles above the entrance light into either of the two main branches. The entrance is well marked by lights and buoys. The lane through the fish traps can be navigated on a course of **355°.**

Wynne, on the east side of the entrance to Smith Creek, has good wharves with depths of 5 to 10 feet at their outer ends; fuel and other supplies are available on most of them. The largest marine railway on the north side of Wynne can haul out boats up to 100 feet in length, for hull and engine repairs.

St. Marys River, on the Maryland side of Potomac River 11.5 miles above the mouth, is 2 miles wide at the entrance and about 600 yards wide at St. Marys City, 5.5 miles up. The channel has depths of 20 feet or more to St. Marys City, then shoals gradually to 12 feet at **Martin Point** and to 8 feet at **Tippity Wichity Island,** 8 miles above the mouth. St. Marys River is sometimes used as an anchorage by the deeper-draft vessels seeking shelter from heavy gales, but small boats prefer Smith Creek. The river has very little traffic other than local fishing craft. The course through the fish traps off the entrance is **345°.** The mean range of tide is about 1.5 feet.

St. George Island, on the west side of the entrance to St. Marys River, is long, low, and sparsely wooded. The island is thickly settled, mostly by oystermen and fishermen, and is also used to some extent as a summer resort. **St. George Bar** extends 1.3 miles southeastward from the island and is marked at its outer end by a lighted buoy.

The dredged channel marked by lights and daybeacons at the entrance to **Island Creek,** at the southeast end of St. George Island, had a controlling depth of 3 feet along the centerline, in June 1959.

St. George Creek, which empties into St. Marys River along the northeast side of St. George Island, has a narrow, crooked channel with depths of 10 feet or more for 3.5 miles. The creek is used extensively by oystering and fishing boats the year around and by pleasure craft during the summer. The usual drafts of boats seen in the creek are 3 to 5 feet, but it has been used by deeper drafts. The channel is well marked by lights.

The controlling depth was 6 feet through the passage between the mainland and the northwest end of St. George Island, in October 1958. There are spoil banks on each side of the Potomac River end of the passage, but the channel is marked by lights and daybeacons. The fixed bridge over the passage has a width of 35 feet and a clearance of 18 feet.

The village of **Piney Point** (P.O.) is on the southwest side of St. George Creek 2.5 miles above the mouth and 0.5 mile above the passage at the northwest end of St. George Island. Depths at the wharves are 5 to 8 feet. Gasoline, diesel fuel, and other supplies are available.

A marine railway at **Morgan Point,** 3.5 miles above the mouth, can haul out boats up to 40 feet in length, for hull and engine repairs; gasoline is available.

Priests Point, on the east side of St. Marys River 3 miles above the mouth, has a large building and a water tank, and a light is 300 yards offshore.

Windmill Point, on the west side of St. Marys River 3.5 miles above the mouth, is a low yellow bluff with a cluster of trees at the outer end.

St. Marys City (P.O.), on **Church Point,** east side of St. Marys River 5.5 miles above the mouth, was the original capital of Maryland. Few traces of the original town remain, but the statehouse was reconstructed in 1934 from the ruins of several other buildings nearby. A low church spire is visible above the trees; a monument on the end of the point and an elevated water tank are prominent. A landing on the south side of the point has a depth of about 9 feet at the outer end.

Yeocomico River, on the Virginia side of Potomac River 12 miles above the mouth, has depths of 19 to 14 feet to the forks 1.4 miles above the entrance. Lights mark the channel to the forks, and bush stakes mark the edges of the tributary channels. The initial course through the fish stakes off the entrance to the river is **244°.** The mean range of tide is 1.5 feet at the entrance and 1.4 feet at Kinsale.

West Yeocomico River, the west fork of Yeocomico River, has depths of 13 to 7 feet to **Kinsale** (P.O.), on the southwest side 1.7 miles above the entrance. Gasoline, water, and some other supplies are available inside the cove on the north side of the river east of **Allen Point,** 0.4 mile above the mouth. A marine railway here can haul out boats up to 85 feet in length, for hull and engine repairs; a 30-ton lift is available. The fixed highway bridge at Kinsale has a width of 29 feet and a clearance of 9 feet. The cannery landing has depths of 6 feet at the outer end. The bulkhead wharf just southward has depths of 10 feet alongside; the grain elevators on the wharf are prominent. Gasoline and groceries are available at Kinsale.

South Yeocomico River, the south fork, has depths of 13 to 7 feet to **Lodge,** on the west side 2 miles above the entrance. Fresh water can be obtained from a pipe on the cannery wharf at **Mundy Point** (P.O.), on the west side of the entrance; the depth at the wharf is 6 feet. Several small landings on the south side of the point have depths of 9 feet at their outer ends. Gasoline, diesel fuel, groceries, and some other supplies are available at the store.

Harryhogan Point (P.O.) is on the west side of South Yeocomico River a mile south of the entrance. The marine railways at the settlement can handle vessels up to 50 feet in length. The north landing at the cannery has depths of 9 feet alongside, and the south landing has depths of 5 feet. The lumber-mill landing 0.2 mile southwestward has depths of 7 feet alongside. Gasoline and some supplies are available in the village.

Piney Point is on the northeast, or Maryland, side of Potomac River 16 miles above the mouth. A light shown from a white tower and a fog signal are on the point. The lighthouse wharf and the small private landings on the southeast side have depths of about 5 feet at their outer ends. Gasoline and water are available at a dock about a mile northeast of the point. The prominent T-shaped oil pier that extends 1,100 feet southwestward from the point has a 684-foot outer face, with depths alongside of about 35 feet, and is marked by privately maintained lights.

Chart 558.—Limits of the fish-trap areas that extend upriver as far as Blakiston Island are marked by buoys and are shown on the chart. **Danger zones** for military testing operations extend the length of the chart: limits and regulations are given in **204.40,** Chapter 2.

Herring Creek, on the Maryland side of Potomac River 19 miles above the mouth, has an entrance channel dredged to 6 feet in 1960; however, in June 1961, shoaling was reported across the channel. Depths inside the creek are 4 to 9 feet. Gasoline is available at a marina on the south side just inside the entrance.

A shoal extends 0.5 mile offshore from **Ragged Point,** on the southwest, or Virginia, side of Potomac River, 19.5 miles above the mouth. A light shown from a white hexagonal house on brown piles, in depths of 7 feet, and a fog signal, are near the outer edge of the shoal.

Lower Machodoc Creek, on the Virginia side of Potomac River 22 miles above the mouth, has depths of 17 to 12 feet for 2 miles, thence 9 feet for a mile, and thence 8 to 5 feet to a point 4 miles above the entrance. The critical part of the channel is marked by lights and buoys as far as the narrows 2.2 miles from the entrance, and the shoals usually are bush-staked. The creek can be approached on a general southerly course.

Branson Cove is on the east side of Lower Machodoc Creek a mile above the entrance. The dredged channel leading to a boat basin in the cove had a controlling depth of 6 feet, in 1960.

The village of **Coles Point** (P.O.) is along the shore of Branson Cove. The wharves have depths of about 6 feet at the outer ends. The marine railways can handle boats up to 50 feet in length. Gasoline and some supplies are available, and diesel fuel can be trucked in. There is a large oyster-packing plant on the south side of the entrance to the cove.

Gasoline can be obtained at **Tidwells** on the west side of the narrows 2.2 miles above the entrance to Lower Machodoc Creek. The overhead power cable 3.8 miles above the entrance to Lower Machodoc Creek has a clearance of 30 feet.

Nomini Bay, on the Virginia side of Potomac River 25 miles above the mouth, has general depths of 20 to 15 feet and is the approach to Nomini Creek and Currioman Bay. The shoaling is abrupt on the east side of the bay and gradual on the west side.

Nomini Creek, which empties into the head of Nomini Bay from southward, has a controlling depth of about 7 feet for 3.7 miles to the Nomini bridge, above which depths of 6 feet are reported for 1.5 miles to the Prospect

Hill bridge, thence 3 feet for about 0.5 mile farther. Traffic on the creek consists chiefly of seafood and fertilizer. Most of the vessels using the creek draw 2 to 4 feet, but deeper drafts have been noted.

There is a long jetty on the east side of the entrance to Nomini Creek. A light at the outer end of the jetty, another light, and buoys mark the dredged cut that extends to deeper water a mile above the entrance. The mean range of tide is about 2 feet.

Buckner Creek, on the east side of Nomini Creek at the inner end of the jetty, has depths of 2 to 3 feet in the entrance and 5 to 6 feet inside. The creek is usually bush-staked.

Water is available at a wharf on the east side of Nomini Creek 2 miles above the entrance; gasoline at **McGuires Wharf,** on the south side 2.7 miles up; and gasoline, diesel oil, water, and some other supplies at **Nomini,** on the west side 3.7 miles above the entrance. The landings have depths of about 7 feet at their faces.

The highway bridge at Nomini has a swing span with a width of 39 feet in the west opening and a clearance of 5 feet; the east opening is not used. The fixed highway bridge at **Prospect Hill,** 5 miles above the entrance, has a width of 30 feet and a clearance of 10 feet.

Currioman Bay is separated from the west side of Nomini Bay by **Hollis Marsh,** a narrow 2-mile-long spit which is wooded in the middle. Currioman Bay has depths of 7 to 10 feet in the entrance from the head of Nomini Bay and in most of the area back of Hollis Marsh; the entrance from Potomac River at the northwest end of Hollis Marsh has depths of only 2 to 3 feet. The entrance from Nomini Bay is marked by buoys which should not be confused with those marking Nomini Creek entrance, just eastward.

Breton Bay, on the Maryland side of Potomac River 25.5 miles above the mouth, is a favorite anchoring ground for yachts. Commercial traffic on the bay consists chiefly of petroleum products. Drafts of vessels using the bay are mostly 6 feet or less, but it is navigated occasionally by vessels drawing up to 11 feet.

The bay has depths of 15 to 13 feet for 3.5 miles, thence 11 feet for 0.5 mile, thence through a dredged cut with a controlling depth of about 5 feet to Leonardtown, 5 miles above the entrance.

A 1,000-yard lane extends through the fish traps off the entrance to Breton Bay; the initial course through the lane is **352°**. The shoal that extends eastward from Heron Island Bar to the Breton Bay approach is marked by an obstruction buoy, and another shoal that extends southwestward from **Huggins Point,** on the east side of the entrance, is marked by a light. Buoys and lights mark the bay channel to within 0.5 mile of Leonardtown. The mean range of tide is 1.7 feet in Breton Bay.

Combs Creek, on the north side of Breton Bay 1.5 miles above the mouth, has depths of about 6 feet to the landings. The narrow entrance is between shoal spits marked by stakes. The marine railways on the west side of the creek can haul out boats up to 60 feet in length. An overhead power cable, 0.2 mile above the mouth, has a clearance of 50 feet.

A channel with a controlling depth of 6 feet, marked by piles, leads into the bight just southwestward of the entrance to Combs Creek. The boatyard in the bight can haul out vessels up to 75 feet in length, for hull and engine repairs. Gasoline, water, and some other supplies can be obtained; diesel oil can be trucked in.

Lovers Point is on the east side of Breton Bay 3 miles above the mouth. A bar with depths of less than 1 foot extends 500 yards northwestward from the point and is marked at its outer end by a light. Gasoline and water are available at a pier with a depth of 11 feet alongside on the east side of the point.

Buzzard Point is on the west side of Breton Bay 4.5 miles above the mouth. A light marks the outer end of a bar that extends off the point.

Leonardtown (P.O.) is on the north side of Breton Bay 5 miles above the mouth. Gasoline, water, and ice are available on the wharf, and groceries can be obtained in the town.

Blakiston Island is on the north side of Potomac River 27 miles above the mouth. Near the south end of the thinly wooded island is a prominent cross which commemorates the first Catholic mass by English settlers in America on March 25, 1634. Shoals extend from the island in all directions. The long wharf on the inner side of the island near the north end has a depth of about 16 feet at the outer end.

Heron Island Bar, about 1 mile eastward of Blakiston Island, is an extensive shoal area mostly covered at low water; the bar is marked at the eastern and western ends by buoys.

St. Clement Bay, on the Maryland side of Potomac River back of Blakiston Island, has three entrances. The eastern entrance, between Heron Island Bar and the mainland, is by way of the Breton Bay lane through the fish traps; this entrance has depths of 20 to 16 feet and is easily followed in the daytime. The middle entrance, between Heron Island Bar and Blakiston Island, has depths of 19 feet or more and is approached through a 500-yard lane in the fish traps on an initial course of **352°**; this entrance is narrow and crooked, but is marked by a light and buoys and is easily followed in the daytime. **Dukeharts Channel,** between Blakiston Island and the mainland 0.5 mile to the north-northwestward, has depths of 8 feet and is buoyed from Potomac River to the junction with the middle entrance; the buoys are numbered from east to west and should be followed closely to carry the best water.

St. Clement Bay has channel depths of 14 feet for 3 miles, then shoals gradually to 6 feet 5 miles above the entrance. The mean range of tide is 1.8 feet.

The village of **Coltons Point** (P.O.) is on the west side of the entrance to St. Clement Bay. The marine service pier has depths of 5½ feet at the outer end; gasoline is available, and diesel fuel can be trucked in.

St. Patrick Creek, on the west side of St. Clement Bay 0.5 mile above the mouth, has a dredged entrance channel marked by a light and daybeacons; the controlling depth was 7 feet, in June 1959. Depths decease to 2 feet

toward the head. The creek is much frequented by fishermen and oystermen. **Palmers,** on the south side 0.4 mile above the entrance, has a landing with depths of 5 feet at the face. About 0.5 mile above Palmers is a marine railway that can haul out boats up to 40 feet in length, for hull repairs. Gasoline and some supplies can be obtained across the cove from the marine railway.

Canoe Neck Creek, on the west side of St. Clement Bay 1.1 miles above mouth, has depths of 11 feet in the entrance, then shoals gradually to 6 feet a mile upstream. The landings at **Morris Point,** on the south side just above the entrance, have depths of 4 to 12 feet at the outer ends; gasoline and some groceries are available. The marine railways can haul out boats up to 50 feet in length.

St. Clement Shores, a settlement on the east side of St. Clement Bay 3 miles above the mouth, has several small private landings with depths of 2 to 3 feet at the outer ends.

St. Catherine Sound, on the Maryland side of Potomac River 29.5 miles above the mouth, has depths of 5 to 9 feet behind **St. Catherine Island.** The entrance from southeastward, in the vicinity of Dukeharts Channel, and the channel behind the island, are marked by lights and daybeacons. The outlet to the mouth of Wicomico River on the northwestward has depths of 4 to 6 feet. The wharves along the shore of the sound are privately owned.

Whites Neck Creek, on the north side of St. Catherine Sound, has depths of 4 feet in the entrance and 6 to 2 feet inside. A marine service pier on the west side just inside the entrance has depths of 4 feet at the outer end; gasoline, water, and some other supplies are available. The marine railway just upstream can handle boats up to 45 feet in length for general repairs; a ½-ton lift is available.

Wicomico River empties into the Maryland side of Potomac River 31 miles above the mouth. Commercial traffic on Wicomico River consists chiefly of shellfish. Drafts of vessels using the river are mostly 6 feet or less.

The river is characterized by long spits, with little depth and abrupt outer ends, that extend to the edges of the channel in several places. The entrance is 1.3 miles wide between **St. Margaret Island** on the east and **Cobb Island** on the west. **Cobb Point Bar,** which extends a mile southeastward from the island, is marked at the outer end by a light; and the shoal that extends 0.5 mile westward from St. Margaret Island is marked by a buoy.

The Wicomico River channel has depths of 40 to 15 feet for 4 miles, thence 8 feet with local knowledge for 3.5 miles, and thence 6 to 3 feet to the head, 11 miles above the mouth. The channel is marked at the most critical points for about 8 miles. The mean range of tide is 1.9 feet.

Neale Sound, on the west side of Wicomico River between Cobb Island and the mainland, has depths of 7 to 12 feet and is a secure anchorage for motorboats. Both entrances are marked by lights and the critical part of the channel at the northwest end is marked by daybeacons; the aids are numbered from Wicomico River westward to Potomac River. The controlling depth of the dredged cuts at both entrances was 7 feet, in June 1959.

The highway bridge over Neale Sound 0.6 mile from the Wicomico River entrance has a bascule span with a width of 22 feet and a clearance of 8 feet; see **203.245,** Chapter 2, for **drawspan regulations.** The overhead power cable at the bridge has a clearance of 67 feet. The marine railway just east of the Cobb Island end of the bridge can haul out boats up to 55 feet in length, for hull and engine repairs; a 4½-ton portable lift is available. The landing has depths of 7 feet alongside; gasoline, water, and some other supplies are available. On the north side of the sound, westward of the bridge, is a landing with 5 feet alongside where some groceries can be obtained; a marine railway here can haul out boats up to 50 feet in length.

Rock Point is on the west side of Wicomico River 1.2 miles above the mouth. The outer end of the bar that extends 0.4 mile east-northeastward from the point is marked by a light.

Bushwood (P.O.) is on the east side of Wicomico River 1.5 miles above the mouth. The outer end of the wharf is in ruins, but the inner end can accommodate small boats. Gasoline and groceries are obtained near the wharf.

Charleston Creek, on the west side of Wicomico River 3 miles above the mouth, is used by oyster boats as an anchorage.

From Nomini Bay to within 2 miles of Popes Creek, the Virginia shore of Potomac River is backed by high ground. Along this stretch are **Nomini Cliffs, Stratford Cliffs, Horsehead Cliffs,** and the valleys between them.

Popes Creek, on the Virginia side of Potomac River 33.5 miles above the mouth, leads to **Wakefield** and **George Washington Birthplace National Monument.** The controlling depth is about 1½ feet in the entrance, and a stone jetty 2 feet high extends 200 feet offshore from the point on the north side. Current velocity as high as 4.5 knots has been reported in the entrance.

Mattox Creek, on the Virginia side of Potomac River 36 miles above the mouth, has depths of 7 to 5 feet in a narrow crooked channel for 1.5 miles to the ruins of **Wirt Wharf** and **Massey Wharf,** thence 8 to 3 feet for another 2 miles to a fixed concrete highway bridge. The entrance is marked by a light and daybeacons.

Colonial Beach (P.O.) is a summer resort on the Virginia side of Potomac River 37 miles above the mouth. The largest of the wharves on the river side of the town has depths of 6 feet at the outer end.

Monroe Creek, back of Colonial Beach, is entered between **Gum Bar Point,** at the south end of the town, and **Sebastian Point,** 150 yards westward. The creek is used extensively as an anchorage. The dredged channel marked by lights and daybeacons from the entrance of the creek to **Robins Grove Point** at Colonial Beach has a controlling depth of about 7 feet.

Available supplies at Colonial Beach include gasoline, diesel fuel, water, and groceries. The largest marine railway can haul out boats up to 60 feet in length; a 30-ton portable lift and a half-ton fixed lift are available.

The landings in the basin have depths of 7 feet at their outer ends. A yacht club is on the eastern side of the entrance to Monroe Creek.

Chart 556.—Potomac Beach is on the Virginia side of Potomac River 39 miles above the mouth. The former ferry wharf and an oil wharf are the only usable landings. The oil wharf has depths of about 8 feet alongside; the storage tanks are prominent. Gasoline and some groceries are obtainable.

Rosier Creek, entered just westward of Potomac Beach, has depths of 2 feet in the entrance and 7 to 3 feet for a mile upstream. The creek has no wharves and is little used.

Upper Machodoc Creek empties into the Virginia side of Potomac River 41 miles above the mouth. The **United States Naval Weapons Laboratory** is at **Dahlgren,** on the north side of the entrance to the creek, but also occupies land for a considerable distance along the south shore; limits of the **danger zones** and regulations governing them are given in **204.40,** Chapter 2. The tanks and radio masts at Dahlgren are prominent.

A deep channel has been dredged from the Potomac River main channel to the Dahlgren naval installations; the controlling depth in the channel and principal basin is 20 feet or more. The channel is well marked. The mean range of tide is 1.6 feet.

Above Dahlgren, Upper Machodoc Creek has depths of 7 to 5 feet to **Little Ferry Landing,** 3.5 miles above the entrance, thence 7 to 2 feet for another 2 miles to **Milford Landing.** Only small piers are found along the banks. The creek is little used, and no supplies are available.

Williams Creek, on the north side of Upper Machodoc Creek a mile above the mouth, has depths of 3 to 2 feet to the highway bridge a mile above the entrance. An overhead power cable 0.6 mile above the entrance has a clearance of 24 feet. Gasoline, water, and some other supplies are available 0.6 mile above the mouth. The creek is little used.

Lower Cedar Point Light (38°20.4′ N., 76°59.4′ W.), 38 feet above the water, is shown from a white skeleton tower on brown piles, in depths of 3 feet, on the west edge of Potomac River main channel 42.5 miles above the mouth and 0.7 mile westward of Lower Cedar Point; a fog signal is at the light.

Morgantown is on the south side of **Lower Cedar Point,** on the Maryland side of Potomac River 42.5 miles above the mouth. There are strong cross currents south of the point. The landings that remain intact are suitable only for small boats. Depths of 6 feet can be taken to the landings by passing eastward of the shoal south of Lower Cedar Point; the south end of the 0.7-mile-long shoal is marked by a light. Gasoline and some groceries can be obtained at Morgantown.

Chart 559.—Potomac River Bridge, 44 miles above the mouth, has a fixed channel span with clearances of 135 feet for a width of 480 feet and 105 feet for a width of 700 feet. The centerline of the main span has a fog signal and is marked by a flashing red aviation obstruction light and by a fixed green light surmounted by three fixed white lights mounted vertically 15 feet apart. The bridge also is marked by fixed red lights on the main trusses and approaches.

Gasoline, diesel fuel, water, and ice can be obtained at a marina just above the Potomac River Bridge on the Maryland side. The entrance channel has a depth of 7 feet with 6 feet inside the basin.

A **danger zone** for military testing operations extends 4 miles upriver from the bridge; see **204.40,** Chapter 2, for limits and regulations.

Persimmon Point is on the west, or Virginia, side of Potomac River 45 miles above the mouth. A 5-foot shoal on the west edge of the channel 0.6 mile southeastward of the point is marked by a light.

Popes Creek, on the Maryland side of Potomac River 45.5 miles above the mouth, is not navigable. The village of **Popes Creek** is the terminous of a railroad from Baltimore and Washington. There is a depth of about 7 feet to the railroad wharf. Gasoline and groceries are available in small quantities. A buoy marks a 3-foot spot just south of the wharf.

Between Popes Creek and Upper Cedar Point, 4.5 miles upriver, the Maryland shore of Potomac River bends northward about 2 miles to form **Port Tobacco River Flats,** which have shoal spots of 3 to 5 feet but generally navigable depths of 7 to 10 feet. **Port Tobacco River,** at the head of the bight, has depths of 7 feet for 1.6 miles and thence 5 to 3 feet for another 1.3 miles. The mean range of tide is 1.5 feet.

Chapel Point, on the east side of Port Tobacco River 1.2 miles above the mouth, is a summer resort; the wharf on the south side has depths of about 7 feet at the face. Gasoline and water are available. The village of **Port Tobacco** (P.O.), 4.4 miles above the mouth of the river, is now the head of practical navigation.

Mathias Point is on the Virginia side of Potomac River 48 miles above the mouth. The landing on the northwestern side of the point is in ruins. A light, 44 feet above the water, is shown from a white hexagonal structure on piles, in depths of 3 feet, on the south edge of the channel 0.3 mile northward of the point; a fog signal is at the light. Another light, 0.5 mile north-northeastward of the first, is in depths of 3 feet on Tobacco River Flats, along the opposite edge of the channel.

Upper Cedar Point is on the Maryland side of Potomac River 50 miles above the mouth. A light, 34 feet above the water, is shown from a white square structure on brown piles, in depths of 3 feet, on the north edge of the channel 0.5 mile southeastward of the point; a fog signal is at the light. The light should be given a berth of at least 200 yards.

Nanjemoy Creek, which empties into the Maryland side of Potomac River 51.5 miles above the mouth, has depths of 7 to 4 feet for about 4 miles. There are no landings along the creek.

Riverside is on the Maryland side of Potomac River 53 miles above the mouth. A light marks the outer end of the wharf ruins.

Metomkin Point is on the Virginia side of Potomac River 53.5 miles above the mouth. A light, in depths of 1 foot 0.5 mile off the point, marks the shallowest part of a shoal area along the southeast edge of the channel.

Maryland Point Light (38°21.0′ N., 77°11.9′ W.), 42 feet above the water, is shown from a white hexagonal structure on brown piles, in depths of 9 feet, on the south edge of the Potomac River channel 0.7 mile southeastward of **Maryland Point** and 56 miles above the mouth; a fog signal is at the light. Other shoals east and west of the light are marked by buoys.

Potomac Creek, on the Virginia side of Potomac River 58.5 miles above the mouth, is used only by small motorboats. **Bull Bluff,** on the south side of the entrance, is high and wooded. The creek has depths of 7 feet in the entrance, thence 3 feet for 2 miles. The best water favors the south side of the entrance.

Aquia Creek, on the Virginia side of Potomac River 61 miles above the mouth, has depths of 4 to 5 feet to **Coals Landing,** 5 miles above the entrance; a buoy and two daybeacons mark the entrance. A fixed railroad bridge, 3 miles above the entrance, has a width of 43 feet and a clearance of 26 feet. Gasoline, water, and some supplies can be obtained on the south side of the creek below and above the bridge. The mean range of **tide** is 1.2 feet at the entrance.

Smith Point, on the Maryland side of Potomac River 62 miles above the mouth, is marked by a light. **Clifton Beach** is on the point. The broken piling of a former landing 300 yards south of the light is nearly awash at high water.

There is danger of striking submerged hulks in the mile-wide former restricted anchorage area that extended 2.5 miles upriver along the Virginia shore from directly opposite Smith Point.

Liverpool Point is on the Maryland side of Potomac River 65 miles above the mouth. **Mallows Bay,** on the north side of Liverpool Point, is a ship graveyard area; the western danger limit is a line from Liverpool Point to Sandy Point. A buoy marks the inner edge of the river channel off the bay. The southern part of the bay has unobstructed depths of 5 feet to the submerged wreck near the head. On the southern shore is a small bulkhead landing.

Sandy Point, on the Maryland side of Potomac River 66 miles above the mouth, is marked by a light and fog signal.

An aviation school wharf on the Virginia side of Potomac River 66.5 miles above the mouth has depths of about 8 feet at the outer end. The short dredged channel that leads to the wharf has a controlling depth of about 10 feet. About 0.2 mile north of the wharf, a diversion canal 10 feet deep connects **Chopawamsie Creek** with the river; three fixed bridges over the canal have a minimum width of 11 feet and a clearance of 8 feet.

Quantico, on the Virginia side of Potomac River 68 miles above the mouth, is the site of the **United States Marine Barracks.** The T-pier has depths of 25 to 30 feet at the face, and the launch harbor has depths of about 10 feet. The pier has a fog signal on the outer end. The lights at Quantico are prominent at night.

Quantico Creek, on the west side of Potomac River 68.5 miles above the mouth, has depths of 7 feet in a narrow, crooked entrance channel, and about 2 feet for 2 miles upstream. The fixed railroad bridge over the entrance has a width of 29 feet and a clearance of 8 feet. A small landing on the south side of the entrance is used by local pleasure boats.

The stacks of a power plant are conspicuous just north of **Possum Point,** on the Virginia side of Potomac River 69 miles above the mouth. A privately maintained light marks the wharf 0.2 mile northward of the point.

Chicamuxen Creek, on the Maryland side of Potomac River 69 miles above the mouth, has depths of 5 feet in the entrance but shoals rapidly farther up. The creek is little used.

The Government wharf on the Maryland side of Potomac River, 71 miles above the mouth, has depths of 15 feet at the outer end and is marked by a light. The wharf is on the southwest side of the entrance to Mattawoman Creek.

Mattawoman Creek, on the Maryland side of Potomac River 72 miles above the mouth, has easily navigated depths of 7 to 5 feet for a mile to the marsh that extends southeastward from **Deep Point** to the edge of the channel; the outer end of the marsh is marked by a clump of trees. Above this marsh, the channel has greater depths for 3 miles but meanders back and forth between the flats and is almost impossible to follow without a guide. Gasoline, diesel fuel, water, and some supplies are available at a marina at **Sweden Point,** about 2 miles inside the entrance; hull and engine repairs can be made, and a 12-ton portable lift is available. Depths to the marina are about 4 feet. The mean range of tide is 1.6 feet at the entrance.

Powells Creek, on the Virginia side of Potomac River 72 miles above the mouth, has depths of 4 to 5 feet in the approach and 1 to 2 feet through the railroad bridge and for a short distance upstream. The fixed railroad bridge 0.3 mile above the entrance has a width of 40 feet and a clearance of 26 feet; the old bridge 60 feet beyond has some piling removed. The two stacks of the District of Columbia incinerator plant show prominently at **Cherry Hill,** a mile southward of the bridge.

Chart 560.—Occoquan Bay, on the northwest, or Virginia, side of Potomac River 74 miles above the mouth, has general depths of 5 to 7 feet. The entrance is 2.5 miles wide between **Freestone Point** on the southwest and **High Point** on the northeast; the channel is 0.3 mile off High Point. A man-made rocky islet, 3 feet high, is near the center of the bay, a mile westward of High Point. The bay has little commerce; it and its tributaries are used as an ice harbor when the river channel is closed above.

Neabsco Creek, which empties into the southwest side of Occoquan Bay along the north side of Freestone Point, has depths of 4 to 2 feet. The fixed railroad bridge over

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the mouth has a clearance of 30 feet. The overhead power cables just west of the bridge have a clearance of 28 feet. Gasoline and water are available just above the bridge.

Belmont Bay, the northeastern arm of Occoquan Bay, has general depths of 3 to 4 feet. Belmont Bay is said to be rocky throughout; the rocks are covered at low water except during northwest winds.

Occoquan Creek empties into the head of Occoquan Bay along the west side of Belmont Bay. The creek has natural depths of 7 to 25 feet. The dredged channel through the bay and creek to Occoquan had a controlling depth of 4 feet, in October 1960. The channel is marked by daybeacons and lights through Occoquan Bay to within 0.4 mile of the first bridge over Occoquan Creek. The mean range of **tide** is 1.6 feet at the entrance to the creek.

Two fixed bridges over Occoquan Creek 3.6 miles above the bay entrance have a minimum clearance of 66 feet. The overhead power cable 1.4 miles above the bridges has a clearance of 42 feet.

Occoquan, on the southwest side of Occoquan Creek 5 miles above the bay entrance, is the head of navigation. Channel depths off the Occoquan bulkheads are about 10 feet. Available supplies include gasoline, water, and groceries. Hull and engine repairs can be made about 0.7 mile above the bridges; a 10-ton portable lift is available. The District of Columbia workhouse is across the creek from the town.

The **wharf** on the Maryland side of Potomac River 74.5 miles above the mouth has depths of 12 feet at the outer end of its northern face. The small-boat basin on the lower side of the wharf has depths of 4 feet. The intake house just above the wharf has a fog signal.

Indian Head is a high, wooded bluff on the southeast, or Maryland, side of Potomac River 75.5 miles above the mouth. The town of **Indian Head** is back of the bluff. The Indian Head wharf has depths of 12 to 15 feet at the face. Landing is permitted only in case of emergency.

Glymont is on Maryland side of Potomac River 77 miles above the mouth. A light and fog signal are just offshore in depths of 6 feet.

Craney Island, on the west side of Potomac River channel 77.5 miles above the mouth, is a tiny islet marked by a clump of trees and surrounded by an extensive shoal. Between the islet and the Virginia shore is a narrow unmarked channel with depths of 7 feet.

Pomonkey Creek, on the Maryland side of Potomac River 78 miles above the mouth, has depths of 7 to 3 feet in the entrance but little water inside.

Gunston Cove, on the Virginia side of Potomac River 80 miles above the mouth, has depths of 3 to 5 feet in the entrance and 5 to 7 feet inside. The peninsula between Gunston Cove and Dogue Creek, 2 miles to the northeastward, is a part of the U.S. Army reservation of **Fort Belvoir.**

The Army landing on **Whitestone Point,** on the north side of the entrance to Gunston Cove, has depths of 4 feet at the face and in the approach; the small-boat basin immediately westward also has depths of 4 feet. The outer piles of a former wharf are just eastward of the landing; boats approaching the landing or basin pass outside the marker buoy off these piles.

Pohick Bay and **Accotink Bay,** which join at the head of Gunston Cove 2 miles from the entrance, have depths of 2 to 3 feet for about 0.5 mile from the junction. Pohick Bay is foul with submerged duck-blind and fishnet stakes. Parts of both bays are within the **danger zone** of a Fort Belvoir target range; see **204.40,** Chapter 2, for limits and regulations.

Dogue Creek, on the Virginia side of Potomac River 82 miles above the mouth, has depths of 3 to 5 feet but is foul with grass and submerged duck-blind stakes, and is little used.

Marshall Hall, on the Maryland side of Potomac River 82 miles above the mouth, has an amusement park. Excursion boats operate between Marshall Hall and Washington. The southerly wharf, Government-owned, has depths of about 16 feet at the face and is marked by a light; landing is not permitted. The wharf at the amusement park has depths of about 10 feet at the face.

Mount Vernon, the home of George Washington, is on the Virginia side of Potomac River 83.5 miles above the mouth. The custom of tolling the ship's bell while passing Mount Vernon is said to have originated the night of Washington's death, December 14, 1799. The buildings are open to the public daily from 9 a.m. to 5 p.m. Excursion boats operate between Mount Vernon and the city of Washington. The buoyed dredged channel leading to the Mount Vernon wharf had a controlling depth of 9 feet in October 1960.

Little Hunting Creek, on the Virginia side of Potomac River 84 miles above the mouth, has depths of about 4½ feet in a narrow channel, sometimes marked by bush stakes, for about 0.6 mile above the entrance. A stone-arch bridge over the entrance has a clearance of 19 feet for a width of 25 feet.

Sheridan Point is on the Virginia side of Potomac River 85 miles above the mouth. A light in depths of 3 feet 0.3 mile southeast of the point marks the north edge of the channel.

Piscataway Creek, on the Maryland side of Potomac River 85.5 miles above the mouth, has depths of 2 to 7 feet. Gasoline, water, and some supplies can be obtained at a marina on the north side of the creek about 0.5 mile inside the entrance; hull and engine repairs can be made.

Fort Washington, on the Maryland side of Potomac River 86 miles above the mouth, was built early in the nineteenth century for the protection of the then new nation's capital; the fort is now a unit of National Capital Parks. There is a light and fog signal near the shore at the fort.

Riverview, on the Maryland side of Potomac River 86.5 miles above the mouth, is marked by a light on a wharf which is in poor condition.

Broad Creek, on the Maryland side of Potomac River 88 miles above the mouth, has general depths of 2 to 4 feet. **Indian Queen Bluff** is on the north side of the entrance.

A marine railway on the north side of the creek can haul out boats up to 45 feet in length for hull and engine repairs. The creek is little used.

Rosier Bluff, on the Maryland side of Potomac River 89.5 miles above the mouth, is wooded and prominent. Only piles remain of the wharf just below the bluff. A light is shown from a pile in depths of 6 feet, below the bluff.

Hunting Creek, on the Virginia side of Potomac River 90 miles above the mouth, has depths of 1 to 4 feet. Fixed highway bridges cross the creek 0.6 and 0.9 mile above the entrance. The lower bridge is a three-arch structure with a width of 44 feet and a clearance of 9 feet for a width of 20 feet; the upper bridge has a clearance of 3 feet. A channel marked by piles with a depth of about 4 feet leads to a marina 0.1 mile east of the first bridge; gasoline and diesel fuel are available.

On the Maryland side of Potomac River opposite Hunting Creek is an extensive bight that has been dredged for sand and gravel. Depths are 8 to 20 feet in the inner part of the bight but only 1 to 5 feet along the edge of the river channel.

Jones Point, on the Virginia side of Potomac River 90.5 miles above the mouth, is on the north side of the entrance to Hunting Creek and at the lower end of the Alexandria waterfront. A light is shown from the point. A highway bridge with a bascule span having a clearance of 50 feet was under construction in 1960 from Jones Point across the river to the Maryland shore.

Alexandria, Virginia, is on the west side of Potomac River 91 miles above the mouth. Commercial traffic includes petroleum products, sand and gravel, and fertilizer materials; foreign vessels drawing as much as 22 feet unload newsprint and some other cargoes.

Pilotage to Alexandria was discussed at the beginning of the chapter. Towboats are available. Vessels subject to **quarantine** are required to notify the local representative of the U.S. Public Health Service. Alexandria is a **customs** port of entry at which marine documents are issued. See Appendix for **storm warning** displays.

Jurisdiction of the District of Columbia harbormaster extends upriver from Jones Point. Harbor regulations provide a **speed limit** of 10 statute miles per hour when passing the wharf area of Alexandria except in emergencies.

Some of the cargo wharves that extend nearly a mile along the Alexandria waterfront are owned by the Government, but most are privately owned and several of these are open to the public by special arrangement. In some places along the waterfront, particularly the upper part, old piling are a hazard to approaching vessels. Available supplies include gasoline, water, ice, and groceries. Hull and engine repairs can be made. There is a small marine railway that can haul out boats up to 35 feet in length.

Oxon Creek, across Potomac River from Alexandria, has bare flats in the approaches and general depths of 1 to 3 feet inside. Sand dredges have cut channels through the flats and made holes inside, but local knowledge is needed to find the deeper water.

Goose Island, between the river channel and the north side of the Oxon Creek entrance, has bare flats on its north side. Only piling and rock remain of the old landing at **Fox Ferry,** on the south side of the entrance.

Marbury Point, is on the east, or District of Columbia, side of Potomac River 92 miles above the mouth. A bush-staked channel with depths of about 7 feet leads to the point. Just north of the point is the **Blue Plains** sewage-disposal plant. The pier 0.4 mile above Marbury Point extends to deep water and is marked at its outer end by a light and fog signal. The **Bellevue** pier, 0.7 mile above Marbury Point, is marked by a light and a fog signal; an aviation light is back of the pier.

Fourmile Run, on the Virginia side of Potomac River 93 miles above the mouth, has depths of 14 to 25 feet, but there is a 3-foot spot off the point on the south side. The dredged entrance channel has depths of 14 feet or more and is marked by lighted buoys and a lighted range; the rear range is visible through a lane in the trees and bushes. About midway along the north side of the entrance channel, two rows of piles, spaced 100 feet apart, extend northward over the flats to the airport; each pile is marked by an aviation landing light. The Washington Sailing Marina is in the cove on the south side of Fourmile Run just above the entrance.

Washington National Airport occupies the extensive fill area on the west side of Potomac River 94 miles above the mouth. This section was formerly **Gravelly Point.** Many domestic and international airlines use the airport day and night.

Gieaboro Point is on the Washington side of Potomac River opposite the airport. Submerged pile remains of former wharves extend out about 150 feet from shore in the vicinity of the point.

Washington, District of Columbia, on the east side of Potomac River 96 miles above the mouth, is the **Capital of the United States.** The city, with its impressive memorials and public buildings, is one of the most beautiful in the world, and is host to a constant stream of visitors. Prominent from the river are the Capitol dome, the Washington Monument, and the Lincoln and Jefferson Memorials.

Commercial traffic in Washington Harbor consists chiefly of sand and gravel and petroleum products; there is also some passenger traffic. The mean range of **tide** is 2.9 feet; daily predictions for Washington are given in the Tide Tables. Currents are variable but the set is usually in the directions of the channels, and there is little or no flood current during freshets; information for several places in Washington Harbor is given in the Tidal Current Tables. Ice closes the river at Washington during severe winters, but power vessels keep the channels open during ordinary winters. During the highest freshet in recent years, the river rose about 11.5 feet above mean low water in Washington Channel. See Appendix for **storm warning displays.**

Pilotage to Washington was discussed at the beginning of the chapter. Towboats are available.

Quarantine.—Vessels subject to quarantine are required

to notify the local representative of the U.S. Public Health Service. An **outpatient clinic** of the Public Health Service is in Washington.

Customs.—Washington is a port of entry and marine documents are issued.

Habor regulations.—The District of Columbia **Harbormaster,** who is the officer commanding the Harbor Precinct of the Metropolitan Police Department, regulates the operation, navigation, mooring, and anchoring of all vessels within the waters of the District of Columbia and enforces all laws and regulations relating to the harbor. The person in charge of any vessel, 26 feet or more in length, entering the harbor, shall, if he intends to remain over 24 hours, report the date and time of arrival without delay and shall also report immediately before finally departing, to the Harbormaster at the Harbor Precinct wharf, Maine Avenue and M street, S.W., or to any police officer under his command.

Hains Point, Washington, 94.6 miles above the mouth of Potomac River, is 0.4 mile north of the junction of Virginia Channel, Washington Channel, and Anacostia River, which comprise **Washington Harbor.** A lighted buoy marks the outer end of the shoal that extends southward from Hains Point.

Anacostia River extends northeastward from its junction with Potomac River south of Hains Point. A Federal project provides for a channel 24 feet deep to the foot of Fifteenth Street, S.E., 2.6 miles above the mouth; the controlling depth was 19 feet in October 1960.

Above Fifteenth Street, S.E., the river has depths of about 8 feet to the East Capitol Street Bridge, 4 miles above the mouth, thence about 3 feet to a marina 6.5 miles above the mouth.

Anchorage areas have been established by the District of Columbia on the southeast side of Anacostia River between the second and fifth bridges; the areas are marked by buoys. No vessel shall come to anchor in the usually travelled channel northwest of the established areas.

Anacostia River is crossed by seven bridges between the mouth and the head of navigation. The South Capital Street Bridge, 1.4 miles above the mouth which is 95.7 miles above the Potomac River mouth, has a swing span with a clearance of 42 feet. The Eleventh Street Bridge, 2.2 miles above Anacostia River mouth, has a bascule span with a clearance of 21 feet; see **203.330,** Chapter 2, for **drawspan regulations.** The John Philip Sousa Bridge at Pensylvania Avenue, 2.8 miles above the mouth, has a fixed span with a clearance of 33 feet in the middle 40 feet. The Pennsylvania Railroad Bridge, 3.3 miles above the mouth, has a vertical-lift span with a width of 32 feet and a clearance of 6 feet down and 29 feet up; see **203.330,** Chapter 2, for **drawspan regulations.** The East Capitol Street Bridge, 4 miles above the mouth, has a fixed span with a clearance of 23 feet. The Benning Bridge, 4.4 miles above the mouth, has a fixed span with a width of 40 feet and a clearance of 17 feet. The Pennsylvania Railroad Bridge, 6 miles above the mouth, has a fixed span with a clearance of 12 feet.

The commercial waterfront of Anacostia River extends along the north side from the mouth to the Pennsylvania Railroad lift bridge. The piers and bulkhead wharves are privately owned or used by Government agencies. The Corinthian Yacht Club is near the entrance and the Washington Yacht Club is between the second and third bridges. Gasoline, water, and ice are available along the river, and the marine railways can handle boats up to about 50 feet in length.

Washington Channel extends northward along the east side of Hains Point for 2 miles from the junction with Potomac River to the Fourteenth Street causeway. The Federal project provides for a channel 24 feet deep the length of the waterway; the controlling depth was 19 feet, in July 1956. A fixed highway bridge with a clearance of 28 to 38 feet between the piers was under construction in 1961 near the upper end of the channel.

Anchorage areas have been established by the District of Columbia along the west side of Washington Channel; the areas are marked by buoys. No vessel shall anchor in the channel outside these areas. Harbor regulations prescribe a **speed** limit of 6 statute miles per hour in the anchorage areas and in the upper half of the channel.

The principal passenger wharves and other facilities of Washington are on the eastern side of Washington Channel. The waterfront is owned by the Federal Government, which leases the facilities to private organizations and companies; only the municipal wharves are open to public use. The municipal fish wharf is open to all, charges for wharfage or dockage varying according to the commodity handled. Excursion boats operate from the passenger wharves.

The Capital and Columbia Yacht Clubs are near the head of Washington Channel and, together with several boatyards and service floats, provide all types of service for small craft. Gasoline, diesel fuel, water, ice, and marine supplies are available. The largest marine railway can handle vessels up to 55 feet in length; the machine shop repairs gasoline and diesel engines, and does hull work.

Virginia Channel is the local name for that part of Potomac River between Hains Point and Georgetown. The Federal project provides for a channel 24 feet deep from below Hains Point to the Francis Scott Key Bridge at Georgetown; the controlling depth was about 15 feet in 1960.

A **measured nautical mile** on course **337°** begins just above Hains Point. The front markers are yellow triangles on the **Potomac Park** seawall rail, and the rear markers are yellow diamond shapes on poles. The half-mile markers are yellow rectangles with black vertical center lines.

The railroad bridge 1.3 miles above Hains Point and 96 miles above the mouth of Potomac River has a swing span with a clearance of 18 feet; the northeast opening is used. **Rochambeau Memorial Bridge,** 200 yards above the railroad bridge, has a bascule span with a clearance of 24 feet. **Drawspan regulations** are given in **203.325,** Chapter 2.

The highway bridge 350 yards above the railroad bridge has a swing span with a clearance of 18 feet. The draw

remains in the closed position. **George Mason Memorial Bridge,** under construction in 1961 just above this bridge, will have a fixed span with a permit clearance of 24 feet.

On the northeast side of Potomac River 1.6 miles above Hains Point is the entrance to the **Tidal Basin**; depths are about 4 feet in the entrance and 8 to 10 feet in the basin.

Directly across Potomac River from the Tidal Basin is the **Pentagon Lagoon.** Depths are about 5 feet in the entrance and 7 to 10 feet in the lagoon. The fixed bridge over the entrance is a stone arch, 100 feet between piers, with a clearance of 18 feet over the middle 41 feet. On the north side of the lagoon just above the bridge is a marina with extensive berthing facilities; available supplies include gasoline, water, and ice. There is a 2-foot shoal just off the marina. **Boundary Channel,** which extends northward from the lagoon between Columbia Island and the Virginia shore, is shallow and is crossed by several fixed bridges.

Arlington Memorial Bridge, 2.3 miles above Hains Point and 97 miles above the mouth of Potomac River, has a bascule span with a clearance of 30 feet; see **203.325,** Chapter 2, for **drawspan regulations.** Harbor regulations prescribe a **speed** limit of 6 statute miles per hour above the bridge.

Theodore Roosevelt Island, on the west side of Potomac River 97.5 miles above the mouth, is a park area. Boats should not attempt to pass between the island and the Virginia shore. In 1960, a fixed highway bridge with a permit clearance of 24 feet was under construction across the river at the southern end of Theodore Roosevelt Island.

Francis Scott Key Bridge, 98.3 miles above the mouth of Potomac River, connects **Georgetown** on the Washington side with **Rosslyn** on the Virginia side. The bridge has a fixed channel span, 207 feet between piers, with a clearance of 61 feet over the middle width of 80 feet. The stone piers of the former Aqueduct Bridge, just above Key Bridge, are 109 feet apart and stand 3 to 5 feet above the water.

The commercial wharves of Georgetown are between Key Bridge and Rock Creek, 0.6 mile downriver. The wharves, which are mostly of the bulkhead type, are privately owned and are used by tugs, barges, and tankers. A small tanker wharf is below the Rossyln end of the bridge.

Above Key Bridge, Potomac River is unmarked and very rocky, but there is good water along the Virginia shore; barges go to within 0.3 mile of **Chain Bridge,** 101 miles above the mouth. Several boat clubs are just above the Georgetown end of Key Bridge.

An **anchorage area** has been established by the District of Columbia on the shoals between Key Bridge and the **Three Sisters Islands,** which are on the Georgetown side 0.5 mile above the bridge. No vessel shall anchor between the designated area and the shores.

13. CHESAPEAKE BAY, PATUXENT AND SEVERN RIVERS

Charts 1224 to 1226.—From Potomac River to Patuxent River, the western shore of Chesapeake Bay is mostly low, although the 100-foot contour does come within a mile of the water midway between the two rivers. Above Patuxent River, the ground rises and 100-foot elevations are found close back of the shore along the unbroken stretch northward to Herring Bay. Above Herring Bay, the 100-foot contour is pushed back by the tributaries. Except for the developed areas, the shore is mostly wooded.

The bay channel has depths of 39 feet or more and is well marked by lights and buoys. The principal tributaries are Patuxent River, Herring Bay, West River, South River, Severn River, and Magothy River.

The **fish-trap areas** that extend along this entire section of the western shore are marked at their outer limits and are shown on the charts. Ice is encountered in the tributaries, particularly during severe winters.

Chart 1224.—The **danger zone** of an aerial gunnery range and target area begins off Point Lookout and extends northward to Cedar Point; see **204.42,** Chapter 2, for limits and regulations.

A middle ground with depths of 12 to 18 feet is about 8 miles eastward of Point Lookout; the area within the 18-foot curve is about 5 miles long in a north-south direction and 2 miles wide. The stranded wreck near the middle of the shoal is marked by lighted buoys; the wreck is 3 miles due east of a point 68 miles along Chesapeake Bay main channel from the Virginia Capes.

Chart 557.—**St. Jerome Creek,** on the west side of Chesapeake Bay 5 miles north of Point Lookout, has general depths of 4 to 8 feet above the dredged entrance and is used principally as an anchorage for oystering and fishing boats. The controlling depth of the entrance channel, marked by a buoy and a lighted range, was 2½ feet in October 1960.

There are several small wharves along St. Jerome Creek. The landing at **Airedele,** on the south side just above the entrance, has depths of about 6 feet at the channel face; gasoline is available.

Point No Point, on the west side of Chesapeake Bay 6 miles north of Point Lookout, has no prominent natural marks. **Point No Point Light (38°07.7′ N., 76°17.4′ W.),** 52 feet above the water, is shown from a white octagonal brick dwelling on a brown cylinder, in depths of 22 feet, 1.6 miles southeastward of the point; a fog signal is sounded at the light. Point No Point Light is 1.7 miles due west of a point 73.5 miles along Chesapeake Bay main channel from the Virginia Capes.

An aerial target is 1 mile due west of a point 79 miles along Chesapeake Bay main channel from the Virginia Capes; see **204.42,** Chapter 2, for limits and regulations of the **prohibited area.** The 200-yard-square target area has rock and concrete piers at the corners and in the center, all in depths of 37 feet. Each pier is 50 feet in diameter and 12 feet high; lighted buoys are moored east and west of the target.

Hooper Island Light (38°15.4′ N., 76°15.0′ W.), 63 feet above the water, is shown from a white conical tower on a brown cylindrical base, in depths of 18 feet near the outer edge of the shoals, 3 miles westward from Hooper Islands; a fog signal is sounded at the light. Hooper Island Light is 3 miles due east of a point 82 miles along Chesapeake Bay main channel from the Virginia Capes.

Chart 553.—The inclosed Navy **seaplane** basin 8.5 miles north-northwestward of Point No Point and 2 miles southwestward of Cedar Point has depths of about 10 feet; a light marks the outer end of the north breakwater.

Cedar Point is 10 miles north-by-west of Point No Point. The ruins of an abandoned lighthouse are on a tiny islet 0.3 mile off the point and 85 miles above the Virginia Capes. The shoal extending 0.5 mile eastward from the tiny islet is marked at its outer end by a lighted buoy.

Charts 553, 561.—**Patuxent River** empties into the west side of Chesapeake Bay 86 miles above the Virginia Capes. Commercial traffic consists chiefly of logs and pulpwood, shellfish and shells, and petroleum products. Drafts of vessels using the river are mostly 7 feet or less and seldom exceed 12 feet.

The river has natural depths of 27 to 31 feet in the approach, 30 to 100 feet for 16 miles upstream, thence 23 feet to the Benedict highway bridge 19 miles above the mouth, thence 10 feet for 12 miles to within 2 miles of Nottingham, thence 6 feet for 5 miles, and thence 3 feet to Hills Bridge, 40 miles above the mouth. The channel is not difficult to follow as far as the Benedict bridge, and the principal shoals are marked by lights and buoys; the channel above the bridge is narrow in places and is marked only by an occasional buoy.

Vessels frequently anchor off the mouth of Patuxent River for the night; shelter from westerly winds is found in depths of 20 to 30 feet close to shore on the north side of the approach. Shelter from easterly winds is found in depths of 30 to 60 feet in the channel about 1.5 miles above the entrance.

Bottom in Patuxent River channel is mostly soft as far as the Benedict highway bridge, and vessels can anchor where convenient. Small vessels anchor in the creeks back of Solomons Island, but there is little swinging room. St. Leonard Creek is a good small-vessel anchorage in any weather.

The mean range of tide is 1.2 feet at the entrance to Patuxent River, 1.6 feet at Benedict, and 2.5 feet at Nottingham. The current velocity is 0.6 knot in the entrance to Patuxent River off Drum Point. Ice closes the river to near the mouth in severe winters.

The principal places along Patuxent River for supplies and small-vessel repairs are in the creeks back of Solomons Island. Supply and repair facilities are also available in Cuckold Creek.

Patuxent River empties into the head of the bight between Cedar Point and **Cove Point,** 5 miles to the northward. **Cove Point Light (38°23.2′ N., 76°22.9′ W.),** 45 feet above the water, is shown from a white tower on the point; a radiobeacon and fog signal are at the light. Cove Point Light is 1 mile due west of a point 90 miles along Chesapeake Bay main channel from the Virginia Capes. The daytime **vessel-reporting station** at the light communicates with Baltimore by telephone. The high bluffs on **Little Cove Point,** 1.5 miles to the southward, are prominent.

The entrance to Patuxent River is between **Drum Point** and **Fishing Point,** 0.9 mile to the southward; the midchannel point is 4 miles west of the 86-mile point in the bay channel. The shoals that extend off Fishing Point and **Hog Point,** a mile to the east-northeastward, are marked at their outer ends by lighted buoys.

Drum Point Light (38°19.2′ N., 76°25.3′ W.), 46 feet above the water, is shown from a white hexagonal house on brown piles in depths of 1 foot at the point; a fog signal is sounded at the light. Drum Point Light is 4 miles due west of a point 86 miles along Chesapeake Bay main channel from the Virginia Capes.

The **Patuxent River Naval Air Station** is along the south side of the entrance. The inclosed seaplane basins 0.8 and 1.5 miles from the mouth have general depths of 11 to 15 feet. A **restricted area** off the Naval Air Station begins at the mouth of the river and extends upstream about 2.5 miles; see **207.125,** Chapter 2, for limits and regulations.

Solomons Island, on the north side of Patuxent River 2 miles above the mouth, is joined to the mainland on the northwest by a causeway. The shoal that extends 500 yards southward from **Sandy Point,** at the south end of the island, is marked at its outer end by a lighted buoy. **Solomons** (P.O.), the village on the island, is populated mostly by oystermen and fishermen. The wharf of the **Chesapeake Biological Laboratory** on the east side of the island has depths of 8 feet at the outer end and is marked by a light.

Back Creek and **Mill Creek** have a common entrance between Solomons Island and the mainland 200 yards to the north-northeastward. The main approach, between the island and the shallow middle ground to the eastward, has depths of 20 to 25 feet and is marked by lights and a lighted buoy. The second approach, between the middle ground and the mainland to the northward, has depths of 12 feet and is marked by buoys.

The two creeks separate just above the entrance. Mill Creek goes eastward of a shallow spit with a small islet at the southern end, and Back Creek goes westward; the spit and the islet are marked by lights.

The Back Creek cove between the islet and the inner side of Solomons has general depths of 15 feet and is used as an anchorage by many yachts and fishing boats. The largest marine service pier has depths of 10 feet at the outer end; available supplies include gasoline, diesel fuel, fresh water, ice, groceries, and some marine hardware. A 12-ton travel lift at the pier can haul out boats 48 feet in length; the local machine shop repairs gasoline and diesel engines, and does hull work.

Back Creek has depths of 12 feet for 0.7 mile above the cove, thence 10 to 6 feet for another 0.5 mile. The numerous piers along the creek have depths of 7 to 12 feet at their outer ends. Marinas on both sides of the creek, 0.6 mile above the mouth, have gasoline and water. Twelve-ton travel lifts can haul out boats 48 feet in length.

Mill Creek has depths of 16 to 12 feet for 1.2 miles, thence 10 to 4 feet for another mile. Two submerged wrecks lie in 8 feet of water along the east side of the channel 0.6 mile above the mouth. Midchannel courses will safely pass the wrecks.

Town Point is on the southwest side of Patuxent River 3 miles above the mouth. There are small landings along the north side of the low point.

Point Patience is on the northeast side of Patuxent River 3.6 miles above the mouth; a light is near the tip of the point, and a buoy marks the shoal just outside the light. The long Government piers on the east and west sides of the point have depths of 20 feet or more at their outer ends; see **207.125,** Chapter 2, for limits and regulations of the **restricted area** in the vicinity of these piers.

Mill Creek and **Cuckold Creek** have a common entrance on the west side of Patuxent River 4.5 miles above the mouth. A buoy marks the outer end of the shoal that extends 0.4 mile southeastward from the point on the north side of the entrance, and daybeacons mark the entrance channel. Gasoline, water, and a concrete launching ramp are available at Clarks Wharf, on the peninsula between the two creeks. The depth at the pumps is about 6 feet.

Cuckold Creek, which extends northwestward from the entrance, has depths of 15 to 11 feet for a mile, thence 10 to 4 feet into the several arms. Depths of 4 feet can be carried into the basin of a marina on the south side of the creek, 0.7 mile above the entrance. Water and berths are available. A marine railway can haul out boats 30 feet in length. A marine service dock, with depths of 6 feet at the outer end, is on the south side of Cuckold Creek 0.9 mile above the entrance; gasoline, water, and ice are available. The marine railway at the dock can haul out boats up to 60 feet in length.

Hellen Creek, on the east side of Patuxent River 5.5 miles above the mouth, has depths of 3 feet over the bar at the entrance, which is marked by bush stakes, thence 11 to 5 feet for a mile; the deeper water favors the east side of the entrance. The creek is used principally as a small-boat harbor.

St. Leonard Creek, on the northeast side of Patuxent River 7 miles above the mouth, has depths of 15 to 10 feet

for 2 miles, then shoals gradually to 1 foot at the head, 3.5 miles above the entrance. Safe anchorage in any weather is available in depths of 15 to 21 feet, 0.5 mile above the entrance. Gasoline and water are available at a yacht club on the east side, 2 miles above the mouth, and also at a pier on the west side about a mile above the mouth. The shoal that extends 0.4 mile southward from **Petersons Point,** on the northwest side of the entrance, is marked at its outer end by a light.

Broome Island, which is not an island but a mainland peninsula, is on the northeast side of Patuxent River, 9.5 miles above the mouth. A light marks the limit of the shoal area extending 0.2 mile southward of the peninsula.

Island Creek, which empties into Patuxent River along the east side of Broome Island, has depths of 8 to 10 feet for a mile, but there are unmarked shoals, particularly along the west side of the entrance; a light marks the east side of the entrance.

The village of **Broome Island** (P.O.) is on the west side of Island Creek about a mile from the outer end of the peninsula. A marine railway can haul out boats up to 40 feet in length. Gasoline, ice, and groceries are available in small quantities along the creek.

Parkers Wharf, on the northeast side of Patuxent River, 11 miles above the mouth, is in ruins.

Battle Creek, on the northeast side of Patuxent River 13 miles above the mouth, has depths of 10 to 7 feet for 1.5 miles, but local knowledge is needed to navigate between the 2-foot shoals on either side of the channel just above the entrance. The shoal that extends 0.3 mile southwestward from the point on the east side of the entrance is marked at its outer end by a light.

The highway bridge over Patuxent River 19 miles above the mouth, from **Town Point** on the west side to **Hallowing Point** on the east side, has a swing span with a clearance of 15 feet; see **203.245,** Chapter 2, for drawspan regulations.

Benedict (P.O.), a village just below the west end of the highway bridge, is the head of commercial navigation on Patuxent River. The marine service dock at Benedict has depths of 5 feet at the outer end; gasoline, water, and ice are available. Other docks along the waterfront have depths of 4 to 9 feet at their outer ends. A marine railway can haul out boats up to 40 feet in length, for hull repairs.

Depths of 4 feet can be carried to a small-boat basin just below Hallowing Point. Gasoline and water are available.

Navigation on Patuxent River above Benedict is difficult because of the numerous fish traps and stakes.

An overhead power cable across Patuxent River, 25 miles above the mouth and about a mile above **Holland Cliff,** has a clearance of 46 feet.

Lower Marlboro (P.O.) is a village on the east side of Patuxent River 28 miles above the mouth. The State landing has depths of 12 feet at the face.

Nottingham is a village on the west side of Patuxent River 33 miles above the mouth. The landing has depths of 13 feet at the face.

The abandoned railroad bridge, with superstructure removed, 38 miles above the mouth of Patuxent River, has a width of 78 feet; only the west channel opening is used. **Western Branch** of Patuxent River, 38.2 miles above the mouth, has depths of 2 feet for about a mile, above which numerous snags and debris make the river unsafe for navigation.

Flag Harbor, on the west side of Chesapeake Bay 6.3 miles northwest of Cove Point, had depths of 3½ feet in the entrance channel and 5½ feet in the basin, in October 1960. There are 600-foot stone jetties on either side of the entrance. The northerly jetty is marked at the outer end by a privately maintained light. The dredged basin back of the jetties is L-shaped. Gasoline, water, and lubricating oils are available.

Chart 551.—Kenwood Beach, 9 miles northwest of Cove Point, has a small-boat pier with depths of 5½ feet at the face. **Dares Beach,** 12.5 miles northwestward of Cove Point, has prominent summer cottages.

Plum Point, 15 miles above Cove Point and 104.5 miles from the Virginia Capes, has a small yacht basin with a bulkhead entrance that has depths of 2 feet; an overhead power cable at the entrance has a clearance of 42 feet. Gasoline and water are available at the northern end of the basin. The ruins of a pier are 0.4 mile south of the basin. About 2.5 miles northwestward of Plum Point there is a prominent tank at **Randle Cliff Beach.**

The **danger zone** of the **Naval Research Laboratory** firing range extends out from the western shore of Chesapeake Bay 107 miles above the Virginia Capes; see **204.32,** Chapter 2, for limits and regulations.

Chesapeake Beach is a summer resort on the western shore of Chesapeake Bay 109 miles above the Virginia Capes. **Fishing Creek** empties into Chesapeake Beach. The dredged channel at the entrance to the creek leading to an anchorage basin just inside had a controlling depth of 5 feet, in October 1960. Lights mark the outer ends of the entrance jetties, and a lighted range marks the channel.

A fixed highway bridge 250 yards above the inner ends of the Fishing Creek jetties has a width of 36 feet and a clearance of 10 feet. Gasoline, diesel fuel, water, and ice are available at the bulkhead on the south side of the entrance. A travel lift in the basin can haul out boats 30 feet in length; marine railways can haul out boats up to 50 feet in length.

North Beach is a small resort about a mile north of Chesapeake Beach. A pier with depths of about 3 feet at the outer end has good mooring facilities for small boats. Gasoline is available.

Chart 550.—Holland Point, on the western shore of Chesapeake Bay 111 miles above the Virginia Capes, has shoal areas extending in all directions; depths of 11 feet are 1.3 miles to the eastward and northeastward. Buoys mark the outer edges of the shoals.

Herring Bay, between Holland Point and the marsh 3 miles to the northward, has general depths of 14 to

7 feet, and is used considerably as an anchorage. **Long Bar,** with depths of 2 to 5 feet, extends from the north side of the bay to within a mile of Holland Point, and is marked at its south end by a light. Good westerly-weather anchorage is available in depths of 15 to 20 feet east of the bar; small vessels usually anchor west of the bar in depths of 7 to 12 feet, protected somewhat from easterly weather by the bar.

Rose Haven Harbor, on the south side of Herring Bay 0.6 mile west of Holland Point, has a dredged entrance channel marked by a lighted buoy, and private lights and daybeacons. The controlling depth in the entrance channel was 5 feet, in October 1960. Available supplies include gasoline, water, and electricity; a travel lift can haul out boats 50 feet in length.

Rockhold Creek, at the northwest corner of Herring Bay, has good shelter for small boats. A dredged channel extends from the entrance of the creek to the vicinity of the county wharf just below the fixed highway bridge; the controlling depth was 4½ feet, in August 1960. Depths are 3 to 5 feet for about 0.4 mile above the bridge. A light marks the outer end of the breakwater on the north side of the entrance, and lights and daybeacons mark the channel. The mean range of tide is 0.9 foot.

There are several small communities along the shores of Herring Bay and Rockhold Creek. **Fairhaven** is on the west side of the bay, and **Deale** is on the east side of the creek.

The fixed highway bridge a mile above the entrance to Rockhold Creek has a width of 19 feet and a clearance of 10 feet. The creek has extensive marine facilities. Channel depths prevail at the ends of most of the piers along the creek. Available supplies include gasoline, diesel fuel, water, ice, and groceries. The largest of the boatyards on the creek is above the bridge. A 20-ton travel lift can haul out boats 60 feet in length for complete marine service.

West River, on the west side of Chesapeake Bay 119 miles above the Virginia Capes, has depths of 14 to 12 feet for 1.5 miles, then shoals gradually to 7 feet 3 miles above the mouth. Shoals extend nearly to midriver off some of the points. The channel is marked by buoys and lights. The mean range of tide is 0.9 foot.

Parish Creek, on the south side of West River 0.5 mile above the mouth, has general depths of 2 to 3 feet, but has been improved by dredging. The entrance channel, marked by lights and a daybeacon, extends to **Shady Side** at the head of the south fork of Parish Creek; the controlling depth was 5 feet, in October 1960. Gasoline is available at several of the landings which have depths of about 5½ feet; marine railways can handle boats up to 50 feet in length, for hull repairs.

Rhode River, on the north side of West River a mile above the mouth, has depths of 11 to 9 feet for 2 miles. A light marks the shoal on the east side of the entrance, and daybeacons mark the inner channel. **Cadle Creek,** on the east side of Rhode River a mile above the mouth, has depths of 4 to 7 feet. Gasoline, water, ice, and groceries are available at **Mayo** (P.O.), on the east side of Cadle Creek 0.3 mile above the entrance. A marine railway in the creek can handle boats up to 30 feet in length; a local machine shop repairs gasoline and diesel engines and does hull work.

Bear Creek, on the north side of Rhode River 1.5 miles above the mouth, has depths of 9 to 5 feet for a mile. **Carr Wharf,** on the east side of the entrance, has depths of 9 feet at the outer end. A marine railway in the creek can haul out boats up to 45 feet in length, for engine and hull repairs. Gasoline and water are available.

Contees Wharf, on the north side of Rhode River 2 miles above the mouth, is in ruins. The wharf about 200 yards to the westward has depths of 7 feet at the outer end.

Galesville is on the northwest side of West River 2.5 miles above the mouth. The wharves have depths of about 6 feet at the outer ends. Available supplies include gasoline, water, ice, and groceries. There are several boatyards in and around Galesville along West River and its tributaries. A boatbuilding yard at the south end of Galesville can haul out vessels up to 50 feet in length. Depths of 6 feet can be carried to a boatyard near the head of West River that can haul out vessels up to 100 feet in length, for complete repairs; gasoline and water are available.

South Creek, which empties into West River opposite Galesville, has general depths of 4 to 6 feet. A yacht club on the north side of the entrance has gasoline and water.

South River, on the west side of Chesapeake Bay 121 miles above the Virginia Capes, has depths of 14 feet for 6 miles, thence 13 to 8 feet for a mile, then shoals gradually to 2 feet at the highway bridge near the head, 8.5 miles above the mouth. Several of the creeks that empty into the river have good depths and are used extensively by local yachts and motorboats. Buoys mark the principal shoals in the lower half of the river.

The entrance to South River is between **Saunders Point** and **Thomas Point,** 1.8 miles to the northeastward. **Thomas Point Shoal Light (38°53.9′ N., 76°26.2′ W.),** 43 feet above the water, is shown from a white hexagonal tower on brown piles, in depths of 7 feet near the outer end of the shoal 1.2 miles east-southeastward of the point; a radiobeacon and fog signal are at the light. Thomas Point Shoal Light is 1 mile due west of a point 121.5 miles along Chesapeake Bay main channel from the Virginia Capes.

Selby Bay, on the southwest side of South River 1.7 miles above the mouth, has general depths of 8 to 11 feet. The south end of the bay is shallow and is heavily covered with grass. The channel to **Selby Beach,** on the northwest side of the bay, is marked by lights and a daybeacon. A marine service pier here has depths of 5 feet at the pumps; gasoline, water, and ice are available. A marine railway in the southern part of the bay can handle boats up to 35 feet in length; gasoline and water are available.

Ramsay Lake has a narrow entrance from the south end of Selby Bay; depths are about 2 feet in the entrance and 7 to 8 feet in the lake. The fixed highway bridge over the Selby Bay entrance has a width of 18 feet and a clearance of 9 feet. A marine railway on the southeast side of

the lake can haul out boats up to 40 feet in length; gasoline is available. A shallow canal at the northeast end of the lake had less than 1 foot of water, in October 1960.

Brewer Creek, on the southwest side of South River 3 miles above the mouth, has a controlling depth of about 4 feet through the narrows 0.2 mile above the entrance. A marine railway at the head of the southeast arm can haul out boats up to 40 feet in length.

Glebe Creek, on the southwest side of South River 3.5 miles above the mouth, has depths of 16 to 11 feet for a mile. Care should be taken to avoid the 2-foot shoal in the center of the creek 0.3 mile above the entrance. A marine railway in the cove on the north side just above the entrance can handle boats up to 40 feet in length.

The highway bridge at **Edgewater,** 5 miles above the mouth of South River, has a swing span with a clearance of 13 feet; see **203.245,** Chapter 2, for **drawspan regulations.** Marine service piers with depths of 9 to 12 feet at the outer ends, just below the south end of the bridge and just above the north end of the bridge, have gasoline, water, and ice available.

Gingerville Creek, on the north side of South River, just above Edgewater bridge, has depths of 6 feet for 0.7 mile, nearly to the head. A boatyard on the east side at the entrance has a marine railway and travel lift that can haul out boats 50 feet in length; gasoline and water are available.

A **speed** limit of 8 statute miles per hour, between May 1 and September 15, is prescribed by **207.120,** Chapter 2, for that part of South River, including tributaries, above the Edgewater bridge.

Beards Creek, on the south side of South River 5.7 miles above the mouth, has depths of 15 to 8 feet for a mile; a shallow spit extends halfway across the entrance from the point on the northwest side. A marine railway on the west side of Beards Creek 0.5 mile above the entrance can handle boats up to 50 feet in length.

The highway bridge at **Riva,** 6 miles above the mouth of South River, has a fixed span with a clearance of 25 feet. Gasoline is available on a pier just below the bridge.

Special note on South River.—The following report, dated April 11, 1961, from a member of the Annapolis Yacht Club, may be of interest to Chesapeake Bay skippers.

"Following our conversation relative to the revision of U.S. Coast Pilot 3, Atlantic Coast, I sat down with a number of active cruising members of the Annapolis Yacht Club familiar with the general area near Annapolis. We carefully considered the western shore of Chesapeake Bay from Patuxent River to Magothy River and the eastern shore from Honga River to Chester River including tributaries.

"Each paragraph of the 1953 edition of the Coast Pilot was checked against local knowledge and the charts. We have only one minor addition to suggest, and that concerns South River. Omitted are some of the finest anchorages on the west side of the Chesapeake Bay; they are **Harness, Aberdeen, Crab,** and **Church Creeks** on the northeast side of South River. No commercial facilities are available in any of these creeks, but the water is deep and the shelter is excellent, particularly in Crab and Church Creeks which have high banks."

Chart 566.—Severn River, the approach to Annapolis, empties into the west side of Chesapeake Bay 125 miles above the Virginia Capes. Commercial traffic consists chiefly of petroleum products, sand and gravel, and some shellfish. Drafts of vessels using the river are as much as 12 feet, but mostly 6 feet or less.

The river has depths of 18 feet or more through the entrance channel to Annapolis, thence 15 feet or more for 8 miles, thence 11 to 7 feet for 2 miles to within a mile of the head. The channel is well marked as far as Annapolis, above which it is marked at the critical points and is easy to follow.

The mean range of tide is 0.9 foot, and is greatly influenced by winds. The velocity of the tidal current seldom exceeds 0.5 knot. Ice seldom interferes with navigation except in severe winters, and then only for a short time.

The entrance to Severn River is between Tolly Point and Greenbury Point, 2 miles to the northward. **Tolly Point** is wooded and has many houses. **Tolly Point Shoal,** with depths of 4 to 5 feet, extends a mile east-southeastward from the point and is marked at its outer end by a lighted buoy.

The entrance to **Lake Ogleton** is on the southwest side of Severn River 0.8 mile above Tolly Point. The lake has depths of 7 to 9 feet, but the narrow entrance marked by daybeacons was only about 3 feet deep, in October 1960. The small private wharves along the shore of the lake are used chiefly for mooring pleasure craft.

The **Annapolis Roads Club** is on the southwest side of Severn River a mile above Tolly Point. The clubhouse halfway up the wooded slope back of the shore is prominent. The wharf has depths of 10 feet at the outer end.

Greenbury Point is on the north side of the entrance to Severn River. The tall towers of the Naval radio station on the point are prominent from up and down the bay; each tower has a flashing red light on top and fixed red lights on the sides. A light and fog signal mark the shoal extending 0.4 mile south of the point. A 3-foot depth at the outer tip of the shoal is 250 yards westward of the light and only 100 yards northeastward of the buoyed entrance channel.

A Naval deep-draft **anchorage area** is southeast of Greenbury Point, and several smaller Naval anchorages and prohibited anchorage areas are west and northwest of the point; see **202.159,** Chapter 2, for limits and regulations.

Seaplane **restricted areas** extend eastward from Greenbury Point and southward from Tolly Point; see **207.115,** Chapter 2, for limits and regulations.

The entrance to **Carr Creek** is northwest of Greenbury Point. The creek has depths of 6 feet over the unmarked bar at the entrance and deeper water inside. A Naval rifle range is nearby. Mariners are warned to keep out of the creek when the red flag is flying at the entrance.

Back Creek, on the southwest side of Severn River 0.7 mile above the mouth, has depths of 7 to 9 feet for most

of its 1-mile length. A light marks the outer end of the breakwater on the south side of the entrance, and a light and a daybeacon mark the south side of the narrow entrance channel. The creek is used mostly by oyster and fishing boats drawing 3 to 5 feet. There are numerous small piers at **Eastport**, on the peninsula between Back Creek and Spa Creek, to the northwestward. The boatyards along Back Creek can haul out and make ordinary repairs to vessels up to 45 feet in length. Gasoline and supplies are available.

Spa Creek, on the southwest side of Severn River 1.4 miles above the mouth, has depths of 13 feet in the entrance channel, thence 11 feet to the highway bridge, thence 10 to 6 feet for 0.7 mile to near the head. Drafts of vessels using the creek are mostly 10 feet or less. The highway bridge that crosses Spa Creek from Eastport to Annapolis, 0.4 mile above the entrance, has a 40-foot bascule span with a clearance of 16 feet.

Annapolis, the capital of Maryland, is on the north side of Spa Creek. The **United States Naval Academy** occupies the entire northeastern part of the city between Spa Creek and Dorseys Creek, 0.7 mile to the northwestward. Annapolis is a **customs** port of entry at which marine documents are issued. See Appendix for **storm warning displays.**

The two inclosed basins on the Severn River side of Annapolis and most of the waterfront on the north side of Spa Creek below the highway bridge are Naval Academy installations; the basins have depths of 13 feet or more, and the bulkheads and wharves in Spa Creek have depths of 6 to 12 feet at their faces.

Extensive marine facilities are located on both sides of Spa Creek. Available supplies include gasoline, diesel fuel, fresh water, ice, electricity, and marine hardware. **Market Slip**, 250 yards below the north end of the highway bridge, is 250 yards long and 40 yards wide, and has depths of 10 to 8 feet; the slip is open to the public and is used extensively by small craft. The largest of the marine railways along the south, or Eastport, side of the creek can handle vessels up to 125 feet in length; vessels are built and general repairs are made.

On the northeast side of Severn River across from Spa Creek are other Naval installations. The inclosed basin on the west side of **Carr Point** has depths of about 12 feet. A **restricted area** extends around the United States Naval Engineering Experiment Station northwest of the basin; see **207.116**, Chapter 2, for limits and regulations.

Dorseys Creek, on the southwest side of Severn River 2.1 miles above the mouth, has depths of 11 to 8 feet for most of its 1-mile length; the best water in the entrance is along the south side. A fixed footbridge, three drawbridges and two fixed bridges cross the creek from Annapolis on the southeast bank to **West Annapolis** on the northwest bank. The footbridge near the entrance has a width of 40 feet and a clearance of 15 feet. The swing span and bascule spans of the next three bridges have a minimum width of 40 feet and a clearance of 5 feet; see **203.245**, Chapter 2, for drawspan regulations. The two fixed bridges have a minimum width of 40 feet and a clearance of 11 feet.

The highway bridge 2.4 miles above the mouth of Severn River has a bascule span with a clearance of 16 feet; see **203.310**, Chapter 2, for **drawspan regulations.** The railroad bridge 3 miles above the mouth has a swing span with a clearance of 6 feet.

Weems Creek, on the southwest side of Severn River 3.2 miles above the mouth, has depths of 13 feet for 0.8 mile, thence 11 to 7 feet for 0.3 mile to near the head. A shoal extends 300 yards eastward from the point on the north side of the entrance, and is marked by a privately maintained buoy. The highway bridge 0.5 mile above the entrance has a swing span with a width of 28 feet and a clearance of 6 feet; see **203.245**, Chapter 2, for **drawspan regulations.** The fixed highway bridge about 500 feet above the drawbridge has a clearance of 28 feet.

The fixed highway bridge 3.5 miles above the mouth of Severn River has a clearance of 80 feet.

Round Bay, an expansion of the river beginning 6 miles above the mouth of Severn River and continuing for 2 miles, has general depths of 17 to 23 feet, and is traveled extensively by motorboats. **Little Round Bay**, on the west side of Round Bay, has general depths of 17 to 19 feet, and is marked by daybeacons. Depths of 6 feet can be carried to a boatyard in **Browns Cove**, behind **St. Helena Island.** Gasoline, water, and ice are available. The yard has a travel lift that can haul out boats up to 40 feet in length, for engine and hull repairs.

Forked Creek, on the north side of Severn River 9 miles above the mouth, has depths of 16 to 10 feet for most of its 0.4-mile length. The marine service pier in the creek has depths of 8 feet at the outer end; gasoline, fresh water, and ice are available. The marine railway at the pier can handle boats up to 50 feet in length; the boatyard does hull work and some engine repairs. A machine shop is nearby and a mechanic can be called in for heavy engine repairs. There is a small-boat basin on the east side of Severn River, 11 miles above the mouth, where gasoline and a launching ramp are available. The controlling depth to the basin is about 3 feet.

Whitehall Bay, on the west side of Chesapeake Bay, is between Greenbury Point and **Hackett Point**, 1.5 miles to the northeastward. The bay has general depths of 13 to 10 feet. The entrance channel is about 300 yards wide between **Whitehall Flats** on the west and **North Shoal** on the east, both with depths of 3 to 4 feet; a light marks the outer end of North Shoal. **Mill Creek**, which empties into the northwest corner of Whitehall Bay, has depths of 2 feet over the bar across the entrance, thence 7 to 14 feet for 1.5 miles to near the head. With local knowledge, 6 feet can be carried in the narrow, crooked entrance channel. Gasoline is available at a pier 0.7 mile above the entrance. A marine railway, 1.3 miles above the entrance, can haul out boats up to 50 feet in length. Gasoline and water are available just west of the railway.

Whitehall Creek, which empties into the northeast corner of Whitehall Bay, has depths of 13 to 10 feet for 1.5 miles, then shoals gradually to 1 foot at the head 0.5 mile farther up. The narrow, crooked entrance channel is marked by buoys and daybeacons. The marine service

pier on the northeast side of Whitehall Creek, 1.4 miles above the entrance, has depths of about 9 feet at the outer end; gasoline, diesel fuel, water, and ice are available. The marine railway at the pier can handle boats up to 50 feet in length, for engine and hull repairs. Another marine railway, just inside the entrance of **Ridout Creek** 0.9 mile above the mouth of Whitehall Creek, can haul out boats up to 40 feet in length.

Meredith Creek, which empties into the northeast corner of Whitehall Bay just eastward of Whitehall Creek, has depths of about 6 feet in a very narrow entrance, thence 10 to 7 feet for 0.7 mile, then shoals gradually to 1 foot at the head, 0.6 mile farther up. Local knowledge is necessary to carry more than 2 feet through the entrance.

Chesapeake Bay Bridge (see also Charts 550 and 1225), 127.5 miles above the Virginia Capes, is 3.7 miles long from shore to shore; the western end is 0.5 mile southwestward of Sandy Point, and the eastern, or Kent Island, end is 4 miles south-southwestward of Love Point.

The suspension span over the main channel 1.4 miles from the western end of the bridge has a width of 1,500 feet and a clearance of 186 feet. Flashing red aero obstruction lights, 354 feet above the water, mark the tops of the two suspension towers. The center of the span is marked by a range of two green lights mounted just below the outermost edges of the span structure; a set of three white lights is arranged in a vertical line above each green light. A fog signal is mounted on each side of the center of the span.

The fixed span over the secondary channel 1.2 miles from the eastern end of the bridge has a width of 690 feet and a 12-foot center clearance of 58 feet with a clearance of 62 feet on either side of the center. The center of the span is marked by a range of two green lights similar to those on the suspension span. A fog signal is at the span center.

Red lights mark the ends of the bridge piers, except those adjacent to the main channel, between points 0.3 mile from the western end and 1 mile from the eastern end. Lighted buoys mark the main channel on either side of the bridge. The abandoned Sandy Point-Matapeake Ferry Terminal is just south of the west end of the bridge. Mariners are permitted to tie up at the old slips in case of emergency. The north half of the terminal is State owned; the south half is privately owned. Depths of 10 feet could be carried into the slips, in October 1960.

Sandy Point Light (39°01.0′ N., 76°23.1′ W.), 51 feet above the water, is shown from a red brick dwelling, with white roof, on a brown cylinder pier in depths of 13 feet 0.4 mile northeastward of **Sandy Point.** A fog signal is sounded at the light and special radio direction-finder calibration service is provided; see Light List. Sandy Point Light is 0.5 mile due west of a point 129 miles along Chesapeake Bay main channel from the Virginia Capes.

Baltimore Light (39°03.5′ N., 76°24.0′ W.), 52 feet above the water, is shown from a white, octagonal, brick dwelling on a brown cylinder pier, in depths of 22 feet, 1.4 miles off the west, or Gibson Island, shore of the bay; the fog signal at the light is sounded only when the Craighill Channel lighted buoys are removed due to ice conditions. Baltimore Light is 0.4 mile due west of a point in Baltimore channel 131.5 miles above the Virginia Capes.

Magothy River, which empties into the west side of Chesapeake Bay 1.7 miles westward of Baltimore Light, has depths of 12 feet or more for 6 miles, thence 4 feet for 0.5 mile to within 0.2 mile of a fixed highway bridge. The river is used mostly by boats drawing 3 to 5 feet, but it has been entered by vessels drawing 10 feet or more. There are many excellent anchorages in the numerous tributaries, and the area is a favorite cruising ground for local yachts. A light and a lighted buoy mark the entrance, and buoys mark the critical points along the lower half of the 12-foot channel.

The entrance to Magothy River is between **Persimmon Point** and Mountain Point, 0.5 mile to the north-northeastward. **Mountain Point,** the southernmost extremity of **Gibson Island,** is a sandy spit at the foot of a high wooded bluff; the peak of a pavilion on the point is prominent. The current velocity is about 0.6 knot in the entrance to Magothy River.

Deep Creek, on the south side of Magothy River 0.5 mile above the mouth, has depths of 7 to 5 feet for 0.6 mile to near the head. The creek is used as an anchorage by small craft. Gasoline is available at a marina within the creek.

Sillery Bay, which empties into the north side of Magothy River along the west side of Gibson Island, has general depths of 8 to 13 feet. The bay is the approach to Magothy Narrows and the harbor on the north side of Gibson Island; the eastern shore of the island is connected with the mainland on the north by a causeway.

The privately marked channel through **Magothy Narrows** has depths of about 10 feet, and there are depths of 9 to 10 feet in **Inner Harbor,** off the community of **Gibson Island.** The Gibson Island Club has facilities in the harbor. See Appendix for **storm warning displays.**

A marine service pier on the east side of the entrance to **Redhouse Cove,** at the west end of Inner Harbor, has depths of 9 feet at the outer end; gasoline, water, and ice are available. A local boatyard can haul out vessels up to 50 feet in length, and a 2-ton hoist is available; engine and hull repairs can be made.

Cornfield Creek, which empties into the eastern end of Magothy Narrows, has depths of 7 to 9 feet nearly to its head. Gasoline and water are available at a pier just above the mouth.

A **speed** limit of 8 statute miles per hour is prescribed; see **207.110,** Chapter 2, for the waters between Magothy Narrows and Inner Harbor.

Grays Creek empties into the northwest side of Sillery Bay. The creek had depths of 3 feet over the bar at the entrance in a narrow marked channel, and deeper water inside, in October 1960. A boatyard just inside the north prong has a marine railway that can haul out boats up to 45 feet in length, for hull and minor engine repairs. Gasoline and water are available.

Blackhole Creek, on the north side of Magothy River

3.5 miles above the mouth, has depths of 7 feet in a narrow marked entrance channel, and 5 or more feet almost to the head. A special small-vessel **anchorage area** is in the cove on the west side of Blackhole Creek 0.2 mile above the entrance; see **202.1** and **202.72**, Chapter 2, for limits and regulations.

Mill Creek and **Dividing Creek** have a common entrance on the south side of Magothy River, 3.8 miles above the mouth. Depths of 8 to 12 feet can be carried in both creeks for about 0.3 mile. A marina just inside Mill Creek has a marine railway that can haul out boats up to 30 feet in length. Gasoline and water are available.

Cypress Creek is on the southwest side of Magothy River 4 miles above the mouth. The entrance channel marked by daybeacons has a controlling depth of 7 feet with depths of 9 feet inside gradually shoaling to the flats at the head. Gasoline, diesel fuel, water, ice, and marine supplies are available at a marine service pier on the south side of the entrance to the northwest arm. A marine railway on the southeast side of Cypress Creek can haul out boats up to 75 feet in length; a nearby machine shop repairs gasoline and diesel engines and does hull work.

Gasoline is available at a pier on the southwest side of Magothy River, 5 miles above the mouth.

14. CHESAPEAKE BAY, EASTERN SHORE

Charts 1222 to 1226.—The Eastern Shore of Chesapeake Bay, from Cape Charles to Chester River, is mostly low and has few prominent natural features. The mainland and the islands are subject to erosion, and many of the islands and points have completely washed away. **Fish-trap limits** are shown on the charts and usually are marked by black and white horizontal-banded buoys. In the tributaries of Pocomoke Sound, **ice** sufficient to interfere with the navigation of small vessels may be encountered at any time from January through March. The ice from Pocomoke and Tangier Sounds does not interfere with the larger vessels in the bay, but the smaller oyster and fishing boats frequently are held up and sometimes require assistance, especially in Kedges and Hooper Straits.

Chart 1222.—Wise Point, the mainland tip of **Cape Charles,** is discussed in Chapter 9, which also describes Fisherman Island, Cape Charles Light on Smith Island, and the Atlantic entrance to Chesapeake Bay.

Kiptopeke Beach, 3.2 miles northward of Cape Charles, is the Eastern Shore terminal of the automobile and passenger ferry which will operate across the lower part of the bay to Little Creek until completion of the causeway and tunnel now under construction across Chesapeake Bay; see Chapter 9. The breakwaters that protect the ferry dock consist of obsolete ships filled with sand and sunk end-to-end; they are marked by lights. Gasoline, water, and ice can be obtained on the dock. Just northward of the ferry terminal is **Butlers Bluff,** which has steep bare faces that are conspicuous from the bay.

Old Plantation Creek, about 7 miles northward of Cape Charles, has depths of 1½ feet for about 2 miles upstream. Many of the bars and middle grounds are marked by discolored water and the channel usually is marked by bush stakes, but it is narrow and difficult to navigate without local knowledge. The opening in the thick woods at the mouth is visible from outside. No supplies are available along the creek.

Old Plantation Flats Light (37°13.7′ N., 76°02.8′ W.), 39 feet above the water, is shown from a square white structure on brown piles in 10 feet on the north end of the flats, 1.5 miles from shore; a fog signal is at the light. Old Plantation Flats Light is 4.5 miles due east of a point 19 miles along Chesapeake Bay main channel from the Virginia Capes. The current velocity is 1.3 knots 0.5 mile west of the light.

Cape Charles Harbor, 9 miles northward of Cape Charles, is a dredged basin on the south side of the town of **Cape Charles.** A well marked channel just north of Old Plantation Flats Light leads to the harbor between a sand mole on the south and a stone jetty on the north; the controlling depth was 15 feet in August 1960. The turning basin at the east end of the harbor has a controlling depth of about 9 feet.

The mean range of tide is 2.4 feet at Cape Charles. The tidal currents set across the entrance to the dredged channel, but farther north they follow the general direction of the axis. The channel is exposed to westerly winds but is partially protected by the flats to the westward, and seldom is too rough for motorboats. Navigation is not hindered by ice. Because of the limited space in the channel and harbor, the larger vessels and tows occasionally are somewhat of a hazard to small boats.

Cape Charles is a **customs** port of entry where marine documents are issued. The town is a terminus of the Pennsylvania Railroad, which operates car floats to Little Creek. Available supplies include gasoline, diesel fuel, water, ice, and groceries.

Cape Charles Harbor is owned by the Pennsylvania Railroad but is open to general navigation. Small craft seeking shelter in the harbor should moor so as not to interfere with the railroad vessels. The larger vessels load and discharge at the wharf on the north side of the harbor, and fishing craft and other small boats make fast to the bulkhead on the south side and at the eastern end. Depths alongside the wharf are about 15 feet. The municipal bulkhead on the south side of the inner basin has depths of 9 to 13 feet alongside; gasoline and diesel fuel are available in this basin.

Cherrystone Channel is a passage inside Old Plantation Flats that leads from deep water 2 miles south-southeastward of Old Plantation Flats Light northward to Kings Creek and Cherrystone Inlet. The route follows part of the channel to Cape Charles Harbor for about a mile. Depths of 10 feet or more are available in the marked channel to the vicinity of **Cherrystone Island,** a mile north of Cape Charles Harbor. The channel is narrow in places and local knowledge is required to carry the best water.

Kings Creek, eastward of Cherrystone Island, has depths of 3½ feet for a mile upstream. The shoal that extends out from the north side of the entrance bares at low water and is marked by daybeacons. The creek is used extensively by oystermen and yachtsmen. Gasoline, diesel fuel, water, and electricity are available just inside the entrance; a marine railway can haul out boats up to 60 feet in length for minor repairs.

Cherrystone Inlet, which extends northeastward from Cherrystone Channel and Cherrystone Island, has depths of 5 feet for 2 miles, thence 2 to 4 feet to the upper end. The channel in the inlet sometimes is marked by bush stakes, but it is narrow and difficult to navigate without local knowledge.

Boats bound for Kings Creek or Cherrystone Inlet can leave the Cape Charles Harbor channel just west of the

jetty on the north side of the harbor entrance and proceed northward in Cherrystone Channel. Depths of 2 to 4 feet over the flats that extend southward 2 miles along the west side of Cherrystone Channel from Cherrystone Island limit the draft that can be carried over that area from westward and northwestward. The area between Cherrystone Island and **Westcott Point**, which is on the west side of the entrance to Cherrystone Inlet and 0.5 mile north of the island, bares at low water.

Chart 1223.—Hungar Creek and **Mattawoman Creek** have a common outlet to the bay 8 miles northward of Cape Charles Harbor. Both creeks are marked by bush stakes but are difficult to follow without local knowledge.

Hungar Creek extends about 4 miles in a northeasterly direction to the village of **Bridgetown.** Depths of 3 feet are available in the narrow entrance channel marked by lights, thence depths decreasing to 1 foot to Bridgetown where supplies can be obtained.

Mattawoman Creek extends about 2 miles in a southeasterly direction and has several branches at its head. The best approach is to follow the lights at the entrance to Hungar Creek to the light off **Wilsonia Neck** then follow the bush stakes southeastward and southward along the shore. The controlling depth is about 2 feet to the head of navigation. The overhead power cables near the head of the creek have minimum clearance of 29 feet.

A **danger zone** for Naval firing begins about 12 miles north-northwestward of Cape Charles Harbor and extends northward to Tangier Sound Light; see **204.46,** Chapter 2, for limits and regulations.

Nassawadox Creek, 13 miles northward of Cape Charles Harbor, extends about 5 miles in a northeasterly direction. The controlling depth across the bar is 3 feet, thence 4 feet for 4 miles upstream. The entrance channel is marked by a buoy and a light, and bush stakes mark the inside channel, but local knowledge is necessary to carry the best water. The flats on either side of the entrance are nearly bare at low water, are covered by marsh grass in the summer, and are usually well defined. The mean range of tide is 1.8 feet. **Bayford** (P.O.) on the southeast side of the creek 1.5 miles above the mouth, has a wharf and a store. The several creeks that branch off from Nassawadox Creek have depths of 3 feet or less.

Occohannock Creek empties in Chesapeake Bay from eastward 18 miles northward of Cape Charles Harbor; a fixed bridge 6 miles above the entrance is the head of navigation. The centerline controlling depth is 3 feet to **Morley Wharf,** on the south side 4 miles above the entrance, with lesser depths to the fixed bridge. The mean range of tide is 1.7 feet.

The channel over the bar at the mouth of Occohannock Creek is marked, but it is narrow and tortuous, and difficult to nagivate without local knowledge. The channel within the creek also is narrow, but the ends of the shoals are marked by daybeacons all the way to Morley Wharf. The wharf across the creek from Morley Wharf is in ruins.

Nandua Creek empties into Chesapeake Bay 23 miles northward of Cape Charles Harbor. The controlling depth is 4 feet to the wharf in ruins at the settlement of **Nandua,** 3 miles above the mouth. The mean range of tide is 1.7 feet. The entrance channel is marked, but it is narrow and shifting; local knowledge is required to carry the best water. The shoals at the entrance usually can be distinguished by the difference in color of the water, but in rough weather the water is so clouded that they are not readily visible. A clump of pine trees are prominent on the south side of the entrance. Daybeacons mark the critical parts of the channel to Nandua.

Back Creek, on the north side of Nandua Creek a mile above the mouth, has depths of 3 feet to the village of **Hacksneck** (P.O.) where supplies in limited quantities are available.

Pungoteague Creek, 3 miles northeastward of Nandua Creek, has depths of 8 feet to the town of **Harborton,** 2 miles above the mouth, and thence 4 feet to the ruins of **Boggs Wharf,** 3 miles above the mouth. Above this point the creek shoals rapidly. The entrance and inside channel are marked as far as Harborton. The mean range of tide is 1.7 feet. Barges load pulpwood at Harborton.

Chart 568.—Onancock Creek, 38 miles north of Cape Charles, has considerable traffic in petroleum products, pulpwood, and fertilizers. A dredged channel, marked by lights, buoys, and daybeacons, leads across the entrance bar to **Onancock,** 4.3 miles above the mouth; in August 1960 the controlling depths were 10 feet to **Poplar Cove Wharf,** on the north side 2.3 miles above the mouth, thence 7 feet to a turning basin in **North Branch** at Onancock; 6 feet in **Joynes Branch** and 4 feet in **Titlow Creek** anchorage basin at Onancock. The mean range of tide is 1.8 feet.

Pulpwood is loaded on barges at Poplar Cove Wharf; a boatyard at the wharf can haul out and make minor repairs to boats up to 40 feet in length. Gasoline can be obtained.

Available supplies at Onancock include gasoline, groceries, and marine hardware; diesel fuel can be delivered by truck. A public hoist can haul out boats up to 1 ton.

Chesconessex Creek, 2 miles northward of Onancock Creek, has depths of 8 feet in the approach channel and for a mile above the mouth to a line midway along the south shore of **Tobacco Island,** thence 3 feet to **Chesconessex,** 2 miles above the mouth, and for an additional 0.6 mile above the village. The creek is used by many small local boats.

The approach to Chesconessex Creek from eastward of Watts Island Light is marked by buoys and a light; the channel above the entrance is marked by daybeacons and sometimes bush stakes. Gasoline is available at Chesconessex; a marine railway can haul out craft up to 30 feet in length for minor hull repairs.

The southern and main entrance to **Pocomoke Sound** is 40 miles northward of Cape Charles and 15 miles due east of a point 53 miles along Chesapeake Bay main channel from the Virginia Capes. Extensive flats occupy most of the sound, though a channel, wide and deep at the

entrance but comparatively shallow in its most northerly part, leads to Pocomoke River, the most important tributary.

The shores of Pocomoke Sound are low and without prominent natural landmarks. The critical points along the main channel between the entrance and the mouth of Pocomoke River are marked by lights and buoys. The Virginia-Maryland boundary line is marked by white spar buoys. The sound is used by many local oyster and fishing boats and by some tugs and barges. Small boats can enter from northwestward in Tangier Sound by way of Broad Creek, which is discussed later. The mean range of tide is 2 feet in Pocomoke Sound; for current predictions, see the Tidal Current Tables.

A string of marshy islands and large shoals separates the lower part of Pocomoke Sound from Tangier Sound on the westward. **Watts Island,** southernmost of the string, is marshy and wooded; the south end of the island is 3.5 miles from the mainland and 1.8 miles due west of the midentrance position. Watts Island Light is 1.5 miles south-southeast of the island.

Little Fox Islands, 5 miles northward of the entrance, are bare and marshy; the flats between these islands and Watts Island are very shallow and cannot be navigated without local knowledge. **Great Thorofare,** just northward of Little Fox Islands, has depths of 2 feet and is sometimes used by local boats.

Great Fox Island, 6 miles northward of the entrance to Pocomoke Sound, consists of a group of low islands, the northeasternmost of which is marked by a large building.

Beach Island Shoal Light (37°47.8′ N., 75°50.3′ W.) is on the east side of the main entrance to Pocomoke Sound. Just north of the light, a crooked tributary channel with depths of 8 feet or more and marked by buoys leads between shallow flats for 5 miles into a dredged channel of **Deep Creek.** The controlling depth in the dredged channel marked by lights and daybeacons is 7 feet for 2.3 miles to the settlement of **Deep Creek.**

Deep Creek is used only by small local boats, many of which enter from Hunting Creek on the eastward by way of **The Notch,** a passage behind the 1.5-mile chain of islands which separates the outer parts of the two creeks; the controlling depth in The Notch is about 2½ feet; the channel is marked by bush stakes.

Gasoline, fresh water, and other supplies are available at the county wharf at the settlement of Deep Creek; diesel fuel is delivered by truck. A boatyard can haul out vessels up to 50 feet in length for minor repairs.

Another tributary channel 3 miles northeastward of Beach Island Shoal Light leads to **Hunting Creek** along the south side of **Guilford Flats** and southward through **The Thorofare** to the wharf at **Hopkins** (P.O.) on the east side of Hunting Creek, 2.5 miles above the mouth. The channel, marked by buoys, lights, and daybeacons, has depths of 7 feet or more to within 0.7 mile of Hopkins, thence 2½ feet to the wharf.

Guilford Creek is 2.5 miles northeastward of Hunting Creek, with which it has a common approach from the main channel as far as the inner buoy on the south side of Guilford Flats. The channel to Guilford Creek continues eastward along the flats, then turns northeastward and rounds a light off the mouth of the creek; the total distance from the main channel is about 8 miles and depths are 8 feet or more all the way. Within Guilford Creek the depths are 6 to 4 feet; protected small-boat anchorage, with depths of 2 to 3 feet, is available in **Old Cove,** on the east side of the creek.

Messongo Creek empties into the east side of Pocomoke Sound 4.5 miles northward of Hunting Creek. The best approach to Messongo Creek is from west-southwestward and the distance from the main channel is about 6 miles. The approach is well marked. Depths of 7 feet at the mouth of the creek shoal gradually to about 1 foot at the village of **Marsh Market,** 2.5 miles above. The creek is used only by small local boats.

Starling Creek, on the southeast side of Pocomoke Sound 11 miles above the south entrance, has a dredged entrance channel marked by lights and daybeacons leading to a basin just inside; the controlling depth was 4 feet in 1960.

Saxis, a village on the northeast side of the Starling Creek turning basin, is the center of a considerable shellfish industry. The village has many prominent white buildings. Gasoline and diesel fuel can be obtained at the Saxis bulkhead and some groceries are available in the village.

Charts 568, 1224.—Pocomoke River, which empties into the northeast end of Pocomoke Sound, carries a large tonnage of petroleum products, pulpwood, and fertilizer. The improved approach to the river begins in natural depths of 7 to 8 feet 13 miles above the entrance to the sound, and follows a dredged cut through the flats, a channel between an earth dike and the northern shore, and a land cut through **Williams Point** to comparatively deep water in the mouth of the river 16 miles above the sound entrance.

The Federal project for the improvement of Pocomoke Sound and River provides for a channel 11 feet deep to the deep water in the river. The controlling depth was 7 feet in the center of the northerly half of the channel, in January 1961. Mariners are advised to avoid the shoaling along the southerly edge of the channel in the area protected by the dike. The approach channel is well marked.

The controlling midchannel depth in Pocomoke River from the mouth to Snow Hill, 26 miles upstream, was 8 feet in August 1960. Navigation is easy for 20 miles, but the remainder of the channel to Snow Hill is narrow, unmarked, and requires local knowledge to carry the best water. The mean range of tide is 2.4 feet at Shelltown and 1.4 feet at Pocomoke, but is considerably affected by winds. Freshets cause a rise of 1 to 5 feet at Snow Hill, but are not dangerous. The water is fresh above **Rehobeth,** 7.5 miles above the mouth.

Shelltown is a village on the west bank of Pocomoke River a mile above the mouth. Gasoline and groceries can be obtained at a store in the village. The landing is in very poor condition. The town has a launching ramp.

Pocomoke City is on the east bank 14 miles about the mouth of the river. The town has bus and rail communication, and all kinds of supplies are available. The bulkhead landings are in poor condition. The railroad bridge over the river at Pocomoke City has a swing span with a clearance of 2 feet; the best water is in the western opening. The overhead power cable 0.3 mile below the bridge has a clearance of 137 feet. The highway bridge 0.5 mile above the railroad bridge has a bascule span with a clearance of 2 feet. The fixed highway bridge a mile above the railroad bridge has a clearance of 35 feet.

A State park is on the west bank, 20 miles above the mouth. Camping and picnic grounds and a launching ramp are here.

Snow Hill, the town on the east bank 26 miles above the mouth, has rail freight communication. The highway bridge just above the wharves has a 40-foot bascule span with a clearance of 1 foot; see **203.245,** Chapter 2, for **drawspan regulations.** The river is navigable for 2 miles above the bridge. Supplies available in town include fuel, water, and groceries. A boat ramp is about half a mile below the bridge.

A line of marshy islands and flats, with Tangier Island at the south end, separates Tangier Sound from Chesapeake Bay on the westward; the principal thorofares between the islands are Kedges and Hooper Straits. Watts Island and the other islands and shallow passages on the east side of the southern entrance to Tangier Sound have been described in connection with Pocomoke Sound. The danger zones south and west of Tangier Island have been discussed in Chapter 11.

Tangier Island is low, sparsely wooded in the middle, and bare on the north and south ends. **Tangier** (P.O.) is the village midway along the eastern side of the island; a church spire is prominent. Oystering, crabbing, and fishing are the principal industries of Tangier and the smaller communities on the island. Available supplies include gasoline, diesel fuel, water, ice, groceries, and some marine hardware. The island has telephone and motorboat communication with Crisfield.

Tangier Sound Light (37°47.3′ N., 75°58.4′ W.), 39 feet above the water, is shown from a white square tower on brown piles, in depths of 5 feet; a fog signal is at the light. Tangier Sound Light is 9.5 miles due east of a point 52.5 miles along Chesapeake Bay main channel from the Virginia Capes.

Tangier Sound, its main entrance a mile northeastward of Tangier Sound Light, is 28 miles long and 2.5 to 5 miles wide. The broad and deep channel that extends the length of the sound is bordered by extensive flats, but the critical points are marked by lights and buoys.

The well marked dredged channel to the town of Tangier is entered a mile west of a point 3 miles along the Tangier Sound main channel from the southern entrance. In September 1960, the controlling depth to the town anchorage basin was 8 feet. A marine railway here can haul out craft up to 40 feet in length.

A 2,400-volt overhead power cable in 1960 was considered a definite hazard to high-masted vessels using the Tangier basin. The cable line runs parallel to and about 300 feet north of the channel, and passes considerably closer to the basin.

The flats between Tangier Island and Smith Island, on the north, are shallow and can be navigated only by very small boats at high water; a line of telephone poles extends across the flats from island to island.

Chart 555.—Smith Island consists of a large group of marshy islands separated by narrow thorofares; travel from island to island is entirely by boat because there are no bridges. **Tylerton, Ewell,** and **Rhodes Point** are small villages along the interior channels; oystering and fishing are the principal industries. Gasoline can be obtained at the villages, and groceries are available in limited quantities. The island has telephone and motorboat communication with Crisfield. A marine railway at Rhodes Point can haul out boats up to 40 feet in length for hull repairs.

A well marked 5-mile dredged channel extends from Tangier Sound through **Big Thorofare** to Ewell, thence northwestward in **Levering Creek** and again through Big Thorofare to Chesapeake Bay; the controlling depth was 5 feet to Ewell, thence 6 feet to Chesapeake Bay, in September 1960. The eastern end of the channel is 2 miles west of a point 10 miles along the Tangier Sound main channel from the southern entrance; the jettied west end is 7 miles due east of a point 65.5 miles along Chesapeake Bay main channel from the Virginia Capes. A marked channel from Big Thorofare through **Tyler Ditch** to Tylerton has a controlling depth of 3 feet. An overhead power cable across Tyler Ditch just north of Tylerton has a clearance of 72 feet. Another marked channel from Tylerton to Rhodes Point has a controlling depth of 4 feet.

Local fishermen in shallow-draft boats sometimes approach Tylerton from southward at high water, leaving the main channel in Tangier Sound about 6 miles from the southern entrance and following the deeper water northward into Tyler Creek. The depth in the southern approach was 4 feet in September 1960. Several thorofares with depths of about 2½ feet lead westward from the interior of Smith Island into Chesapeake Bay; the principal thorofare leads to Rhodes Point and is marked on the north side of the bay entrance by a light. Navigation of all these channels requires some local knowledge.

Kedges Straits, between Smith Island on the south and uninhabited **South Marsh Island** on the north, are used by vessels bound from northward in Chesapeake Bay to points southward of Manokin River in Tangier Sound. The inner approach to the straits is from a point about 15 miles along the Tangier Sound main channel from the southern entrance. A depth of 10 feet can be carried through the straits.

Holland Island Bar Light (38°04.1′ N., 76°05.7′ W.), 37 feet above the water, is shown from a white hexagonal tower on brown piles in depths of 9 feet, on the north side of the bay approach to Kedges Straits; a fog signal is at the light. Holland Island Bar Light is 6.5 miles due east

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of a point 70 miles along Chesapeake Bay main channel from the Virginia Capes.

Solomons Lump Light (38°02.9′ N., 76°00.9′ W.), 47 feet above the water, is shown from a white octagonal dwelling, with a square tower, on a brown cylinder, in depths of 7 feet on the Smith Island side of Kedges Straits; a fog signal is at the light.

The mean range of tide in Kedges Straits is 1.7 feet but it is affected considerably by winds. Easterly winds raise the water and northwesterly winds lower it sometimes as much as 2 feet below the normal level. In severe winters, floating ice makes navigation of the straits dangerous.

Holland Straits are between South Marsh Island on the southeast and Bloodsworth, Adam, and Holland Islands on the northwest; small, low, **Spring Island** is midway through the straits. The straits are shallow at both the Chesapeake Bay and Tangier Sound ends; the unmarked channels should not be used without local knowledge. The inner approach to Holland Straits is from a point 22 miles along the Tangier Sound main channel from the southern entrance.

The deepest water in Holland Straits is between Spring Island and Holland Island. Sand bars 1 to 5 feet deep obstruct the bay entrance, and patches of eel grass uncover in the sound entrance on the lower tides. The best entrance to Holland Straits from Tangier Sound for boats of shallow draft is by way of the narrow passage between tiny **Deep Banks Island** and South Marsh Island.

Holland Island and **Adam Island,** just to the northward, are low, marshy, and uninhabited; there is a lookout tower on Adam Island. **Bloodsworth Island** is a large marsh with scattered clumps of trees, and is within a **danger zone** for naval firing and bombing; see **204.36,** Chapter 2, for limits and regulations.

Hooper Strait, between Bloodsworth Island on the south and Hooper Islands and Bishops Head on the north, is the most northerly direct passage from Chesapeake Bay into Tangier Sound and is used by vessels bound from northward in the bay to tributaries at the north end of the sound. The inner approach to the strait is from a point 26 miles along the Tangier Sound main channel from the southern entrance; the bay entrance is 8 miles due east of a point 79 miles along Chesapeake Bay main channel from the Virginia Capes.

The narrow, crooked channel through Hooper Strait has a controlling depth of about 12 feet. The shoals on each side are well marked; strangers should have little difficulty if they pay close attention to the chart. **Hooper Strait Light (38°13.6′ N., 76°04.5′ W.),** 41 feet above the water, is shown from a white hexagonal house on brown piles in depths of 9 feet midway along the north side of the channel; a fog signal is at the light. **Sharkfin Shoal Light (38°12.1′ N., 75°59.2′ W.),** 44 feet above the water, is shown from a white hexagonal house on brown piles in depths of 7 feet on the south side of the approach from the main channel in Tangier Sound; a fog signal is at the light.

The mean range of tide is 1.7 feet at Hooper Strait Light and 2.2 feet at Sharkfin Shoal Light, but in the fall and winter long-continued northerly winds may lower the water as much as 2 feet below normal level. The current velocity is 1.5 knots; the current floods eastward through Hooper Strait. In the winter vessels navigating Hooper Strait are in danger from running ice.

Charts 555, 568.—Little Annemessex River, the approach to the town of Crisfield, empties into Tangier Sound 2 miles east-northeast of a point 9 miles along the main channel from the southern entrance to the sound. The entrance to the river is 0.8 mile wide between **Great Point** on the south and **Island Point** on the north. Prominent features are a square brick stack near the outer end of the narrow spit that extends 0.7 mile eastward from Island Point, and the ice plant and other buildings on the Crisfield waterfront.

The main entrance to Crisfield is through the well marked channel of Little Annemessex River; the controlling depth was 10½ feet to a point opposite the ice plant 300 yards above the municipal pier, in August 1960. The spur channel to the wharves 0.3 mile northeast of the ice plant has depths of 3½ feet, and the L-shaped channel and mooring basin a half mile northward has depths of 7 feet.

The southerly approach to Crisfield from Pocomoke Sound, used extensively by oyster boats, is through crooked **Broad Creek;** the controlling depth of the channel marked by lights and buoys was 5 feet in August 1960. The northerly approach from Big Annemessex River is through **Annemessex Canal,** marked by lights at both ends; the controlling depths were 2½ feet in the north approach and 4 feet through the remainder of the channel to Crisfield, in 1960. The tidal current floods northward in the canal and ebbs southward; the velocity is 1.3 knots.

The mean range of tide in Little Annemessex River is 2 feet. The current velocity is 0.9 knot.

Jenkins Creek, which enters Little Annemessex River close northeastward of Broad Creek, is used by fishermen and crabbers. Depths of 3 feet can be carried 0.5 mile above the mouth of the creek, thence 2 feet for 0.5 mile farther to the highway bridge with a 16-foot fixed span and a clearance of 6 feet; small boats pass through the bridge to piers on the north shore.

Crisfield, on the east side of Little Annemessex River 2 miles above the mouth, is a fishery and seafood processing center. Waterborne commerce consists chiefly of seafood and petroleum products. The harbor is used by many oyster, fish, and crab boats with drafts of 2 to 6 feet. Small freight and passenger boats operate daily to Tangier and Smith Islands.

See Appendix for **storm warning displays.** Crisfield is a **customs** port of entry at which marine documents are issued and has an **outpatient office** of the Public Health Service.

The Crisfield waterfront is largely built up with bulkhead wharves and timber piers, most of which are privately owned but open to the public on equal terms. Some of the terminals have mechanical freight-handling equipment but most of the freight is transferred by hand.

Depths at the wharves and piers range from 5 to 12 feet, the deepest being at the outer end of the railroad pier.

Available supplies at Crisfield include gasoline, diesel fuel, water, ice, and groceries. The largest marine railway can haul out vessels up to 135 feet in length; the yard makes hull and engine repairs and can supply most metal fittings, but machined parts usually are made in Norfolk.

Somers Cove, on the south side of the railroad pier, has general depths of 2 to 3 feet. A 6-foot channel leads to the crab factories on the north shore of the cove, and a 4-foot channel leads to the factories on the west shore. A highway bridge over the entrance has a 24-foot retractile span with a clearance of 1½ feet; see **203.250,** Chapter 2, for **drawspan regulations.**

Chart 555.—Big Annemessex River empties into Tangier Sound 2.5 miles northeast of a point 14 miles along the main channel from the southern entrance to the sound. The river has depths of 8 feet for 4 miles, thence 5 feet for 1 mile, and thence 3 feet for 1 mile. The channel is marked as far as Colbourn Creek. The mean range of tide is 2.1 feet.

Annemessex Canal, already described, enters the south side of Big Annemessex River 1.3 miles above the mouth. **Jones Creek,** close eastward of the canal, has depths of 2 feet for about 1.5 miles above the mouth but the channel is narrow, crooked, and unmarked.

Colbourn Creek, on the south side of Big Annemessex River 3.5 miles above the mouth, has depths of 4 feet for about 0.7 mile, thence 2 feet for 0.5 mile. Excellent storm anchorage with good holding ground is available in depths of 5 feet, in midstream 0.3 mile above the entrance.

Manokin River empties into the east side of Tangier Sound 2.5 miles north-northeastward of a point 15 miles along the main channel from the southern entrance to the sound and directly across the sound from Kedges Straits, described earlier. The entrance to the river is 3.5 miles wide between **Hazard Point** on the southeast and low **Little Deal Island** on the northwest, but is obstructed by numerous shoals.

The main channel of Manokin River is narrow and crooked and favors the southeast shore. In August 1960, the channel had depths of 10 feet to abeam of **St. Pierre Island,** on the north side 4 miles above the mouth of the river, thence 6 feet to within 0.5 mile of **Locust Point,** on the northwest side 7 miles above the mouth, and thence 1 foot to **Princess Anne,** 15 miles above the mouth. The channel is marked as far as **Inverness,** on the south side 6 miles above the mouth, where gasoline is available. The lower of the two fixed highway bridges, 14 miles above the mouth, has a clearance of 3 feet. The mean range of tide in Manokin River is 2.1 feet. Most of the piers and wharves along the river are in poor condition.

Deal Island, between Little Deal Island and the mainland, has a sizeable shellfish industry. **Lower Thorofare,** between Little Deal Island and the south end of Deal Island, has a dredged channel leading to a mooring basin at Wenona, that begins a mile east-northeastward of a point 20 miles along the main channel from the southern entrance to the sound. The controlling depth was 5 feet in the channel, marked by lights and buoys, in September 1960.

Wenona (P.O.), a village on the south end of Deal Island, is 0.7 mile above the outer end of the improved channel. The mooring basin has a good bulkhead and several small piers. Gasoline and groceries can be obtained at the village.

Upper Thorofare, between Deal Island and the mainland, has an improved entrance channel that begins a mile eastward of a point about 24 miles along the main channel from the southern entrance to Tangier Sound. The centerline controlling depth to just north of the highway bridge was 6 feet in September 1960. A wreck with 2 feet over it lies in the northwest corner of the anchorage basin. Beyond the bridge a depth of 1 foot can be carried southeastward for 2.5 miles to Manokin River.

The west entrance to Upper Thorofare is marked by a light, a lighted range, and buoys. The highway bridge over Upper Thorofare between Deal Island and **Chance** (P.O.), a village on the mainland, has a 21-foot fixed span with a clearance of 11 feet. On the northwest side of the bridge is an overhead power cable with a clearance of 34 feet, but there is sufficient water for some high-masted vessels to drift close enough to touch the wires; extreme caution should be observed. Available supplies include gasoline and groceries. A marina just east of the bridge has a concrete ramp and a marine railway that can haul out boats up to 40 feet long.

Chart 554.—Wicomico River empties into the north end of Tangier Sound 4 miles east-northeastward of a point a mile southward of the inner approach to Hooper Strait, described earlier, and 25 miles along the main channel from the southern entrance to the sound. The entrance to Wicomico River is 1.5 miles wide between **Long Point** on the south and **Nanticoke Point** on the north. Waterborne commerce is largely in petroleum products but sizable tonnage of commodities, sand and gravel, fertilizer, and shellfish also are carried on the river.

The channel in Wicomico River, marked with lights, daybeacons, and buoys, had a controlling depth of 8 feet from Chesapeake Bay to Salisbury, in August 1960. **Great Shoals Light (38°12.8′ N., 75°52.8′ W.),** 37 feet above the water, is shown from a white square tower on brown piles in depths of 4 feet on the north side of the river, 0.5 mile above the mouth; a fog signal is at the light.

The mean range of tide in Wicomico River is 2.3 feet at the entrance and 3 feet at Salisbury. Strong tidal currents set across the main channel off Monie Bay; the current velocity in the entrance to the river is 0.6 knot on the flood and 0.9 knot on the ebb. Ice usually forms on the river as far down as Whitehaven; in ordinary winters the channel usually is open to navigation, but in severe winters it is often closed for extended periods.

Monie Bay is a large cove on the southeast side close within the mouth of Wicomico River. The bay has depths of 4 feet to the head, but it is used only by small local boats.

A marine railway on **Semi Point,** on the south side of

Wicomico River 2 miles above the mouth, can haul out boats up to 40 feet in length for engine and hull repairs.

Webster Cove, on the south side of Wicomico River 3.5 miles above the mouth, is entered by a dredged channel marked by daybeacons; the controlling depth was 5 feet in August 1960. A loading ramp and small hoist are in the cove; gasoline is available.

Whitehaven (P.O.) is a village on the north bank 6.5 miles above the mouth. Gasoline and groceries are available. Most of the docks are in very poor condition. A marine railway can haul out boats up to 150 feet in length. The cable ferry operates during daylight hours only; the cables rest on the bottom when the ferry is tied up.

Wicomico Creek, which empties into the south side of Wicomico River 8.5 miles above the mouth, is navigable for small craft for several miles. In August 1960, the depth was 4 feet at the unmarked entrance, with deeper water inside. A small marina on the north side of the entrance has gasoline, water, and electricity. The cable ferry about a mile above the mouth operates daily except Sundays in daylight hours only, and drops its cable when tied up.

Gasoline is available at a wharf on the north bank of Wicomico River, 13 miles above the mouth, between Cox Landing and Quantico Wharf. At **Upper Ferry,** 15 miles above the mouth, a cable ferry crosses during daylight hours only; it drops its cables when tied up. Fishing boats use the large wharf on the south bank, 16.5 miles above the mouth; water is available. An overhead power cable, 17.7 miles above the mouth, has a clearance of 137 feet.

Shad Point, 18 miles above the mouth on the southeast side of the river, has a boatyard that can haul out craft up to 75 feet in length for minor repairs. Available supplies include gasoline, water, and groceries.

Salisbury, the head of navigation 20 miles above the mouth, is an important city on the eastern shore. The river forks at the city; the **North Prong** has a controlling depth of 10 feet to the fixed bridge, about 0.4 mile upstream, but **South Prong** is used only by vessels small enough to clear the fixed bridge at the entrance.

The highway bridge over the entrance to North Prong has a 40-foot bascule span with a clearance of ½ foot. The highway bridge over the entrance to South Prong has a 35-foot fixed span with a clearance of 6 feet; the highway bridge 0.3 mile above the forks has a 40-foot bascule span with a clearance of 6 feet; see **203.260,** Chapter 2, for **drawspan regulations.**

All kinds of supplies are available at Salisbury. A large marine railway at the city will haul out vessels up to 200 feet in length when it is not in private use.

Nanticoke River empties into the north end of Tangier Sound 28 miles along the main channel from the southern entrance to the sound and about 3 miles northeast of the inner approach to Hooper Strait. The river entrance is between Nanticoke Point on the east side, and **Clay Island** on the west. Waterborne commerce is mostly in petroleum products but sizable tonnages of fertilizers, corn, pulpwood and logs, shellfish, and shells also are carried.

The controlling depth of the marked channel in Nanticoke River to the highway bridge at Seaford, Delaware, was 8 feet in August 1960. A depth of about 11 feet can be carried to Sharptown, but local knowledge is needed to carry the best water. From the mouth to Wetipquin Creek, the river is more than a mile wide and is obstructed by extensive shoals, most of which are marked by lights or buoys. The deepest water is usually near the points rather than in the bends.

The mean range of tide in Nanticoke River is 2.3 feet at the entrance and at Vienna. The current velocity is 1.2 knots in the entrance. The water is fresh above Vienna. Ice forms on the river in winter, but ordinarily there is enough traffic to keep the channel open. Spring freshets do not interfere with navigation.

Nanticoke (P.O.), a village on the east bank of Nanticoke River 2.5 miles above the mouth, has a dredged channel to a small-boat harbor. The controlling depth in the marked channel was 3 feet in August 1960. There are several packing plants at the village. Available supplies include gasoline and groceries; marine railways can haul out craft up to 40 feet in length.

Bivalve (P.O.), a village on the east side of Nanticoke River 5 miles above the mouth, has a jettied basin for skiffs and oyster boats about a mile to the northeastward. The controlling depth of the marked channel was 6 feet in August 1960.

Wetipquin Creek, on the east side of Nanticoke River 7 miles above the mouth, has depths of 4 feet to the wharf at **Tyaskin** (P.O.), a village on the south side of the creek just inside the entrance; gasoline and groceries are available. The fixed bridge 0.5 mile above Tyaskin has a clearance of 5 feet.

Vienna, a village on the west bank of Nanticoke River 20 miles above the mouth, is the site of an electric power plant. The bulkhead wharf just above the Vienna bridge is in good condition, and one dock just below the bridge is in poor condition but usuable; all other docks are in very poor condition. Some supplies can be obtained.

The highway bridge over Nanticoke River at Vienna has a bascule span with a clearance of 18 feet. The overhead power cable 100 yards above the bridge has a clearance of 135 feet.

Marshyhope Creek, on the northwest side of Nanticoke River 25 miles above the mouth, has depths of 5 feet to the Harrison Ferry bridge, 9 miles above the entrance, above which point the creek is obstructed by snags and debris. The highway bridge at **Brookview,** 5 miles above the entrance, has a bascule span with a clearance of 11 feet; see **203.245,** Chapter 2, for **drawspan regulations.**

Sharptown, Maryland, on the southeast bank of Nanticoke River 26 miles above the mouth, has several mills and canneries. Gasoline and groceries are available. The highway bridge over the river at Sharptown has a swing span with a clearance of 7 feet.

Broad Creek, Delaware, on the southeast side of Nanticoke River 29 miles above the mouth, had a controlling depth of 8 feet to Laurel, in August 1960. The highway bridge at **Bethel,** 3.5 miles above the entrance, has a

swing span with the south opening obstructed; the north opening has a clearance of 2 feet. **Laurel,** on the south side 6 miles above the entrance, has a fertilizer plant and several mills. Gasoline and groceries are available. The railroad bridge at Laurel has a swing span with the north opening obstructed; the south opening has a width of 40 feet and a clearance of 15 feet; see **203.245,** Chapter 2, for **drawspan regulations.** Between this bridge and the dam, 0.3 mile upstream, are three drawbridges which have minimum width of 30 feet and clearance of 3 feet.

The vehicular cable ferry over Nanticoke River at **Woodland,** 31 miles above the mouth, operates daytime only, and drops cables when not crossing. Just above the ferry crossing, on the west bank, gasoline is available and a marine railway can haul out boats 40 feet in length for minor repairs.

Seaford, Delaware, on the northwest side of Nanticoke River 35 miles above the mouth, has several mills and factories. The railroad bridge over the river near the lower end of the town has a swing span with a width of 47 feet in the southeast opening and a clearance of 1 foot; a strong cross current runs through the bridge. The highway bridge, 0.3 mile above the railroad bridge, has a 40-foot bascule span with a clearance of 3 feet. Depths of 7 feet are said to extend 1.5 miles above the highway bridge, and small boats can go to a mill dam 5 miles from the bridge, but there is little traffic above Seaford. Fuel and groceries are available in the town.

Fishing Bay is at the north end of Tangier Sound 2 miles northwest of a point 27 miles along the main channel from the southern entrance and a mile north of the inner approach to Hooper strait, described earlier. The entrance to the bay is 3 miles wide between Clay Island on the east and **Bishops Head** on the west. The partially marked channel in Fishing Bay has depths of 9 feet for 2 miles, thence 13 to 30 feet for 4 miles, thence 6 to 7 feet for a mile, and thence 4 to 3 feet to the head, 9 miles above the mouth.

Tedious Creek, on the west side of the bay and 2 miles above Bishops Head, has depths of 4 feet for 0.5 mile from the mouth, then shoals gradually to 1 foot at the head, 0.7 mile above the mouth. The cove at **Crocheron** (P.O.), a village on the south side of the creek just inside the entrance, has several small piers which are obstructed by stakes and crab pounds. The depth to the gasoline pier is about 2 feet.

Goose Creek, on the west side of Fishing Bay 3 miles above the entrance, has a dredged channel leading to the wharves just inside the entrance; the controlling depth of the channel marked by a light and daybeacon was 6 feet in September 1960. Gasoline is available at the wharves.

McCreadys Creek, on the east side of Fishing Bay 4 miles above the entrance, has a dredged channel leading to the wharves at the entrance. The controlling depths were 4 feet in the channel and 3½ feet at the wharves, in September 1960.

Farm Creek, on the west side of Fishing Bay 5 miles above the entrance, has a dredged channel leading to the wharves at **Toddville,** on the south side of the creek 0.6 mile above the mouth. The controlling depth in the marked channel was 6 feet in September 1960, but depths of 3 feet were at the entrance to the basin at Toddville. Gasoline and water are available.

Blackwater River, on the west side of Fishing Bay 8 miles above the entrance, has depths of 4 feet or more for 9 miles to a fixed highway bridge. The bulkhead at the landing just below the bridge has depths of about 8 feet at the face.

Honga River extends northwestward from the western part of Hooper Strait, described earlier, for 14 miles between the mainland on the northeast and the Hooper Islands on the southwest; the river is more than a mile wide for most of its length. Honga River has a sizeable traffic in shellfish and shellfish products.

The southern, and main entrance to Honga River is between Hooper Strait Light on the east, and Honga River Light on the west. The narrow crooked channel in the river has depths of 13 to 55 feet as far as large **Wroten Island,** on the east side 8.5 miles above the southern entrance, and thence 8 feet for 1.5 miles to the improved channel, described later, leading northwestward and westward to Fishing Creek. Depths northward of the Fishing Creek channel are 4 to 5 feet, shoaling gradually to 2 feet at the head. The river is marked by lights and buoys as far as Fishing Creek.

Fox Creek is on the northeast side of Honga River 2.5 miles above the entrance. A light marks the east side of the creek entrance and a daybeacon marks the point of a shoal that extends southeastward from **Paul Point.** The creek has depths of 8 feet to a line from Paul Point to **Wingate Point,** on the east side 2 miles above the entrance, then shoals gradually to 3 feet at the head, a mile farther up.

Duck Point Cove, on the east side just inside the entrance of Fox Creek, has general depths of 2 to 5 feet. The marked dredged channel into **Hearns Cove,** on the north side of Duck Point Cove, had a controlling depth of 4 feet to the basin at Wingate, in September 1960. The oyster-packing plants at **Wingate** (P.O.) have small wharves to accommodate the oyster boats. Gasoline is available in limited quantities.

A dredged 2-foot channel marked by private stakes leads to a marine railway in **Insley Cove** at the northeastern end of Fox Creek; boats up to 50 feet in length can be hauled out for hull repairs.

The three low **Hooper Islands** separate Honga River from Chesapeake Bay and Tar Bay. The two northerly islands are connected with each other and with the mainland by bridges. **Hoopersville** (P.O.) is a village with general stores and packing plants on the middle island opposite a point 3.5 miles along the main channel of Honga River from the southern entrance. The wharf at the village is owned by a fish company.

The highway bridge over the passage between the two northerly islands has a swing span with a width of 23 feet and a clearance of 5 feet; the draw is opened from sunrise to sunset. The marked passage through the

bridge from Honga River to Chesapeake Bay has a controlling depth of about 2 feet; greater depths can be carried with local knowledge.

Back Creek, midway along the inner side of the most northerly of the Hooper Islands and directly across Honga River from Wroten Island, has a dredged channel leading to a basin at the upper end. The controlling depth of the marked channel was 3 feet in September 1960. Several oyster houses and a marine railway are along the creek; boats up to 50 feet can be hauled out for hull repairs. See Appendix for **storm warning displays.** Available supplies on Upper Hooper Island include gasoline, groceries, and some marine hardware.

Charts 553, 554.—A 4-mile dredged channel marked by lights leads from the upper part of Honga River a mile north of Wroten Island through Fishing Creek and Tar Bay to Chesapeake Bay. The controlling depths were 5 feet to the bridge across Fishing Creek, and thence 3½ feet to Chesapeake Bay, in September 1960; greater depths can be carried with local knowledge.

Fishing Creek is between the northernmost of the Hooper Islands and **Meekins Neck.** The highway bridge over the creek has a swing span with a width of 27 feet and a clearance of 6 feet; the draw is opened from sunrise to sunset. The overhead power cable at the bridge has a clearance of 65 feet. The mean range of tide is 1.3 feet. The current velocity is estimated to be 3 knots. A marine railway at the village of **Honga,** just south of the bridge, can haul out boats 55 feet in length for engine and hull repairs. A public wharf and several private wharves are along the creek.

Tar Bay, west of Meekins Neck and the most northerly of the Hooper Islands, is separated from Chesapeake Bay by Barren Island and a smaller island to the northward. The bay is shallow and unimportant except for the channel that leads through it from Honga River to Chesapeake Bay.

Chart 551.—Sharps Island Light (38°38.3′ N., 76° 22.5′ W.), 54 feet above the water, is shown from a brown tower on a cylindrical pier, in 10 feet at the north end of a shoal with depths as shallow as 2 feet; a fog signal is at the light. Sharps Island Light is 3 miles due east of a point 106 miles along Chesapeake Bay main channel from the Virginia Capes. Tiny **Sharps Island,** 1.3 miles south-southeast of the light, is subject to rapid erosion.

Just south of the island is a small Naval **danger zone;** see **204.34,** Chapter 2, for limits and regulations.

Little Choptank River flows into the eastern side of Chesapeake Bay 6 miles south-southeastward of Sharps Island Light. Although obstructed by shoals, the river has depths of 11 feet in a crooked channel for 7 miles and the tributaries have depths of 5 feet for considerable distances. The river channel is well marked as far as Madison Bay, above which it is difficult to carry more than 7 feet without local knowledge. The tributary channels are usually marked by bush stakes, but navigation is difficult without some local information.

The mean range of tide in the entrance to Little Choptank River is 1.4 feet. The current velocity is 0.4 knot. The river carries a small commercial traffic in shellfish and shells.

The entrance to Little Choptank River is between **James Island** on the southwest and **Hills Point** on the northeast. James Island is subject to rapid erosion. Good anchorage is available in depths of 12 to 18 feet in the bight between James Island and **Hooper Point,** which is on the west side of the entrance to Slaughter Creek.

Slaughter Creek (Chart 553), on the south side of Little Choptank River 4 miles above the mouth, has depths of 4 feet over the bar marked by lights, thence 6 feet to the bridge at the village of **Taylor Island** (P.O.), 2 miles above the entrance. The creek is used by oyster tongers and crab fishermen. Available supplies at Taylors Island include gasoline, water, and groceries. A boatyard on the east side of the creek just north of the bridge has a marine railway that can haul out boats up to 40 feet in length, for hull and engine repairs; berthing and launching facilities are available.

Hudson Creek, on the north side of Little Choptank River 6 miles above the mouth, has depths of 6 feet for 4 miles to **Hudson,** a village at the head. The entrance is marked by buoys, and the upper reaches usually are bush-staked. The wharves at Hudson are in poor condition; grass growth is prevalent in the creek at the village.

Madison Bay, across Little Choptank River from Hudson Creek, has depths of 6 to 8 feet for 1 mile, thence about 2 feet for 0.5 mile to **Madison,** a village at the head. There is a small wharf at Madison.

Fishing Creek, on the southeast side of Little Choptank River 7 miles above the mouth, has a controlling depth of 5 feet for 4 miles to the forks at the head. The channel is narrow and crooked, and difficult to navigate without local knowledge. There are several small piers along the creek and it is used extensively by boats bound for Church Creek, the principal tributary. The entrance is marked by buoys, and the upper reaches usually are marked by bush stakes. The Northeast and Southeast Branches have depths of 3 feet. A boatyard on the Southeast Branch can haul out boats 45 feet in length, for engine and hull repairs.

Church Creek, on the south side of Fishing Creek 2.5 miles above the mouth, has depths of 6 feet for 0.8 mile, thence 4 feet for 0.8 mile, and thence 1 to 3 feet for 0.3 mile to **Church Creek** (P.O.), a village near the head. Gasoline and groceries can be obtained at the village.

Other tributaries of Little Choptank River have depths of 2 to 5 feet, and are used by small local boats.

Choptank River, which empties into Chesapeake Bay 2 miles eastward of Sharps Island Light, is navigable for 57 miles to the town of Greensboro. Traffic on the river consists chiefly of petroleum products, fish and shellfish, and shell.

The main approach to Choptank River is from southward and eastward of Sharps Island; the broad channel has a least depth of 24 feet. The approach between desig-

nated **fish-trap areas** northward and eastward of Sharps Island Light has a least depth of 10 feet. Both approaches are well marked.

The river channel has natural depths of 19 feet for 17 miles, thence 11 feet for 27 miles to Tuckahoe Creek. The channel is marked by lights and buoys to Cambridge and thence by buoys to Tuckahoe Creek. Above this point the river narrows and becomes difficult to navigate without some local knowlodge. The controlling depth in the river channel from Tuckahoe Creek to Denton and thence to within a mile of Greensboro was 6 feet, in September 1960.

The mean range of tide is 1.6 feet at Cambridge, 2.2 feet at Denton, and 2.5 feet at Greensboro. The river water is fresh above the town of Choptank. The current velocity is 0.7 knot in the entrance off Cook Point. In Choptank and Tred Avon Rivers the current velocity is less than 1.0 knot.

Two miles above Hills Point, on the south side of the entrance to Choptank River, is shallow **Trippe Bay** which is little used except by small oyster and fishing boats. The channel to **Brannock Bay,** at the head of Trippe Bay, is buoyed.

Tilghman Island, on the north side of the entrance to Choptank River, has a substantial crabbing, oystering, and fishing industry. The island, which is 3 miles long in a north-south direction, is subject to rapid erosion on its western side.

Blackwalnut Cove, at the south end of Tilghman Island, is well sheltered except from the south, and is used extensively by small boats. A dredged channel marked by lights and buoys leads through the cove to a basin at the upper end; the controlling depth was 6 feet, in September 1960. The mean range of tide is 1.3 feet. There are small piers at the village of **Fairbank,** on the west side of the basin; a small marine railway is available.

Dogwood Harbor, on the eastern side of Tilghman Island, has depths of 7 feet to the packing-plant wharf at **Avalon** (P.O.); gasoline, water, and groceries can be obtained at the village.

Knapps Narrows, between the mainland and the northern end of Tilghman Island, has a dredged channel that leads from Harris River to Chesapeake Bay. The controlling depth was 7½ feet in September 1960. The narrows and both approaches are marked by lights; **note** that the system of marking is from each entrance and reverses at the bridge. The highway bridge over the narrows has a 50-foot bascule span with a clearance of 7 feet. The mean range of tide is 1.3 feet.

Tilghman (P.O.) is a village on the south side of Knapps Narrows. The bulkheaded sides of the turning basin on the west side of the southerly abutment of the bridge are available for public use. Available supplies include gasoline, water, ice, and some marine hardware. The larger of two boatyards along Knapps Narrows, east of the bridge, can haul out vessels up to 55 feet in length for general repairs and some machine work.

Harris Creek empties into Choptank River from northward along the east side of Tilghman Island. The channel has depths of 10 feet and is marked by buoys as far as **Indian Point,** on the east side 4 miles above the mouth, and by lights and daybeacons as far as the entrance to Cummings Creek. Above this point, the narrow and crooked channel has depths of 6 feet to the forks, thence 5 feet in a channel marked by private stakes for 1 mile up **Northeast Branch** (Chart 550), and thence 2 feet for 1 mile to the head of the branch, 9 miles above the mouth of the creek. **Northwest Branch** (Chart 550) also extends about 2 miles from the forks, and has a controlling depth of about 2 feet to its head.

Sherwood (P.O.) is a village on the west side of Harris Creek 4.5 miles above the mouth. The county wharf at the village, available for public use, has depths of 3 feet alongside.

Cummings Creek empties into the northwest side of Harris Creek 5.5 miles above the mouth. A depth of about 5 feet can be carried up Cummings Creek to the county wharf at **Wittman** (Chart 550). The larger of two yards along the prongs just eastward of Cummings Creek can haul out boats up to 46 feet in length, for general hull repairs.

Broad Creek, on the north side of Choptank River 5 miles above the mouth, has depths of 16 feet as far as **Edge Creek,** on the east side 3 miles above the mouth. Above Edge Creek, the winding channel has depths of 9 feet for 3 miles, then shoals gradually to depths of 2 feet at the head, 7.5 miles above the entrance. The wide channel at the entrance to Broad Creek is marked, but some local knowledge is needed in the narrow unmarked upper reaches.

Balls Creek, on the west side of Broad Creek 1 mile above the entrance, has depths of 6 to 7 feet almost to its head; the narrow entrance is marked by a light and the channel by daybeacons. **Neavitt** (P.O.) is a village on the southwest side near the head.

St. Michaels, a town with its main waterfront on Miles River, can be reached from Choptank River by way of Broad Creek, thence southeastward in Edge Creek for 0.7 mile, and thence northward in **San Domingo Creek** for 2.3 miles to its head, 6 miles from the mouth of Broad Creek. San Domingo Creek has depths of 7 feet or more for most of its length, and a controlling depth of 4 feet to St. Michaels.

Irish Creek, on the north side of Choptank River 5 miles above the mouth, has depths of 7 feet for 1.4 miles, then shoals gradually to 2 feet at its head, 2 miles above the entrance. The narrow approach channel is marked by buoys. The creek is used only by small local boats.

Tred Avon River, which empties into the north side of Choptank River 7 miles above the mouth, has natural depths of 16 feet or more for 5 miles, thence 11 feet for 1 mile to Peachblossom Creek. The channel from Peachblossom Creek to Easton is discussed later. Traffic in the river consists chiefly of petroleum products and shellfish.

Choptank River Light (38°39.4′ N., 76°11.1′ W.), 35 feet above the water, is shown from a white hexagonal house on brown piles in depths of 10 feet 0.6 mile outside the entrance to Tred Avon River; a fog signal is at the light. Depths of 16 feet can be carried into the river

0.4 mile on either side of the light. The channel within the river is marked by lights and buoys for 7 miles, above which midchannel courses can be steered with safety by boats drawing up to 5 or 6 feet as far as Easton Point.

Small motorboats can find anchorage near midchannel in any of the larger tributaries of Tred Avon River. The river bottom is quite firm but the bottom in the tributaries is mostly soft mud. There is excellent protection from the wind except when it blows up or down stream. The brush and trees that line most of the banks provide further protection from the wind.

Oxford is on the east side of Tred Avon River, 2 miles above the mouth. A tall silver tank stands well above the trees and can be seen for a considerable distance. The ferry landing on the river side of Oxford has depths of 14 feet at the face. Year-round ferry service is maintained to Bellevue, on the opposite side of the river, from 6:30 a.m. to dark daily and Sundays from April 1 through December 19; the Sunday service is discontinued during the remainder of the year.

Town Creek enters Tred Avon River east of Oxford and comprises the waterfront area of the town. A dredged channel marked by lights and daybeacons leads to the head of the creek; the controlling depth was 6 feet, in September 1960. The mean range of tide is 1.4 feet.

The several packing houses have wharves along the west bank of Town Creek, and small piers are scattered on both sides. Available supplies at Oxford include gasoline, diesel fuel, water, ice, groceries, and marine hardware. The largest shipyard can haul out vessels up to 110 feet in length for general repairs to hulls and engines. The town has a launching ramp.

Bellevue, across Tred Avon River from Oxford, is the site of several oyster-packing plants in ruins but prominent as landmarks. There are no facilities for mooring.

Peachblossom Creek branches eastward from Tred Avon River about 6 miles above the mouth. From this creek to Easton Point the midchannel depth was 8 feet in September 1960. The channel is marked only as far as the shoals extending off Watermelon Point, on the east side 1 mile above Peachblossom Creek. The mean range of tide is 1.6 feet. Caution should be exercised if going beyond Easton Point because of abrupt shoaling.

Easton Point, 1 mile from the town of Easton, is on the east side of Tred Avon River 8.5 miles above the mouth. On the point there are bulkhead wharves for the receipt and distribution of petroleum products. A marina at the junction of North Fork and Papermill Pond has supplies available including gasoline, diesel fuel, water, ice, and some hardware; a 6-ton travel lift can hoist craft up to 32 feet in length.

Island Creek empties into the north side of Choptank River 8 miles above the mouth. A natural channel through the bar about 5½ feet deep is marked by lights. Inside the creek the channel depths are 6 feet or more for 3 miles.

Lecompte Bay, on the south side of Choptank River 10 miles above the mouth, has general depths of 7 to 13 feet. The entrance to the bay is between **Castle Haven Point** on the northwest and **Horn Point** on the southeast. Behind the inner end of the spit that extends 0.6 mile eastward from Castle Haven Point is a long pier at **Castle Haven** which has several large buildings. The pier and boathouse are privately owned and not open to the public.

La Trappe Creek empties into the north side of Choptank River 10.5 miles above the mouth. The channel in the creek has depths of 10 feet for 0.5 mile, thence 7 feet or more to within 0.3 mile of **Trappe Landing,** 3 miles above the mouth. The entrance is marked by lights. The bulkhead at Trappe Landing has a depth of about 8 feet at the face. **Trappe** (P.O.) is a village 1.2 miles inland to the eastward of the landing.

Chart 552.—Cambridge, on the south side of Choptank River 15 miles above the mouth, has considerable trade by water and is the center of a fair-sized oystering and fishing industry. The town has railroad freight service. **Cambridge Harbor,** in the southeastern part of the city, comprises the major waterfront facilities.

A dredged channel marked by range lights and buoys extends from Choptank River to the head of Cambridge Harbor; the controlling depth was 12 feet in September 1960. The controlling depth of the dredged channel into the municipal boat basin 300 yards northwest of the harbor channel was 5½ feet in September 1960; the entrance is marked by lights. The Columbia Yacht Club is in the municipal basin; the clubhouse resembles a ship's bridge.

The Market Street bridge over Cambridge Harbor, 0.3 mile above the entrance, has a bascule span with a clearance of 8 feet; see **203.270,** Chapter 2, for **drawspan regulations.** The mean range of tide is 1.6 feet.

Cambridge is a **customs** port of entry and marine documents are issued. The U.S. Public Health Service maintains an **outpatient office** in the city. A **harbormaster** supervises anchorage and tie-ups in the municipal basin. See Appendix for **storm warning displays.**

Available supplies at Cambridge include gasoline, diesel fuel, water, ice, groceries, and some marine hardware. The largest shipyard can handle vessels up to 120 feet in length, for hull and engine repairs.

The highway bridge over Choptank River at the southeast side of Cambridge, 15.5 miles above the mouth, has a swing span with a clearance of 18 feet.

Warwick River, on the east side of Choptank River 20 miles above the mouth, has a dredged channel to the village of **Secretary** (P.O.) a mile above the entrance. The controlling depth was 8 feet, in September 1960; the entrance is marked by buoys. Gasoline is available at the bulkhead wharves.

Cabin Creek, on the east side of Choptank River 22 miles above the mouth, has depths of 5 feet to the fixed highway bridge 1 mile above the entrance, thence 2 feet for 0.5 mile nearly to the head. The bridge has a width of 17 feet and a clearance of 7 feet. Gasoline is available at a small marina just below the bridge.

Hunting Creek, which empties into the east side of Choptank River 29.5 miles above the mouth, has depths

of 3 feet for 3 miles to a fixed highway bridge. The fixed highway bridge 0.4 mile above the entrance has a width of 15 feet and a clearance of 8 feet.

Choptank is a village on the northeast side of Choptank River 30 miles above the mouth. The small yacht harbor at Choptank has depths of 2 to 3 feet behind its wooden bulkheads. The old wharf northwest of the yacht harbor is in ruins.

The overhead power cable 35 miles above the mouth of Choptank River has a clearance of 139 feet.

Dover Bridge, 37.5 miles above the mouth of Choptank River, has a swing span with a clearance of 10 feet.

Tuckahoe Creek empties into the north side of Choptank River 44 miles above the mouth. The channel in the creek has depths of 8 feet for 2.7 miles, thence 6 feet for 6 miles, and thence 1½ feet to the fixed highway bridge from **Hillsboro** to **Queen Anne,** at the head of navigation 11 miles above the entrance. **Tuckahoe Bridge,** 1.7 miles above the entrance, has a 40-foot fixed span with a clearance of 17 feet. Above the bridge, the channel is unmarked, crooked, and difficult to navigate in places without local knowledge. The flats are covered with tuckahoes or marsh grass in the summer. The creek is used only by small fishing and pleasure boats. The overhead power cable just north of the bridge has a reported clearance of 30 feet. The overhead power cable across the creek about 7 miles about the mouth has a clearance of 32 feet.

Williston is a small settlement with a bulkhead landing on the east side of Choptank River 46 miles above the mouth.

The Choptank River is constricted by **Pealiquor Shoal,** 48 miles above the mouth. A dredged channel through the shoal area had a controlling depth of 6 feet in September 1960; the channel is marked by daybeacons to Denton.

Denton is a town on the east side of Choptank River 50.5 miles above the mouth. The highway bridge over the river at Denton has a 48-foot bascule span with a clearance of 4 feet. The railroad bridge 0.4 mile above the highway bridge has a swing span with a width of 49 feet and a clearance of 6 feet; see **203.245,** Chapter 2, for **drawspan regulations.**

Available supplies at Denton include gasoline and groceries. A boat club is just below the highway bridge.

Greensboro is a town at the head of navigation 57 miles above the mouth of Choptank River. The controlling depth in the dredged channel above Denton was 6 feet to within a mile of the first bridge at Greensboro, thence 2½ feet to the bridge, in September 1960. The first of two fixed highway bridges at Greensboro has a width of 37 feet and a clearance of 10 feet. Gasoline and groceries can be obtained in town.

Chart 550.—Eastern Bay, the approach to Claiborne, St. Michaels, Miles River, and other tributaries, is entered between the southerly tip of Kent Island and the northerly end of Poplar Island, 2.2 miles southward. The entrance is 2 miles due east of a point 116.3 miles along the Chesapeake Bay main channel from the Virginia Capes. The shores are low and have few prominent marks. Light-draft vessels also can enter from southward through Poplar Island Narrows and from Chester River on the north by way of Kent Island Narrows on a southerly passage.

A lighted buoy is 250 yards west of the structure of **Bloody Point Bar Light (38°50.1′ N., 76°23.5′ W.),** which was destroyed by fire in 1960.

The bay is used extensively by oystermen and fishing craft, as well as by increasing numbers of pleasure craft. The channel is wide and deep; within the bay are large shoal areas, but depths of 25 feet can be taken without difficulty to the mouths of most of the tributaries.

Currents.—East of Poplar Island the current velocity is 1.0 knot on the flood and 0.6 knot on the ebb. Throughout Eastern Bay the current velocity is less than 1.0 knot.

Poplar Island, on the south side of the main entrance to Eastern Bay, is 1.3 miles long in a north-south direction, and is low and wooded. Smaller **Jefferson Island,** southeast of the northern part of Poplar Island, and **Coaches Island,** east-southeast of the southern end, once were part of the large island. **Poplar Harbor,** formed by the three islands, has secure anchorage in depths of 4 to 6 feet.

Poplar Island Narrows has a least width of 1 mile between Coaches Island and the mainland to the eastward. The channel through the narrows has a controlling depth of about 7 feet and is marked by lights and buoys.

Ferry Cove, on the mainland side of Poplar Island Narrows, had a centerline controlling depth of 7 feet in the marked channel leading to Lowes Wharf at the head, in September 1960. Depths of 4 feet are outside the centerline of the channel and alongside the wharf.

Claiborne (P.O.), is a summer-resort village on the southeast side of Eastern Bay 5 miles by deep channel from the main entrance. A combination pier and jetty extends 0.2 mile west-southwestward from the Claiborne waterfront; the pier is in very poor condition. The former ferry landing is just south of the old pier. The channel to Claiborne had a controlling depth of 10 feet with depths of 5 feet in the basin in September 1960. Gasoline and groceries can be obtained in the village.

Kent Point, on the north side of the main entrance to Eastern Bay, is the southernmost extremity of **Kent Island,** which has a north-south length of 12.5 miles and a greatest width of 5.5 miles.

Cox Creek flows southward from the interior of Kent Island and empties into Eastern Bay between **Long Point,** 2 miles northeast of Kent Point, and **Turkey Point,** 3 miles farther to the northeastward. The midchannel point in the mouth of Cox Creek is 5 miles by deep channel from the main entrance to the bay. The channel within the creek has depths of 22 feet for 1.5 miles, thence 11 feet for 2 miles, thence 7 feet for 2 miles, and then shoals gradually to 2 feet at the head of navigation, a fixed highway bridge 6.5 miles above the mouth.

Romancoke landing is on the west side of Cox Creek 1.5 miles northward of Long Point; depths off the end of the landing which is in poor condition are about 4 feet. Above the Romancoke landing, Cox Creek has no villages

along its bank and is used mostly by oyster boats. The channel is very narrow in places and shallow water is close to the edges. The shoals are unmarked and local knowledge is needed to avoid them.

Crab Alley Bay empties into Eastern Bay from the interior of Kent Island between **Bodkin Island,** 0.8 mile east-southeastward of Turkey Point, and **Parson Island,** 2 miles eastward of Turkey Point. Bodkin Island is very small and is thickly wooded. Larger Parson Island is sparsely wooded and has a ragged appearance; a house is visible from some directions.

The midchannel point in the entrance to Crab Alley Bay is 8 miles by deep channel from the main entrance to Eastern Bay. The principal channel in Crab Alley Bay has depths of 8 feet for 2.5 miles to Crab Alley Creek, in the northwestern part of the bay, and is marked by buoys; one of the buoys marks a 2-foot shoal on the west side 2 miles from the entrance. The other channel branches northward 0.8 mile above the entrance to the bay and has depths of 6 feet to a point 2.2 miles from the entrance, thence 1 to 2 feet to the head, 0.4 mile farther up.

The mouth of **Crab Alley Creek,** between the main part of Kent Island on the west and relatively small **Johnson Island** on the east, is partly obstructed by very shallow areas that extend out from both sides. The channel within the creek has depths of 6 feet for a mile, then shoals gradually to 1 foot at the head. About 1 mile above the entrance is a marine railway that can haul out boats up to 45 feet in length.

Little Creek, about 0.2 mile northwest of Johnson Island, has a marked channel leading about halfway up the creek. Depths of 7 feet or over can be carried up as far as the last daybeacon. There is a marine railway near the end of the marked channel that can haul out boats up to 50 feet in length.

The main entrance to **Prospect Bay,** in the northeastern part of Eastern Bay, is between Parson Island and **Piney Neck Point,** 2 miles to the east-southeastward. The midchannel point in the entrance is 9 miles by deep channel from the main entrance to Eastern Bay.

Prospect Bay extends northward between Kent Island on the west and the mainland on the east for 5 miles to the bridge over **Kent Island Narrows.** The channel has natural depths of 21 feet for 2 miles, thence 11 feet for 1 mile, and thence 7 feet for 1 mile to the beginning of the buoyed approach to the narrows, which is discussed later in connection with Chester River.

Greenwood Creek is on the southeast side of Piney Neck Point in the eastern part of Eastern Bay. The entrance to the creek is 10 miles by deep channel from the main entrance to the bay. The best approach to Greenwood Creek favors the bay shore on the south side. The depth over the bar at the mouth is 3 feet. The channel within the creek has depths of 5 feet for 2.6 miles to within 0.3 mile of the head.

Miles River empties into the eastern part of Eastern Bay from southeastward, between **Tilghman Point,** at the northeastern end of **Rich Neck,** and **Bennett Point,** 2.3 miles to the east-southeastward. The midchannel point in the entrance to the river is 8.5 miles by deep channel from the main entrance to the bay. The river channel has depths of 20 feet or more for 6 miles, thence 10 feet to the highway bridge 11 miles above the mouth, thence 5 feet for 2 miles, and thence 1 to 3 feet for 1.5 miles to the head, 14.5 miles above the mouth. A shallow **middle ground** about 2 miles above the entrance to Miles River bares in one place at low water but is well marked on all sides by buoys. Lights and buoys mark the river channel as far as the bridge. The small trade on the river is chiefly in shellfish and shells.

Tilghman Creek is on the west side of the entrance to Miles River along the southeast side of Tilghman Point and Rich Neck. The outer end of Tilghman Point is heavily wooded. The narrow entrance marked by a light and a buoy, has depths of 9 feet; depths of 11 to 8 feet are inside the creek for the remainder of its 1-mile length. A vessel must stay in midchannel to carry the best water. A marine railway along the creek can haul out boats up to 40 feet in length for engine and hull repairs; gasoline is available.

Wye River flows into the east side of Miles River entrance, just inside Bennett Point. The approach can be made either around the previously described middle ground or to the north of it. The northerly approach is shorter by 2 miles, but is limited to depths of 9 feet; the southerly encircling approach has depths of 30 feet or more. Both approaches are marked.

Small local boats are the prinicpal users of Wye River and its several branches. The twisting channels are unmarked and local knowledge is needed to follow the deepest water. The channel in the river proper has depths of 30 feet or more for 2 miles, thence 10 feet for 4 miles, thence 6 feet for 1.5 miles, and thence 1 to 3 feet for 2 miles to the head, 9.5 miles above the mouth. Oyster bars are found along the channel edges in the vicinity of Wye Island. There are several landings along the river and its branches.

One mile above the mouth of Wye River, **Wye East River** extends northeastward and then eastward along the southeast side of **Wye Island.** The channel in the tributary has depths of 10 feet for 5.5 miles to the junction with Wye Narrows and Skipton Creek at the east end of the island. **Skipton Creek** extends eastward with depths of 5 feet for 1.3 miles to the forks. Wye East River turns northward and has depths of 8 feet for 1 mile, thence 3 feet for 2 miles, then shoals gradually in 0.5 mile to a depth of 1 foot at the head, 9 miles from Wye River.

Wye Narrows follows the north side of Wye Island and has a total length of 4 miles between the junction with Wye East River at the east end of the island and the junction with Wye River proper at a point 4 miles above the river's mouth. The channel through the narrows has a controlling depth of 6 feet. Midway along the narrows is a fixed highway bridge with a width of 40 feet and a clearance of 10 feet.

Long Haul Creek, on the west side of Miles River 5 miles above the entrance, has depths of 9 feet or more in most of its 0.6-mile length. The Miles River Yacht

Club maintains the finger posts and the range that mark the channel into the small club harbor in the creek; the range has a bearing of about **285°** and is lighted from April 1 to December 1.

St. Michaels, a town at the head of a small harbor on the west side of Miles River, is 6 miles by deep channel from the entrance to the river and 15 miles from the main entrance to Eastern Bay. A tank, two church spires, and a stack are prominent. The entrance, marked by a light and a buoy, has depths of 10 feet and the harbor has depths of 5 to 8 feet. The mean range of tide is 1.2 feet.

The wharf on the north side of the entrance to the inner harbor is in ruins. Two marinas and two boatyards are located within the harbor at the town. The depths at the faces of the piers are 5 to 8 feet. The town has a wooden launching ramp. See Appendix for **storm warning displays.** Available supplies include gasoline, diesel fuel, water, ice, groceries, and some marine hardware. Local marine railways can haul out craft up to 65 feet in length for hull and engine repairs; there is a machine shop at one of the boatyards. St. Michaels has railroad freight service.

Leeds Creek is directly across Miles River from St. Michaels. **Fairview Point,** on the north side of the entrance, is thickly wooded; the cupola of a large Moorish-type dwelling 0.4 mile north of the point is prominent; the entrance is marked by a buoy. The creek has depths of 5 feet for 2 miles to the village of **Tunis Mills,** then shoals gradually to 3 feet at the head, 0.5 mile farther up. The fixed highway bridge from Tunis Mills to **Copperville,** on the northwest side of the creek, has a width of 23 feet and a clearance of 5 feet.

Oak Creek, on the south side of Miles River 8 miles above the entrance, has depths of 2 feet in the mouth and 3 to 5 feet to the village of **Royal Oak** at the head, 0.6 mile above. The two bridges over the entrance to Oak Creek, the first with a swing span and the second with a bascule span, have minimum width of 24 feet and a clearance of 2 feet; see **203.285,** Chapter 2, for **drawspan regulations.** The overhead power cables at the railroad bridge have a clearance of 48 feet. Above the wharves at **Newcomb,** on the west side just above the bridges, the creek is obstructed by grass.

Hunting Creek, directly across Miles River from Oak Creek, has depths of 5 feet for 2.5 miles. A buoy marks the river channel off the mouth of the creek. The peninsula on the west side of lower Hunting Creek has a break-through with a depth of 2 feet, 0.8 mile above the entrance.

The highway bridge over Miles River 11 miles above the entrance has a 34-foot bascule span with a clearance of 5 feet; see **203.280,** Chapter 2, for **drawspan regulations.**

The bay shore of Kent Island is low and wooded. A **measured nautical mile** on course **001°30′** is off **Brickhouse Bar,** which is 5 miles north of Kent Point and a mile west of Kent Island; buoys and shore ranges mark the course.

Kentmorr Marina, on the west side of Kent Island 4.8 miles north of Kent Point, has a service pier and slips that can accommodate boats up to 60 feet in length. The controlling depth into the basin was 4½ feet in September 1960. Available supplies include gasoline, water, electricity, ice, and marine hardware; a 25-ton travel lift can haul out boats up to 50 feet in length for engine and hull repairs.

Matapeake, 7 miles north of Kent Point, is the site of a former ferry terminal for the eastern shore. The jettied entrance channel had a controlling depth of 6 feet to the slips in September 1960; a pier just north of the slips has 8 feet at the outer end. The Chesapeake Bay Bridge, 9 miles north of Kent Point, is described in Chapter 13.

Chart 548.—Love Point Light (39°03.4′ N., 76°17.0′ W.), 38 feet above the water, is shown from a white hexagonal house on brown piles in depths of 10 feet, 1.4 miles northeast of Love Point; a fog signal is at the light. Love Point Light is 2.5 miles due east of a point 132 miles along the channel from the Virginia Capes to the head of Chesapeake Bay.

The main entrance to **Chester River** is between **Love Point,** the northern end of Kent Island, and Eastern Neck Island, 3 miles to the eastward. The approach is northward and eastward of Love Point Light. Light-draft vessels can also enter from Eastern Bay and Miles River on the southward by way of Kent Island Narrows. Traffic on the river consists chiefly of petroleum products and shellfish.

Chester River has natural depths of 20 feet or more for 19 miles, thence 12 feet for 7 miles, thence 8 feet for 4 miles to Deep Landing, and thence 4½ feet to within a mile of Crumpton, 32 miles above the mouth. The river channel is marked by lights, lighted ranges, and buoys to Chestertown and by buoys to Crumpton. Above Chestertown, deepest water is difficult to follow without local knowledge and unless extreme caution is exercised.

The mean range of tide in Chester River is 1.1 foot at the entrance, 1.3 feet at Queenstown, 1.8 feet at Chestertown, and 2.4 feet at Crumpton. The current velocity is less than 1.0 knot. The river is usually closed to navigation by ice for extended periods during ordinary winters; in mild winters the channel is kept clear most of the time by powerboats. The river water is fresh above Chestertown.

Love Point is a summer-resort village on the point on the west side of the entrance to Chester River. The old railroad pier on the river side of the village is in ruins.

Eastern Neck Island, on the east side of the entrance to Chester River, is about 3 miles long in a northwest-southeast direction and has a greatest width of 1.6 miles. The island is sparsely wooded, and extensive grassy flats are found along the south shore, and is connected with the mainland on the north by a fixed highway bridge over **Eastern Neck Narrows,** which is very shallow and little used.

Macum Creek and **Piney Creek,** 3.3 and 4 miles, respectively, along the Kent Island shore of Chester River

from Love Point, are shallow and are used only as anchorages by small local boats. **Chester** is a village at the head of Macum Creek.

The approach to **Kent Island Narrows,** on the south side of Chester River, is from a point 4.5 miles along the river channel from the main entrance. The controlling depth in the channel from Chester River to Eastern Bay was 5 feet in September 1960.

The channel through Kent Island Narrows is marked by numerous buoys. **Note well** that the system of marking is continuous from Eastern Bay to Chester River; consequently, buoys colored black with odd numbers are on the right and buoys colored red with even numbers are on the left proceeding from the river to the bay. The highway bridge that crosses the narrows has a 48-foot bascule span with a clearance of 18 feet; see **203.290,** Chapter 2, for **drawspan regulations.** The current velocity is 1.0 knot on the flood and 1.4 knots on the ebb at the bridge.

Several piers are along Kent Island Narrows adjacent to crab and oyster houses. Kent Island Yacht Club is on the west side of the narrows, 0.2 mile south of the bridge. Depths of 7 feet are on the outside face of the club's L-shaped pier.

Wells Cove, on the east side of Kent Island Narrows 0.4 mile southeast of the bridge, has general depths of 1 to 5 feet. A dredged channel marked by buoys leads from the channel in the narrows to a basin in the cove; the controlling depth was 6 feet in September 1960. Facilities in the cove include: small wharf, marine railway, 20-ton hoist, and public landing with 4 to 6 feet along the face; gasoline is available.

Jackson Creek, on the south side of Chester River 5 miles above the entrance, is a cove with general depths of 2 to 7 feet used as an anchorage by oyster boats; the channel is marked by buoys. The bottom within the cove is covered with grass.

Queenstown Creek is on the southeast side of Chester River 7 miles above the main entrance. In October 1960, the depth was 6 feet over the bar at the entrance and 7 feet in the turning basin at **Queenstown,** a village on the southeast side of **Little Queenstown Creek.** The entrance channel is bordered by very shallow grassy flats, and is well marked. Supplies can be obtained in the town, but not at the waterfront. About 0.7 mile above Queenstown, Queenstown Creek is crossed by an overhead power cable with a clearance of 66 feet. The creek has general depths of 7 feet. A prominent elevated tank is in the town.

Grays Inn Creek, a mile northwest of a point 11.5 miles along the Chester River channel from the main entrance, has depths of 8 feet for 2.3 miles to a small settlement on the west side, then shoals gradually to 1 foot at the head, 3.4 miles above the mouth. About 1.8 miles above the mouth, a marina on **Skinners Neck** has a marine railway that can haul out craft up to 45 feet in length for hull repairs; a nearby mechanic can be called in to repair engines.

The mouth of **Langford Creek** is 1.3 miles northward of the 11.5-mile point in the main channel. The creek has depths of 12 feet over the bar and much deeper water inside to the forks 1.7 miles above the mouth; the channel is marked by buoys thus far. An unmarked shoal extends southwestward from small **Cacaway Island** toward the junction of the two fork channels; above the shoal the unmarked forks are clear in midchannel. **East Fork** has depths of 10 feet for 3 miles, thence 7 feet for 1 mile to within a mile of the head. **West Fork** has depths of 8 feet for about 3 miles, thence 6 feet for 0.7 mile.

Long Cove, on the west side of Langford Creek 0.7 mile above the mouth, has depths of 4 feet to the head; the entrance is buoyed. A marine railway in the cove can haul out boats up to 40 feet in length for hull and engine repairs; gasoline, water, and electricity are available.

Davis Creek, on the west side of Langford Creek 1.5 miles above the mouth, has depths of 9 feet to a marina on the south side near the entrance. Gasoline, water, and electricity are available. A marine railway at the marina can haul out boats up to 40 feet in length, for hull and engine repairs.

The common entrance to **Reed Creek** and **Grove Creek** is a mile southeast of the 11.5-mile point in the main channel of Chester River. The channel to the fork 0.3 mile above the common mouth has a depth of 6 feet. Reed Creek extends southeastward and has depths of 7 feet for about 0.6 mile from the fork, then shoals gradually to 1 foot a mile farther up. The channel in Grove Creek, which extends eastward, is only about 60 feet wide 0.3 mile above the fork but has depths of 3 feet through the narrows and 5 feet for a mile above that. An elevated tank is conspicuous east of the fork.

Corsica River is on the east side of Chester River 13 miles above the main entrance. The controlling depth in the channel to the wharf at **Centreville Landing,** 5 miles above the mouth, was 7 feet in October 1960. The channel is marked by buoys for 3 miles, above which navigation is difficult without local knowledge. Available supplies at the town of Centreville, 0.5 mile inland of the landing, include gasoline and groceries. The main wharf at the landing is in poor condition, but a smaller wharf is available.

Southeast Creek, on the southeast side of Chester River 20 miles above the mouth, has depths of 4 feet for 1.8 miles, then shoals to 1 foot at the head of navigation 0.4 mile farther up. **Island Creek,** which empties into the south side of Southeast Creek 0.5 mile above the mouth, has depths of 3½ feet in the entrance and 4 feet or more for 2 miles to a fixed highway bridge. Both creeks are marked by bush stakes in the difficult reaches. A marina, 0.3 mile above the entrance to Island Creek, has a marine railway that can haul out boats up to 45 feet in length for engine and hull repairs; available supplies include gasoline, water, and electricity.

On the east bank of Chester River, 21 miles above the mouth, there is a marina with a marine railway that can haul out craft up to 30 feet in length for hull and engine repairs; available supplies include gasoline, water, and ice.

Chestertown, on the northwest side of Chester River 24 miles above the mouth, is a county seat and has bus

and rail transportation. The highway bridge over the river at Chestertown has a bascule span with a clearance of 12 feet. The wharf at the marina just below the bridge has depths of 14 feet at the outer end and 6 feet at the inner face; available supplies include gasoline, water, and ice. The marine railway can handle boats up to 30 feet in length for engine and hull repairs. The yacht club on the west side of the river, 1.5 miles below Chestertown, has a pier with 14 feet at the face; gasoline and water are available.

Between Chestertown and Crumpton the channel is very narrow in places, with broad flats on either side that are almost awash at low water. Though marked by buoys in the more critical places, it is difficult to navigate without local knowledge, and is more easily followed at low water.

Morgan Creek, on the northwest side of Chester River 26 miles above the mouth, has depths of 4 feet over the bar at the entrance and 5 feet for 2 miles in a narrow crooked channel. The entrance is a narrow slough between flats almost awash at low water and is usually marked by bush stakes. A fixed highway bridge 0.6 mile above the entrance has a clearance of 8 feet.

Gasoline is available at **Deep Landing,** on the south side of Chester River 30 miles above the mouth.

Crumpton is on the south side of Chester River 32 miles above the mouth. The highway bridge at the town has a 40-foot fixed span with a clearance of 14 feet.

Above Crumpton, the Chester River is unmarked and the channel is difficult to follow; the controlling depth to **Churacre,** a small private landing 37 miles above the mouth, was 2½ feet in October 1960. A highway bridge with a 17-foot fixed span crosses the river 3.5 miles above Crumpton. Gasoline can be obtained about 0.5 mile below the bridge; a launching ramp and small-boat berths are available. An overhead power cable 0.2 mile west of Churacre landing has a clearance of 45 feet.

Rock Hall Harbor is northward of the entrance to Chester River, 5 miles north-northeastward of Love Point Light. Traffic in the harbor consists chiefly of shellfish, shells, and petroleum products. The controlling depth in the channel leading to the harbor terminals was 8 feet in September 1960.

The approach to Rock Hall Harbor is from southward, between **Swan Point Bar** and the mainland on a lighted range. The dredged channel at the entrance to the harbor and inside the jetties is marked by lights, buoys, and daybeacons.

Depths at the wharves in Rock Hall Harbor range up to 9 feet. Available supplies on the waterfront include gasoline, water, and ice; groceries can be obtained in **Rock Hall** (P.O.), the village 0.4 mile inland to the eastward. The largest marine railway in the harbor can haul out vessels up to 65 feet in length for hull and engine repairs; a 20-ton boat lift also is available.

Swan Creek is a mile northwestward of Rock Hall Harbor and 0.7 mile southeastward of **Swan Point,** which is 137 miles above the Virginia Capes. The creek channel has depths of 7 feet for 1 mile above **Little Neck Island,** on the west side of the entrance, then shoals to 1 foot at the head of navigation 2.3 miles above the entrance.

The shallow flats that extend 0.4 mile south-southeastward from Little Neck Island are marked by a buoy. The approach to Swan Creek is made on the same north-by-west lighted range used for Rock Hall Harbor. Gasoline, berthing, water, electricity, and groceries are available at **Gratitude,** about half a mile above the entrance to Swan Creek. The channel is privately marked by buoys a short distance north of Gratitude around the point to **Deep Landing,** where berthing, mooring, gasoline, diesel fuel, water, and electricity are available. The area immediately north of Deep Landing and the cove, **The Haven,** a half mile east of Deep Landing, provides a good small-boat refuge in heavy weather.

15. BALTIMORE TO HEAD OF CHESAPEAKE BAY

Chart 1226.—The most important of the many tributaries that empty into the northern end of Chesapeake Bay are Patapsco, Elk, and Susquehanna Rivers. Patapsco River forms Baltimore Harbor, and Elk River is the approach to the Chesapeake and Delaware Canal; the other tributaries are seldom used by vessels drawing more than 12 feet. The shores are mostly wooded in the undeveloped areas and rise to considerable heights in the vicinity of Northeast and Susquehanna Rivers.

There are extensive shoal areas in the upper part of the bay, and **fish traps** are numerous in season; fish-trap limits are shown on the chart. All of the tributaries are usually closed by ice for extended periods during the winter.

Chart 549.—Sandy Point Light and Baltimore Light, 129 and 131.5 miles above the Virginia Capes, were described in Chapter 13. The channel to Baltimore and the channel to the head of Chesapeake Bay separate 0.5 mile eastward of Sandy Point Light; at Baltimore Light, the Baltimore channel and the bay channel are 0.4 mile and 3 miles due eastward.

Sevenfoot Knoll Light (39°09.3′ N., 76°24.5′ W.), 42 feet above the water, is shown from a red cylindrical pile structure on the northeast side of the channel to Baltimore 137 miles from the Capes; a fog signal is sounded at the light.

Baltimore Harbor consists of the entire Patapsco River and its tributaries; a part of the waterfront thus included lies outside the municipal limits of Baltimore but by State law is within the jurisdiction of the Maryland Port Authority.

Patapsco River empties into the west side of Chesapeake Bay between Bodkin Point and North Point, 4 miles to the northward; the midchannel point in the entrance, 2 miles northwest of Sevenfoot Knoll Light, is 139 miles from the Virginia Capes and 54 miles from Delaware River.

Channels.—The Federal project provides for dredging depths of 39 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore; 27 feet in the side channel from just above the Chesapeake Bay Bridge to Chesapeake and Delaware Canal; and 27 feet in the cutoff channel from Chesapeake and Delaware Canal to Baltimore, 10 miles above the Chesapeake Bay Bridge.

The dredged sections in the lower Chesapeake Bay were discussed in Chapter 11. The dredged sections in the upper bay are: in the main channel from about a mile southward of Baltimore Light up the Patapsco River to Fort McHenry, a distance of 17 miles; in the side channel from just below Pooles Island, 18 miles above the Chesapeake Bay Bridge, to Chesapeake and Delaware Canal; and in the cutoff channel to Baltimore, 10 miles above the Chesapeake Bay Bridge. The channels are well marked by lights, lighted ranges, lighted and unlighted buoys.

Project channels into Curtis Bay, Middle Branch, and Northwest Harbor, tributaries of Patapsco River at Baltimore, are discussed later.

Bodkin Point is the low northeastern extremity of **Bodkin Neck,** on the south side of the entrance to Patapsco River. Shoals extend northward and eastward from the point to the edge of the main channel.

Bodkin Creek, which empties into Patapsco River along the inner side of Bodkin Neck, has depths of 9 feet in the approaches and 7 to 9 feet for considerable distances into its branches. The channel is very narrow at the mouth of the creek and leads between extensive shoals. Buoys mark the approaches and the narrow entrance.

Back Creek empties into the west side of Bodkin Creek just inside the mouth. **Main Creek** is on the same side and is separated from Back Creek by **Spit Neck.** Both branches have depths of 7 to 9 feet almost to their heads and are much used by pleasure craft. A marine railway near the head of Back Creek can haul out boats 30 feet in length; gasoline is available.

Gasoline, water, and ice can be obtained at a pier on **Graveyard Point,** on the south side of Main Creek 0.2 mile above the mouth. The marine railways on the point can handle boats up to 75 feet in length; the well-equipped machine shop can repair gasoline and diesel engines. A 10-ton travel lift can haul out boats up to 27 feet in length. Berthing for numerous boats is available and marine hardware can be obtained. A yacht club is on the premises. A marina at the entrance to **Perry Cove,** 1.3 miles above the mouth of Main Creek, has gasoline, water, and electricity on the piers, with berthing for 45-foot boats. A marine railway at the marina can haul out boats 45 feet in length for hull repairs.

Rock Point is on the southwest side of Patapsco River 3 miles above Bodkin Point. Back of Rock Point is an elevated water tank, and a pier extends out from the Rock Creek side to depths of 5 feet or more. **White Rocks,** 0.6 mile northwest of Rock Point, are about 15 feet high and are marked by a light; the deepest water is north and west of the rocks.

Rock Creek, which empties into Patapsco River along the northwest side of Rock Point, has depths of 11 feet almost to the head. Buoys mark the entrance and the channel into the creek. A light on the east side marks the narrow part of the channel off **Fairview,** 0.5 mile above the mouth.

Wall Cove empties into the southeast side of Rock Creek along the south side of Fairview. The Maryland Yacht Club piers on the Fairview side of the entrance

have depths of about 13 feet at their outer ends; gasoline, fresh water, and other supplies are available on the piers. A boatyard in the cove can haul out vessels up to 85 feet in length and can make all kinds of hull and engine repairs; the yard has a 30-tone mobile crane. Available supplies include gasoline, diesel fuel, fresh water, and ice.

Several marinas and marine railways are located in Rock Creek; the largest railway can haul out boats up to 50 feet in length; gasoline, water, ice, and other supplies are available. The marina on the east side of the creek, 1.5 miles above the mouth, has a 10-ton travel lift that can haul out boats up to 45 feet in length. Most of the places do engine and hull work.

Stony Creek, on the southwest side of Patapsco River 5 miles above Bodkin Point, has depths of 12 feet or more almost to the head. The channel along the west side of the entrance is about 70 yards wide and is marked by a light and buoys; the east side is obstructed by rocks, some of which bare at all stages of the tide. The highway bridge 0.8 mile above the mouth of Stony Creek has a 40-foot bascule span with a clearance of 18 feet.

Nabbs Creek, on the northwest side of Stony Creek, a mile above the mouth, has depths of 12 feet almost to the head; gasoline and water are available on the north side of the entrance. A yard on the south side of Nabbs Creek near the head has a marine railway that can handle boats up to 40 feet in length; the machine shop can repair hulls and engines. Gasoline and water can be obtained at the yard.

Back Cove, on the north side of Nabbs Creek near the mouth, has depths of 12 feet to a boatyard 0.3 mile above the entrance. The yard can haul out boats up to 75 feet in length for engine and hull repairs; gasoline and water are available.

North Point is on the north side of the entrance to Patapsco River. **Old Road Bay,** which empties into the river along the west side of the point, has general depths of 7 to 12 feet. A rock, covered 1 foot, near the mid-entrance is marked by a buoy; another buoy marks the edge of the shoal that extends westward from North Point; a light, 0.25 mile off the north shore of the bay, marks the outer end of a shoal that extends 0.5 mile from the west shore.

North Point Creek and **Jones Creek,** which empties into the northeast and northwest corners of Old Road Bay, have depths of 4 to 6 feet; the approach to both creeks is eastward of the light off the north shore of the bay. Several marinas and marine railways are located in Jones Creek, and one marina is located in North Point Creek; the largest railway can haul out boats up to 40 feet in length; gasoline, water, and ice are available.

Chart 545.—Baltimore, Maryland, one of the major ports of the United States, is situated at the head of tidewater navigation on Patapsco River. The midharbor point, at the intersection of Fort McHenry Channel and Ferry Bar Channel 0.6 mile southeast of Fort McHenry, is 8 miles from the mouth of the river, 147 miles from the Virginia Capes, and 62 miles from Delaware River.

Principal imports are crude petroleum and petroleum products, iron ore, chrome and manganese, gypsum, sugar, and bananas; exports are chiefly grains, iron products, coal, and fertilizers. Coastwise receipts are crude petroleum and petroleum products, fertilizers, sulfur, and sugar; shipments are mostly petroleum and iron products.

Channels.—The main channel from the Virginia Capes to Fort McHenry was discussed at the beginning of the chapter. The branch channels will be covered in the descriptions of the tributaries.

Anchorages.—Anchorage areas have been prescribed for Baltimore Harbor by the Maryland Port Authority, who has issued the following regulations. Limits of the anchorages are shown on Chart 545.

All vessels anchoring in the harbor shall anchor so as to keep within one of said anchorages and be subject to all rules and regulations which the Maryland Port Authority may prescribe. All vessels, when at anchor between sunset and sunrise, shall comply with Federal regulations governing anchor lights.

The master or other person in charge of any vessel so anchored as to obstruct the free passage of any other vessel to or from an anchorage, wharf, or dock, or moored or anchored so that they will be or will swing beyond the boundaries of said anchorage, shall, upon being notified, immediately correct the condition, and if the condition continues beyond six hours from the time of the notification, a penalty of $25.00 for each and every hour beyond this time limit, or thirty days in the city jail, or both, shall, upon conviction, be imposed upon the person responsible therefor. If no person be on such vessel, upon whom said notice can be served, then the Maryland Port Authority shall have such vessel removed and the expense for same shall be paid to the Maryland Port Authority by the master, owner, or agent of such vessel. The Maryland Port Authority shall have the authority to designate such other emergency anchorage locations in Baltimore Harbor as the needs may require and to maintain and patrol said locations until the emergency has ceased.

Anchorage A is in Canton Hollow in the Northwest Branch, Patapsco River. No vessel shall anchor within 300 feet of any pier or bulkhead fronting on this anchorage.

Anchorage C is south of Ferry Bar. This anchorage shall be restricted to yachts. Vessels must anchor in such a way as not to block entrance to the slips of the nearby yacht clubs.

Anchorage No. 1 (Fort McHenry). This anchorage is to be used only as an overnight anchorage for vessels waiting to go to piers. No vessel may remain on this anchorage more than 12 hours without a permit from the Maryland Port Authority.

Anchorage No. 2 (General Anchorage) is between Lazaretto Point and the Dundalk Marine Terminal. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to

be a general anchorage for vessels with a draft of 24 feet and under.

Anchorage No. 3 (Riverview, General Anchorage) is between Fort McHenry Channel and the Dundalk Marine Terminal. This anchorage shall be restricted to vessels of over 24 feet draft. No vessel shall remain on this anchorage longer than four days without obtaining a permit from the Maryland Port Authority.

Anchorage No. 4 (General Anchorage) is between Sollers Point and the Dundalk Marine Terminal. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to be a general anchorage for vessels drawing 20 feet and under.

Anchorage No. 5 (General Anchorage) is between Fort McHenry Channel and Curtis Bay Channel. No vessel shall remain longer than four days without obtaining a permit from the Maryland Port Authority. This is to be a general anchorage for vessels drawing 20 feet and under.

Anchorage No. 6 (Explosives Anchorage) is northeast of Fort McHenry Channel and just northwest of Fort Carroll. Vessels are to anchor here only for the loading and unloading of explosives; vessels loading explosives are to leave the port immediately upon the completion of the transfer.

Anchorage No. 7 (Quarantine Anchorage) is in the area west of Fort McHenry Channel and south of Curtis Bay Channel. This anchorage is to be used only by vessels waiting quarantine inspection. Special permits for use of the lower part of the anchorage for explosive loading of vessels may be issued in extraordinary cases.

Anchorage No. 8 (Dead Anchorage) is in Curtis Bay, south of Curtis Bay Channel. Vessels shall anchor so as not to swing within 100 yards of the channel. No vessel may occupy this anchorage without obtaining a permit from the Maryland Port Authority. When the Maryland Port Authority finds such action necessary to conserve space, he may require vessels in this anchorage to moor bow and stern to one anchor.

Anchorage No. 9 (General Anchorage) is north of Ferry Bar Channel and southwest of Fort McHenry Park. This anchorage is to be used only by vessels using nearby docks while awaiting berths at piers. No vessel may remain in this anchorage more than 12 hours without obtaining a permit from the Maryland Port Authority.

Tides and currents.—The mean range of tide is 1 foot at Baltimore; daily predictions are given in the Tide Tables. Prolonged winds of constant direction may cause substantial variation in the tide. Currents in the harbor are too weak and variable to be predicted.

See Appendix for **storm warning displays** in Baltimore Harbor.

Fogs occur chiefly from October to March, inclusive; during that period there are 12 days on the average with dense fogs. From April to September there are only two days, on the average, with dense fogs. Very light winds clear the fog away.

Ice.—Baltimore Harbor is frozen over during severe winters, but the municipal ice-breakers and the larger power-driven vessels keep the dredged channels open so that self-propelled vessels seldom have difficulty in entering the harbor. Ice conditions in the main channel are most severe in the vicinity of Sevenfoot Knoll Light, where ice moving from the northern end of Chesapeake Bay tends to collect in packs. Navigation from Baltimore to the upper end of the bay and the Chesapeake and Delaware Canal is likely to be interrupted by ice for short periods during an average winter.

Pilotage is compulsory for foreign vessels and American vessels in the foreign trade bound to or from the port of Baltimore.

The Association of Maryland Pilots provides pilotage between Baltimore and the Virginia Capes, and between Baltimore and the Maryland entrance to the Chesapeake and Delaware Canal at Chesapeake City, Maryland. Pilots of the association also serve tributaries of the Chesapeake Bay. The dispatch office is on Recreation Pier at the foot of Broadway, 0.7 mile above Fort McHenry.

Pilotage information for incoming vessels is given in Chapters 6, 7, and 9.

Towage.—A large fleet of tugs operated by several towboat companies is available at all times to assist vessels arriving or departing, in docking or undocking, and in shifting within the harbor.

Quarantine.—Vessels requiring inspection remain in the quarantine anchorage southward of the junction of Fort McHenry and Curtis Bay Channels until cleared by officials of the Public Health Service.

A hospital of the Public Health Service is in Baltimore.

Customs.—Baltimore is a port of entry and marine documents are issued. Vessels subject to the customs laws are usually boarded at the quarantine anchorage, but they may be boarded after arrival at berth.

Immigration.—Inbound vessels are boarded immediately after quarantine inspection. Passengers denied entry by the immigration inspector are detained aboard vessel (medical cases excepted) until examined by a special board of inquiry.

Harbor regulations.—The Maryland Port Authority has general jurisdiction over the physical operation of Baltimore Harbor and issues rules and regulations pertaining to the use of public wharves and anchorage areas.

Local regulations prescribe a **speed** limit of 7 knots in Northwest Harbor westward of a line from Fells Point to Locust Point; 9 knots eastward of the line; and 8 knots in Patapsco River or tributaries within 300 feet of any pier or bulkhead.

Wharves.—The total length of developed waterfront in Baltimore Harbor, measured along the established bulkhead line, is about 23 miles. Extensive areas remain which are available for future development. The existing terminal facilities include wharves, piers, grain elevators, coal and ore piers, storage and bunkering facilities for fuel oil, terminal warehouses, marine railways, drydocks, and shipyards.

Several municipal piers administered by the harbor-

master are located throughout the harbor district. They are used principally by vessels in the coastwise trade.

Supplies.—Bunker coal is available in Curtis Bay, at Port Covington, and in Northwest Harbor. Bunker oil can be obtained in Curtis Bay, at Fairfield, and in Northwest Harbor. Water of high quality for drinking and boiler purposes is available at practically all of the larger piers.

Repairs.—Baltimore is well supplied with drydocking and hauling-out facilities. The largest floating drydock, in Northwest Harbor, has a lifting capacity of 20,000 tons and has handled vessels up to 600 feet in length and 22 feet in draft; a graving dock at the same plant has only slightly less capacity. Marine railways are available with lifting capacities up to 1,800 tons. Several smaller railways along the tributaries cater to the yachtsman and small-boat operator.

Baltimore has extensive facilities for wrecking and salvage. In addition to equipment especially designed for salvage operations, there are a number of heavy hoisting facilities which, though primarily designed for private industrial purposes, are available in case of need.

Communications.—Nearly all the piers, wharves, and docks in Baltimore Harbor are close to the center of the city and all are connected to it by wide, well paved streets. Many of the piers have direct connections with the main-line railroads whose tracks extend to all parts of the port area.

The Maryland Port Authority radio station reports local harbor information to shipping.

Baltimore is served by the Pennsylvania Railroad, the Baltimore and Ohio Railroad, and the Western Maryland Railway. The Canton Railroad is a terminal line that operates about 35 miles of track in the port area and connects with the major roads.

More than 50 steamship services connect Baltimore with principal United States and foreign ports by regular sailings in the overseas, coastwise, and intercoastal trades.

Friendship International Airport is inland, about 7 miles southwestward of Fort McHenry.

Sparrows Point, on the northeast side of Patapsco River 3 miles above the mouth, is the site of a large iron and steel works and a shipbuilding plant. The buildings, stacks, and tanks are prominent. About 2 miles along the main channel from the river mouth, **Sparrows Point Channel,** with depths of 35 feet or more, privately maintained and well marked, extends 1.1 miles on a lighted range bearing **354°** to the ore-handling wharves on the south side of the point. About 4 miles above the river mouth, a feeder channel with depths of 23 feet follows a lighted range bearing **038°**; buoyed branches with depths of 17 to 23 feet lead eastward to the wharves and shipyard on the west side of the point. All the facilities on Sparrows Point have good rail connections.

Bear Creek, on the northeast side of Patapsco River 4 miles above the mouth, has depths of 12 feet or more in the approach from the Sparrows Point feeder channel and for 3 miles upstream. The abandoned railroad bridge 0.7 mile above the mouth of the creek has a swing span which is secured in an open position. A gas and cable pipeline just below the bridge is carried on a trestle to the edge of the channel where it is submerged. An overhead power cable, 0.3 mile above the bridge, has a clearance of 95 feet between two lighted structures.

Peachorchard Cove, on the west side of Bear Creek 1.5 miles above the entrance, has depths of 9 feet for 0.4 mile to within 0.1 mile of its head.

The highway bridge that crosses Bear Creek just above Peachorchard Cove has a bascule span with a clearance of 15 feet. The highway bridge 0.5 mile upstream has a bascule span with a clearance of 25 feet. **Drawspan regulations** for these bridges are given in **203.245,** Chapter 2. The railroad bridge 2.1 miles above the mouth of Bear Creek has a swing span with a clearance of 8 feet. A marina, just north of the railroad bridge, has a 10-ton travel lift that can haul out vessels up to 40 feet in length for hull and engine repairs; available supplies include gasoline, water, and ice. The depths at the gasoline pier are about 14 feet.

Lynch Cove, on the northwest side of Bear Creek 2.2 miles above the mouth, has depths of 12 feet for 0.5 mile, thence 9 feet for another 0.3 mile, and thence 7 feet to just south of the burned wreck of a large barge. At this point abrupt shoaling occurs to 1 foot or less. A 4-foot shoal in midentrance is marked by a buoy.

A boatyard on the south side of Lynch Cove, 0.5 mile above the entrance, can haul out vessels up to 80 feet in length; a nearby machine shop repairs gasoline and diesel engines and does hull work. Available supplies include gasoline, diesel fuel, fresh water, and ice. The depth at the piers is about 14 feet. Gasoline, water, and ice are available at a marina just north of the boatyard. The depth at the gasoline pier is about 11 feet.

Schoolhouse Cove, on the northeast side of Bear Creek 3 miles above the mouth, has depths of 8 to 12 feet to near the head. A small boatyard in the cove can haul out boats up to 42 feet in length. A yacht club is on the east side of Bear Creek just below Schoolhouse Cove.

The highway bridge that crosses Bear Creek, 3.1 miles above the mouth, has a bascule span with a clearance of 12 feet. A small marina on the east bank just north of the bridge has a hard-surfaced launching ramp.

Fort Carroll is a stone and concrete structure on the northeast side of Patapsco River main channel 4.4 miles above the mouth. A light, 45 feet above the water, is shown from a white structure on the west front of the fort; a fog signal is sounded at the light.

Hawkins Point, on the southwest side of Patapsco River 4.5 miles above the mouth, is at the southeastern limits of the City of Baltimore. A buoyed channel with depths of 36 feet or more leads to a long cargo pier 0.4 mile northwestward of the point. Caution should be exercised in approaching the pier because the outer portion is in ruins and there may be underwater obstructions.

Leading Point is on the southwest side of Patapsco River 5.5 miles above the mouth. The wharf in **Thoms Cove** on the east side of the point has a buoyed approach with depths of about 10 feet.

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Curtis Bay, on the southwest side of Patapsco River 6 miles above the mouth, is the approach to large coal and oil wharves and to several industrial plants. The entrance is between Leading Point and Fishing Point, 0.8 mile to the northwestward; the midchannel point is 1.1 miles westward along Curtis Bay Channel from its intersection with the main channel 5.2 miles above the mouth of the river.

Channels.—The Federal project for Curtis Bay provides for depths of 35 feet in **Curtis Bay Channel** and in Curtis Creek to a point 750 feet north of Pennington Avenue bridge, thence 22 feet for 0.9 mile above this bridge to the wharves on the west side of the creek and to the Coast Guard depot in Arundel Cove. The channels were at or near project depths when last surveyed. The entrance channel is well marked by a lighted range bearing **267°** and by lighted and unlighted buoys; the critical points in Curtis Creek are marked by buoys.

The oil-bunkering wharves on **Fishing Point,** on the northwest side of the entrance to Curtis Bay, have depths of about 30 feet at their faces; one wharf can load at the rate of 1,000 barrels per hour. The Baltimore and Ohio Railroad coal pier at the head of Curtis Bay Channel has depths of about 35 feet alongside and can load at the rate of 2,000 tons per hour.

Stonehouse Cove empties into the head of Curtis Bay from northward. On the southwest side of the entrance to the cove is a large ore-handling wharf operated by the Baltimore and Ohio Railroad. The channel to the wharf from the head of Curtis Bay Channel is privately maintained at depths of 35 feet or more and is marked by a lighted range bearing **316°.**

Curtis Creek empties into the head of Curtis Bay from southward between **Sledds Point** and **Ferry Point,** 0.3 mile to the southwestward. **Cabin Branch,** on the west side of the creek just south of Ferry Point, has depths of 18 feet or more to within 0.1 mile of a fixed bridge which has a width of 20 feet and a clearance of 7 feet, 0.4 mile above the entrance. The industrial wharves on the north side of Cabin Branch have depths of 14 to 25 feet at their faces.

Several of the wharves on either side of Curtis Creek between the entrance and Pennington Avenue bridge have depths of 25 to 30 feet at their faces.

The Pennington Avenue bridge, 0.9 mile above the entrance to Curtis Creek, has a bascule span with a clearance of 18 feet. A shipyard on the west side of Curtis Creek just north of the bridge has a marine railway with a hauling capacity of 300 tons; the shop repairs engines and wooden hulls.

The railroad bridge 1.3 miles above the entrance to Curtis Creek has a swing span with a clearance of 14 feet.

Arundel Cove is on the east side of Curtis Creek 1.6 miles above the entrance. A Coast Guard depot is on the north side of the cove. A highway bridge 0.4 mile above the entrance to the cove has a 28-foot fixed span with a clearance of 6 feet.

A depth of 16 feet can be carried up Curtis Creek beyond the improved sections to the forks 2.3 miles above the entrance. **Marley Creek** (Chart 549), the middle fork, has depths of 12 feet or more for 1.2 miles, then shoals gradually to 3 feet at a fixed bridge a mile farther up; the bridge has a clearance of 4 feet. An overhead cable about 0.6 mile above the entrance to the creek has a clearance of 57 feet.

A marine service pier on the west side of Marley Creek 1.3 miles above the forks has depths of 12 feet at the face and is marked by a light; gasoline and fresh water are available. A marine railway directly opposite the service station can handle boats up to 75 feet in length for hull and engine repairs.

The **Fairfield** section of Baltimore begins about 6.5 miles above the mouth of Patapsco River and extends upriver along the southwest side for more than a mile. Most of the piers and wharves have depths of 18 to 25 feet at their faces, but some have 30 feet. About 6.8 miles above the mouth, privately dredged channels, with depths of 30 to 34 feet and marked by lighted ranges, lead to oil-bunkering wharves; one wharf can load at the rate of 1,800 barrels per hour. The largest of the floating drydocks at the upper end of Fairfield has a lifting capacity of 18,000 tons; repairs are made to engines, boilers, dynamos, and to wood or steel hulls.

Colgate Creek empties into the northeast side of Patapsco River 6.5 miles above the mouth. A buoyed entrance channel with depths of about 30 feet leads to the **Dundalk Marine Terminal** on the east side of the creek, a mile northeastward of the main channel. Depths above the terminal are 20 feet for 0.2 mile, thence 13 feet to the railroad bridge, about 0.8 mile above the terminal, where the depths shoal to a few feet. The factory buildings on the west side of the entrance to the creek are prominent; the bulkhead wharf has depths of 20 feet or more alongside. The highway bridge 0.3 mile above the entrance has a swing span with a width of 40 feet and a clearance of 4 feet; see **203.245,** Chapter 2, for **drawspan regulations.** The railroad bridge 0.8 mile above the entrance has a swing span with a width of 30 feet and a clearance of 5 feet; the drawspan is fixed in the closed position.

The **Lower Canton** section of Baltimore begins on the northeast side of Patapsco River 7.5 miles above the mouth and extends westward to **Lazaretto Point.** Dredged and buoyed channels lead to the principal piers, which have depths of 20 to 30 feet at their faces. The Pennsylvania Railroad grain elevator, at the eastern end of Lower Canton, has a storage capacity of more than 4,000,000 bushels; the pier serving the elevator has berthing space for six deep-draft vessels.

Patapsco River turns sharply westward at the intersection of Ferry Bar Channel and main Fort McHenry Channel 7.8 miles above the mouth. About 0.7 mile wide between **Fort McHenry** on the north and Fairfield on the south, the river narrows to a width of 150 yards 10 miles above the mouth and meanders off to the southwestward while the deep channel continues westward to Middle Branch. The first of several fixed bridges over the narrow part of the river has a width of 28 feet and a clear-

ance of 8 feet; the river has depths of only 1 foot across the flats in the approach to the bridge.

The Federal project for **Ferry Bar Channel** provides for a depth of 35 feet from the main channel at Fort McHenry to Ferry Bar. The eastern section of the channel is maintained at or near project depth as far as the approaches to the Port Covington deep-draft piers. The western section had a midchannel controlling depth of 19 feet in November 1960. The channel is well marked by a lighted range bearing **270°** and by lighted and unlighted buoys.

The piers and wharves on the north side of Ferry Bar Channel immediately westward of Fort McHenry belong to the Baltimore and Ohio Railroad Company. The principal wharves have depths of 15 to 30 feet at their faces and are reached by an access channel and turning basin with controlling depths of about 28 feet. A lighted range and buoys mark the channel and basin.

The **Port Covington** section of Baltimore begins about 0.8 mile west of Fort McHenry and extends westward and southwestward to Ferry Bar. The principal piers in this section have depths of 35 feet at their faces, and the approaches from Ferry Bar Channel are buoyed. The Western Maryland Railway operates a grain elevator, with a storage capacity of about 4,000,000 bushels, and a coal-bunkering pier at Port Covington.

Ferry Bar, 2 miles westward along Ferry Bar Channel from Fort McHenry Channel, is the point on the east side of the entrance to **Middle Branch.** The Federal project for **Spring Garden Channel** provides for a depth of 27 feet from Ferry Bar to the Western Maryland Railway bridge. The channel has been partially dredged as far as the Hanover Street bridge and had a midchannel controlling depth of 21 feet in November 1960; above the bridge, the buoyed natural channel in Middle Branch has depths of 20 feet or more to the railroad bridge, thence 15 feet to within 0.2 mile of the head, 1.4 miles above Ferry Bar.

The slips and basin on the southwest side of the entrance to Middle Branch have depths of 10 to 15 feet; the best approach is from the vicinity of the drawspan in the Hanover Street bridge.

The marine service stations between Ferry Bar and the north end of the Hanover Street bridge have piers with depths of 5 to 8 feet at the outer ends; gasoline, fresh water, and ice are available. Boats up to 50 feet in length can be hauled out, and engine repairs can be made.

The Hanover Street Bridge, which crosses Middle Branch 0.3 mile above Ferry Bar, has a bascule span with a clearance of 33 feet; see **203.305,** Chapter 2, for **drawspan regulations.**

The Western Maryland Railway bridge, which crosses Middle Branch a mile above Ferry Bar, has a swing span with a clearance of 9 feet. A marginal wharf just below the west end of the bridge has depths of 18 feet at the face. A pipeline 300 yards above the bridge is carried on a trestle to the edges of the channel where it is submerged.

The entrance to **Northwest Harbor** is between Fort McHenry and Lazaretto Point, 0.3 mile to the eastward; the midchannel point is 8.2 miles by main channel from the mouth of Patapsco River. The harbor has depths of about 35 feet to the principal piers on either side of the lower reaches and to the line from **Locust Point** on the southwest to **Fells Point** on the northeast, 1.2 miles above the entrance; thence about 25 feet for 0.6 mile; and thence about 21 feet to the head, 2.5 miles from the entrance.

The principal deep-draft piers in Northwest Harbor are on the southwest side between Fort McHenry and Locust Point and have depths of about 35 feet at their faces. Some of those on the east side of the lower harbor have depths of 30 to 32 feet, as have a few on the southwest side above Locust Point. Depths at the others range from 15 to 25 feet.

Bunker coal is available at the Pennsylvania Railroad pier on the east side of Northwest Harbor about 0.2 mile above Lazaretto Point; the pier has depths of 30 feet alongside. Bunker oil is loaded at the rate of 6,000 barrels per hour from the piers on the east side 0.7 mile above Lazaretto Point; depths alongside are 32 to 35 feet. The Baltimore and Ohio Railroad operates a grain elevator, with a storage capacity of about 4,000,000 bushels, on the west side 0.2 mile below Locust Point; depths alongside the piers are 35 feet.

The graving dock on the southwest side of Northwest Harbor 0.4 mile above Fort McHenry has handled vessels up to 420 feet in length and 15 feet in draft. The marine railway 0.4 mile west of Locust Point has a lifting capacity of 1,800 tons and has handled vessels up to 240 feet in length. The largest of the floating drydocks 0.7 mile westward of Locust Point has a lifting capacity of 20,000 tons and has handled vessels up to 600 feet in length and 22 feet in draft; a graving dock at the same plant has only slightly less capacity. Other marine railways, with lifting capacities up to 700 tons, are available in the upper harbor. Most or all of these plants repair engines, boilers, dynamos, and wood or steel hulls.

Chart 549.—Swan Point, on the east side of Chesapeake Bay 137 miles above the Virginia Capes, has been mentioned in Chapter 14.

Tolchester Beach, 4.5 miles north-northeastward of Swan Point, has an amusement park that is visited during the summer by excursion boats from Baltimore. The wharf has depths of 10 to 13 feet at the face and is marked by a light and a fog signal.

Fairlee Creek, on the east side of Chesapeake Bay 8.5 miles north-northeastward of Swan Point, has a narrow entrance between a jetty on the east and a long, low hook on the west. The privately buoyed entrance had depths of 6 feet in November 1960. A yacht club with berthing facilities is on the east side of the creek just inside the entrance; gasoline, water, and ice are available. See Appendix for **storm warning displays.**

Worton Point is on the east side of Chesapeake Bay 149.5 miles above the Virginia Capes. A flashing white light is shown from a watch tower on the point during

the ice season; a flashing red light is shown from this structure at night when firing is in progress; see **204.30,** Chapter 2, for regulations of the **restricted area.**

About 1.5 miles southward of Worton Point is **Worton Creek,** which has depths of 10 to 12 feet in the broad bight at the entrance and 7 feet inside for 1.4 miles. Good anchorage, protected from easterly winds, is available in depths of 11 to 12 feet just inside the entrance. The critical part of the channel, 0.5 mile above the entrance, is marked by buoys.

The marina at **Buck Neck Landing,** on the east side of Worton Creek, 1.4 miles above the entrance, has extensive berthage and storage facilities. Available supplies include gasoline, diesel fuel, water, and ice. A marine railway that can haul out boats up to 60 feet in length and a 12-ton travel lift are available. The public bulkhead that adjoins the marine wharf has depths of about 6 feet alongside.

North Point, on the north side of the entrance to Patapsco River, has been mentioned earlier in the chapter.

A shallow passage 3 miles northeast of North Point is between the mainland and the southwest end of **Hart Island.** The passage has depths of only 1½ feet and is crossed by a fixed bridge with a clearance of about 5 feet. Narrow Hart Island, 1.7 miles long and mostly marsh, has an amusement park near the bridge and a thick clump of trees near the middle. **Miller Island,** a bare marsh, is just northeastward of Hart Island.

The common approach to Back River, Middle River, and Gunpowder River is between Miller Island and Pooles Island, 4 miles to the east-northeastward.

Pooles Island, low and wooded, is 1.2 miles long in a north-northeasterly direction and has an abandoned lighthouse on the west side near the north end. On the island are the white skeleton towers of two lighted ranges, the rear tower common to both. The north range marks a reach of the main channel leading to the Chesapeake and Delaware Canal. The south range marks a passage across the middle ground east of the island. Pooles Island is entirely within the Aberdeen Proving Ground; see **204.30,** Chapter 2, for limits and regulations of the **restricted area.**

Local magnetic disturbance.—Differences of as much as 5° from the normal variation have been observed in the channel from Pooles Island to Howell Point.

Pooles Island Bar Light (39°15.7′ N., 76°16.7 W.), 27 feet above the water, is shown from a black skeleton tower on a cylinder base, in depths of 18 feet 0.8 mile south-southwestward of the island; a fog signal is sounded at the light. Pooles Island Bar Light is 2 miles due west of a point 145.5 miles along Chesapeake Bay channel from the Virginia Capes.

A buoyed lane extends southwestward between fish-trap areas from eastward of Pooles Island to the Baltimore channel a mile southward of North Point. The lane has a minimum depth of 10 feet and is entered on the Pooles Island south range, **bearing 264°**; Pooles Island Bar Light is on the northwest side of the lane.

The approach to the rivers back of Miller and Pooles Islands is through a side lane, also buoyed, with an average width of about 1 mile. Pooles Island Bar Light is on the northeast side of the bay entrance to the lane and the direction is roughly northwest.

Hawk Cove, between Miller and Hart Islands and the mainland to the northwest, has depths of 8 to 11 feet and is a good anchorage.

Back River, which empties into the southwest end of Hawk Cove, has depths of 4 to 7 feet for 6 miles to a fixed highway bridge with a width of 44 feet and a clearance of 14 feet; even the smallest boats seldom go above the bridge. The channel is unmarked but is clear except for a 4-foot middle ground about halfway between Hawk Cove and the bridge. A boatyard on the west side of Back River opposite the lower end of the middle ground can haul out and make general repairs to vessels up to 45 feet in length; gasoline and some marine supplies are available. Another yard on the east side of the river, 5 miles above the mouth, has a marine railway that can haul out boats up to 55 feet in length and an 8-ton travel lift than can handle boats 27 feet in length; gasoline is available. Several marine service stations along Back River have gasoline, water, and some other supplies.

Charts 549, 1226.—Middle River entrance, 2 miles northwestward of Miller Island, is between **Booby Point** and **Bowley Point,** 0.8 mile to the northward. A channel marked by two lights and a buoy extends from the entrance to the aircraft plant at the head of **Dark Head Creek,** on the north side of Middle River 2.3 miles above the mouth; the controlling depth was 9 feet in October 1960. Above Dark Head Creek, depths of 7 feet can be carried in Middle River to within 0.5 mile of a fixed bridge near the head. Numerous small-boat facilities are along the shores of Middle River and its tributaries.

Sue Island, joined to the mainland on the southside of Middle River 0.6 mile above the mouth, is the headquarters of the Baltimore Yacht Club. Depths of about 7 feet can be carried to the piers on the west side of the island. A seasonal light is at the north end of the island. See Appendix for **storm warning displays.**

Frog Mortar Creek, on the northeast side of Middle River 1.5 miles above the mouth, has depths of 6 to 8 feet. A privately dredged channel with depths of 12 feet or more leads from the Middle River to the Martin Company seaplane basin on the west side of the creek 0.5 mile above the entrance.

Numerous boat slips, gasoline, water, electricity, and some marine supplies are available at the marinas along Frog Mortar Creek. Boats up to 45 feet in length can be hauled out for general repairs. See Appendix for **storm warning displays.**

Hopkins Creek, on the southwest side of Middle River 2.6 miles above the mouth, has general depths of 6 to 8 feet. A marine service station on the south side of the entrance to Hopkins Creek has gasoline, fresh water, ice, and some marine supplies. There are several small marine railways and travel lifts in the vicinity.

The village of **Middle River,** at the head of navigation 3.5 miles above the river mouth, is on the main line of the Pennsylvania Railroad and has bus service to Balti-

more. The Martin Company aircraft factory is in the vicinity. Marinas near the head of Middle River have gasoline, water, electricity, marine supplies, and numerous slips for berthing. A marine railway and travel lift are available.

Seneca Creek, which empties into Chesapeake Bay 1.5 miles northeast of Middle River, has depths of 8 feet in the entrance and 5 to 6 feet into the several arms. Gasoline, water, and ice are available at a pier on the east side of the creek, a mile above the entrance. A marine railway at the pier can haul out boats 30 feet in length. A light marks the outer end of the shoal that extends 0.5 mile southward from the point on the east side of the entrance.

Gunpowder River is 3 miles east-northeastward of Middle River and about the same distance west-northwestward of Pooles Island. Marshy **Spry Island,** just off midentrance, covers at high water and is to be avoided. The approach westward of Spry Island is marked by buoys. The outer ends of the shoals that extend out from either side just inside the entrance also are marked by buoys. The river has channel depths of 11 feet or more for 2 miles; thence 6 to 8 feet for 3.5 miles; and thence 4 feet to a fixed railroad bridge, with a width of 35 feet and a clearance of 12 feet, 6.3 miles above the mouth. There is little or no traffic above the bridge.

Spry Island and most of Gunpowder River are within the **Aberdeen Proving Ground**; see **204.30,** Chapter 2, for limits and regulations of the **restricted area.** Flashing red lights are shown on **Robins Point,** at the south end of Gunpowder Neck, and **Maxwell Point,** on the east side of Gunpowder River 3.5 miles above the mouth, at night when firing is in progress.

Chart 572.—Bush River is on the northwest side of Chesapeake Bay 149 miles above the Virginia Capes. The lower 5 miles of the river are within the Aberdeen Proving Ground. A flashing red light is shown on **Pond Point,** on the east side 3.5 miles above the mouth, at night when firing is in progress; see **204.30,** Chapter 2, for limits and regulations of the **restricted area.**

The river has minimum depths of 7 feet to the railroad bridge 6.3 miles above the mouth, thence 5 to 6 feet for another 1.5 miles. The approach to the river and the channel inside are marked by buoys as far up as **Tapler Point,** on the west side 3.5 miles above the mouth. The mean range of tide is 1.4 feet.

The Pennsylvania Railroad bridge 6.3 miles above the mouth of Bush River has a 35-foot bascule span with a clearance of 13 feet; see **203.245,** Chapter 2, for **drawspan regulations.** The power cable at the bridge has a clearance of 37 feet. A high-voltage power cable about 200 yards below the bridge has a clearance of 43 feet and is supported by towers on either bank and a tower near mid-river; a privately maintained light is shown from the southeast leg of the middle tower.

The village of **Bush River** is at the northeast end of the railroad bridge. The marine railway above the bridge can handle boats up to 45 feet in length for hull and engine repairs; gasoline and some other supplies are available.

The yacht club pier on the west side of Bush River a mile above the bridge has depths of about 6 feet at the outer end. Gasoline, fresh water, and ice are available.

Otter Point Creek, on the west side of Bush River 0.5 mile above the railroad bridge, has depths of 5 feet for a mile above the entrance. Gasoline, water, groceries, and other supplies can be obtained at two marinas, one on each side of the creek, about 0.5 mile above the mouth.

Romney Creek, on the northwest side of Chesapeake Bay 3 miles above Bush River, has depths of about 4 feet in a narrow entrance. The creek is within the Aberdeen Proving Ground and is closed to the public.

Still Pond, a roughly square bight on the southeast side of Chesapeake Bay 152.5 miles above the Virginia Capes, has general depths of 9 to 11 feet and is a good anchorage for small craft during easterly winds. **Churn Creek,** which empties into the southwest corner of the bight, has depths of 2 feet in the very narrow entrance and deeper water inside. **Stillpond Creek,** at the southeast corner of the bight, has depths of 3 feet in the very narrow entrance and 4 to 8 feet inside for 2 miles, nearly to the head.

A flashing red light is shown on **Meeks Point,** on the north side of Still Pond, at night when firing is in progress; see **204.30,** Chapter 2, for limits and regulations of the **restricted area.**

Sassafras River empties into Chesapeake Bay from eastward 156.5 miles above the Virginia Capes. The entrance is between **Howell Point,** marked by a light and a fog signal, and **Grove Point,** 3.5 miles east-northeastward; the entrance width normal to the channel is about 1 mile. The river is used by vessels drawing up to 12 feet, but the usual draft is 6 feet or less.

The river channel has depths of 11 feet for 11 miles, thence 7 to 3 feet for another 2 miles. The channel is broad and straight for the first 4 miles, then is narrow and crooked in places but is marked as far as the highway bridge 10 miles above the mouth. The mean range of tide is 1.7 feet at Betterton and 2 feet at Georgetown.

Betterton is a summer resort on the south side of Sassafras River 2 miles eastward of Howell Point. The principal wharf has depths of 9 feet at the outer end. Excursion boats from Baltimore call at the wharf during the summer. Gasoline and some other supplies are available in the summer.

Turner Creek, on the south side of Sassafras River 4.5 miles above the mouth, has depths of at least 7 feet in a very narrow, unmarked entrance and 5 feet for 0.6 mile upstream. The creek has several small landings along its shores and is much traveled by local pleasure boats.

Kentmore Park is a small community on the south side of Sassafras River 5 miles above the mouth. The community wharf has depths of 7 feet at the outer end.

Back Creek, on the northeast side of Sassafras River 6 miles above the mouth, has depths of 6 feet in an unmarked entrance and for 0.5 mile upstream, thence 3 to 15 feet for another mile. The creek is little used.

Fredericktown, on the north side, and **Georgetown,** on the south side of Sassafras River 10 miles above the

mouth, are connected by a highway bridge that has a 40-foot bascule span with a clearance of 4 feet. See Appendix for **storm warning displays.**

The fuel docks just below the Fredericktown end of the bridge have depths of 8 feet at the outer ends; available supplies include gasoline, diesel oil, fresh water, and ice. The 30-ton marine travel lifts can handle boats up to 55 feet in length; a machine shop repairs gasoline and diesel engines, and does hull work.

The unmarked channel in Sassafras River above the bridge is narrow in places and difficult to navigate without local knowledge. A marina on the south side of the river a mile above the bridge has gasoline, water, ice, and some other supplies; a marine railway can haul out boats up to 40 feet in length for engine and hull repairs.

Spesutie Narrows, on the northwest side of Chesapeake Bay 157 miles above the Virginia Capes, is between the mainland and **Spesutie Island,** close to the eastward. A dredged channel with depths of 8 to 11 feet leads from the flats of the same depths off the southern entrance into and along the narrows to the United States Army landings: the entrance channel is marked by lighted ranges and buoys, and the inner channel is marked by buoys.

The highway bridge over the north end of Spesutie Narrows, 2.5 miles from the south end, has a 13-foot fixed span with a clearance of 8 feet; a pipeline crosses underneath the bridge, limiting the clearance to about 6 feet. The passage through the north part of the narrows has depths of about 3 feet.

Spesutie Island and Spesutie Narrows are within the Aberdeen Proving Ground. A flashing red light is shown on **Mulberry Point,** on the west side of Spesutie Narrows a mile above the south entrance, at night when firing is in progress; see **204.30,** Chapter 2, for limits and regulations of the **restricted area.**

Elk River, which empties into the east side of Chesapeake Bay 160 miles above the Virginia Capes, is the approach to the Chesapeake and Delaware Canal. The entrance to the river is between **Grove Point** and **Turkey Point,** 3 miles north-northeastward; the latter point is a thinly wooded bluff with abrupt slopes at the south end. A light is shown from a white tower on the bluff. The entrance width normal to the channel is about a mile.

The mean range of tide is 2.1 feet at the entrance to Elk River and 2.3 feet at the head. The current velocity is 0.6 knot.

Local magnetic disturbance.—Differences of 3° to 8° from normal variation have been observed in Elk River channel from Grove Point to Courthouse Point.

Bohemia River, on the east side of Elk River 5 miles above the mouth, has depths of 7 feet or more for 4 miles to the junction of **Great Bohemia Creek** and **Little Bohemia Creek,** thence 6 to 4 feet for 1.5 miles in Great Bohemia Creek and 7 feet for a mile in Little Bohemia Creek. The unmarked channel is broad and easy to follow for 2 miles above the entrance, then becomes very narrow and crooked.

The cove on the southwest side of Bohemia River 3 miles above the entrance has depths of 3 to 5 feet and is much used as a small-boat anchorage. Gasoline, water, groceries, and some other supplies are available at a marina on the northwest side of the cove; a 10-ton travel lift at the pier can haul out boats of 40 feet in length; engine repairs are made. **Hack Point** is a village on the southeast side of the cove.

A highway bridge 3.6 miles above the mouth of Bohemia River has a 40-foot bascule span with a clearance of 12 feet; see **203.245,** Chapter 2, for **drawspan regulations.** Gasoline, water, ice, groceries, marine hardware, and some other supplies are available at a marina just west of the bridge; a 20-ton travel lift can haul out vessels up to 50 feet in length for hull and engine repairs.

Old Town Point Wharf, on the southeast side of Elk River 7 miles above the mouth, has depths of 10 feet at the outer end. This is a Government wharf and a reporting station for the west end of the Chesapeake and Delaware Canal.

Back Creek, on the east side of Elk River 9 miles above the mouth and 169 miles from the Virginia Capes, is the route of the Chesapeake and Delaware Canal and has been discussed in Chapter 7.

Above Back Creek, the natural channel in Elk River has depths of 9 to 5 feet for 6 miles to the junction of **Big Elk Creek** and **Little Elk Creek,** 15 miles above the mouth. The channel is narrow and crooked in places but is marked by buoys to within a mile of the junction. Traffic on the upper river consists chiefly of sand and gravel carried in motor vessels and barges drawing up to 9 feet.

A marina is just north of **Plum Point** on the west side of Elk River, 5 miles above Old Town Point Wharf. Available supplies include gasoline, water, and ice; a 10-ton travel lift can haul out vessels up to 45 feet in length for engine and hull repairs. The channel to the marina has a controlling depth of about 5 feet and is privately marked.

Old Frenchtown Wharf, on the east side of Elk River 6 miles above Old Town Point Wharf, has depths of 5 feet alongside. Available supplies include gasoline, water, and ice; a boatyard can haul out vessels up to 40 feet in length; the machine shop repairs gasoline engines and does hull work.

Big Elk Creek, on the east, and Little Elk Creek, on the west, have depths of 3 feet to the fixed highway bridges 0.6 and 0.4 mile above their respective mouths. The channels in each are narrow and crooked with numerous snags and shoals that are unmarked. Extreme caution should be exercised beyond the junction. **Elkton** between the creeks and 16 miles above the mouth of Elk River, is on the main line of the Pennsylvania Railroad and has several industrial plants.

The natural channel of Chesapeake Bay turns northward off the mouth of Elk River and splits into two branches between Turkey Point and Spesutie Island, 2.3 miles to the westward. One branch rounds Spesutie Island and leads northward to Susquehanna River; the

other hugs the west side of Turkey Point and high, thickly wooded **Elk Neck** and leads to Northeast River. The flats between the two branches are very shallow, and large areas bare at low water.

Fishing Battery Light (39°29.7′ N., 76°05.0′ W.), 38 feet above the water, is shown from a black skeleton tower on the battery on the east side of the channel leading to Susquehanna River; the light is 165 miles above the Virginia Capes. Near the light are a house and a few trees. A shallow channel leads from the main channel to a basin on the west side of the light.

Swan Creek, on the western shore of Chesapeake Bay opposite Fishing Battery Light, has depths of 4 feet in the entrance and 3 to 10 feet inside for about 2 miles. The creek is little used except by boats of the United States Army.

Susquehanna River empties into the head of Chesapeake Bay from northwestward 168 miles above the Virginia Capes. The entrance is between **Concord Point**, marked by a light, and **Perry Point**, a mile east-northeastward. The controlling depth in the entrance channel through the flats to Havre de Grace was 13½ feet in October 1960, and is well marked by buoys. The mean range of tide is 1.7 feet at Havre de Grace and 2.1 feet at Port Deposit. The river usually is entirely closed by ice for about three months during the winter, but ice gorges and freshets are infrequent because of the dams upstream.

Havre de Grace, on the west side of the entrance to Susquehanna River, is on the main lines of the Pennsylvania Railroad and the Baltimore and Ohio Railroad. The town has little waterborne commerce, and most of the wharves are in poor condition. The oil wharf just above the first bridge has depths as low as 4 feet at the face and 5 feet in the basin.

A channel with a controlling depth of about 2½ feet leads to a small-boat basin just south of Concord Point. The south side of the basin is protected by an island, and the channel is marked by buoys. Gasoline and water are available.

A marine service pier just north of Concord Point has depths of about 7 feet at the face; gasoline, diesel fuel, water, ice, and some other supplies are available. The marine railway can handle boats up to 35 feet in length for engine and hull repairs. A small basin, protected by old railroad barges sunk in place, is just south of the marine service pier. Just north of the pier is a shipyard that builds barges.

A rock, covered 6 feet and marked by buoys on the east and west sides, is about 200 yards off the Havre de Grace wharves and 500 yards below the drawspan of the first bridge. There are said to be several other rocks between this rock and the wharves that require local knowledge to avoid.

The Pennsylvania Railroad bridge, which crosses Susquehanna River from Havre de Grace to Perryville 0.8 mile above the mouth, has a swing span with a clearance of 52 feet; see **203.245**, Chapter 2, for **drawspan regulations.** The overhead power cable on the lower side of the bridge has a clearance of 130 feet. Just below the bridge are the stone piers of a former highway bridge; the piers stand about 15 feet above high water and are about opposite those of the railroad bridge.

In **Perryville**, at the east end of the first railroad bridge, the Pennsylvania Railroad maintains division repair shops. The buildings, tanks, and stacks of the United States Veterans Hospital are conspicuous in the southeastern part of the town toward Perry Point. The wharves just above the bridge have depths of 7 to 12 feet alongside; gasoline and water are available. A 15-ton travel lift can haul out boats 40 feet in length.

Above Havre de Grace, depths of 13 to 50 feet are in the channel of Susquehanna River to **Port Deposit**, on the northeast side 4 miles above the mouth; the river is obstructed by rocks above this point.

Garrett Island, 0.8 mile long and 0.4 mile broad, high and wooded, is in midriver a mile above the mouth. The fixed highway bridge, which crosses Susquehanna River and the lower end of Garrett Island 1.2 miles above the river mouth, has a clearance of 87 feet. The Baltimore and Ohio Railroad bridge, over the river and the upper part of the island 1.6 miles above the river mouth, has a fixed channel span with a clearance of 86 feet; the channel is through the second opening west of the island. A boatyard on the east bank, just below the Baltimore and Ohio Railroad bridge, has a lift that can haul out boats 40 feet in length; gasoline and water are available.

A marina at Port Deposit has a 15-ton travel lift that can haul out boats up to 42 feet in length for engine and hull repairs; gasoline and water are available.

Conowingo Dam is about 10 miles above the mouth of Susquehanna River.

Northeast River empties into the head of Chesapeake Bay 4.5 miles eastward of Susquehanna River and 167 miles above the Virginia Capes. The entrance is between **Red Point**, which is 5 miles north-northeastward of Turkey Point, and **Carpenter Point**, 1.3 miles to the west-northwestward. The only commercial traffic on the river is in seafood products, but it is used extensively by yachtsmen; there are several boat-storage yards along the shores of the river.

The controlling depth from the entrance through the flats is 10 feet to within a mile of a dam at the head of navigation. The channel is well marked by buoys for most of its length. The mean range of tide is 1.9 feet.

Charlestown, on the west side of Northeast River 2.5 miles above the mouth, is on the main line of the Pennsylvania Railroad. The largest of several marinas has depths of 9 feet at the gasoline piers. Available supplies include gasoline, diesel fuel, water, and ice. A 25-ton travel lift and a marine railway can handle boats up to 46 feet in length for complete repairs; a machine shop repairs gasoline engines.

Northeast Heights is on the east side of Northeast River 3 miles above the mouth. The marine service pier has depths of about 5 feet alongside; gasoline, fresh water, ice, and marine supplies are available. The marine rail-

ways can handle boats up to 55 feet in length; the machine shop repairs gasoline and diesel engines and does hull work. Extensive berthage facilities are available.

North East, at the head of navigation 4.5 miles above the mouth of Northeast River, has good rail and highway connections. Depths of about 4 feet can be carried to the town where gasoline and other supplies are available at some of the fish piers.

APPENDIX

COAST AND GEODETIC SURVEY.—United States Coast Pilots, Tide Tables, Tidal Current Tables, and Tidal Current Charts: For sale by U.S. Coast and Geodetic Survey, Washington 25, D.C., also at its district offices and sales agencies, which are listed semiannually in the Notice to Mariners.

United States Coast Pilots:

1, Atlantic Coast, Eastport to Cape Cod, 1960.
2, Atlantic Coast, Cape Cod to Sandy Hook, 1960.
3, Atlantic Coast, Sandy Hook to Cape Henry, 1961.
4, Atlantic Coast, Cape Henry to Key West, 1959.
5, Gulf Coast, Puerto Rico, and Virgin Islands, 1958.
7, Pacific Coast, California, Oregon, Washington, and Hawaii, 1959.
8, Southeast Alaska Dixon Entrance to Yakutat Bay, 1952.
9, Alaska, Cape Spencer to Arctic Ocean, 1954.

Distances Between United States Ports, Third (1961) Edition.

A Coast Pilot for which a supplement has been issued should not be used except with reference to the latest issue of its supplement. Supplements may be obtained from the U.S. Coast and Geodetic Survey, Washington 25, D.C., or any of its district offices.

Tide Tables:

Europe and West Coast of Africa.
East Coast, North and South America.
West Coast, North and South America.
Central and Western Pacific Ocean and Indian Ocean.

Tidal Current Tables:

Atlantic Coast, North America.
Pacific Coast, North America and Asia.

Tidal Current Charts:

Boston Harbor (1949).
Narragansett Bay to Nantucket Sound (1955).
Long Island Sound and Block Island Sound (1954).
New York Harbor (1956).
Delaware Bay and River (1960).
Tampa Bay (1951).
San Francisco Bay (1947).
Puget Sound, Northern Part (1952).
Puget Sound, Southern Part (1948).

District Offices.—Baltimore District, 518 E. 32d St., Baltimore 18, Md. The Baltimore District includes all of the States of Pennsylvania, Ohio, Maryland, and Delaware.

Norfolk District, 102 W. Olney Rd., Norfolk, 10, Va. The Norfolk District includes all of the States of West Virginia, Virginia, North Carolina, and the parts of Kentucky and Tennessee east of the Tennessee River.

Coast and Geodetic Survey Sales Agents.—Agents marked with an (*) asterisk also handle certain U.S. Navy Hydrographic Office publications, and those marked with a (†) dagger also handle certain U.S. Coast Guard publications.

New Jersey:

Atlantic City: †Marine Mart, Inc., Melrose and Massachusetts Aves.
Bay Head: †Dale Boat Yards, Inc., 666 Lake Ave.
Beach Haven: †Shelter Harbor Marina, Inc., 317 11th St.
Bridgeton: Cumberland Sports Center, 45 S. Laurel St.
Camden: †M & E Marine Supply Co., Rt. 130 at Collingswood Overpass, Woodlynne.
Cape May: Cape May Marina, Rt. 4, Inland Waterway.
Forked River: Charles R. French, Rt. 4–9.
New Gretna: †Bass River Marina.
Ocean City: Nixon's Marina, 242 Bay Ave.
Pennsville: Riverview Marine, foot Ferry Rd.
Point Pleasant Beach: †Point Pleasant Hardware Co.; †The Ship Chandlers, Inc., 601 Bay Ave.
Riverside: Dredge Harbor Yacht Basin, St. Mihiel Dr.
Sea Bright: Navesand Marine Sales Co., 1428 Ocean Ave.
Sea Isle City: Edward H. Dever & Sons, Inc., 44th & Venicean Rd.
Shipbottom: Long Beach Marine, 236 W. 8th St.
Toms River: Hotaling's Boat Yard; Zeller Cruiser Sales, Inc., 3404 E. Washington St.
Westville: Marina Equipment & Supply Co., Route 47 & Harvard Ave.
Wildwood: South Jersey Marine, Inc., 401 W. Rio Grande Ave.

Delaware:

Lewes: C. H. Ellis & Co., 121–123 Front St.
Milford: Taylor Marine, Rehoboth Blvd.
New Castle: Boe Huckman, Du Pont Highway & Basin Rd.
Wilmington: *H. P. Norem & Sons, Inc., 621 E. Fourth St.

Pennsylvania:

Essington: Essington Yacht Yard, Inc.
Lancaster: Darmstaetter's, Inc., 37 N. Queen St.
Philadelphia: *†Victor Auguste Gustin, 105 S. Second St.; *†Riggs & Brother, 310 Market St.

Maryland

Annapolis: American Yachtsmen's Association, "Candour" Amberley, P.O. Box 588; *†Weems System of Navigation, Inc., 229 Prince George St.; Fawcett Boat Supplies, Inc., 100 Compromise St.
Baltimore: *Keefer & Baltimore Nautical Supples, Inc., 43 South Gay St.; The Wm. H. Whiting Co., 6701 Moravia Rd.; Stickell-Flanagan Marine Corp., 1616 Mt. Royal Ave.; *†Wilfrid O. White & Sons, Inc., 406 Water St.; Middle River Boat Sales, 203 Nanticoke Rd.
Benson: The Canvasback.

Cambridge: Cambridge Office Supply Co.
Charlestown: Wellwood Yacht Marina, Inc., N. East River.
Chesapeake City: Joseph Schaefer & Sons.
Crisfield: J. P. Tawes & Brother.
Deale: Berlitz Marine Anchorage.
Easton: The Shannahan & Wrightson Co.
Essex: Marine Basin, Inc., Box 7782.
North East: Bay Boat Works, Inc., Hances Point.
Oxford: †The Oxford Boatyard Co.
St. Michaels: The St. Michaels Co.; St. Michaels Marina, Inc.
Salisbury: White Marine Supplies, 202 Newton St.
Solomons: Solomons Marina, Inc.
Silver Spring: †The Boat Center, 8236 Georgia Ave.
Sparrows Point: North Point Marine & Hardware Co., N. Point Rd. & Wise Ave.
Whitemarsh: The Imperial Marine, Inc.

District of Columbia:

Washington: U.S. Coast & Geodetic Survey, Dept. Commerce Bldg., Constitution Ave. at 15th St. N.W.; The Washington Marina, 1300 Maine Ave. SW.

Virginia:

Arlington: M. J. Styron Co., 3152–54 Jefferson Davis Hwy.
Colonial Beach: Martin Lunsford, Colonial Yacht Club.
Hampton: Hampton Roads Marina Corp., Marina Rd.; Moore Marine Sales, 200 E. Queen St.
Hopewell: Cormany's Sporting Center, 301 Randolph Rd.
Kilmarnock: †Chesapeake Boat Basin.
Kinsale: †Kinsale Marina.
Newport News: *†E. Smola Co., 134 25th St.
Norfolk: Coast & Geodetic Survey District Office, 102 W. Olney Rd.; *†W. T. Brownley, 121 Randolph St.; *†Henry Eagleton Co., 430 Boush St.; *†E. Smola Co., 316 W. Olney Rd.
Richmond: Everett Waddey Co., at three locations: 1627 Willow Lawn Dr., †614 W. Southside Place, and †1105 E. Main St.; Pinell's, Inc., 701–703 W. Broad St.
Sunny Bank: Smith Point Marina.

PUBLICATIONS.—A résumé of the U.S. Government publications of navigational value is included for the ready reference of the mariner. In addition to the agents located in the principal seaports handling sales publications, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

Nautical Charts.—United States coastal waters (Chart No. 1, a pamphlet, is Nautical Chart Symbols and Abbreviations): Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

Mississippi River (Cairo, Ill., to Gulf of Mexico): Published and for sale by Mississippi River Commission, Vicksburg, Miss.

Mississippi River (Cairo, Ill., to Minneapolis, Minn.) and Illinois Waterway (Mississippi River to Lake Michigan): Published and for sale by U.S. Army Engineer District, Chicago, Ill.

Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada: Published and for sale by U.S. Lake Survey, Detroit, Mich.

Foreign countries: Published by U.S. Navy Hydrographic Office; for sale by H.O. and its sales agents.

Coast Pilots.—Coasts of the United States and Possessions: Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

Great Lakes (Great Lakes Pilot): Published and for sale by U.S. Lake Survey, Detroit, Mich.

Foreign countries (Sailing Directions): Published by U.S. Navy Hydrographic Office: for sale by H.O. and its sales agents.

Tide and Tidal Current Tables, and **Tidal Current Charts.**—Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents. Special Publication **No. 230.**—Coastal Currents Along the Atlantic Coast of the United States, may be obtained for 75 cents from the Superintendent of Documents, Washington 25, D.C.

Notices to Mariners may be obtained free from the following: Local Notices to Mariners—District Commander of the local Coast Guard district; Weekly Notice to Mariners, Part I (Western Hemisphere Edition)—Commandant, U.S. Coast Guard; Weekly Notice to Mariners, Part II (Eastern Hemisphere Edition)—U.S. Navy Hydrographic Office; Weekly Notice to Mariners, Great Lakes—Commander, Ninth Coast Guard District, Cleveland, Ohio.

Light Lists.—United States and Possessions: Published by the Coast Guard; for sale by the Superintendent of Documents and his sales agents.

Foreign countries: Published by U.S. Navy Hydrographic Office; for sale by H.O. and its sales agents.

Radio.—Radio Navigational Aids (H.O. Pub. No. 117), Radio Weather Aids (H.O. Pub. No. 118), Weather Station Index (H.O. Pub. No. 119), and International Code of Signals, Vol. II—Radio (H.O. Pub. No. 104): Published by U.S. Navy Hydrographic Office; for sale by H.O. and its sales agents.

Miscellaneous.—American Nautical Almanac and American Ephemeris and Nautical Almanac: Published by United States Naval Observatory; for sale by Superintendent of Documents and his sales agents.

American Practical Navigator (Bowditch) (H.O. Publication No. 9), and International Code of Signals, Volume I—Visual (H.O. Publication No. 103): Published by U.S. Navy Hydrographic Office; for sale by H.O. and its sales agents.

Rules of the Road, International—Inland (CG–169). Rules of the Road, Western Rivers (CG–184). Rules of the Road, Great Lakes (CG–172): Published by and free on application to the U.S. Coast Guard.

Port Series of the United States: Prepared by the Corps of Engineers, U.S. Army, in cooperation with the Maritime Administration, U.S. Department of Commerce; for sale by the Superintendent of Documents.

CORPS OF ENGINEERS, U.S. ARMY.—New York District office: 111 E. 16th Street, New York 3, N.Y.

The district includes the ports on the north and south

shores of Long Island, the ports of Greater New York Harbor, Hudson River and its tributaries, Lake Champlain, part of the New York Canal System to and including Oneida Lake, and the Atlantic Coast of New Jersey to and including Shark River.

Philadelphia District office: 2635 Abbottsford Ave., Philadelphia, Pa.

The district includes the Atlantic coast of New Jersey from the southern boundary of the New York District southward to and including Delaware Bay and River and their tributaries, the Chesapeake and Delaware Canal, and the Atlantic coast of Delaware.

Baltimore District office: 24th St. and Maryland Ave., Baltimore 18, Md.

The district includes the Atlantic coast of Maryland and Virginia southerly to and including Gargathy Inlet, and Chesapeake Bay and its tributaries northward of Smith Point on the western shore, including Potomac River, and northward of Onancock Creek on the eastern shore.

Norfolk District office: Foot of Front St., Norfolk, Va.

The district includes the Atlantic coast of Virginia southward of Gargathy Inlet, Elizabeth River and Dismal Swamp Canal to and including Pasquotank River, and Chesapeake Bay and tributaries southward of Smith Point on the western shore and Onancock Creek southward on the eastern shore.

COAST GUARD.—Commander, Third District. The Third Coast Guard District, with district office at U.S. Customhouse, New York 4, N.Y., comprises the counties of Orleans, Franklin, Grand Isle, Chittenden, and Addison in Vermont; Connecticut, but not including the waters of Beach Pond in New London County; Watch Hill Light Station in Rhode Island; that portion of Massachusetts containing the waters of Congamond Lakes in Hampden County; New York, except that part north of latitude 42° N. and west of longitude 74°39′ W.; New Jersey; Pennsylvania east of longitude 79° W.; Delaware, including Fenwick Island; the ocean area between a line from Watch Hill Light due south to Montauk Point Light, thence 112° True and a line from the coastal end of the Third-Fifth Coast Guard District boundary, thence 122° True.

Captain of the Port Office, Pier 9, East River, New York 4, N.Y. All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from Navesink South Tower through Ambrose Lightship to the 73°39′00″ W. meridian, 40°35′00″ N. parallel; thence due north to the 41°00′00″ N. parallel; thence due west to the 74°10′00″ W. meridian; thence southwesterly to a point located at 40°30′00″ N., 74°30′00″ W.; thence due south to the 40°23′48″ N. parallel; thence due east to Navesink South Tower.

Captain of the Port Office, 1006 U.S. Custom House, Second and Chestnut Streets, Philadelphia 7, Pa. All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from Hereford Inlet Light to the south tower at Indian River Inlet; thence northwesterly to a point on the Delaware-Maryland boundary at 39°20′00″ N., thence northerly along Delaware-Maryland boundary to a point at 39°35′00″ N., thence northeasterly to a point at 40°20′00″ N., 74°50′00″ W.; thence east to the 74°40′00″ W. meridian; thence south to the 40°07′30″ N. parallel; thence southwesterly to a point at 39°35′00″ N., 75°20′00″ W.; thence southeasterly to a point at 39°20′00″ N., 74°55′00″ W.; thence south-southeasterly to Hereford Inlet Light.

Commander, Fifth District. The Fifth Coast Guard District, with district office at Federal Building, 301 Crawford St., Portsmouth, Va., comprises: Maryland, Virginia, District of Columbia, and North Carolina; and the ocean between a line from the coastal end of the Third-Fifth Coast Guard District boundary, thence 122° True, and a line from the coastal end of the Fifth-Seventh Coast Guard District boundary, thence 122° True.

Captain of the Port Office, 303 Appraisers Stores Building, Baltimore 2, Md. All navigable waters of the United States and contiguous land areas within the following boundaries: On the east the 76°15′00″ W. meridian; on the south the 38°53′30″ N. parallel, on the west the 76°40′00″ W. meridian, and on the north the 39°18′00″ N. parallel.

Captain of the Port Office % Coast Guard Group Office, P.O. Box 4557, Berkeley Station, Norfolk 6, Va. All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from Cape Charles Light in a south-southwesterly direction to a point located at 36°45′00″ N., 76°00′00″ W., thence west to 76°49′00″ W., thence north to 37°15′00″ N., thence in an easterly direction to Cape Charles Light.

Lifeboat Stations.—The lifeboat stations operated by the Coast Guard in the areas covered by this Coast Pilot are:

Sandy Hook, N.J. (No. 97), 40°28.3′ N., 74°00.7′ W. On bay side, 0.5 mile south of point of hook.

Monmouth Beach, N.J. (No. 100), 40°20.5′ N., 73°58.5′ W. At Galilee, about a mile south of Sea Bright, N.J. (seasonal)

Shark River, N.J. (No. 103), 40°11.7′ N., 74°00.6′ W. Half mile north of mouth of Shark River.

Manasquan Inlet, N.J. (No. 105), 40°06.2′ N., 74°02.3′ W. Half mile west of Manasquan Inlet entrance, on south side.

Toms River, N.J. (No. 109), 39°56.2′ N., 74°04.3′ W. On Island Beach, abreast mouth of Toms River.

Barnegat, N.J. (No. 113), 39°45.5′ N., 74°06.4′ W. On Long Beach at Barnegat City, 0.4 mile south-southeast of abandoned light tower.

Bonds, N.J. (No. 118), 39°32.2′ N., 74°15.8′ W. On Long Beach, about 1.8 miles southwest of Beach Haven.

Little Egg, N.J. (No. 119), 39°30.5′ N., 74°19.4′ W. North side of entrance to Great Bay.

Atlantic City, N.J. (No. 123), 39°22.7′ N., 74°25.4′ W. North side of Clam Creek near Absecon Inlet entrance.

Ocean City, N.J. (No. 126), 39°17.7′ N., 74°33.8′ W. At Ocean City on Great Egg Bay, 1 mile southwest of Great Egg Inlet.

Corson Inlet, N.J. (No. 128), 39°11.9′ N., 74°39.4′ W. On Ludlam Beach at Strathmere, 2.5 miles north-northeast of Ludlam Beach Light.

Townsend Inlet, N.J. (No. 130), 39°07.7′ N., 74°42.6′ W. North side of Townsend Inlet 2.5 miles southwest of Ludlam Beach Light.

Hereford Inlet, N.J. (No. 133), 39°00.5′ N., 74°47.5′ W. At Hereford Inlet Light.

Cape May, N.J. (No. 137), 38°58.0′ N., 74°57.8′ W. North bank of the west entrance to Cape May Canal.

Lewes, Del. (No. 139), 38°46.8′ N., 75°07.3′ W. Located 2.5 miles southwest of Harbor of Refuge Light.

Indian River Inlet, Del. (No. 142), 38°38.0′ N., 75°04.0′ W. Located about 1.5 miles north of Indian River Inlet.

Ocean City, Md. (No. 146), 38°19.9′ N., 75°05.1′ W. At Ocean City, 0.5 mile north of Ocean City Inlet.

Assateague Beach, Va. (No. 150), 37°51.7′ N., 75°22.0′ W. Southeast point of Assateague Island.

Metomkin Inlet, Va.(No. 152), 37°40.3′ N., 75°35.7′ W. North end of Cedar Island, south side of Metomkin Inlet.

Parramore Beach, Va. (No. 154), 37°34.4′ N., 75°37.0′ W. West side of Parramore Island, about 0.5 mile south of Wachapreague Inlet.

Little Machipongo, Va. (No. 155), 37°27.2′ N., 75°40.5′ W. Inside north end of Hog Island, 0.5 mile south of Little Machipongo Inlet.

Cobb Island, Va. (No. 157), 37°18.2′ N., 75°46.7′ W. On Cobb Island near south end, 4.5 miles southwest of Great Machipongo Inlet.

Little Creek, Va. (No. 161), 36°54.7′ N., 76°10.7′ W. Located 1 mile south of mouth of Little Creek.

Virginia Beach, Va. (No. 162), 36°51.2′ N., 75°58.5′ W. On beach front, 5 miles south of Cape Henry Light.

CUSTOMS DISTRICTS.—The first port listed in each district is the headquarters port. An (*) asterisk precedes the names of ports authorized to issue marine documents.

Philadelphia District: That part of the State of Pennsylvania lying east of 79° west longitude, the State of Delaware, and that part of the State of New Jersey not included in the New York district.

Ports of entry: *Philadelphia, Pa.; Chester, Pa.; *Wilmington, Del.

Maryland District: The limits are the State of Maryland and the District of Columbia.

Ports of entry: *Baltimore, Md.; *Annapolis, Md.; *Cambridge, Md.; *Crisfield, Md.; *Washington, D.C.

Virginia District: The limits are the State of Virginia.

Ports of entry: *Norfolk and *Newport News; *Alexandria, *Cape Charles City, Petersburg, *Reedville, Richmond.

PUBLIC HEALTH SERVICE.—Quarantine stations where supervision of quarantine and medical examination of aliens are performed:

Baltimore, Md., Room 426, U.S. Customs House, Gay and Lombard Sts.

Philadelphia, Pa., Marcus Hook, Market St. and Delaware Ave.

Fort Monroe, Va., waterfront.

Washington, D.C., Room 2212 A South, HEW Bldg., 3d and C Sts., SW.

Additional ports at which quarantine inspection and/or medical examination of aliens are performed:

Patuxent, Annapolis, and Piney Point, Md.; Atlantic City, Cape May, and Long Beach Island, N.J.; Newcastle, Lewes, and Wilmington, Del.; Norfolk, Newport News, Alexandria, and Richmond, Va.

Hospitals:

Baltimore, Md.; Wyman Park Dr. and 31st St.

Norfolk 8, Va.: 6500 Hampton Blvd., Larchmont.

Outpatient Clinics:

Philadelphia 6, Pa.: 225 Chestnut St.

Washington 25, D.C.: Health, Education, & Welfare Bldg., 4th and D Sts. SW.

Outpatient offices:

Cambridge, Md.: 6 Church St.; Cape May, N.J.: Columbia Ave. and Ocean St.; Crisfield, Md.: 322 Main St.; Kilmarnock, Va.; Lewes, Del.: 821 Savannah Rd.; Newport News, Va.: 129½ 26th St.; Reedville, Va.; Richmond 20, Va: 714 North Blvd.; Wilmington, Del.: 1401 Pennsylvania Ave.

IMMIGRATION and NATURALIZATION.—Offices of these services are established in the following ports covered by this Coast Pilot:

Regional office: Bldg. 420, McGuire Hospital, Richmond, Va.

District offices: Baltimore, Md.: 707 N. Calvert St. Philadelphia, Pa.: Lafayette Bldg., 5th & Chestnut Sts. Washington, D.C.: #311 Old Post Office Bldg., 12th & Penna. Ave. NW.

FEDERAL COMMUNICATIONS COMMISSION.—District field offices in the areas covered by this Coast Pilot are:

Philadelphia, Pa.: U.S. Customhouse.

Baltimore, Md.: McCawley Bldg.

Washington, D.C.: 718 Jackson Place, NW.

Norfolk, Va.: Federal Bldg.

LEGAL HOLIDAYS.—In the areas covered by this Coast Pilot, the following holidays are observed throughout:

January 1, New Year's Day; February 22, Washington's Birthday; May 30, Memorial (Decoration) Day; July 4, Independence Day; Labor Day; November 11, Veterans Day; Thanksgiving Day; December 25, Christmas Day.

Other holidays are observed as indicated: January 19, Lee-Jackson Day in Virginia; January 20, Presidential Inauguration Day, every fourth year, in the District of Columbia; February 12, Lincoln's Birthday, in all except the District of Columbia; Good Friday in Delaware, New Jersey, and Maryland; March 25, Maryland Day in that

state; June 14, Flag Day in Pennsylvania; September 12, Defender's Day, in Maryland; October 12, Columbus Day, in New Jersey, Pennsylvania, and Maryland.

YACHT CLUBS.—Yacht clubs in the area covered by this Coast Pilot include:

New Jersey:

Atlantic City: Atlantic City Yacht Club, 619 Sewell Ave.; Atlantic City Tuna Club, 741 North Massachusetts Ave.; Evening Star Yacht Club.

Avalon: Avalon Yacht Club, 7th and Bay Aves.; Townsend Inlet Yacht Club.

Bay Head: Bay Head Yacht Club, 111 Metcalfe St.

Beach Haven: Bay Vista Yacht Club, Beach Haven Terrace; Beach Haven Yacht Club, Long Beach Id.; Beach Haven Marlin and Tuna Club, Beach Haven; Little Egg Harbor Yacht Club, Berkeley Ave. and Bay Front.

Beverly: Red Dragon Canoe Club, Edgewater Park.

Bordentown: Bordentown Yacht Club, foot of Farnsworth Ave.

Brant Beach: Brant Beach Yacht Club, Long Beach Id.

Brielle: Brielle Marlin and Tuna Club, Ocean and Riverfront; Manasquan River Marlin and Tuna Club; Brielle Yacht Club, Green Ave. Manasquan River Yacht Club, River View Lane.

Camden: Skippers' Club, 622 Penn St.

Cape May: Corinthian Yacht Club, Delaware and Buffalo Aves.; Harbor Sailing Club.

Fairhaven: Shrewsbury River Yacht Club, 925 River Rd.

Forked River: Forked River Tuna Club.

Harvey Cedars: Barnegat Light Yacht Club, 76th at Bay End.

Island Heights: Island Heights Yacht Club.

Lavallette: Lavallette Yacht Club.

Long Branch: Long Branch Ice Boat and Yacht Club, Pleasure Bay.

Longport: Great Egg Harbor Yacht Club, 5 N. 25th Ave.

Mantaloking: Mantaloking Yacht Club.

Margate City: Margate City Yacht Club, 412 N. Vendome Ave.

Neptune: Shark River Yacht Club, So. Riverside Dr.

Normandy Beach: Normandy Beach Yacht Club.

Ocean Beach: Ocean Beach and Yacht Club.

Ocean City: Ocean City Yacht Club, Bay Ave. and Battersea Rd.

Ocean Gate: Ocean Gate Yacht Club.

Oceanport: Shrewsbury Sailing and Yacht Club, Seawanhaka Ave. and Shrewsbury River.

Pine Beach: Pine Beach Yacht Club, Midland Ave. and Riverside Dr.

Pleasantville: Pleasantville Yacht Club.

Riverton: Riverton Yacht Club, foot Main St.

Sea Isle City: Sea Isle City Yacht Club.

Seaside Park: Seaside Park Yacht Club, Bayview Ave., foot 3rd Ave.

Shore Acres: Shore Acres Yacht Club.

Spray Beach: Spray Beach Yacht Club.

Stone Harbor: Stone Harbor Yacht Club.

Surf City: Surf City Yacht Club.

Toms River: Shelter Cove Yacht Club, Shelter Cove; Toms River Yacht Club, Robbins Parkway; Beachwood Yacht Club.

Tuckerton: Holly Lake Harbor Boat Club, Holly Lake Harbor; Tuckerton Yacht Club.

Trenton: Crescent Temple Yacht Club, 50 N. Clinton St.

Wildwood: Greater Wildwood Yacht Club, Wildwood Crest; Wildwood Yacht Club; Schooner Island Yacht Club.

Pennsylvania:

Bristol: Anchor Boat Club.

Cornwells Heights: Pennsylvania Yacht Club, 2189 State Rd.

Essington: Riverside Yacht Club, Wanamaker Ave. and Delaware River; Tri-State Yacht Club.

Oakmont: Oakmont Yacht Club, 11 Washington Ave.

Philadelphia: Corinthian Yacht Club, Essington at Delaware River; Quaker City Yacht Club of Philadelphia, 7101 N. Delaware Ave.; Wissinoming Yacht Club, 11 Delaware Ave., Lardners Point.

Torresdale: Delaware River Yacht Club, Milnor St. and Grant Ave.

Maryland:

Aberdeen Proving Ground: Spesutie Island Boat Club.

Abingdon: Bush River Boat Club, Inc., Long Bar Harbor.

Annapolis: Annapolis Yacht Club, Compromise St.; Severn Sailing Ass'n., Eastport; Slocum Society Sailing Club, Shady Side; U.S. Naval Academy Sailing Squadron, U.S. Naval Academy; Annapolis Roads Club, Tolly Point.

Baltimore: Arundel Boat Club, 2901 Hanover St.; Baltimore Yacht Club, Sue Id; Buomi Yacht Club, Mount Vernon Pl.; Eastern Yacht Club; North Point Yacht Club, Sparrows Point; Sailing Club of the Chesapeake, 236 Equitable Bldg.; Glenmar Sailing Ass'n., 31 Elm Dr.; Potapskut Sailing Ass'n.; Chesapeake Bay Yacht Racing Ass'n., 525 Mathieson Bldg.

Beverly Beach: West River Yacht Club.

Cambridge: Cambridge Yacht Club, foot of Mill St.

Centerville: Corsica River Yacht Club, Corsica River.

Charlestown: Wellwood Country and Yacht Club.

Chester: Kent Island Yacht Club.

Chestertown: Great Oak Lodge and Yacht Club, Route 298; Chester River Yacht Club.

Dundalk: Corinthian Yacht Club of Baltimore.

Eastern Neck Island: Sassafras River Yacht Club.

Easton: Chesapeake Bay Yacht Club, N. Washington St.

Edgewater: Selby Bay Yacht Club, Turkey Point; South River Yacht Club.

Elkton: Elk River Yacht Club, Oldfield Point.

Fairhaven: Fairhaven Sailing Club.

Fredericktown: Tockwogh Yacht Club.

Galesville: West River Sailing Club.

Gibson Island: Gibson Island Yacht Squadron.

Grasonville: Anglers Club.

Havre de Grace: Havre de Grace Yacht Club.

Margate: Margate Yacht Club.

Millersville: Indian Landing Boat Club.

North East: Hances Point Yacht Club.
North East Heights: North East River Yacht Club.
Oxford: Tred Avon Yacht Club.
Pasadena: Maryland Yacht Club, Fairview, Rock Creek; Riviera Beach Yacht Club; Pasadena Yacht Club, Fort Smallwood Rd.
Rock Hall: Rock Hall Yacht Club.
Rose Haven: Rose Haven Yacht Club.
Royal Oak: Edge Creek Boat Club.
St. Marys City: St. Mary's River Yacht Club.
St. Michaels: Miles River Yacht Club, Long Haul.
Severna Park: Cypress Yacht Club.
Shady Side: Chesapeake Yacht Club.
Solomons Island: Solomons Island Yacht Club.
Ventnor: Ventnor Yacht Club.
West River: Shady Oaks Yacht Club, Shady Oaks Manor.

District of Columbia:

Washington: Almas Temple Yacht Club, 1315 K St. NW.; Capital Yacht Club, 1020 Maine Ave. SW.; Columbia Yacht Club, Inc., Maine Ave. and M St. SW.; Continental Yacht Club, 1300 Maine Ave. SW.; Corinthian Yacht Club, 2nd and V Sts. SW.; Washington Yacht Club, 15th and Water Sts. SE.; Potomac Boat Club, 3530 Water St. NW.; Potomac River Sailing Ass'n.

Virginia:

Alexandria: National Yacht Club, Daingerfield Island; Old Dominion Boat Club, foot of King St.
Chincoteague: Chincoteague Yacht Club.
Colonial Beach: Colonial Yacht Club.
Fort Monroe: Old Point Comfort Yacht Club.
Hampton: Hampton Yacht Club, Fort Victoria Ave.
Hilton Village: Hilton Boat Club.
Hopewell: Hopewell Yacht Club, 21st St.
Irvington: Rappahannock River Yacht Club.
Langley Field: Langley Yacht Club, Langley Air Force Base.
Mobjack Bay: Mobjack Bay Yacht Club; Mathews Yacht Club.
Norfolk: Norfolk Yacht & Country Club, Hampton Blvd.; Tidewater Boat Club, 45th St. and Colley Ave.; Norfolk Boat Club, W. Freemason St.; Willoughby Yacht Club, 414 First View St.; Lafayette Yacht Club, Inc., 4257 Granby St.
Portsmouth: Portsmouth Boat Club.
Ruark: Fishing Bay Yacht Club, Stove Point Neck.
Richmond: Richmond Yacht Club, near Dutch Gap, James River; Fishing Bay Yacht Club.
Tappahannock: Tappahannock Yacht Club.
Urbanna: Commonwealth Yacht Club; Virginia Yacht Club.
Virginia Beach: Cavalier Yacht & Boating Club.
Weems: Rappahannock Yacht Club.
Williamsburg: Williamsburg Boat Club.

WEATHER BUREAU.—Barometers may be compared with standards at the following offices:

Philadelphia: New Terminal Bldg., International Airport.
Atlantic City: Airport Station, Atlantic City Airport.
Baltimore: Weather Bureau Station, Friendship Internationl Airport.
Washington, D.C.: Washington National Airport.
Norfolk, Va.: 424 Postoffice Bldg.

Radiotelephone broadcasts by Coast Guard.—Scheduled marine information, broadcasts of notices to mariners, hydrographic information, storm warnings, small-craft warnings, advisories, and other important marine information are broadcast by radiotelephone at the scheduled times and indicated frequencies preceded by an initial call on 2182 kc. Safety and urgent broadcasts are made on 2182 kc. upon receipt.

NMY, New York, N.Y., 2670 kcs., 0720 and 1920 EST.
NMK, Cape May, N.J., 2670 kcs., 0520 and 1720 EST.
NMX, Baltimore, Md., 2670 kcs., 1130 EST.
NMN, Norfolk, Va., 2670 kcs., 0200 and 1220 EST.

Radiotelegraph broadcasts by Coast Guard.—Scheduled marine information broadcasts of notices to mariners, hydrographic information, storm warnings, advisories, and other important marine information are broadcast by radiotelegraph at the scheduled times and indicated frequencies, preceded by an initial call on 500 kc. Urgent broadcasts are made on 500 kc. upon receipt and repeated during the last 15 seconds of the first silent period after receipt. Urgent broadcasts are preceded by the Urgent Signal (XXX).

NMY, New York, N.Y., 486 kc., 1100 and 2000 EST.
NMN, Norfolk, Va., 466 kc., 1120 and 2020 EST.

Radiotelephone broadcasts of weather information.—Regular broadcasts of weather forecasts, storm warnings, and other information are made in plain language by commercial coastal harbor radiotelephone stations. Regular scheduled broadcasts, on local time, are:

WAQ, Ocean Gate, N.J., 2558 kc. at 0715 and 1915.
WEH, Wilmington, Del., 2558 kc. at 0730 and 1930.
WGB, Norfolk, Va., 2538 kc. at 0000, 0600, and 1800.

Weather broadcasts by harbor radiotelegraph stations.—Regular broadcasts on eastern standard time of weather forecasts (storm warnings on receipt) and other weather information are made by commercial coastal harbor radiotelegraph stations as follows:

WSC, Tuckerton, N.J. 460 kc. at 0930 and 1730.

WMH, Baltimore, Md. 428 kc. at 0830, 1030, and 1430; 6446 kc. at 2030; 8502 kc. at 0830, 1030, 1430, and 2030; and 12885 kc. at 0830, 1030, and 1430.

Weather broadcasts by commercial radio stations.—Taped or direct broadcasts of forecasts and storm warnings are made by commercial radio stations in the areas covered by this Coast Pilot. These usually are put on the air at least twice daily; broadcast times are published in local newspaper radio program schedules, and in the Coastal Warning Facilities Charts issued annually by the U.S. Weather Bureau. The charts are on sale, 10 cents each, at Superintendent of Documents, Washington 25, D.C.

Storm warning stations.—Weather Bureau listings of the display stations in the area covered by this Coast Pilot follow: **DN** indicates day and night display; **D,** day display only; **(S)** seasonal display only.

New Jersey:

DN Long Branch; 40°18.2′; 73°58.7′.
D Shark River Lifeboat Station; 40°11.7′, 74°00.6′.
DN Manasquan Inlet Lifeboat Station; 40°06.2′, 74°02.3′.
D Bay Head; 40°03.9′, 74°02.9′. (S)
D Barnegat Lightship; 39°46.0′, 73°56.0′.
D Barnegat Lifeboat Station; 39°45.5′, 74°06.3′.
D Lanoka Harbor; 39°52.2′, 74°09.2′. (S)
D Bonds Lifeboat Station; 39°32.2′, 74°15.7′.
D Brigantine; 39°24.5′, 74°22.2′. (S)
DN Atlantic City Lifeboat Station; 39°22.7′, 74°25.4′.
D Atlantic City, Tuna Club; 39°22.5′, 74°25.3′.
D Atlantic City, Kentucky Ave.; 39°21.6′, 74°25.6′. (S)
D Longport; 39°18.9′, 74°31.6′.
D Ocean City Lifeboat Station; 39°17.7′, 74°33.8′.
D Townsend Inlet Lifeboat Station; 39°07.7′, 74°42.6′.
DN Cape May Lifeboat Station; 38°58.1′, 74°57.8′.
D Five Fathom Bank Lightship; 38°47.0′, 74°35.0′.
DN Bivalve; 39°14.1′, 75°02.1′.

Delaware:

D Delaware Lightship; 38°27.2′, 74°35.1′.
DN Delaware Breakwater; 38°47.0′, 75°07.0′.
D Indian River Inlet Lifeboat Station; 38°36.5′, 75°03.8′.

Maryland:

D Elk River, Herring Island; 39°30.8′, 75°52.6′.
D Fredericktown; 39°21.8′, 75°53.2′. (S)
D Baltimore, Frog Mortar Creek; 39°19.3′, 76°24.1′.
DN Baltimore; 39°16.9′, 76°35.5′.
D Sue Island; 39°17.3′, 76°23.8′.
D Fairlee Creek, Great Oak; 39°16.0′, 76°12.7′.
D Gibson Island; 39°05.1′, 76°25.4′.
DN Annapolis, Naval Academy; 38°58.9′, 76°28.8′.
D St. Michaels; 38°47.1′, 76°13.2′.
D Tilghman Island; 38°43.2′, 76°20.3′.
DN Cambridge Yacht Club; 38°34.6′, 76°04.4′.
D Fishing Creek; 38°19.3′, 76°13.3′.
D Ocean City Lifeboat Station; 38°19.8′, 75°05.1′.
D Ewell, Smith Island; 37°59.7′, 76°01.9′.
D Crisfield; 37°58.7′, 75°51.8′.

District of Columbia:

D Corinthian Yacht Club; 38°51.9′, 77°00.9′.

Virginia:

D Arlington, Pentagon Lagoon; 38°52.0′, 77°03.0′.
D Alexandria, Old Town Yacht Basin; 38°48.0′, 77°02.5′.
D Oyster; 37°17.2′, 75°55.5′.
D Fort Eustis; 37°10.0′, 76°36.5′.
DN Fort Monroe; 37°00.1′, 76°18.5′.
D Chesapeake Lightship; 36°59.0′, 75°42.0′.
DN Newport News; 36°58.3′, 76°25.9′.
DN Norfolk Navy Base; 36°57.1′, 76°20.0′.
DN Cape Henry; 36°55.8′, 76°00.5′.
DN Little Creek; 36°55.0′, 76°10.5′.
DN Norfolk (Royster Bldg); 36°50.9′, 76°17.5′.

APPENDIX

CLIMATOLOGICAL TABLES

These tables were compiled from U. S. Weather Bureau data.

Sky cover is expressed in a range of 0 for no clouds to 10 for complete sky cover. The number of clear days is based on average cloudiness of 0 to 3, partly cloudy days on 4 to 7, and cloudy days on 8 to 10.

Heavy fog includes data referred to at various times in the past as "Dense" or "Thick." The upper visibility limit for heavy fog is 1/4 mile.

(a) means length of record in years.
* means less than one-half.
T means trace, an amount too small to measure.

NEW YORK, N. Y. (Weather Bureau Office) 40° 42' N., 74° 01' W. Elevation (ground) 10 feet WB-1960

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme												Sunrise to sunset						
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest	Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	7 a.m., EST	12 noon EST	Mean speed	Prevailing direction	Maximum speed and direction			Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				90	90		90	76	72	43	49	40	49	67	70	90	90	90	90	76	77	56
Jan.	39.9	25.8	32.9	71	-6	3.46	3.42	7.3	72	62	14.3	NW	66 SW	51	6.2	8	10	13	12	2	*	3
Feb.	40.1	25.3	32.7	73	-14	3.13	3.25	8.9	70	59	14.6	NW	79 SW	57	5.8	8	9	11	10	2	*	2
Mar.	48.5	32.8	40.7	84	3	3.56	3.60	5.8	69	56	14.8	NW	79 SW	59	5.9	9	11	12	12	2	1	2
Apr.	57.9	41.7	49.8	91	12	3.22	3.72	1.0	69	54	13.6	NW	83 NW	60	5.2	8	11	11	11	*	2	2
May	69.0	52.5	60.8	95	34	3.51	4.17	T	71	56	11.6	NW	64 W	61	5.8	8	12	11	11	*	4	2
June	77.7	61.8	69.8	97	44	3.70	3.88	0	74	58	11.0	S	82 W	64	5.7	8	13	9	10	0	5	1
July	82.3	66.9	74.6	102	54	4.24	4.90	0	76	58	10.4	S	83 NW	65	5.7	8	13	10	11	0	7	1
Aug.	80.4	66.0	73.2	102	51	4.34	6.71	0	78	60	10.0	S	64 NW	63	5.6	9	12	10	10	0	6	*
Sep.	74.5	60.1	67.3	100	38	3.67	6.17	0	78	60	10.7	N	86 N	64	5.2	11	10	9	9	0	3	1
Oct.	64.5	49.5	57.0	90	27	3.04	9.40	T	75	59	12.0	NW	98 SE	63	5.0	11	10	10	9	0	1	2
Nov.	53.0	39.5	46.3	81	7	3.09	3.62	0.9	73	61	13.6	NW	76 W	56	5.8	9	9	11	9	*	*	2
Dec.	42.4	28.9	35.7	69	-13	3.07	3.23	6.2	72	62	14.0	NW	79 NW	53	6.0	8	10	13	10	2	*	2
Year	60.9	45.9	53.4	102	-14	42.03	9.40	30.1	73	59	12.6	NW	98 SE	60	5.7	104	131	130	124	8	30	20

NEWARK, N. J. (Newark Airport 40° 42' N., 74° 10' W. Elevation (ground) 11 feet. WB-1960

Month	Air temperature (°F.)					Precipitation (inches)			Humidity (percent)		Wind (knots)			Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days						
	Normal			Extreme												Sunrise to sunset						
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest	Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	7 a.m. EST	1 p.m. EST	Mean speed	Prevailing direction	Maximum speed and direction			Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				19	19		7		19	19	17	19			15	19	19	19	19	19	19	19
Jan.	39.0	24.0	31.5	74	0	3.60	1.33	6.3	72	56	9.7	NE			6.7	7	7	17	12	2	*	3
Feb.	39.5	23.9	31.7	76	- 7	3.21	1.87	6.5	70	56	10.0	NW			6.3	7	8	13	10	2	*	2
Mar.	49.2	31.8	40.5	89	6	3.78	1.76	6.0	66	53	10.4	WNW			6.2	8	9	14	12	1	1	2
Apr.	59.5	40.4	50.0	91	23	3.27	2.01	.8	70	50	9.6	WNW			6.6	7	9	14	12	*	1	2
May	71.3	50.9	61.1	94	33	3.73	1.11	T	72	52	8.6	SW			6.6	6	11	14	13	0	4	2
June	80.5	60.4	70.5	102	43	3.80	1.52	.0	73	52	8.0	SW			6.0	7	12	11	10	0	5	2
July	84.9	65.6	75.3	105	52	4.20	2.54	.0	74	51	7.5	SW			6.2	7	12	12	10	0	7	1
Aug.	82.6	63.6	73.1	103	51	4.19	4.17	.0	78	53	7.3	SW			6.0	8	11	12	9	0	4	1
Sep.	76.5	57.1	66.8	105	35	3.89	4.06	.0	81	54	7.5	SW			5.6	10	8	12	9	0	2	2
Oct.	65.4	45.8	55.6	92	30	3.20	2.53	T	80	53	8.1	SW			5.4	11	8	12	8	0	1	3
Nov.	53.2	36.6	44.9	85	15	3.10	1.52	.5	77	55	8.7	SW			6.0	9	8	13	10	*	*	2
Dec.	41.4	26.6	34.0	72	- 1	3.10	1.83	8.4	73	57	9.1	SW			6.2	9	8	14	11	2	*	2
Year	61.9	43.9	52.9	105	- 7	43.07	4.17	28.5	74	54	8.8	SW			6.2	96	111	158	126	7	25	24

TRENTON, N. J. (Federal Building) 40° 13' N., 74° 46' W. Elevation (ground) 56 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent)		Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				28	28		28	28			28	26	28	28	17	28	28	28	28	28	28	
Jan.	39.8	25.4	32.6	72	-3	3.16	2.03	4.9			8.6	NW	42 N	49	6.5	7	9	15	12	2	*	
Feb.	40.3	25.0	32.7	73	-14	2.75	2.13	6.3			8.9	NW	43 W	55	6.1	8	8	12	9	2	*	
Mar.	50.0	32.5	41.3	86	8	3.20	2.55	4.8			9.3	NW	37 NW	55	6.0	8	9	14	12	2	1	
Apr.	60.3	41.0	50.7	91	24	3.00	2.46	.4			8.9	S	37 N	59	6.3	7	9	14	11	*	2	
May	72.0	51.6	61.8	95	34	3.48	2.02	.0			7.8	S	32 NW	62	6.5	7	11	13	12	0	5	
June	80.6	60.9	70.8	100	43	3.87	4.79	.0			7.3	S	31 SE	65	5.9	7	12	11	10	0	6	
July	84.6	66.0	75.3	106	53	4.06	4.30	.0			6.8	S	40 SW	68	5.9	8	12	11	10	0	8	
Aug.	82.2	64.2	73.2	100	48	4.59	4.76	.0			6.6	S	36 N	64	5.8	9	11	11	10	0	6	
Sep.	76.1	57.9	67.0	100	36	3.75	4.01	.0			6.8	S	49 NW	63	5.6	10	9	11	8	0	3	
Oct.	65.4	46.8	56.1	94	27	2.65	3.25	T			7.3	N	52 NW	60	5.2	12	8	11	8	0	1	
Nov.	53.5	37.7	45.6	83	14	2.86	2.31	1.1			8.0	NW	56 E	53	6.0	9	8	13	9	*	*	
Dec.	42.0	27.9	35.0	70	-2	2.78	2.67	4.4			8.1	NW	37 W	49	6.1	8	9	14	10	1	*	
Year	62.2	44.7	53.5	106	-14	40.15	4.79	21.9			7.8	S	56 E	59	6.0	100	115	150	121	7	32	

PHILADELPHIA, PA. (International Airport) 39° 53' N., 75° 15' W. Elevation (ground) 7 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7 a.m. EST	1 p.m. EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				19	19		14	18	20	20	20	20	20	18	20	20	20	20	20	20	20	20
Jan.	40.9	25.4	33.2	74	2	3.37	1.67	4.6	76	60	8.9	WNW	53 NE	47	6.8	7	7	17	12	2	*	3
Feb.	41.8	25.3	33.6	74	3	3.12	1.55	4.9	75	56	9.6	NW.	51 NW	55	6.3	7	8	13	9	1	*	3
Mar.	52.0	32.5	42.3	87	7	3.32	1.82	4.2	74	52	10.2	NNW	49 NW	57	6.2	8	8	15	12	1	1	2
Apr.	62.2	40.9	51.6	92	24	3.38	1.82	T	73	49	9.6	SW	51 SW	57	6.5	6	9	15	11	*	2	2
May	74.1	52.0	63.1	96	33	3.58	2.09	.0	75	51	8.4	SW	49 SW	59	6.7	5	11	15	12	0	5	2
June	82.6	61.5	72.1	100	44	3.87	2.96	.0	76	52	7.7	SW	63 NW	64	6.2	6	13	11	10	0	5	2
July	86.5	66.0	76.3	102	52	4.20	2.84	.0	79	52	7.1	SW	41 W	63	6.1	7	12	12	10	0	6	1
Aug.	84.0	63.9	74.0	101	50	4.58	4.81	.0	82	55	6.8	SW	58 E	61	5.9	8	11	12	10	0	5	2
Sep.	77.8	57.5	67.7	100	36	3.46	5.45	.0	84	53	7.0	SW	43 NE	60	5.6	9	10	11	8	0	2	2
Oct.	67.1	46.0	56.6	96	28	2.60	3.22	T	83	53	7.8	ENE	57 SW	59	5.6	11	8	12	8	*	1	5
Nov.	54.9	36.8	45.9	79	15	3.08	3.46	.8	80	55	8.3	WNW	52 SW	53	6.1	7	10	13	9	*	*	3
Dec.	44.4	27.4	35.9	72	1	2.67	1.77	3.9	76	58	8.7	WNW	41 NW	51	6.3	7	10	14	9	1	*	3
Year	64.0	44.6	54.3	102	1	41.23	5.45	18.4	78	54	8.3	SW	63 NW	57	6.2	88	117	160	120	5	27	30

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WILMINGTON, DEL. (New Castle County Airport) 39° 40' N., 75° 36' W. Elevation (ground) 78 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7 a. m., EST	1 p. m., EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				13	13		13	13	13	13	12	13			13	13	13	13	13	13	13	13
Jan.	41.8	24.7	33.3	75	-4	3.56	1.56	5.2	77	62	8.2	WNW			6.9	6	8	17	12	2	*	5
Feb.	42.8	24.6	33.7	74	2	3.08	1.90	4.5	76	59	8.7	NW			6.4	7	7	14	10	1	*	4
Mar.	53.0	32.0	42.5	86	9	3.61	2.75	5.0	75	55	9.6	NW			6.2	9	8	14	13	1	1	3
Apr.	63.2	40.4	51.8	89	23	3.64	1.91	.1	75	52	8.8	WNW			6.6	7	8	15	12	*	2	3
May	74.6	51.0	62.8	93	34	3.81	2.01	.0	78	54	7.5	S			6.7	5	11	15	12	0	5	3
June	83.1	60.4	71.8	99	44	4.02	2.67	.0	78	53	7.2	S			5.8	8	11	11	9	0	6	2
July	86.7	65.0	75.9	102	50	4.49	6.24	.0	81	53	6.5	NW			6.1	7	12	12	9	0	6	3
Aug.	84.6	62.9	73.8	101	48	5.28	4.00	.0	84	57	6.2	S			5.8	9	10	12	9	0	6	4
Sep.	78.8	57.1	68.0	100	37	3.80	5.62	.0	86	56	6.4	S			5.6	10	8	12	8	0	3	4
Oct.	67.2	45.2	56.2	91	26	2.99	2.94	T	85	55	6.8	NW			5.5	11	7	13	9	0	1	4
Nov.	55.3	35.7	45.5	85	14	3.33	3.83	1.5	82	57	7.5	NW			6.1	8	8	14	9	*	1	5
Dec.	43.9	26.2	35.1	71	6	2.99	1.99	3.6	77	60	7.5	WNW			6.3	8	8	15	10	1	0	4
Year	64.6	43.8	54.2	102	-4	44.60	6.24	19.9	80	56	7.6	NW			6.2	95	106	164	122	5	31	44

ATLANTIC CITY, N. J. (23 S. Rhode Id. Ave.) 39° 22' N., 74° 25' W. Elevation (ground) 10 feet. WB-1958

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7 a.m., EST	1 p.m., EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				85	85		85	75	70	23	37	75	37	62	60	82	82	82	85	75	84	53
Jan.	42.4	29.1	35.8	68	- 4	3.78	2.98	4.2	79	68	14.0	NW	70 E	51	6.2	8	9	14	12	1	*	2
Feb.	42.1	28.6	35.4	77	- 9	3.24	2.66	4.8	77	68	14.2	NW	67 SE	57	5.6	9	9	10	10	2	*	2
Mar.	48.3	34.7	41.5	84	8	3.53	3.13	2.3	77	66	14.8	NW	63 SE	58	5.7	9	10	12	12	1	1	2
Apr.	56.1	42.6	49.4	90	15	3.40	3.15	.2	76	65	14.5	NW	70 NE	59	5.8	9	10	11	11	*	2	2
May	65.4	52.7	59.1	95	33	2.98	3.24	.0	78	69	13.1	SW	51 NE	62	5.6	9	12	10	11	0	3	3
June	75.0	62.4	68.7	99	45	2.99	4.22	.0	80	71	12.2	S	50 NE	65	5.5	9	12	9	10	0	5	2
July	79.3	67.9	73.6	102	52	3.78	5.41	.0	81	72	11.6	SW	53 SW	67	5.3	10	12	9	10	0	5	2
Aug.	78.8	67.4	73.1	104	48	4.72	8.97	.0	82	71	11.6	SW	66 E	66	5.2	11	11	9	10	0	4	1
Sep.	74.1	62.4	68.3	94	37	3.51	9.13	.0	81	70	12.2	SW	79 NE	65	5.1	11	10	9	8	0	2	1
Oct.	64.8	51.2	58.0	91	29	3.21	9.21	T	80	64	13.1	NW	63 NE	64	4.8	13	8	10	9	0	1	1
Nov.	54.7	41.4	48.1	80	10	3.32	5.15	.5	79	65	13.6	NW	63 E	58	5.4	10	9	11	9	*	*	1
Dec.	44.9	31.4	38.2	68	- 7	3.31	3.52	2.6	78	67	13.4	NW	61 NE	52	6.0	10	10	11	10	1	*	2
Year	60.5	47.7	54.1	104	- 9	41.77	9.21	14.6	79	68	13.2	NW	79 NE	60	5.5	118	122	125	122	5	23	21

BALTIMORE, MD. (Custom House) 39° 17' N., 76° 37' W. Elevation (ground) 14 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7:00 a.m., EST	1:00 p.m., EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				90	90		90	68	60	31	24	40	39	57	80	80	80	80	90	58	67	60
Jan.	43.6	29.6	36.6	79	-6	3.66	3.73	6.1	72	58	8.9	SW	49 NW	48	5.9	9	9	13	11	2	*	2
Feb.	44.6	29.9	37.3	83	-7	3.09	3.48	6.6	70	56	9.4	SW	56 NW	56	5.6	9	9	10	10	2	*	2
Mar.	53.7	36.8	45.3	90	5	3.63	4.14	4.8	69	53	10.0	SW	57 W	59	5.6	10	10	11	12	1	1	2
Apr.	63.3	45.3	54.3	95	15	3.72	3.99	.6	65	50	9.8	SW	56 W	59	5.5	9	10	11	11	*	2	1
May	74.4	56.2	65.3	98	34	4.01	3.89	T	67	51	8.7	SW	49 NE	61	5.4	10	11	10	11	0	5	*
June	83.1	65.5	74.3	105	46	3.52	4.47	.0	70	53	8.2	SW	53 N	64	5.3	9	13	8	11	0	6	*
July	86.9	70.0	78.5	107	54	3.94	4.13	.0	71	52	7.6	SW	53 NE	65	5.2	10	12	9	11	0	8	*
Aug.	84.6	68.2	76.4	105	51	4.38	7.82	.0	74	55	7.5	S	52 SW	63	5.1	11	11	9	11	0	6	*
Sep.	78.6	62.2	70.4	101	39	3.46	6.07	.0	75	56	7.7	S	47 SW	64	4.9	12	9	9	8	0	3	1
Oct.	67.8	50.7	59.3	97	30	3.37	5.30	.1	74	53	8.0	SW	43 NW	63	4.7	13	9	9	8	*	1	2
Nov.	56.2	41.1	48.7	87	12	2.96	4.19	.6	72	55	8.7	SW	49 S	55	5.3	10	10	10	9	*	*	2
Dec.	45.4	32.1	38.8	75	-3	2.95	3.16	3.9	71	58	8.6	SW	49 NW	49	5.7	9	10	12	10	1	*	3
Year	65.2	49.0	57.1	107	-7	42.69	7.82	22.7	71	54	8.6	SW	57 W	59	5.4	121	123	121	123	6	32	15

WASHINGTON, D. C. (National Airport) 38°51' N., 77°02' W. Elevation (ground) 14 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7 a.m. EST	1 p.m. EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				19	19		17	17	19	19	12	10	12	12	12	12	12	12	19	17	12	12
Jan.	43.8	28.5	36.2	79	5	3.24	1.73	4.2	74	57	9.4	NW	49 NW	45	6.8	7	7	17	11	2	0	2
Feb.	45.3	28.8	37.1	82	5	2.53	1.52	3.8	71	51	9.6	NW	50 NW	52	6.4	7	7	14	8	1	*	2
Mar.	54.5	36.0	45.3	89	11	3.03	3.43	2.8	71	49	10.4	NW	52 E	55	6.1	8	9	14	12	1	1	1
Apr.	64.5	44.2	54.4	95	24	3.06	1.77	T	70	46	9.8	S	49 N	55	6.5	6	9	15	10	0	3	1
May	74.5	54.8	64.7	94	34	3.98	4.32	.0	75	51	8.5	S	42 S	56	6.4	6	11	14	12	0	6	*
June	82.5	64.3	73.4	101	47	3.41	3.67	.0	75	53	8.2	S	50 NW	65	5.6	8	12	10	9	0	5	*
July	86.1	68.4	77.3	103	55	4.26	2.97	.0	77	53	7.5	SSW	47 E	64	5.9	8	12	11	10	0	7	*
Aug.	83.7	67.0	75.4	100	53	4.75	6.39	.0	81	54	7.3	S	43 NE	61	5.6	10	9	12	10	0	5	*
Sep.	78.2	61.0	69.6	100	40	4.12	3.63	.0	82	54	7.6	S	49 SE	62	5.4	11	8	11	8	0	3	1
Oct.	67.4	48.9	58.2	94	30	2.85	4.98	T	82	54	8.0	SSW	68 SE	58	5.3	12	7	12	8	0	1	2
Nov.	56.1	39.3	47.7	85	16	2.73	2.52	.7	77	52	8.3	SSW	52 E	55	5.9	9	8	13	8	*	1	2
Dec.	45.4	30.6	38.0	75	1	2.61	1.85	3.2	72	54	8.4	NW	54 SW	49	6.2	9	7	15	9	1	0	2
Year	65.2	47.7	56.5	103	1	40.57	6.39	14.7	76	52	8.6	S	68 SE	56	6.0	101	106	158	115	5	32	13

RICHMOND, VA. (Byrd Field) 37 30' N., 77 20' W. Elevation (ground) 162 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7:00 a.m., EST	1:00 p.m., EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				31	31		23	23	26	26	12	12	10	10	15	15	15	15	23	23	23	31
Jan.	48.1	28.4	38.3	80	-12	3.64	3.23	4.3	81	58	7.1	S	35 S	49	6.7	7	7	17	10	1	*	3
Feb.	50.3	29.0	39.7	83	-10	2.85	1.56	2.5	80	53	7.4	WSW	39 SW	54	6.1	9	6	13	9	1	*	2
Mar.	59.2	35.8	47.5	93	11	3.42	2.04	2.7	78	48	7.9	W	36 SE	57	6.2	8	9	14	11	1	1	2
Apr.	68.3	43.8	56.1	96	26	3.23	2.07	.1	76	46	7.8	S	35 NW	63	6.2	7	10	13	10	*	2	2
May	77.7	53.9	65.8	100	31	3.64	2.30	.0	78	49	6.6	SSW	34 SW	65	6.3	6	12	13	11	0	6	2
June	85.4	63.1	74.3	104	41	3.87	2.85	.0	80	52	6.3	S	45 NW	69	5.9	7	13	10	9	0	7	2
July	87.8	67.2	77.5	104	51	5.64	4.90	.0	84	55	6.1	SSW	49 NW	70	5.9	8	11	12	12	0	10	2
Aug.	86.3	65.4	75.9	102	46	5.05	8.79	.0	87	57	5.8	S	43 SE	65	6.0	8	11	12	10	0	7	3
Sep.	80.9	59.7	70.3	103	38	3.65	3.82	.0	89	55	6.1	S	39 SE	64	5.8	9	8	13	8	0	3	4
Oct.	70.4	47.2	58.8	99	23	2.61	3.96	T	89	53	6.3	NNE	59 SE	58	5.5	12	7	12	8	0	1	4
Nov.	59.6	37.2	48.4	86	10	2.49	4.07	.6	84	50	6.5	S	30 S	54	5.7	10	7	13	9	*	1	2
Dec.	49.4	29.5	39.5	78	- 1	2.89	3.16	1.8	82	55	6.5	SW	35 SE	52	6.0	10	7	14	9	1	*	3
Year	68.6	46.7	57.7	104	-12	42.98	8.79	12.0	82	53	6.7	S	59 SE	60	6.0	101	108	156	116	4	38	31

NORFOLK, VA. (Municipal Airport) 36° 53' N., 76° 12' W. Elevation (ground) 26 feet. WB-1960

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 7 a. m., EST	1 p. m., EST	Wind (knots): Mean speed	Prevailing direction	Maximum speed and direction	Percent of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, sleet 1.0 inch or more	Thunderstorms	Heavy fog
(a)				12	12		12	12	12	12	12	12	7	7	12	12	12	12	12	12	12	12
Jan.	50.0	33.0	41.5	77	14	3.17	2.26	2.1	77	60	10.0	NNE	49 SW	58	6.4	8	7	16	10	1	*	2
Feb.	50.9	33.1	42.0	78	11	3.17	1.51	.8	77	57	10.3	NNE	45 SW	60	6.3	8	6	14	10	*	1	3
Mar.	59.2	38.9	49.1	85	20	3.27	3.18	.8	74	53	10.7	N	47 W	60	6.1	9	7	15	12	*	2	2
Apr.	66.2	46.4	56.3	97	30	3.16	2.40	T	75	51	10.2	SW	54 N	64	5.9	8	10	12	11	0	3	2
May	75.4	56.4	65.9	97	36	3.45	2.64	.0	78	56	8.3	SW	31 NE	66	6.0	8	11	12	10	0	6	2
June	84.1	65.2	74.7	100	50	4.16	2.70	.0	78	56	7.8	SW	42 NW	70	5.4	9	11	10	8	0	7	
July	86.0	68.9	77.5	103	60	6.05	3.17	.0	81	58	7.3	SW	55 SW	65	5.8	8	12	11	11	0	9	1
Aug.	84.6	68.1	76.4	97	56	5.08	5.79	.0	85	62	7.6	SW	50 NE	62	5.8	9	11	11	12	0	8	2
Sep.	79.9	64.0	72.0	98	46	3.86	6.79	.0	83	61	8.1	NE	63 W	63	5.8	8	10	12	8	0	3	2
Oct.	70.0	52.4	61.2	95	32	2.45	4.19	.0	84	62	9.1	NE	68 S	58	5.5	12	6	13	8	0	2	3
Nov.	60.2	42.5	51.4	85	20	2.67	3.35	.1	81	55	9.2	SW	36 W	61	5.3	11	8	11	9	0	*	3
Dec.	51.1	34.4	42.8	77	15	2.88	2.12	1.8	78	58	9.2	SW	42 NW	62	5.8	10	7	14	8	1	*	2
Year	68.1	50.3	59.2	103	11	43.37	6.79	5.6	79	57	8.9	SW	68 S	62	5.8	108	106	151	117	2	41	26

MEAN SURFACE WATER TEMPERATURES AND SALINITIES

Station	Years	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Mean	
		Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰	Temp. °F	Sal. ‰
Sandy Hook, N. J.	22	35.3	22.5	35.3	22.7	39.5	21.4	48.7	20.3	58.4	21.7	68.4	23.7	74.3	25.5	74.4	25.6	69.5	25.6	58.9	25.5	48.7	24.6	38.8	23.5	54.2	23.5
Atlantic City, N. J.	47	37.3	31.4	36.3	31.4	39.9	31.2	47.4	31.1	55.9	31.4	64.7	31.6	69.3	31.9	71.7	31.6	69.8	31.6	61.4	31.6	51.5	31.6	41.6	31.4	53.9	31.5
Breakwater Harbor, Del.	15	38.2	27.8	37.9	28.1	42.4	27.8	50.3	27.3	59.7	27.8	68.7	28.4	73.3	29.7	73.8	29.9	71.7	29.8	62.7	29.7	52.4	29.3	42.4	28.6	56.1	28.7
Philadelphia, Pa.	31	36.0	0.3	36.3	0.3	41.4	0.3	51.0	0.4	63.4	0.7	73.6	0.8	78.9	0.8	78.6	0.8	73.4	0.7	62.7	0.6	50.5	0.4	39.8	0.3	57.1	0.5
Kiptopeke Beach, Va.	9	40.3	26.8	41.3	25.9	45.7	25.2	54.3	23.9	64.8	23.9	74.3	25.6	78.6	26.4	78.3	27.6	74.4	27.6	64.9	27.7	53.6	27.1	44.9	26.5	59.6	26.2
Old Point Comfort, Va.	9	42.5	19.3	42.5	18.3	48.4	16.7	57.2	17.1	67.1	17.8	75.0	19.0	80.1	20.8	79.1	21.6	75.1	21.7	65.9	21.6	54.9	21.7	45.2	20.1	61.1	19.6
Richmond, Va.	14	41.5	0.2	43.3	0.2	48.1	0.2	58.6	0.3	69.3	0.4	77.6	0.6	82.6	0.6	81.4	0.4	75.9	0.4	64.8	0.3	52.1	0.2	42.1	0.2	61.4	0.3
Washington, D. C.	17	38.1	0.0	39.5	0.0	46.4	0.0	57.9	0.2	68.8	0.3	77.4	0.4	83.0	0.4	81.7	0.4	76.6	0.3	65.2	0.2	52.9	0.0	41.0	0.0	60.7	0.2
Solomons, Md.	23	38.2	14.5	38.0	14.1	43.1	12.7	53.0	10.8	64.9	10.5	74.6	11.0	80.0	12.3	80.3	13.2	75.5	14.6	65.5	15.7	54.5	16.5	43.3	15.6	59.2	13.5
Cambridge, Md.	8	39.4	9.7	39.4	9.0	44.7	9.0	55.4	8.4	66.3	7.9	75.4	8.0	80.8	8.4	79.6	8.5	74.0	10.2	63.4	11.5	52.5	12.0	40.8	11.0	59.3	9.5
Annapolis, Md.	14	37.5	10.6	37.5	10.2	42.3	9.2	53.3	6.6	64.8	6.6	74.2	7.6	80.4	8.9	79.9	9.9	74.9	11.4	64.8	12.8	52.6	13.5	41.3	11.8	58.6	9.9
Baltimore, Md.	47	37.6	9.7	37.1	9.4	42.5	8.1	52.9	5.9	64.2	5.5	74.0	5.9	79.6	6.7	79.6	7.7	75.2	9.3	65.5	10.6	53.8	10.8	42.9	10.3	58.7	8.3

For sea water temperature and salinity in greater detail, see Coast and Geodetic Survey Publication 31-1, Surface Water Temperatures and Salinites; Atlantic Coast, North and South America.

HOURS OF OPERATION OF FOG SIGNALS
(U.S. Coast Guard)

Light station	10 Calendar Years - 1950 thru 1959														Pre - 1950		
	Average													Max. 1 yr.	Ave.	For yrs.	Max. 1 yr.
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year				
Ambrose Channel Lightship, N.Y. 40°27.1'N., 73°49.4'W.	87	75	69	95	116	104	77	65	55	48	53	67	911	1169	1137	56	2051
Scotland Lightship, N.J. 40°26.6'N., 73°55.2'W.	86	68	65	72	83	74	55	44	29	44	49	52	721	888	721	41	2025
North Hook (Sandy Hook), N.J. 40°28.3'N., 74°00.3'W.	109	82	82	89	94	88	78	80	60	69	69	87	987	1251	693	61	796
Barnegat Lightship, N.J. 39°45.8'N., 73°56.0'W.	46	56	41	70	89	48	30	17	16	23	28	44	508	631	850	16	--
Cape May West Jetty, N.J. 38°56.2'N., 74°51.9'W.	89	95	117	113	141	134	100	117	64	66	78	108	1222	1923	826	6	1417
Overfalls Lightship, Del. 38°48.0'N., 75°01.4'W.	47	57	60	72	68	68	60	41	16	21	42	52	604	915	656	51	823
Harbor of Refuge, Del. 38°48.9'N., 75°05.6'W.	29	35	31	39	42	35	19	19	8	14	19	31	321	472	436	44	562
Brandywine Shoal, Del. 38°59.2'N., 75°06.8'W.	60	65	55	45	49	49	29	25	34	25	42	51	529	655	516	47	1006
Miah Maull Shoal, N.J. 39°07.6'N., 75°12.6'W.	54	65	46	32	27	19	8	14	10	16	38	45	374	469	439	37	838
Ship John Shoal, N.J. 39°18.3'N., 75°22.6'W.	52	56	38	24	19	8	4	10	11	18	41	52	333	459	354	44	612
Cherry Island Range Front, Del. 39°45.0'N., 75°29.7'W.	41	39	26	19	15	6	10	8	13	20	33	45	275	450	315	44	686
Little Tinicum Island Range Front, N.J. 39°50.9'N., 75°15.2'W.	53	41	28	17	13	10	5	12	14	21	39	45	298	416	246	40	471
Fort Mifflin, Pa. 39°52.5'N., 75°12.6'W.	30	21	13	13	9	6	1	5	7	15	24	30	174	267	260	44	390
Five Fathom Bank Lightship, N.J 38°47.3'N , 74°34.6'W.	46	62	54	82	84	60	41	23	13	18	25	32	540	680	548	61	690
Winter Quarter Shoal Lightship, Va. 37°55.5'N., 74°56.4'W.	38	43	60	68	69	51	13	5	3	20	22	31	423	601	439	50	781
Chesapeake Lightship, Va. 36°58.7'N., 75°42.2'W.	56	57	56	47	48	34	22	20	16	23	29	33	441	863	652	14	1122
Cape Henry, Va. 36°55.6'N., 76°00.4'W.	43	51	33	32	34	18	7	14	12	18	27	36	325	440	359	65	867

HOURS OF OPERATION OF FOG SIGNALS
(U. S. Coast Guard)

Light station	10 Calendar Years - 1950 thru 1959														Pre - 1950		
	Average													Max. 1 yr.	Ave.	For yrs.	Max. 1 yr.
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year				
Thimble Shoal, Va. 37°00.9'N., 76°14.4'W.	47	58	38	31	31	11	6	13	16	31	37	49	368	517	287	46	465
Old Point Comfort, Va. 37°00.1'N., 76°18.4'W.	53	59	31	28	36	8	7	12	21	32	41	55	383	527	263	46	545
York Spit, Va. 37°12.6'N., 76°15.5'W.	45	55	27	20	22	7	4	8	7	14	25	41	275	448	262	44	525
Tue Marshes, Va. 37°14.1'N., 76°23.2'W.	34	45	20	13	14	2	2	4	4	10	20	34	202	315	188	44	373
Old Plantation Flats, Va. 37°13.7'N., 76°02.8'W.	46	53	35	29	29	10	6	12	8	19	21	39	307	506	297	44	472
Wolf Trap, Va. 37°23.4'N., 76°11.4'W.	72	78	59	34	33	15	5	20	17	33	42	71	479	852	309	54	664
Tangier Sound, Va. 37°47.3'N., 75°58.4'W.	66	68	38	22	18	9	3	9	6	12	28	63	342	390	364	44	575
Smith Point, Va. 37°52.8'N., 76°11.0'W.	109	107	83	61	44	18	7	11	17	30	59	89	635	864	442	50	1038
Point Lookout, Md. 38°02.3'N., 76°19.3'W.	68	67	53	38	27	9	2	9	8	20	45	55	401	479	345	44	558
Piney Point, Md. 38°08.1'N., 76°31.8'W.	61	59	48	31	20	10	6	10	12	17	37	53	364	457	261	44	465
Holland Island Bar, Md. 38°04.1'N., 76°05.7'W.	79	78	45	25	21	6	7	11	10	22	45	67	416	576	343	44	755
Point No Point, Md. 38°07.7'N., 76°17.4'W.	73	75	62	39	23	9	6	6	9	16	45	65	428	676	402	44	1431
Hooper Island, Md. 38°15.4'N., 76°15.0'W.	86	97	71	49	23	13	6	14	24	26	56	79	544	771	338	44	707
Drum Point, Md. 38°19.2'N., 76°25.3'W.	43	41	34	19	13	4	2	4	5	10	34	44	253	340	243	44	374
Cove Point, Md. 38°23.2'N., 76°22.9'W.	65	72	60	43	28	16	11	41	12	20	48	63	479	865	344	47	1045
Bloody Point Bar, Md. 38°50.0'N., 76°23.5'W.	91	99	70	43	35	12	4	12	23	27	61	89	566	703	343	44	751
Thomas Point Shoal, Md. 38°53.9'N., 76°26.2'W.	73	80	61	44	25	10	4	6	17	21	54	79	474	680	349	44	764
Sandy Point, Md. 39°01.0'N., 76°23.1'W.	73	68	51	38	29	14	6	8	17	18	56	68	446	576	416	44	801
Craighill Channel Range Front, Md. 39°11.3'N., 76°23.7'W.	45	60	31	21	7	7	8	3	5	12	36	49	284	523	325	9	396

COASTWISE DISTANCES

NEW YORK, N.Y., TO CHESAPEAKE BAY ENTRANCE, VA.

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N.Y., is 240 nautical miles from Philadelphia, Pa.

	NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	MONTAUK POINT, N.Y. 41°01.7'N., 71°47.3'W.	New York, N.Y. 40°42.0'N., 74°01.0'W.	Manasquan Inlet, N.J. 40°06.1'N., 74°01.9'W.	Barnegat Inlet, N.J. 39°46.0'N., 74°06.3'W.	Atlantic City, N.J. 39°22.6'N., 74°24.9'W.	Cape May Harbor, N.J. 38°57.1'N., 74°52.6'W.	DELAWARE BAY ENTRANCE 38°50.5'N., 75°03.3'W.	Harbor of Refuge, Del. 38°49.0'N., 75°05.2'W.	C. & D. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	Wilmington, Del. 39°43.2'N., 75°31.5'W.	Marcus Hook, Pa. 39°48.2'N., 75°25.2'W.	Chester, Pa. 39°50.0'N., 75°22.0'W.	Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	U.S. Steel Basin, Pa. 40°08.2'N., 74°45.3'W.	Trenton, N.J. 40°11.4'N., 74°45.4'W.	Indian River Inlet, Del. 38°36.5'N., 75°03.6'W.	Ocean City, Md. 38°19.6'N., 75°05.6'W.	Chincoteague, Md. 37°56.1'N., 75°22.8'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.
113																				
223	122																			
212	117	40																		
221	131	63	22																	
242	159	94	52	32																
271	192	128	85	65	37															
285	212	153	97	78	49	16														
285	212	153	98	79	50	17	2													
336	263	204	148	129	100	67	51	52												
347	274	215	159	140	111	78	62	63	11											
353	280	221	165	146	117	84	68	69	17	8										
356	283	224	169	150	121	88	72	73	21	11	3									
372	299	240	184	165	136	103	87	88	36	26	18	15								
395	322	263	207	188	159	126	110	111	59	49	41	38	23							
400	327	268	212	193	164	131	115	116	64	54	46	43	28	5						
285	209	145	105	86	57	24	15	14	66	77	83	86	101	124	129					
295	227	161	121	101	73	40	32	31	83	95	101	104	119	142	147	20				
328	262	201	161	141	113	80	72	71	123	134	140	144	159	182	187	60	41			
381	322	267	219	199	171	141	155	155	206	218	224	227	242	265	270	118	100	69		

DISTANCES BY NEW JERSEY INTRACOASTAL WATERWAY

MANASQUAN INLET, N. J., TO CAPE MAY CANAL, N. J.

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Atlantic City, N. J., is 13 nautical miles from Ocean City, N. J.

	New York, N. Y. (Battery)* 40°42. 0'N., 74°01. 0'W.	Shark River Inlet * 40°11. 2'N., 74°00. 5'W.	Manasquan Inlet * 40°06. 1'N., 74°01. 9'W.	Bay Head 40°03. 8'N., 74°03. 1'W.	Mantoloking 40°02. 2'N., 74°03. 4'W.	Toms River (town) 39°56. 9'N., 74°11. 8'W.	Seaside Park 39°55. 3'N., 74°05. 0'W.	Marine Terminal (Forked R.) 39°50. 1'N., 74°11. 7'W.	Barnegat Inlet 39°46. 0'N., 74°06. 3'W.	Beach Haven 39°34. 0'N., 74°14. 8'W.	Atlantic City 39°22. 6'N., 74°24. 9'W.	Mays Landing 39°26. 9'N., 74°43. 4'W.	Ocean City 39°17. 3'N., 74°34. 4'W.	Sea Isle City 39°09. 4'N., 74°42. 0'W.	Avalon 39°06. 6'N., 74°44. 0'W.	Stone Harbor 39°03. 4'N., 74°46. 0'W.	Wildwood 39°00. 5'N., 74°49. 8'W.	Cape May Harbor 38°57. 1'N., 74°52. 6'W.	Cape May Canal W. Ent. 38°58. 0'N., 74°58. 0'W.	C. & D. CANAL E. ENT., Del. 39°33. 8'N., 75°32. 8'W.
34																				
40	6																			
44	9	4																		
46	11	6	2																	
58	23	18	14	12																
54	20	14	10	9	7															
63	29	23	19	17	15	10														
66	32	26	22	20	18	13	8													
79	45	39	35	33	31	26	21	20												
97	62	57	53	51	49	44	39	38	18											
124	90	84	80	79	77	71	66	65	45	30										
108	74	68	64	63	60	55	50	49	29	13	18									
119	85	79	76	74	72	66	61	60	40	25	29	11								
123	89	83	79	77	75	70	65	64	44	28	33	15	4							
128	94	88	85	83	81	75	70	69	49	34	38	20	9	5						
133	99	93	89	88	86	80	75	74	54	39	43	25	14	10	5					
138	103	98	94	92	90	85	80	79	59	43	47	30	18	15	9	5				
142	108	102	98	96	94	89	84	83	63	47	52	34	23	19	14	9	4			
190	156	150	146	144	142	137	132	131	111	95	100	82	71	67	62	57	52	48		

*Outside distances between New York and Manasquan Inlet.

DISTANCES ON DELAWARE BAY AND RIVER

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Salem, N. J., is 41 nautical miles from Philadelphia, Pa.

	DELAWARE BAY ENT. 38°50.5'N., 75°03.0'W.	Roosevelt Inlet, Del. 38°47.7'N., 75°09.4'W.	Cape May Canal W. Ent., N. J. 38°58.0'N., 74°58.0'W.	St. Jones River Mouth, Del. 39°04.0'N., 75°22.5'W.	Mauricetown, N. J. 39°17.1'N., 74°59.5'W.	Bridgeton, N. J. 39°25.5'N., 75°14.2'W.	Smyrna River Mouth, Del. 39°22.2'N., 75°30.2'W.	Salem, N. J. 39°34.6'N., 75°28.7'W.	C. & D. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	New Castle, Del. 39°39.4'N., 75°33.6'W.	Wilmington, Del. 39°43.2'N., 75°31.5'W.	Marcus Hook, Pa. 39°48.2'N., 75°25.2'W.	Bridgeport, N. J. 39°48.0'N., 75°21.3'W.	Chester, Pa. 39°50.0'N., 75°22.0'W.	Schuylkill River Mouth, Pa. 39°52.8'N., 75°11.9'W.	Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	Burlington, N. J. 40°04.9'N., 74°51.8'W.	U. S. Steel Basin, Pa. 40°08.2'N., 74°45.3'W.	Bordentown, N. J. 40°09.1'N., 74°43.0'W.	Trenton, N. J. 40°11.4'N., 74°45.4'W.
Roosevelt Inlet, Del.	6																			
Cape May Canal W. Ent., N. J.	9	14																		
St. Jones River Mouth, Del.	20	20	21																	
Mauricetown, N. J.	33	37	26	30																
Bridgeton, N. J.	51	52	47	35	51															
Smyrna River Mouth, Del.	39	40	36	21	39	25														
Salem, N. J.	54	55	51	36	54	39	16													
C. & D. CANAL E. ENT.	51	52	48	34	51	36	13	5												
New Castle, Del.	58	59	55	40	58	43	20	12	7											
Wilmington, Del.	62	63	59	45	62	47	24	16	11	5										
Marcus Hook, Pa.	68	69	65	51	68	53	30	22	17	12	8									
Bridgeport, N. J.	72	73	69	55	72	57	34	26	21	15	11	4								
Chester, Pa.	72	73	69	55	72	57	34	26	21	15	11	3	6							
Schuylkill River Mouth, Pa.	80	81	77	63	80	65	42	34	29	23	19	12	14	9						
Philadelphia, Pa.	87	88	84	69	87	72	49	41	36	30	26	18	22	15	7					
Burlington, N. J.	103	104	100	85	103	88	65	57	52	46	42	34	37	31	23	16				
U. S. Steel Basin, Pa.	110	111	107	92	110	95	72	64	59	53	49	41	44	38	29	23	7			
Bordentown, N. J.	112	113	109	94	112	97	74	66	61	55	51	43	46	40	31	25	9	2		
Trenton, N. J.	115	116	112	97	115	100	77	69	64	58	54	46	49	43	34	28	12	5	4	

CHESAPEAKE BAY DISTANCES

June 17, 1961

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Washington, D.C., is 155 nautical miles from Annapolis, Md.

	C. & D. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	Chesapeake City, Md. 39°31.8'N., 75°48.9'W.	Havre de Grace, Md. 39°32.7'N., 76°05.0'W.	Baltimore, Md. 39°16.0'N., 76°34.5'W.	Chestertown, Md. 39°12.4'N., 76°03.8'W.	Annapolis, Md. 38°59.0'N., 76°28.6'W.	St. Michaels, Md. 38°47.2'N., 76°13.2'W.	Cambridge, Md. 38°34.4'N., 76°04.3'W.	Solomons, Md. 38°19.2'N., 76°27.4'W.	Salisbury, Md. 38°21.9'N., 75°36.3'W.	Potomac River Mouth 37°57.7'N., 76°16.7'W.	Washington, D.C. 38°52.4'N., 77°01.4'W.	Crisfield, Md. 37°58.6'N., 75°51.9'W.	Fredericksburg, Va. 38°17.8'N., 77°27.2'W.	Cape Charles, Va. 37°15.9'N., 76°01.4'W.	Yorktown, Va. 37°14.4'N., 76°30.5'W.	West Point, Va. 37°31.6'N., 76°48.1'W.	Newport News, Va. 36°58.0'N., 76°26.0'W.	Suffolk, Va. 36°44.3'N., 76°35.0'W.	Hopewell, Va. 37°19.0'N., 77°16.4'W.	Petersburg, Va. 37°14.1'N., 77°24.0'W.	Richmond, Va. 37°31.4'N., 77°25.2'W.	Norfolk, Va. 36°50.9'N., 76°17.9'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.
C. & D. CANAL E. ENT.																								
Chesapeake City, Md.	13																							
Havre de Grace, Md.	33	20																						
Baltimore, Md.	62	49	41																					
Chestertown, Md.	78	65	61	45																				
Annapolis, Md.	65	52	45	28	40																			
St. Michaels, Md.	83	70	62	45	59	25																		
Cambridge, Md.	98	85	78	60	72	39	36																	
Solomons, Md.	103	90	84	66	78	45	48	39																
Salisbury, Md.	143	130	124	107	119	86	89	81	51															
Potomac River Mouth	122	109	101	84	96	64	65	58	27	49														
Washington, D.C.	213	200	192	175	187	155	156	149	118	141	96													
Crisfield, Md.	134	121	115	98	110	77	80	72	42	43	27	121												
Fredericksburg, Va.	243	230	224	206	219	186	190	182	150	165	125	221	129											
Cape Charles, Va.	169	156	149	132	146	112	116	107	76	87	50	146	51	122										
Yorktown, Va.	192	179	163	155	156	130	126	117	87	100	68	164	64	132	28									
West Point, Va.	214	201	185	174	178	152	149	140	109	122	90	186	86	154	50	22								
Newport News, Va.	207	194	172	170	167	136	138	129	97	110	86	182	74	143	29	55	63							
Suffolk, Va.	209	196	190	172	185	152	156	147	115	128	89	185	92	161	48	55	78	21						
Hopewell, Va.	265	252	230	228	225	194	196	187	155	168	144	240	132	201	88	114	122	58	79					
Petersburg, Va.	259	246	240	222	235	204	206	197	165	178	137	233	142	211	97	101	123	68	89	10				
Richmond, Va.	284	271	249	247	244	213	215	206	174	187	163	259	151	220	106	132	140	77	98	19	28			
Norfolk, Va.	209	196	175	173	170	140	141	132	100	113	89	185	77	146	32	58	66	12	29	70	80	90		
CHESAPEAKE BAY ENT.	187	174	166	150	162	129	132	123	92	103	67	163	67	136	21	34	56	24	42	82	92	101	27	

Radio Bearing Conversion Table

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	146	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
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

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., longitude 69°37′ W.

Radiobeacon station	Latitude	40°37′ N.
Dead-reckoning position of ship	Latitude	39°51′
Middle latitude		40°14′
Radiobeacon 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.

As the ship is east of the radiobeacon, a minus correction is applied. The Mercator bearing then will be 299°−000°39′=298°21′. To facilitate plotting, subtract 180° and plot from the position of the radiobeacon the bearing 298°21′−180°, or 118°21′ (Mercator bearing reckoned clockwise from true north).

Distance of Visibility of Objects at Sea

The following table gives the approximate geographic range of visibility for an object which may be seen by an observer whose eye is at sea level; in practice, therefore, it is necessary to add to these a distance of visibility corresponding to the height of the observer's eye above sea level.

Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles
6	2. 8	48	7. 9	220	17. 0	660	29. 4	2, 000	51. 2
8	3. 1	50	8. 1	240	17. 7	680	29. 9	2, 200	53. 8
10	3. 6	55	8. 5	260	18. 5	700	30. 3	2, 400	56. 2
12	4. 0	60	8. 9	280	19. 2	720	30. 7	2, 600	58. 5
14	4. 3	65	9. 2	300	19. 9	740	31. 1	2, 800	60. 6
15	4. 4	70	9. 6	320	20. 5	760	31. 6	3, 000	62. 8
16	4. 6	75	9. 9	340	21. 1	780	32. 0	3, 200	64. 9
18	4. 9	80	10. 3	360	21. 7	800	32. 4	3, 400	66. 9
20	5. 1	85	10. 6	380	22. 3	820	32. 8	3, 600	68. 6
22	5. 4	90	10. 9	400	22. 9	840	33. 2	3, 800	70. 7
24	5. 6	95	11. 2	420	23. 5	860	33. 6	4, 000	72. 5
26	5. 8	100	11. 5	440	24. 1	880	34. 0	4, 200	74. 3
28	6. 1	110	12. 0	460	24. 6	900	34. 4	4, 400	76. 1
30	6. 3	120	12. 6	480	25. 1	920	34. 7	4, 600	77. 7
32	6. 5	130	13. 1	500	25. 6	940	35. 2	4, 800	79. 4
34	6. 7	140	13. 6	520	26. 1	960	35. 5	5, 000	81. 0
36	6. 9	150	14. 1	540	26. 7	980	35. 9	6, 000	88. 8
38	7. 0	160	14. 5	560	27. 1	1, 000	36. 2	7, 000	96. 0
40	7. 2	170	14. 9	580	27. 6	1, 200	39. 6	8, 000	102. 6
42	7. 4	180	15. 4	600	28. 0	1, 400	42. 9	9, 000	108. 7
44	7. 6	190	15. 8	620	28. 6	1, 600	45. 8	10, 000	114. 6
46	7. 8	200	16. 2	640	29. 0	1, 800	48. 6		

Conversion Table, Degrees to Points and Vice Versa

° ′	Points	° ′	Points	° ′	Points	° ′	Points
0 00	N	90 00	E	180 00	S	270 00	W
2 49		92 49		182 49		272 49	
5 38	N ½ E	95 38	E ½ S	185 38	S ½ W	275 38	W ½ N
8 26		98 26		188 26		278 26	
11 15	N x E	101 15	E x S	191 15	S x W	281 15	W x N
14 04		104 04		194 04		284 04	
16 53	N x E ½ E	106 53	ESE ½ E	196 53	S x W ½ W	286 53	WNW ½ W
19 41		109 41		199 41		289 41	
22 30	NNE	112 30	ESE	202 30	SSW	292 30	WNW
25 19		115 19		205 19		295 19	
28 08	NNE ½ E	118 08	SE x E ½ E	208 08	SSW ½ W	298 08	NW x W ½ W
30 56		120 56		210 56		300 56	
33 45	NE x N	123 45	SE x E	213 45	SW x S	303 45	NW x W
36 34		126 34		216 34		306 34	
39 23	NE ½ N	129 23	SE ½ E	219 23	SW ½ S	309 23	NW ½ W
42 11		132 11		222 11		312 11	
45 00	NE	135 00	SE	225 00	SW	315 00	NW
47 49		137 49		227 49		317 49	
50 38	NE ½ E	140 38	SE ½ S	230 38	SW ½ W	320 38	NW ½ N
53 26		143 26		233 26		323 26	
56 15	NE x E	146 15	SE x S	236 15	SW x W	326 15	NW x N
59 04		149 04		239 04		329 04	
61 53	NE x E ½ E	151 53	SSE ½ E	241 53	SW x W ½ W	331 53	NNW ½ W
64 41		154 41		244 41		334 41	
67 30	ENE	157 30	SSE	247 30	WSW	337 30	NNW
70 19		160 19		250 19		340 19	
73 08	ENE ½ E	163 08	S x E ½ E	253 08	WSW ½ W	343 08	N x W ½ W
75 56		165 56		255 56		345 56	
78 45	E x N	168 45	S x E	258 45	W x S	348 45	N x W
81 34		171 34		261 34		351 34	
84 23	E ½ N	174 23	S ½ E	264 23	W ½ S	354 23	N ½ W
87 11		177 11		267 11		357 11	

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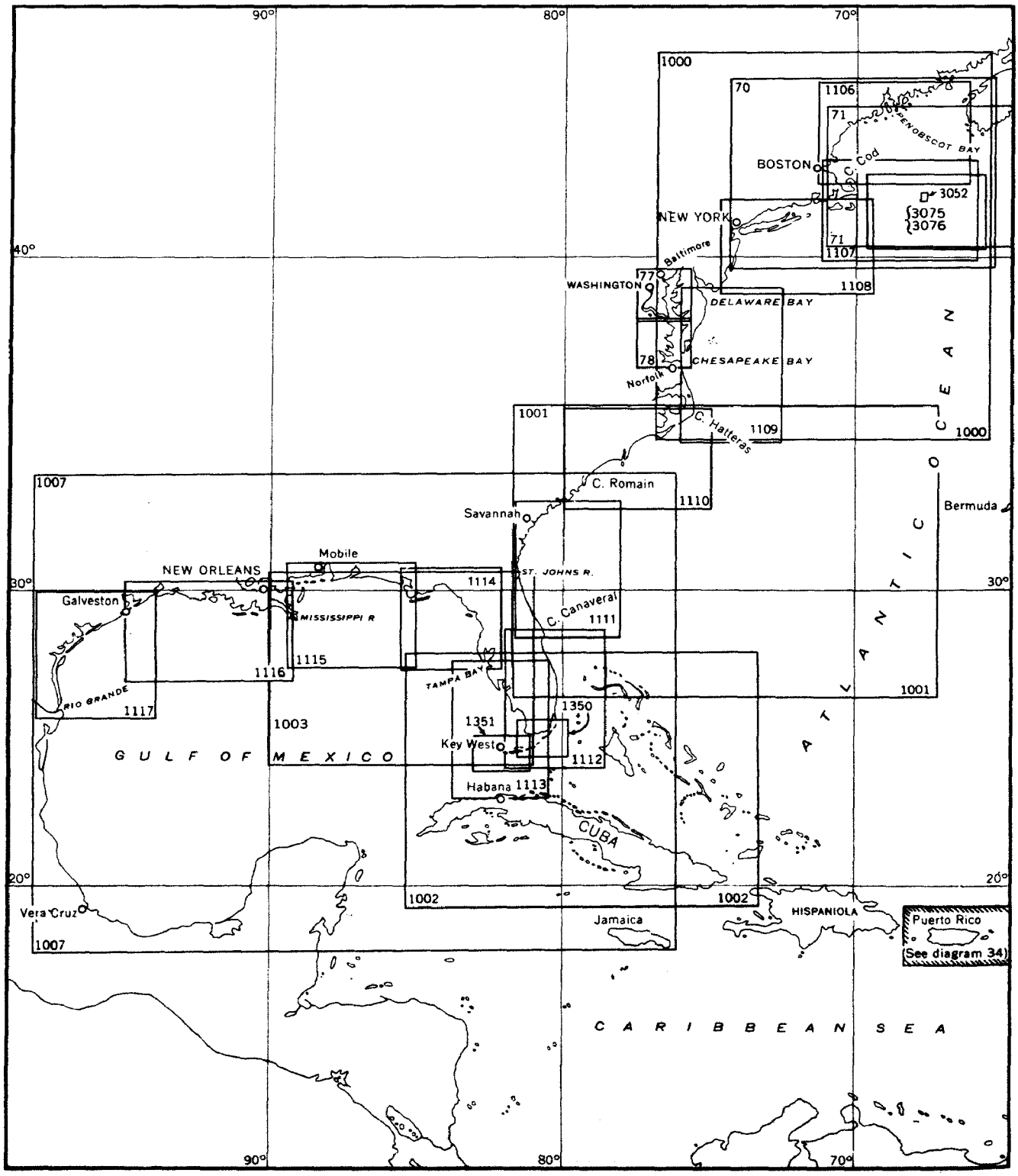
Diagram No. 1

February 1961

SAILING AND GENERAL CHARTS - ATLANTIC AND GULF COASTS



SAILING AND GENERAL CHARTS—ATLANTIC AND GULF COASTS

No.	Price	TITLE	Scale	Paper Size (inches)
		SAILING CHARTS		
70	$1.00	West Quoddy Head to New York	1:675,000	36X46
†1000	1.00	Cape Sable to Cape Hatteras	1:1,200,000	35X43
†1001	1.00	Cape Hatteras to Straits of Florida	1:1,207,256	36X48
†1002	1.00	Straits of Florida and approaches	1:1,210,765	35X43
†1003	1.00	Gulf Coast—Key West to the Mississippi River	1:868,399	36X44
1007	1.00	Gulf of Mexico	1:2,161,530	35X43
		GENERAL CHARTS		
†71	1.00	Gulf of Maine and Georges Bank	1:500,000	36X44
77	.75	Chesapeake Bay—northern part	1:197,250	34X37
78	.75	Chesapeake Bay—southern part	1:200,000	33X34
†1106	1.00	Bay of Fundy to Cape Cod	1:378,838	36X46
†1107	1.00	Georges Bank and Nantucket Shoals	1:400,000	34X48
†1108	1.00	Approaches to New York, Nantucket Shoals to Five Fathom Bank	1:400,000	34X48
†1109	1.00	Cape May to Cape Hatteras	1:416,944	33X52
†1110	1.00	Cape Hatteras to Charleston	1:432,720	34X46
†1111	1.00	Charleston Light to Cape Canaveral	1:449,659	33X45
†1112	1.00	Cape Canaveral to Key West	1:466,940	31X47
1113	1.00	Habana to Tampa Bay	1:470,940	31X45
1114	.75	Tampa Bay to Cape San Blas	1:456,394	30X34
1115	1.00	Cape St. George to Mississippi Passes	1:456,394	35X41
1116	1.00	Mississippi River to Galveston	1:458,596	36X49
1117	1.00	Galveston to Rio Grande	1:460,732	36X44
1350	.75	Florida Keys—Fowey Rocks to American Shoal	1:180,000	35X39
1351	.75	Florida Keys—Sombrero Key to Dry Tortugas	1:180,000	30X48
		SPECIAL CHARTS		
3052	.75	Georges Bank—Georges Shoal, approaches to Texas Tower No. 2	1:20,000	26X42
{3075	1.00	Georges Bank—eastern part	1:220,000	36X46
{3076		Georges Bank—western part	1:220,000	

†Includes Loran Lines of Position

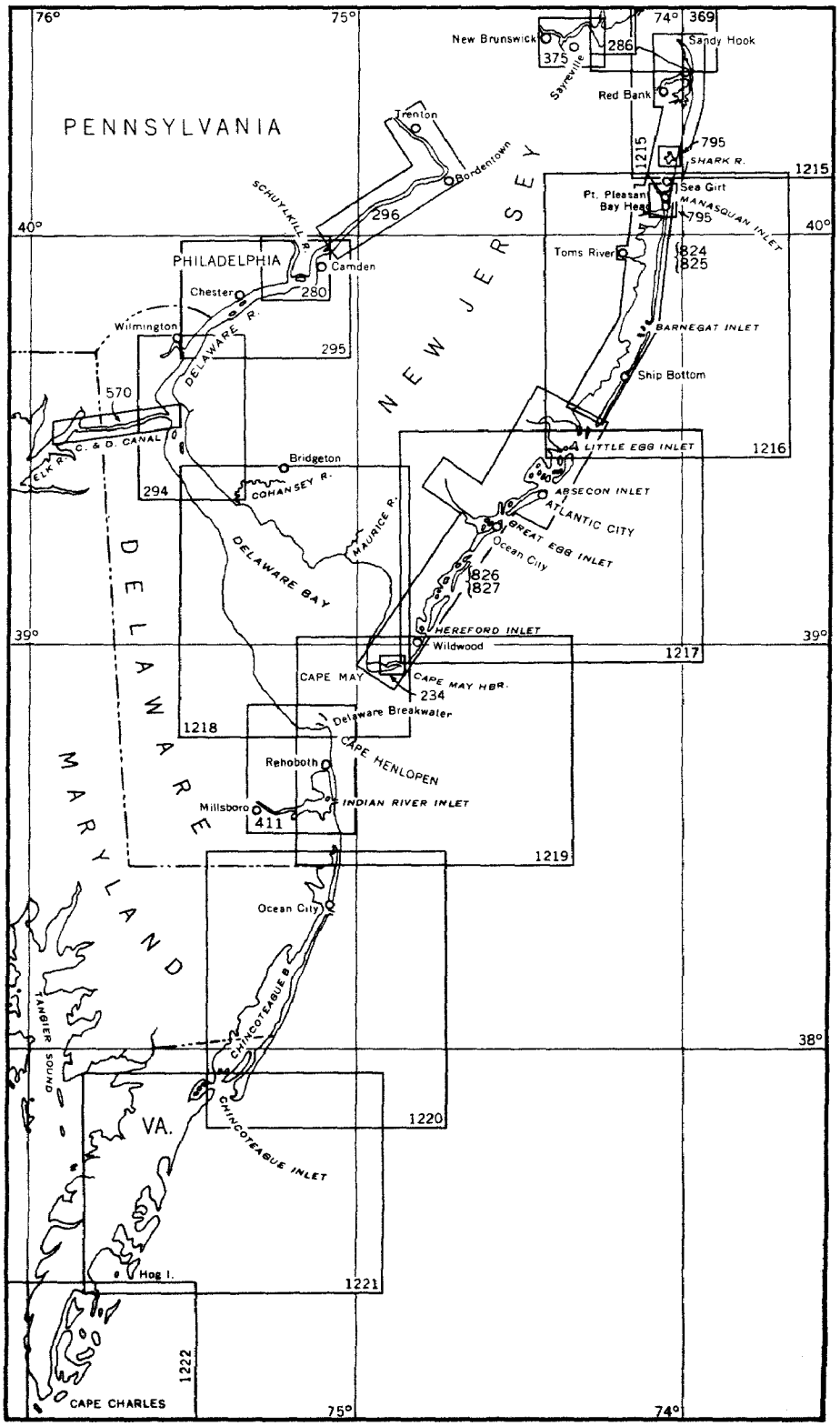
Numbers in brackets represent charts printed back to back.

Diagram No. 6

COAST AND HARBOR CHARTS - ATLANTIC COAST

February 1961

SANDY HOOK, N. J. TO CAPE CHARLES, VA., INCLUDING DELAWARE BAY



COAST AND HARBOR CHARTS—ATLANTIC COAST

SANDY HOOK, N. J. TO CAPE CHARLES, VA., INCLUDING DELAWARE BAY

No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
†1215	$1.00	Approaches to New York—Fire Island Light to Sea Girt Light	N.Y. & N.J.	1:80,000	35X43
1216	1.00	Sea Girt to Little Egg Inlet	New Jersey	1:80,000	35X42
1217	1.00	Little Egg Inlet to Hereford Inlet	"	1:80,000	35X43
		Absecon Inlet	"	1:20,000	
1218	1.00	Delaware Bay	N.J. & Delaware	1:80,000	35X40
†1219	1.00	Cape May to Fenwick Island Light	"	1:80,000	35X49
1220	1.00	Fenwick Island Light to Chincoteague Inlet	Del., Md., & Va.	1:80,000	35X42
		Ocean City Inlet	Maryland	1:20,000	
1221	1.00	Chincoteague Inlet to Great Machipongo Inlet	Virginia	1:80,000	38X43
†1222	1.00	Chesapeake Bay Entrance	"	1:80,000	35X45
		INTRACOASTAL WATERWAY CHARTS (NEW JERSEY COAST)			
{824	.50	Sandy Hook Bay to Manasquan Inlet	New Jersey	1:40,000	25X36
{825		Manasquan Inlet to Little Egg Harbor	"	1:40,000	
{826	.50	Little Egg Harbor to Longport	"	1:40,000	24X39
{827		Longport to Cape May	"	1:40,000	
		HARBOR CHARTS			
234	.25	Cape May Harbor	New Jersey	1:10,000	23X27
280	1.00	Philadelphia and Camden Waterfronts	Pa. & N.J.	1:15,000	36X43
294	1.00	Delaware River—Smyrna River to Wilmington	N.J. & Delaware	1:40,000	31X47
295	1.00	Delaware River—Wilmington to Philadelphia	Del., Pa., & N.J.	1:40,000	34X44
296	.75	Delaware River—Philadelphia to Trenton	N.J. & Pa.	1:20,000	27X46
375	.50	Raritan River—Raritan Bay to New Brunswick	New Jersey	1:20,000	28X36
411	.75	Cape Henlopen to Indian River Inlet	Delaware	1:40,000	32X36
		Breakwater Harbor		1:10,000	
570	.50	Chesapeake and Delaware Canal	Md. & Del.	1:20,000	27X36
795	.75	Shark River, Manasquan River and Bay Head Harbor	New Jersey	1:10,000	29X43

†Includes Loran Lines of Position

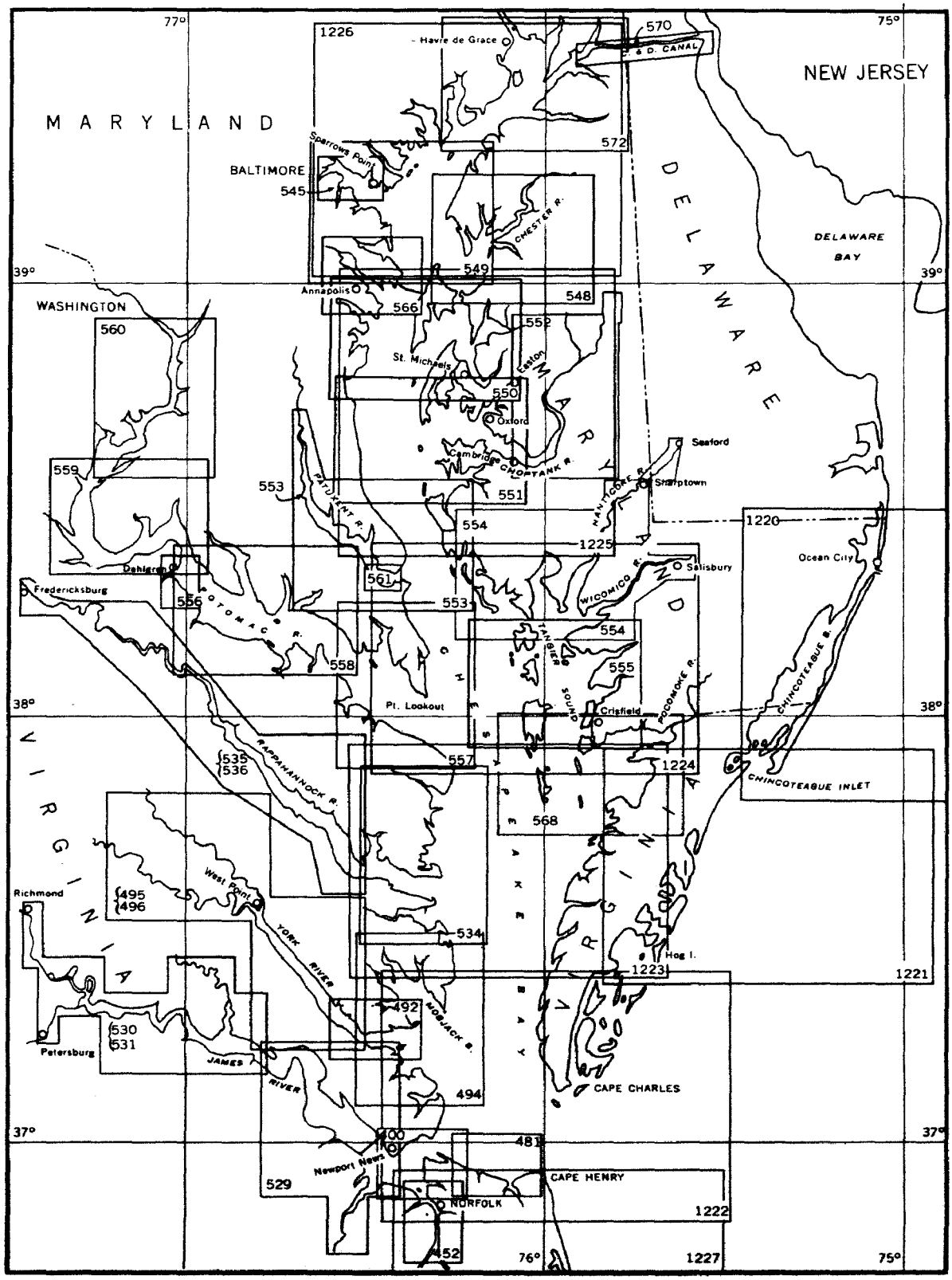
Numbers in brackets represent charts printed back to back.

COAST AND HARBOR CHARTS—ATLANTIC COAST

CHESAPEAKE BAY AND TRIBUTARIES

Diagram No. 7

February 1961



COAST AND HARBOR CHARTS—ATLANTIC COAST
CHESAPEAKE BAY AND TRIBUTARIES

No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1221	$1.00	Chincoteague Inlet to Great Machipongo Inlet	Virginia	1:80,000	38X43
†1222	1.00	Chesapeake Bay Entrance	"	1:80,000	35X45
1223	1.00	Chesapeake Bay—Wolf Trap to Smith Point	"	1:80,000	34X41
1224	1.00	Chesapeake Bay—Smith Point to Cove Point	Md. & Va.	1:80,000	32X43
1225	1.00	Chesapeake Bay—Cove Point to Sandy Point	Maryland	1:80,000	36X40
1226	1.00	Chesapeake Bay—Sandy Point to Head of Bay	"	1:80,000	36X40
		HARBOR CHARTS			
400	1.00	Hampton Roads	Virginia	1:20,000	36X45
452	1.00	Norfolk Harbor and Elizabeth River	"	1:20,000	35X43
481	1.00	Cape Henry to Thimble Shoal Light	"	1:20,000	35X44
492	1.00	York River—Yorktown and vicinity	"	1:20,000	34X48
494	1.00	Mobjack Bay and York River Entrance	"	1:40,000	34X47
{495	1.00	York River—Yorktown to West Point	"	1:40,000	36X42
{496		Pamunkey and Mattaponi Rivers	"	1:40,000	
529	1.00	James River—Newport News to Jamestown Island	"	1:40,000	36X43
{530	1.00	James River—Jamestown Island to Jordan Point	"	1:40,000	34X44
{531		James River—Jordan Point to Richmond	"	1:20,000	
534	1.00	Rappahannock River Entrance, Piankatank and Great Wicomico Rivers	"	1:40,000	35X49
{535	1.00	Rappahannock River—Towles Point to Marsh Point	"	1:40,000	36X44
{536		Rappahannock River—Marsh Point to Fredericksburg	"	1:20,000	
545	.75	Baltimore Harbor	Maryland	1:15,000	33X42
548	1.00	Chester River	"	1:40,000	36X41
		Kent Island Narrows		1:10,000	
		Rock Hall Harbor		1:10,000	
549	1.00	Approaches to Baltimore Harbor	"	1:40,000	36X45
		Rock Hall Harbor		1:10,000	
550	1.00	Chesapeake Bay—Eastern Bay and South River	"	1:40,000	36X49
551	1.00	Chesapeake Bay—Choptank River and Herring Bay	"	1:40,000	36X48
552	.75	Choptank River—Cambridge to Greensboro	"	1:40,000	28X44
553	1.00	Chesapeake Bay—Patuxent River and vicinity	"	1:40,000	35X47
554	1.00	Chesapeake Bay—Honga, Nanticoke, Wicomico Rivers and Fishing Bay	"	1:40,000	36X48
555	1.00	Chesapeake Bay—Tangier Sound—northern part	Md. & Va.	1:40,000	35X44
556	.50	Potomac River—Dahlgren and vicinity	"	1:20,000	21X29
557	1.00	Potomac River—Chesapeake Bay to Piney Point	"	1:40,000	36X46
558	1.00	Potomac River—Piney Point to Lower Cedar Point	"	1:40,000	36X47
559	.75	Potomac River—Lower Cedar Point to Mattawoman Creek	"	1:40,000	32X41
560	.75	Potomac River—Mattawoman Creek to Georgetown	Md., Va., & D.C.	1:40,000	31X43
		Washington Harbor		1:20,000	
561	.75	Patuxent River—Solomons Island and vicinity	Maryland	1:10,000	35X36
566	.75	Chesapeake Bay—Severn and Magothy Rivers	"	1:25,000	34X41
568	1.00	Chesapeake Bay—Pocomoke and Tangier Sounds	Md. & Va.	1:40,000	36X47
570	.50	Chesapeake and Delaware Canal	Md. & Del.	1:20,000	27X36
572	1.00	Head of Chesapeake Bay	Maryland	1:40,000	36X44
		SMALL-CRAFT CHART			
101	1.50	Potomac River	Md., Va., & D.C.	1:80,000	Folio
		Washington and vicinity		1:40,000	

†Includes Loran Lines of Position

Numbers in brackets represent charts printed back to back.

Conversion Tables

INTERNATIONAL NAUTICAL MILES TO STATUTE MILES

1 nautical mile 6,076.10 feet or 1,852 meters 1 statute mile = 5,280 feet or 1,609.35 meters

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0.000	1.151	2.302	3.452	4.603	5.754	6.905	8.055	9.206	10.357
10	11.508	12.659	13.809	14.960	16.111	17.262	18.412	19.563	20.714	21.865
20	23.016	24.166	25.317	26.468	27.619	28.769	29.920	31.071	32.222	33.373
30	34.523	35.674	36.825	37.976	39.126	40.277	41.428	42.579	43.730	44.880
40	46.031	47.182	48.333	49.483	50.634	51.785	52.936	54.087	55.237	56.388
50	57.539	58.690	59.840	60.991	62.142	63.293	64.444	65.594	66.745	67.896
60	69.047	70.197	71.348	72.499	73.650	74.801	75.951	77.102	78.253	79.404
70	80.554	81.705	82.856	84.007	85.158	86.308	87.459	88.610	89.761	90.911
80	92.062	93.213	94.364	95.515	96.665	97.816	98.967	100.118	101.268	102.419
90	103.570	104.721	105.871	107.022	108.173	109.324	110.475	111.625	112.776	113.927

STATUTE MILES TO INTERNATIONAL NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0.000	0.869	1.738	2.607	3.476	4.345	5.214	6.083	6.952	7.821
10	8.690	9.559	10.428	11.297	12.166	13.035	13.904	14.773	15.642	16.511
20	17.380	18.249	19.118	19.986	20.855	21.724	22.593	23.462	24.331	25.200
30	26.069	26.938	27.807	28.676	29.545	30.414	31.283	32.152	33.021	33.890
40	34.759	35.628	36.497	37.366	38.235	39.104	39.973	40.842	41.711	42.580
50	43.449	44.318	45.187	46.056	46.925	47.794	48.663	49.532	50.401	51.270
60	52.139	53.008	53.877	54.746	55.615	56.484	57.353	58.222	59.091	59.959
70	60.828	61.697	62.566	63.435	64.304	65.173	66.042	66.911	67.780	68.649
80	69.518	70.387	71.256	72.125	72.994	73.863	74.732	75.601	76.470	77.339
90	78.208	79.077	79.946	80.815	81.684	82.553	83.422	84.291	85.160	86.029

FEET TO METERS

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

METERS TO FEET

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

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