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(1959)

U.S. DEPARTMENT OF COMMERCE
Frederick H. Mueller, *Secretary*
COAST AND GEODETIC SURVEY
H. Arnold Karo, *Director*

September 12, 1959

UNITED STATES COAST PILOT 4

ATLANTIC COAST

COAST & GEODETIC SURVEY
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Cape Henry to Key West

Sixth (1959) Edition

United States Government Printing Office, Washington : 1960

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National Oceanic and Atmospheric Administration

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Preface

This sixth edition of United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West, is based on the work of the Coast and Geodetic Survey and includes the results of a Coast Pilot field inspection made in 1958. Much information also has been obtained from the Weather Bureau, the Corps of Engineers, the Coast Guard, and from local authorities.

This edition is corrected through Notice to Mariners 37 of September 12, 1959, and cancels the 1948 edition of Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

Supplements to this Coast Pilot, containing changes from various sources, usually are issued early each year. Each supplement is complete in itself and cancels all previous issues. The latest supplement, together with Notices to Mariners subsequent to it, will correct the book to date. Supplements may be obtained from the Coast and Geodetic Survey or its sales agents.

Mariners and other interested parties are requested to send to the Director, Coast and Geodetic Survey, U.S. Department of Commerce, Washington 25, D.C., any information affecting this Coast Pilot that may come to their attention.

H. Arnold Karo, *Director.*

September 12, 1959.

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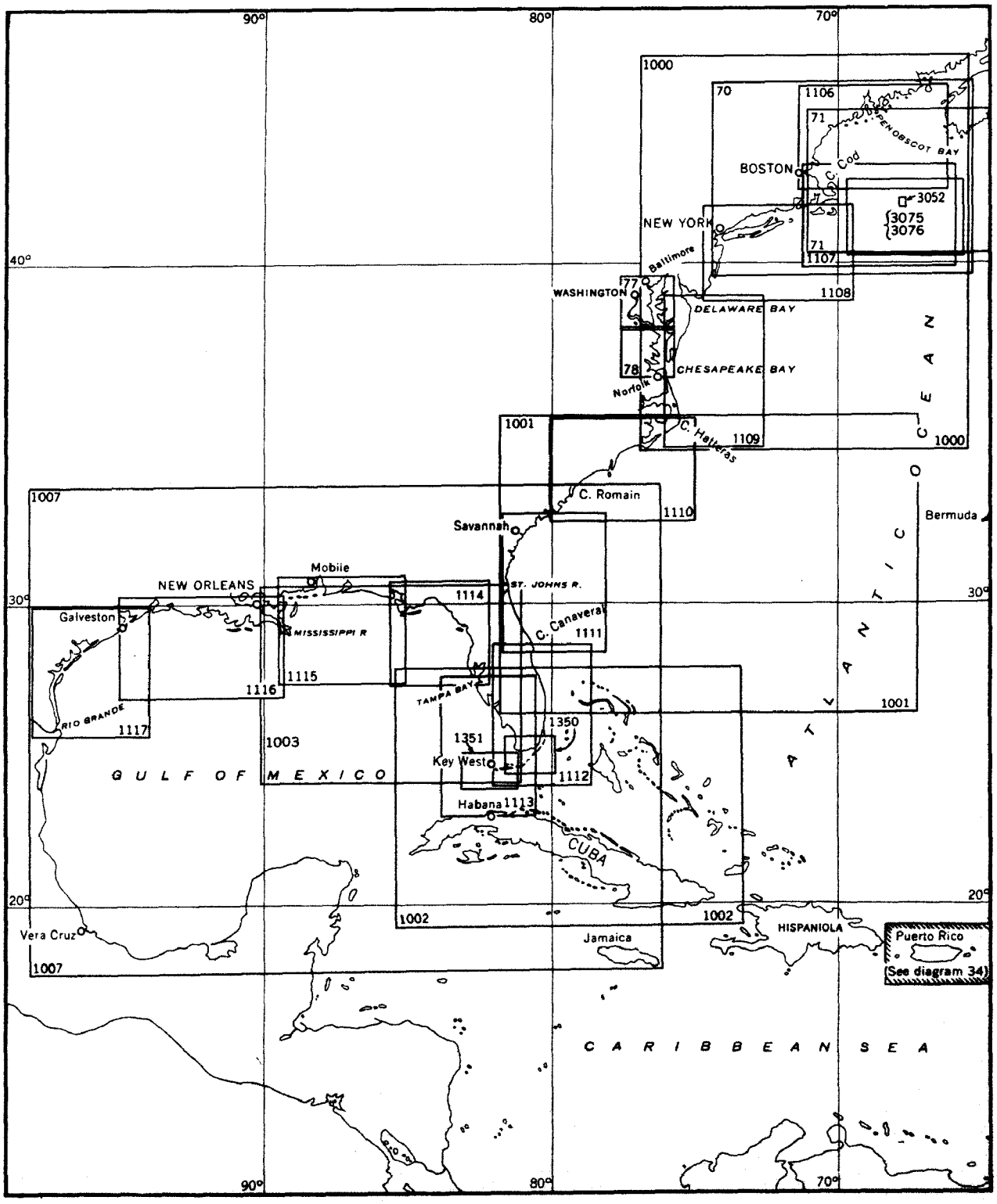
Diagram No. 1

July 1959

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	36 X 46
†1000	1.00	Cape Sable to Cape Hatteras	1:1,200,000	35 X 43
†1001	1.00	Cape Hatteras to Straits of Florida	1:1,207,256	36 X 48
1002	1.00	Straits of Florida and approaches	1:1,210,765	35 X 43
†1003	1.00	Gulf Coast—Key West to the Mississippi River	1:868,399	36 X 44
1007	1.00	Gulf of Mexico	1:2,161,530	35 X 43
		GENERAL CHARTS		
†71	1.00	Gulf of Maine and Georges Bank	1:500,000	36 X 44
77	.75	Chesapeake Bay—northern part	1:197,250	34 X 37
78	.75	Chesapeake Bay—southern part	1:200,000	33 X 34
†1106	1.00	Bay of Fundy to Cape Cod	1:378,838	36 X 46
†1107	1.00	Georges Bank and Nantucket Shoals	1:400,000	34 X 48
†1108	1.00	Approaches to New York, Nantucket Shoals to Five Fathom Bank	1:400,000	34 X 48
†1109	1.00	Cape May to Cape Hatteras	1:416,944	33 X 52
†1110	1.00	Cape Hatteras to Charleston	1:432,720	34 X 46
†1111	1.00	Charleston Light to Cape Canaveral	1:449,659	33 X 45
†1112	1.00	Cape Canaveral to Key West	1:466,940	31 X 47
1113	1.00	Habana to Tampa Bay	1:470,940	31 X 45
1114	.75	Tampa Bay to Cape San Blas	1:456,394	30 X 34
1115	1.00	Cape St. George to Mississippi Passes	1:456,394	35 X 41
1116	1.00	Mississippi River to Galveston	1:458,596	36 X 49
1117	1.00	Galveston to Rio Grande	1:460,732	36 X 44
1350	.75	Florida Keys—Fowey Rocks to American Shoal	1:180,000	35 X 39
1351	.75	Florida Keys—Sombrero Key to Dry Tortugas	1:180,000	30 X 48
		SPECIAL CHARTS		
3052	.75	Georges Bank—Georges Shoal, approaches to Texas Tower No. 2	1:20,000	26 X 42
{3075	1.00	Georges Bank—eastern part	1:220,000	36 X 46
{3076		Georges Bank—western part	1:220,000	

†Includes Loran Lines of Position

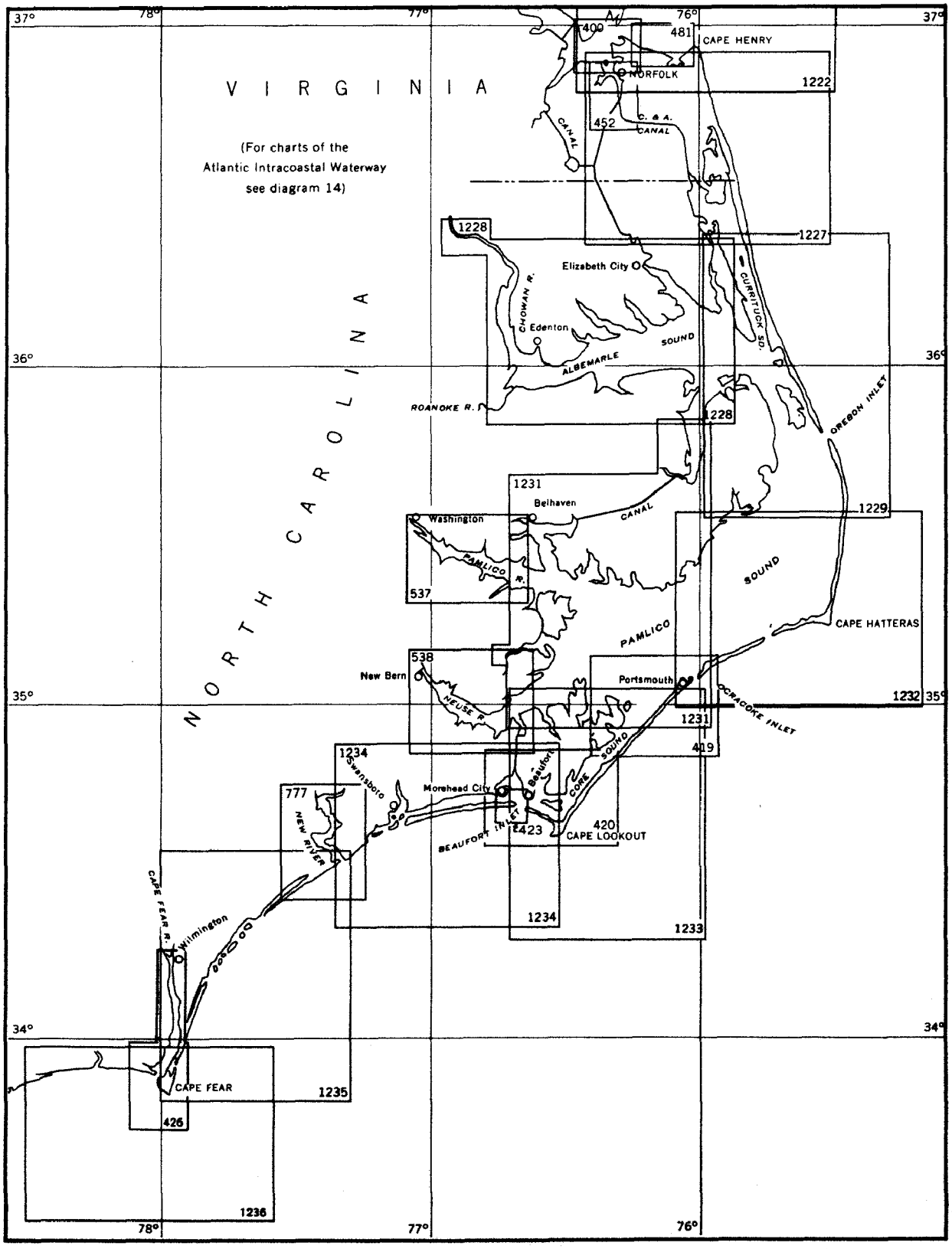
Numbers in brackets represent charts printed back to back.

COAST AND HARBOR CHARTS - ATLANTIC COAST

CAPE HENRY, VA. TO CAPE FEAR, N.C

Diagram No. 8

June 1959



COAST AND HARBOR CHARTS—ATLANTIC COAST

CAPE HENRY, VA. TO CAPE FEAR, N. C.

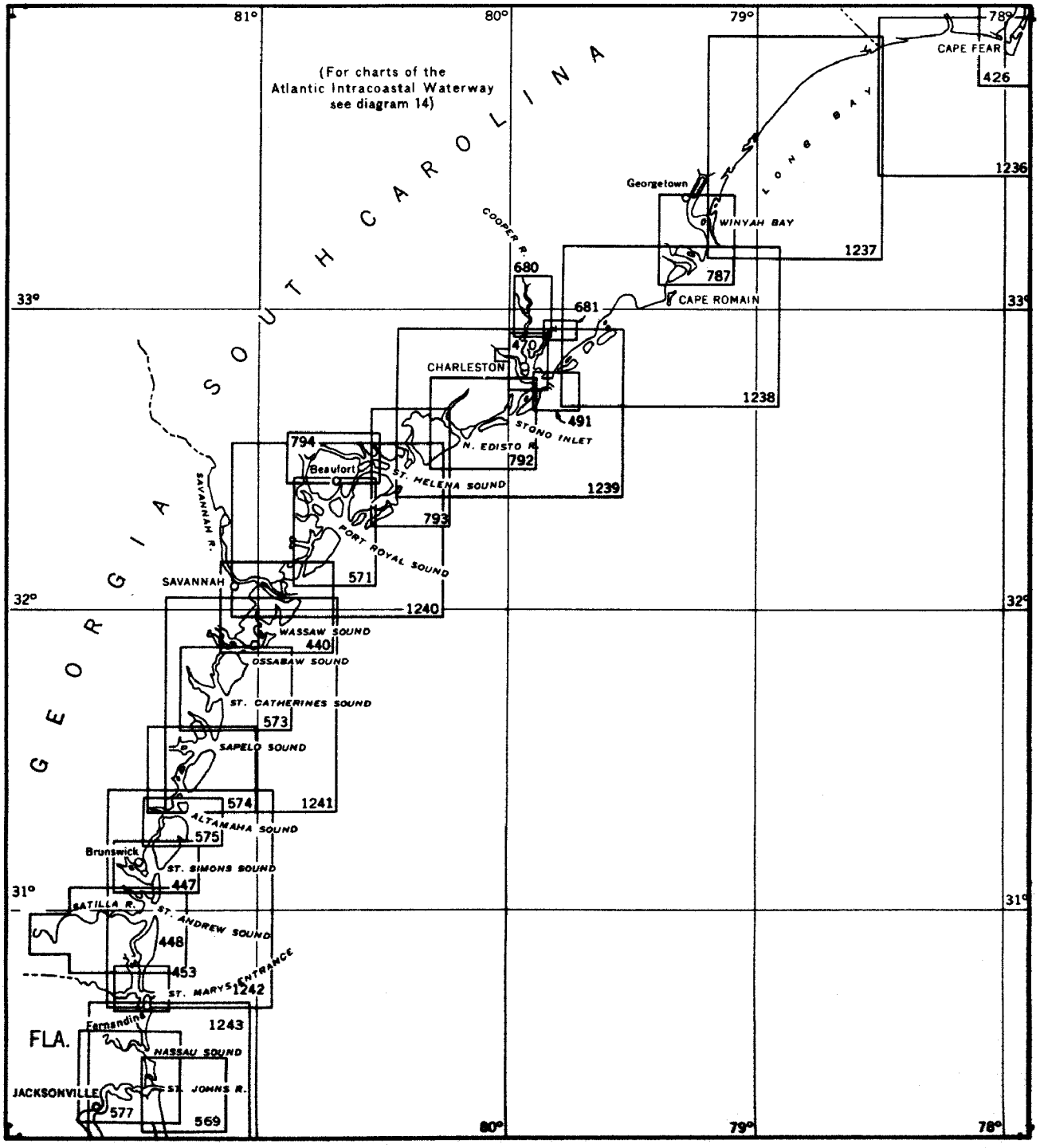
No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1227	$1.00	Cape Henry to Currituck Beach Light	Va. & N.C.	1:80,000	35X43
1228	1.00	Albemarle Sound	North Carolina	1:80,000	34X44
1229	1.00	Currituck Beach Light to Wimble Shoals	"	1:80,000	34X48
1231	1.00	Pamlico Sound—western part	"	1:80,000	36X44
1232	1.00	Cape Hatteras—Wimble Shoals to Ocracoke Inlet	"	1:80,000	36X44
1233	1.00	Portsmouth Island to Beaufort, including Cape Lookout Shoals	"	1:80,000	35X44
1234	1.00	Cape Lookout to New River	"	1:80,000	34X41
1235	1.00	New River Inlet to Cape Fear	"	1:80,000	35X44
1236	1.00	Approaches to Cape Fear River	"	1:80,000	35X45
		HARBOR CHARTS			
400	1.00	Hampton Roads	Virginia	1:20,000	36X45
419	1.00	Ocracoke Inlet and part of Core Sound	North Carolina	1:40,000	36X44
420	1.00	Beaufort Inlet and part of Core Sound Lookout Bight	" "	1:40,000 1:20,000	35X46
423	.75	Morehead City Harbor	"	1:12,500	32X37
426	.75	Cape Fear River—Cape Fear to Wilmington	"	1:40,000	34X36
452	1.00	Norfolk Harbor and Elizabeth River	Virginia	1:20,000	35X43
481	1.00	Cape Henry to Thimble Shoal Light	"	1:20,000	35X44
537	.75	Pamlico River	North Carolina	1:40,000	32X43
538	1.00	Neuse River and upper part of Bay River	"	1:40,000	36X44
777	.75	New River	"	1:40,000	31X41

Diagram No. 9

July 1959

COAST AND HARBOR CHARTS - ATLANTIC COAST

CAPE FEAR, N.C. TO JACKSONVILLE, FLA.



COAST AND HARBOR CHARTS—ATLANTIC COAST

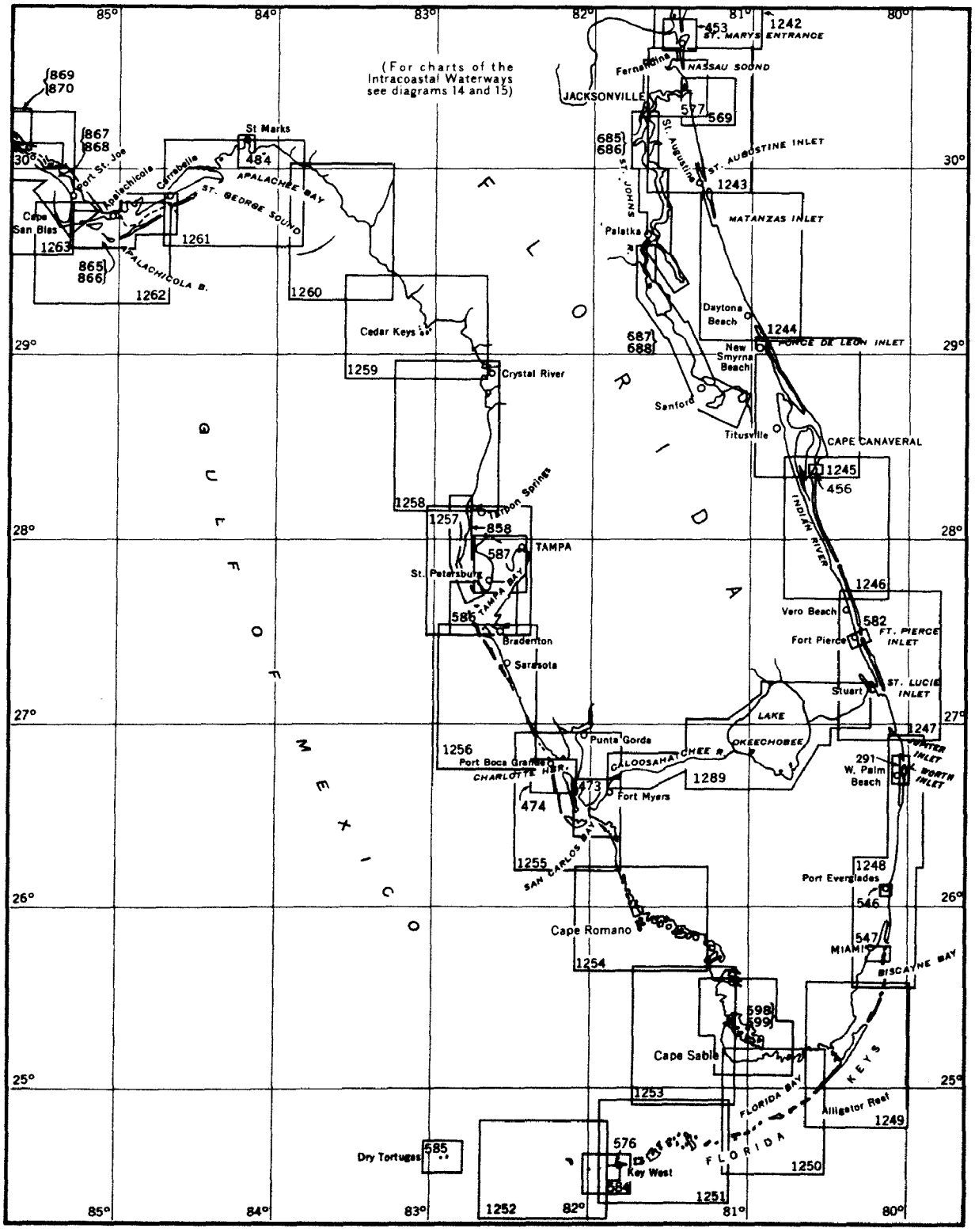
CAPE FEAR, N. C. TO JACKSONVILLE, FLA.

No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1236	$1.00	Approaches to Cape Fear River	North Carolina	1:80,000	35X45
1237	1.00	Little River Inlet to Winyah Bay Entrance	N.C. & S.C.	1:80,000	35X44
1238	1.00	Winyah Bay Entrance to Isle of Palms	South Carolina	1:80,000	35X44
1239	1.00	Charleston Harbor and approaches	"	1:80,000	34X44
1240	1.00	St. Helena Sound to Savannah River	S.C. & Ga.	1:80,000	35X43
1241	1.00	Tybee Island to Doboy Sound	Georgia	1:80,000	35X43
1242	1.00	Doboy Sound to Fernandina	Georgia & Florida	1:80,000	34X44
1243	1.00	Amelia Island to St. Augustine	Florida	1:80,000	34X47
		HARBOR CHARTS			
440	1.00	Savannah River and Wassaw Sound	S.C. & Ga.	1:40,000	36X47
447	.50	St. Simon Sound, Brunswick Harbor, and Turtle River	Georgia	1:40,000	24X36
448	1.00	St. Andrew Sound and Satilla River	"	1:40,000	35X48
453	1.00	Fernandina Harbor to King Bay	Georgia & Florida	1:20,000	28X41
470	1.00	Charleston Harbor	South Carolina	1:20,000	35X45
491	.75	Charleston Harbor Entrance	"	1:20,000	32X38
569	.75	Approaches to St. Johns River	Florida	1:40,000	35X41
		St. Johns River Entrance	"	1:10,000	
571	1.00	Port Royal Sound and inland passages	South Carolina	1:40,000	35X44
573	1.00	Ossabaw Sound and St. Catherines Sound	Georgia	1:40,000	34X44
574	1.00	Sapelo and Doboy Sounds	"	1:40,000	35X44
575	.50	Altamaha Sound	"	1:40,000	24X33
577	1.00	Nassau Sound to Jacksonville	Florida	1:40,000	35X40
680	1.00	Cooper River above Goose Creek	South Carolina	1:20,000	31X47
681	.25	Wando River—upper part	"	1:20,000	21X28
787	.75	Winyah Bay	"	1:40,000	30X37
792	1.00	Stono and North Edisto Rivers	"	1:40,000	36X42
793	1.00	St. Helena Sound	"	1:40,000	32X46
794	.50	Parts of Coosaw and Broad Rivers	"	1:40,000	24X38

Diagram No. 10

COAST AND HARBOR CHARTS - ATLANTIC AND GULF COASTS June 1959

JACKSONVILLE TO CAPE SAN BLAS, FLORIDA



COAST AND HARBOR CHARTS—ATLANTIC AND GULF COASTS
JACKSONVILLE TO CAPE SAN BLAS, FLORIDA

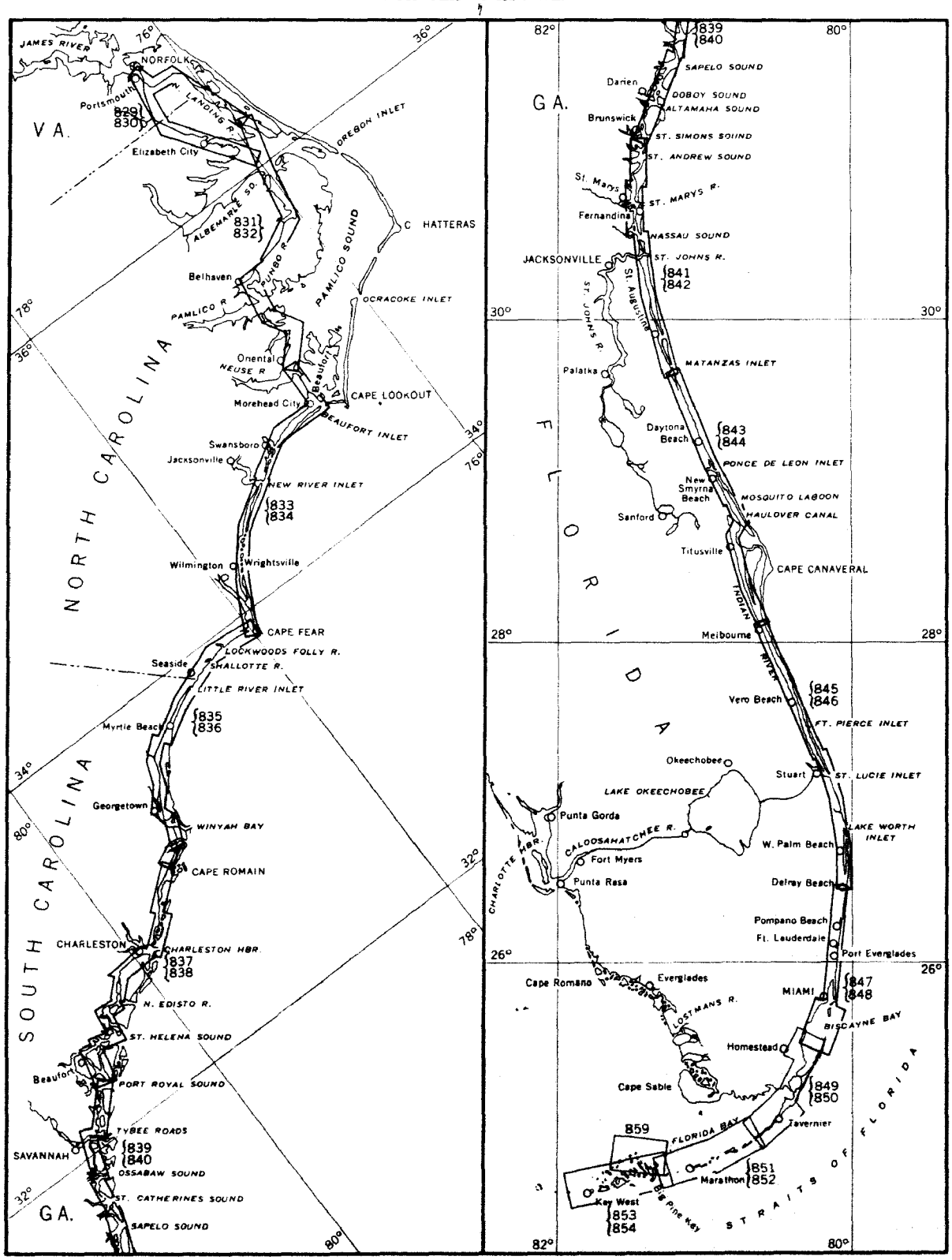
No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1243	$1.00	Amelia Island to St. Augustine	Florida	1:80,000	34X47
1244	1.00	St. Augustine Light to Ponce de Leon Inlet Light	"	1:80,000	34X47
1245	1.00	Ponce de Leon Inlet to Cape Canaveral	"	1:80,000	36X45
1246	1.00	Cape Canaveral to Bethel Shoal	"	1:80,000	35X45
1247	1.00	Bethel Shoal to Jupiter Inlet	"	1:80,000	34X48
1248	1.00	Jupiter Inlet to Fowey Rocks	"	1:80,000	35X42
1249	1.00	Fowey Rocks to Alligator Reef	"	1:80,000	35X47
1250	1.00	Florida Keys—Alligator Reef to Sombrero Key	"	1:80,000	35X43
1251	1.00	Florida Keys—Sombrero Key to Sand Key	"	1:80,000	35X44
1252	1.00	Sand Key to Rebecca Shoal	"	1:80,000	34X43
1253	1.00	East Cape to Mormon Key	"	1:80,000	35X44
1254	1.00	Chatham River to Clam Pass	"	1:80,000	34X44
1255	1.00	Estero Bay to Lemon Bay, including Charlotte Harbor	"	1:80,000	34X44
1256	1.00	Lemon Bay to Passage Key Inlet	"	1:80,000	34X46
1257	1.00	Tampa Bay and St. Joseph Sound	"	1:80,000	34X43
1258	1.00	Anclote Keys to Crystal River	"	1:80,000	35X48
1259	1.00	Crystal River to Horseshoe Point	"	1:80,000	33X47
1260	1.00	Horseshoe Point to Rock Islands	"	1:80,000	35X44
1261	1.00	Apalachee Bay	"	1:80,000	35X45
1262	1.00	Apalachicola Bay to Cape San Blas	"	1:80,000	34X44
1289	1.00	Okeechobee Waterway, including Lake Okeechobee	"	1:80,000	35X48
		HARBOR CHARTS			
291	.75	Lake Worth Inlet and Palm Beach	Florida	1:10,000	27X41
453	1.00	Fernandina Harbor to King Bay	Georgia & Florida	1:20,000	37X43
456	.25	Canaveral Harbor	Florida	1:10,000	21X29
473	.75	San Carlos Bay and Caloosahatchee River	"	1:40,000	30X37
474	.50	Main Entrance to Charlotte Harbor	"	1:40,000	26X31
484	.25	St. Marks River and approaches	"	1:15,000	25X30
546	.75	Port Everglades	"	1:5,000	35X39
547	.75	Miami Harbor	"	1:10,000	29X47
569	.75	Approaches to St. Johns River	"	1:40,000	35X41
		St. Johns River Entrance		1:10,000	
576	.75	Key West Harbor	"	1:10,000	36X38
577	1.00	Nassau Sound to Jacksonville	"	1:40,000	35X40
582	.25	Fort Pierce Harbor	"	1:10,000	19X29
584	1.00	Key West Harbor and approaches	"	1:30,000	36X44
585	.75	Dry Tortugas	"	1:30,000	30X36
		Tortugas Harbor		1:10,000	
586	1.00	Tampa Bay—southern part	"	1:40,000	34X44
587	.75	Tampa Bay—northern part	"	1:40,000	35X37
		St. Petersburg		1:20,000	
		Tampa		1:20,000	
{ 598	.75	Everglades National Park—Whitewater Bay	"	1:50,000	29X42
{ 599		Everglades National Park—Shark River to Lostmans River		1:50,000	
{ 685	.75	St. Johns River—Jacksonville to Racy Pt.	"	1:40,000	36X36
{ 686		St. Johns River—Racy Pt. to Crescent Lake	"	1:40,000	
{ 687	.75	St. Johns River—Dunns Creek to Lake Dexter	"	1:40,000	36X38
{ 688		St. Johns River—Lake Dexter to Lake Harney	"	1:40,000	
		INTRACOASTAL WATERWAY CHARTS (GULF COAST)			
858	.50	Tampa Bay to Anclote Anchorage	Florida	1:40,000	26X42
{ 865	.50	St. George Sound to Apalachicola Bay	"	1:40,000	26X38
{ 866		Apalachicola Bay to Lake Wimico	"	1:40,000	
{ 867	.50	Lake Wimico to Overstreet and St. Joseph Bay Entrance	"	1:40,000	26X38
{ 868		Overstreet to St. Andrew Bay	"	1:40,000	

Numbers in brackets represent charts printed back to back.

Diagram No. 14

April 1959

CHARTS OF THE ATLANTIC INTRACOASTAL WATERWAY
NORFOLK TO KEY WEST



CHARTS COVERING THE ATLANTIC INTRACOASTAL WATERWAY (INSIDE ROUTE)—NEW YORK TO KEY WEST

Arranged in order of progression southward

NEW YORK TO NORFOLK

No.	Price	TITLE	State	Scale	Paper size (inches)
		The following coast and harbor charts, listed with others on pp. 4 to 7 inclusive are relisted here as those best suited for this section of the route.			
369	$1.00	New York Harbor	N.Y.& N.J.	1:40,000	35X46
824	.50	New York Bay to Manasquan Inlet	New Jersey	1:40,000	24X31
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	
1218	1.00	Delaware Bay	N.J. & Del.	1:80,000	35X40
294	1.00	Delaware River—Smyrna River to Wilmington	"	1:40,000	31X47
570	.50	Chesapeake and Delaware Canal	Md. & Del.	1:20,000	25X36
1226	1.00	Chesapeake Bay—Sandy Point to Head of Bay	Maryland	1:80,000	36X40
1225	1.00	Chesapeake Bay—Cove Point to Sandy Point	"	1:80,000	36X40
1224	1.00	Chesapeake Bay—Smith Point to Cove Point	Md. & Va.	1:80,000	32X43
1223	1.00	Chesapeake Bay—Wolf Trap to Smith Point	Virginia	1:80,000	34X41
1222	1.00	Chesapeake Bay Entrance	"	1:80,000	35X45

NORFOLK TO KEY WEST

No.	Price	TITLE	State	Scale	Paper size (inches)
		The following series of Atlantic Intracoastal Waterway (Inside Route) charts shows the route in strips of convenient widths, with 3 strips to each sheet.			
829	$0.50	Dismal Swamp Canal-Norfolk to Albemarle Sound	Va. & N.C.	1:40,000	24X39
830		Norfolk to North River	"	1:40,000	
831	.50	North River to Alligator River—Pungo River Canal	North Carolina	1:40,000	24X39
832		Alligator River-Pungo River Canal to Neuse River	"	1:40,000	
833	.50	Neuse River to New River Inlet	"	1:40,000	24X39
834		New River Inlet to Southport	"	1:40,000	
835	.50	Southport to Socastee Cr.	N.C. & S.C.	1:40,000	24X39
836		Socastee Cr. to McClellanville	South Carolina	1:40,000	
837	.50	McClellanville to Wadmalaw River	"	1:40,000	24X39
838		Wadmalaw River to Port Royal Sound	"	1:40,000	
839	.50	Port Royal Sound to Johnson Creek	S.C. & Ga.	1:40,000	24X39
840		Johnson Creek to Brunswick River	Georgia	1:40,000	
841	.50	Brunswick River to Nassau Sound	Ga. & Fla.	1:40,000	24X39
842		Nassau Sound to Matanzas Inlet	Florida	1:40,000	
843	.50	Matanzas Inlet to Mosquito Lagoon	"	1:40,000	24X39
		Daytona Beach, Municipal Yacht Basin		1:10,000	
844		Mosquito Lagoon to Eau Gallie	"	1:40,000	
845	.50	Eau Gallie to Walton	"	1:40,000	24X39
846		Walton to Delray Beach	"	1:40,000	
847	.50	Delray Beach to Miami	"	1:40,000	25X39
848		Miami to Elliott Key	"	1:40,000	
849	.50	Elliott Key to Tarpon Basin	"	1:40,000	25X40
850		Tarpon Basin to Matecumbe	"	1:40,000	
851	.50	Matecumbe to Grassey Key	"	1:40,000	26X40
852		Grassey Key to Bahia Honda Key	"	1:40,000	
853	.50	Bahia Honda Key to Sugarloaf Key	"	1:40,000	27X39
854		Sugarloaf Key to Key West	"	1:40,000	
859	.50	Big Spanish Channel to Johnson Key	"	1:40,000	27X39

Numbers in brackets represent charts printed back to back.

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1. GENERAL INFORMATION

EXPLANATORY.—The **Coast Pilots** of the Coast and Geodetic Survey provide verbal description of United States coasts, harbors, and connecting waterways that is mostly impossible of presentation on the nautical charts. Subjects include landmarks, navigation regulations, channels, anchorages, dangers, routes, weather, ice, pilotage, customs, and port facilities.

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

Courses are true and are expressed in the same manner as bearings. The courses given are the courses to be made good.

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

Distances 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.

Current velocities are in knots, which are nautical miles per hour; directions are the true directions toward which the currents set.

Wind velocities also are in knots, but directions are the true directions from which the winds blow.

Overhead clearances of bridges and cables are in feet above normal high water unless otherwise stated; clearances of drawbridges are for the closed position. **Permit clearances** are the minimums authorized in the construction permits issued by the Corps of Engineers.

Light and fog-signal characteristics are not described, and light sectors are not usually defined. The Coast Guard Light lists should be consulted for complete information.

Radio navigational aids and radio weather services are not fully described. Coast Guard Light Lists and H.O. Publications 205 and 206 should be consulted.

The COAST AND GEODETIC SURVEY is charged with (1) the survey of the coasts of the United States and its possessions to insure the safe navigation of coastal and intracoastal waters; (2) the compilation and publication of **nautical charts, Coast Pilots, tables of predicted tides and currents, and tidal current charts** to meet the needs of the mariner; (3) the determination of geographical positions and elevations in the interior of the country to coordinate the coastal surveys and provide a framework for mapping and other engineering work; (4) the compilation and publication of aeronautical charts for use in air navigation; (5) observations of the earth's magnetism in all parts of the country to furnish magnetic information essential to the mariner, aviator, land surveyor, radio engineer, and others; and (6) seismological observations and investigations to supply earthquake data required in designing structures.

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. 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, under way 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 under way, 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, under way 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.

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(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, Part B, Rule 4 (c), state 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.

Mariners are urged to obtain and use the largest-scale chart available for the area to be navigated.

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.

Deviation 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, suitably 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 mile 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 burns 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, of neutrality laws and regulations, of rules and regulations in relation to anchorage grounds, and of the Oil Pollution Act; (3) inspection of all vessels to insure safety to passengers and crews; (4) aid to distressed mariners and saving of life and property from shipwreck; (5) issuance of marine licenses and certificates; (6) investigation of circumstances connected with shipwreck or collision at sea; (7) destruction of derelicts; (8) construction, operation, maintenance, and inspection of aids to navigation; and (9) publication of Light Lists and Local Notices to Mariners.

Light Lists.—Aids to navigation, consisting of lights, radiobeacons, fog signals, buoys, and daymarks, are described in the light lists which are for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., and by the various sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the characteristics, candlepower, and visibility of lights, as well as descriptions of light structures and daybeacons, buoys, radiobeacons, and fog signals.

Local Notice 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. These 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 Commandant, United States Coast Guard, and the Hydrographer, United States Navy. These 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.

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.

Buoys.—Buoyage of the United States, with color, shape, numbering, and light characteristics, is described in the introductory pages of the Light Lists. Buoys are liable to be carried away, shifted, or capsized; lighted buoys may be extinguished; or sound buoys may not function because of storm, ice, or collision. The navigator should, therefore, check his position by shore bearings, soundings, or other means.

Vessel operators are required by law to notify the nearest Coast Guard office of collisions with aids to navigation.

Fog signals.—Caution should be exercised in the use of sound fog signals for determining position or a safe course to follow. 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.

Radiobeacons.—A list and descriptive details of all marine radiobeacons are given in the Light Lists and H. O. Publication No. 205, Radio Navigational Aids. There is also 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.

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

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 of a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is, the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

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 purposes 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. 205, 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.

Loran.—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.

Caution must be used in matching loran signals to insure that the ground wave signal of one station is not matched with a sky wave signal of the other station of the rate. Also, loran position determinations on or near the base-line extensions are subject to an error exceeding two nautical miles per microsecond and, therefore, should be avoided whenever possible.

Numbering and recording of undocumented vessels.—Certain undocumented vessels must conform to requirements of the Numbering Act. Owners may obtain the necessary information from the District Commander, United States Coast Guard, having jurisdiction over the area in which the vessel is owned.

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, United States Coast Guard, of the time of arrival in port; see **§ 124.10,** Chapter 2.

Danger signal.—Inland Pilot Rules, Section 80.1, state, "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." **International Pilot Rules,** Part D, Rule 28 (b), state, "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 cirmumstances 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.

Signals to be made by vessels inconvenienced by searchlights.—When navigation of a vessel is inconvenienced by the glare from searchlights near a port, she should make the International Code Signal ZO by lamp and by whistle, siren, or foghorn. Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed. Only real urgency should dictate the use of this signal, as it is not possible for the searchlight operator to know which projector is affected unless the vessel is actually in the rays. This signal is designed to assist mariners; no liability whatever will be admitted.

Search and rescue operations for surface vessels or aircraft in distress or overdue are coordinated by the Coast Guard. Air-Sea Rescue planes have special markings of chrome yellow on the wing tips and wing-tip floats. The cooperation of vessel operators with the Air-Sea Rescue planes may mean the difference between life and death of some seaman or aviator.

Operators of disabled wooden craft that are, or may consider themselves to be, the object of a search should hoist on a halyard or otherwise place aloft any metallic object that would assist their detection by radar. All Coast Guard patrol vessels, planes, and some buoy tenders utilize this equipment and thus can continue searches in darkness and during other periods of low visibility if it can be assumed that the object of the search can be detected through the use of this aid.

Actual observations have shown that wooden hulls or other non-metallic objects are suited as radar targets according to the size, orientation, shape, and other radar-reflecting qualities of the object. Their value as radar targets may be enhanced by the use of special radar-reflecting devices properly oriented and placed as high above the waterline as possible. The largest metallic object available should be used.

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 number of vessels required to render adequate aid, thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance:

1. Name, type, and nationality of vessel; 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 United States 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.

Signals for aid of aircraft in distress.—The information below is quoted from Annex 12 to International Civil Aviation Organization (S. A. R.) (Annex), Search and rescue signals.

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 (meaning 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 an 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. Repetition 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.

The CORPS OF ENGINEERS, United States 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 United States 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 peace-time year, more than 100,000 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, including the Great Lakes, Hawaiian Islands, and Puerto Rico, when winds dangerous to navigation are forecast for any coastal section.

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 lght at night to indicate that winds ranging from 34 to 48 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 UNITED STATES HYDROGRAPHIC OFFICE exists for the improvement of the means of navigating safely the vessels of the United States 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, Greenland, and the Hawaiian Islands 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 nonresident 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 condition 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 205, 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 206, 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. Additional surface and upper-air data for preparation of weather maps at sea is contained in the Synoptic Weather Bulletins broadcast by Civil Aeronautics Administration station WBR, Miami, Fla.

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 the District Voice Working frequency immediately following receipt of the message at the radio station preceded by an initial call on 2182 kc. 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 sum-

maries, 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 signals 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 United States 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 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, water-front 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 to the areas covered by Coast Pilot 4. 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.

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

§ 82.35 Charleston Harbor. A line drawn from Sullivans Island Coast Guard Station to Charleston Lighted Whistle Buoy 2C; thence to Charleston Lighthouse.

§ 82.40 Savannah Harbor. A line drawn from the southwesternmost extremity of Braddock Point to Tybee Lighted Whistle Buoy T; thence to the southernmost point of Savannah Beach, bearing approximately 278°.

§ 82.45 St. Simon Sound, St. Andrew Sound, and Cumberland Sound. Starting from the hotel located approximately ¾ mile, 63½° true, from St. Simon (rear) Lighthouse, a line drawn to St. Simon Lighted Whistle Buoy St. S; thence to St. Andrew Sound Outer Entrance Buoy; thence to St. Marys Entrance Lighted Whistle Buoy 1STM; thence to Amelia Island Lighthouse.

§ 82.50 St. Johns River, Fla. A line drawn from the east end of the north jetty to the east end of the south jetty.

§ 82.55 Florida Reefs and Keys from Miami to Marquesas Keys. A line drawn from the east end of the north jetty at the entrance to Miami, to Miami Lighted Whistle Buoy 2; thence to Fowey Rocks Lighthouse; thence to Pacific Reef Lighthouse; thence to Carysfort Reef Lighthouse; then to Molasses Reef Lighthouse; thence to Alligator Reef Lighthouse; thence to Tennessee Reef Lighthouse; thence to Sombrero Key Lighthouse, thence to American Shoal Lighthouse; thence to Key West Entrance Lighted Whistle Buoy; thence to Sand Key Lighthouse; thence to Cosgrove Shoal Lighthouse; thence to westernmost extremity of Marquesas Keys.

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 vessel (foreign and domestic) shall give at least 24 hours' advance notice of the time of such vessel's arrival to the Captain of the Port where the vessel is to arrive. The master or agents of every foreign vessel, as well as every documented vessel of the United States, destined from one port or place to another port or place shall give at least 24 hours' advance notice of the time of such vessel's arrival to the Captain of the Port where the vessel is to arrive. For such foreign and domestic vessels, this 24 hours' advance notice of time of arrival is applicable at every port of call. In any case where 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 a port or place is located. In a case of force majeure, if it is not possible

to give at least a 24 hours' advance notice of time of arrival, then an advance notice as early as practicable shall be furnished.

(b) The master and agents of a vessel entering the Great Lakes shall be exempt from the requirements of paragraph (a) of this section, but the master or agents of such vessel if bound for a United States port shall:

(1) Immediately on the vessel's entry into Lake Ontario inbound, advise the Commander, 9th Coast Guard District, of the vessel's first intended United States port of call and estimated time of arrival in that port.

(2) Upon the vessel's arrival in the first United States port cause to be delivered to the Captain of the Port an itinerary giving the vessel's foreign ports of call during the preceding six months or last visit to a U.S. port whichever is later, the intended ports of call on the Great Lakes, and the estimated dates of arrival.

(3) Thereafter, immediately advise the Commander, 9th Coast Guard District, when the necessity of a deviation from that itinerary becomes known.

(c) The master or agents of a vessel engaged upon a scheduled route need not furnish the advance notice of arrival in individual instances 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.

(d) The masters of merchant vessels (except on coastwise voyages of 24 hours or less) reporting in accordance with the U.S. Coast Guard's voluntary "Merchant Vessel Reporting Program" 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 are 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 as provided in paragraph (a) of this section.

(e) In the case of 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.

(f) 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.

(g) The requirements of this section do not apply to the following:

(1) Vessels which, during the course of their voyages, do not navigate any portion of the high seas; and

(2) Vessels which are numbered by the Coast Guard.

(h) The term "high seas", as used in this section, shall be construed to mean any portion of the open sea below the low water mark along the coasts and projections of the land across the entrances of bays, sounds and other bodies of water which join the open sea.

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 an 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:

None.

Subpart B—Anchorage Grounds:

§ 202.173 Port of Charleston, S.C.—(a) The Anchorage grounds. The anchorage grounds for general use shall include all the navigable portions of the harbor and the portions of Cooper, Ashley, and Wando Rivers adjacent thereto, except the following:

(1) Areas of prohibited anchorage. (i) A ship channel 1,000 feet wide between the jetties, thence 800 to 400 feet wide (or as much wider as an improved channel may hereafter be dredged), following the established ranges and usual courses and passing east of Drum Island to Goose Creek. Between the north Customhouse Wharf and the northernmost building ways of the Todd Shipyard Corporation, this shall include all the area between the western limit of the Channel and the eastern waterfront of Charleston.

(ii) A ship channel 500 feet wide from the northernmost building ways of the Todd Shipyard Corporation north through Town Creek, following the established ranges and usual courses and connecting at both ends with the main channel.

(iii) A ship channel in Ashley River from its mouth to Standard Wharf 300 feet wide following the established ranges and usual courses and widened at bends and at the upstream and downstream ends.

(iv) The commonly used channel in Wando River, with width of 200 feet.

(v) The commonly used channel in Hog Island Channel with a width of 200 feet from Cooper River to the area opposite Shem Creek.

(2) Anchorage for explosives. Vessels carrying explosives may anchor only in that section of the Wando River designated as "Anchorage for Explosives," which lies on the west side of that river in the area one mile upstream of the south end of Daniel Island: Provided, That vessels carrying explosives shall not anchor within 400 yards of each other, but this provision is not intended to prohibit lighters from lying alongside ships for the transfer of cargo.

(3) Special anchorages. Two special anchorages are provided in Cooper River along the eastern waterfront of Charleston. The use of these special anchorages is limited to loaded vessels for a period of not more than 72 hours. The bearings and distances for the centers of these special anchorages are from the tank atop the Fort Sumter Hotel on the Battery at Charleston:

(i) 30°30′ true; 2,687 yards; diameter of anchorage, 1,400 feet.

(ii) 37°00′ true; 2,017 yards; diameter of anchorage, 1,400 feet.

(b) The regulations. (1) Except in cases of great emergency, no vessel shall be anchored in the prohibited areas described in paragraph (a) of this section, nor shall any vessel be so anchored that it can swing within 400 feet of any wharf or pier on the eastern waterfront of Charleston.

(2) Vessels using the two special anchorages opposite the eastern waterfront of Charleston shall place their anchors as near as possible in the center of the anchorage. Vessels not using a special anchorage shall not place their anchors within the areas of prohibited anchorage, but vessels may be so anchored as to swing into these areas: Provided, That they are so placed, with reference to the customary winds, tides, and currents of the harbor, that they will swing only during slack water, and at this period there shall remain in the waters adjacent to the channel an area providing sufficient depth so as to permit the safe passage of loaded vessels.

(3) Vessels must be anchored in such a way as not to interfere with the free navigation of channels of the port, including Cooper, Ashley, and Wando Rivers, Town Creek, and Hog Island Channel, or to obstruct the approach to any pier or entrance to any slip, or to impede the movement of any vessel or craft.

(4) Dragging of anchors in or across the areas of prohibited anchorage is prohibited.

(5) Vessels which, through force of great emergency, are anchored contrary to the foregoing regulations in this section shall be shifted to new berths in accordance with such regulations at the earliest opportunity.

(6) A vessel, upon notification from the Captain of the Port to shift its position in anchorage grounds or out of areas of prohibited anchorage, must get under way at once or signal for a tug, and must change position as directed with reasonable promptness.

(7) Vessels carrying explosives shall be anchored only within the anchorage ground described in paragraph (a) (2) of this section, which may be used also by vessels carrying other classes of freight when proper anchorage space is not available elsewhere in the harbor, including the connecting rivers.

(8) Vessels carrying explosives shall be at all times in charge of competent persons, and must display by day a red flag, of at least 16 square feet, at the masthead, or at least 10 feet above the upper deck if the vessel has no mast; at night a red light shall be displayed in the same positions specified for the red flag. No smoking will be permitted on or near such vessels, and no persons under the influence of liquor will be allowed on board any vessel, barge, or scow carrying explosives, nor will they be allowed to approach such vessels.

(9) Nothing in this section shall be construed as relieving 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 navigation laws in regard to lights, fog signals, etc.

§ 202.178 Wilmington River, Ga.—(a) The anchorage grounds. An area in the Wilmington River in the vicinity of Thunderbolt Harbor to the westward of a line from the southeasterly corner of the outer end of the wharf of the Shrine Club, bearing 183° true, 480 feet, to a point marked with a buoy; thence 204°30′ true, 2,280 feet, to the Maggioni Packing Plant.

NOTE: Temporary floats or buoys for marking anchors or moorings in place will be allowed in this area. Fixed mooring piles or stakes are prohibited.

(b) The regulations. (1) Except in cases of great emergency, no vessel shall anchor in Wilmington River between the State Highway bridge at Thunderbolt, and 4,000 feet to the southward, except in the anchorage area hereby defined and established: Provided, however, That vessels may moor to any lawfully constructed wharf.

(2) Anchors must not be placed outside the anchorage area, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundary of the anchorage area.

(3) Any vessel anchoring under circumstances of great emergency-outside of the anchorage area should 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 boat, and shall move away immediately after the emergency ceases or upon notification by the District Engineer, Corps of Engineers, Savannah, Georgia, charged with the enforcement of the regulations in this section.

(4) A vessel, upon being notified to move into the anchorage limits or to shift its position on anchorage grounds, must get underway at once and must change position as directed, with reasonable promptness.

(5) Whenever the maritime or navigation interest of the United States so require, the District Engineer is hereby empowered to shift the position of any vessel anchored within the anchorage area and of any vessel which is so moored or anchored as to impede or obstruct vessel movements in any channel.

(6) Nothing in this section shall be construed as relieving the owner of or person in charge of any vessel from the penalties of the law for obstructing navigation or for not complying with the navigation laws in regard to lights, fog signals, or for otherwise violating the law.

§ 202.179 Skidaway River, Isle of Hope, Ga. (a) The anchorage ground. An area in Skidaway River beginning at a point on the mean low water line 400 feet south of Brady Boat Works, thence 76°30′ true 300 feet to a buoy; thence 152°30′ true, 900 feet to a buoy; thence 251°00′ true, 450 feet to the mean low water line at Wymberly Yacht Club dock.

(b) The regulations. (1) Except in cases of great emergency, no vessels shall anchor in Skidaway River between the north end of Barbee's dock and southward to Day Marker 48 except in the anchorage area hereby defined and established: Provided, however, That vessels may moor to any lawfully constructed wharf.

(2) Except in cases of great emergency, no vessel shall be anchored where it can swing within 50 feet of any lawfully constructed wharf or within 50 feet of the mean low water line, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundary of the anchorage area.

(3) Any vessel anchoring under circumstances of great emergency outside the anchorage area should be placed in such a position as not to interfere with the free navigation of the channel nor obstruct the approach to any lawfully constructed wharf nor impede the movement of any boat, and shall move away immediately after the emergency ceases or upon notification of the District Engineer, U.S. Army Engineer District, Savannah, Georgia.

(4) No vessels with an overall length greater than 65 feet will use the anchorage area except in cases of great emergency.

(5) Vessels operating within the anchorage area will not exceed a speed of five (5) miles per hour.

§ 202.183 St. Johns River, Fla.—(a) The anchorage grounds—(1) Anchorage A. Bounded on the north by a line ranging 90° through Grassy Point Middle Ground Lower End 31 Light; on the east by the shore and by a line between Hendricks Point and Point La Vista; on the south by a line bearing 90° from Grassy Point Middle Ground 34 Light; and on the west by a line from Grassy Point Middle Ground 34 Light to Winter Point and by the shore.

(2) Anchorage B. Bounded on the north by a line bearing 90° from Grassy Point Middle Ground 34 Light; on the east by a line between Hendricks Point and Point La Vista; on the south by a line between Point La Vista and Sadler Point; and on the west by the west boundary of Anchorage A extended.

(3) Anchorage C. Shoreward of a line beginning at a point on the shore bearing 180° from 20-Foot Rock Buoy 81; thence to 20-Foot Rock Buoy 81; thence to Commodore Point Lighted Buoy 79; thence 33°45′, 600 yards; and thence to Empire Point.

(4) Anchorage D. Beginning at Terminal Channel 7 Light; thence to Terminal Channel 5 Light; thence to Arlington Cut Buoy 76; thence to Cross Channel Buoy 78; and thence to the point of beginning. No vessels shall anchor within 300 feet of Terminal Channel or Arlington Cut.

(5) Anchorage E. Beginning at Long Branch Range Front 73 Light; thence 270° to the Texas Company wharf; thence to Chaseville Middle Ground Buoy; and thence to the point of beginning.

(6) Anchorage F. Shoreward of a line beginning at Long Branch Range Front 73 Light; thence to Chaseville Middle Ground Buoy; and thence 56°15′ to the shore south of Chaseville.

(7) Anchorage G. Northward of a line bearing 270° from Trout River Cut Buoy 66; and westward of a line 200 yards westerly of and parallel to the west side of Trout River Cut.

(b) The regulations. (1) Anchorages A, B, D, and F are permanent anchorages. Anchorage A is reserved for deep-draft vessels, Anchorage B is reserved for shallow-draft vessels, Anchorage D is reserved for light-draft barges and schooners, and Anchorage F is reserved for deep-draft barges and schooners.

(2) Anchorage C is a temporary anchorage for deep-draft vessels. This anchorage shall be an anchorage for vessels exceeding 24 feet in draft. No vessel shall remain in the anchorage more than 24 hours without obtaining a permit from the Captain of the Port.

(3) Anchorage E shall be used only by vessels awaiting quarantine inspection, or by special permit from the Captain of the Port. Anchorage G is an explosives anchorage.

§ 202.188 Atlantic Ocean off Miami and Miami Beach, Fla.—(a) The anchorage grounds. The area to the eastward of a line bearing 12° (N. 12° E.) through a point X, which is 1½ nautical miles due east of the intersection of the Miami Beach shore line with the north jetty; to the northward of a line bearing 102° (S. 78° E.) and intersecting the 12° line at a point A, one-half nautical mile north of the said point X; and to the southward of a line bearing 102° (S. 78° E.) and intersecting the 12° line at a point B, 2½ nautical miles north of the said point X. The northern and southern extremities of the 12° line are marked by spar buoys. The entire anchorage area lies north of the entrance channel to Miami Harbor.

(b) The rules and regulations. (1) Except in cases of great emergency, no vessel shall be anchored in the Atlantic Ocean in the vicinity of the entrances to the

approach channels leading to the cities of Miami Beach and Miami, Fla., outside of the anchorage area hereby defined and established—that is, they shall not anchor shoreward of the line first named nor southward of the second nor northward of the third line—but may anchor as far to the eastward as may be desired.

(2) Any vessel anchoring under circumstances of great emergency outside of the anchorage area shall be shifted to new berths within the area immediately after the emergency ceases.

(3) All vessels shall lie at anchor with as short a cable as conditions will permit.

(4) A vessel upon being notified to move into the anchorage limits or to shift its position on the anchorage ground must get under way at once or signal for a tug, and must change position as directed with reasonable promptness.

(5) Whenever the maritime or commercial interests of the United States so require, the engineer in local charge, United States Engineer suboffice, Miami Beach, Fla., is hereby empowered to shift the position of any vessel anchored on the anchorage ground or outside thereof, or of any vessel moored or anchored so as to impede or obstruct vessel movements or obstruct or interfere with range lights.

(6) Vessels carrying explosives shall be anchored only under a written permit issued by the engineer in local charge and at such point as he may direct.

(7) Vessels carrying explosives shall be at all times in charge of a competent person, and must display by day a red flag, of not less than 16 square feet, at the masthead, or not less than 10 feet above the upper deck if the vessel has no mast; at night a red light shall be displayed in the positions specified for the red flag.

(8) Nothing in this paragraph shall be construed as relieving the owner or person in charge of any vessel from the penalties of the law for obstructing navigation, or for obstructing or interfering with range lights, or for not complying with the navigation laws in regard to lights, fog signals, or other aids to navigation, or for otherwise violating law.

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 interests of public safety by the proper civil defense authorities during a major disaster or civil defense emergency indicated by the military condition of warning: Yellow (i.e., attack by enemy aircraft, probable) or Red (i.e., attack by enemy aircraft, imminent) notwithstanding any general or special regulations heretofore or hereafter prescribed for the operation of any such drawbridge or drawbridges.

§ 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 strokes 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 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 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 sig-

nal 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 203.448, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.240.

§ 203.241 The Intracoastal Waterway from the Virginia-North Carolina boundary to Key West, Florida and the Gulf Intracoastal Waterway from Rigolets, Louisiana to Apalachee Bay, Florida and tributaries thereto; bridges. (a) Bridges over the above-captioned navigable waters will be operated in accordance with § 203.240. The regulations contained in this section shall be considered as additional to those contained in § 203.240.

(b) Drawbridges shall not be required to open for craft carrying appurtenances unessential to navigation and any vessel operator who causes a bridge to be opened in order to clear appurtenances unessential for navigation shall be considered in violation of the regulations of this section.

(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) Owners of drawbridges shall report to the proper District Engineer the names of any vessels requiring bridge openings considered to be in violation of this section. The District Engineer may at any time cause an inspection to be made of any craft utilizing the above-captioned navigable waters and is empowered to decide in each case whether or not the appurtenances are unessential to navigation. If the District Engineer decides a vessel has appurtenances unessential to navigation, he shall notify the vessel owner of his decision, specifying a reasonable time for making the alterations. If the vessel owner is aggrieved by the decision of the District Engineer, he may within 30 days after receipt of the request to perform necessary alterations, appeal the decision to the District Engineer in writing. After receipt by the District Engineer, the appeal will be forwarded through channels to the Secretary of the Army. If the Secretary of the Army rules that an appurtenance is unessential to navigation, the District Engineer shall again specify to the vessel owner a reasonable time for making necessary alterations to the appurtenance, and after the expiration of the time specified, any operation of the vessel on the above-captioned navigable waters in such a manner as to require drawbridge openings shall be deemed in violation of the regulations of this section, unless the necessary alterations shall have been made.

§ 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) Applies to waterways discharging into Chesapeake Bay.

(g) Waterways discharging into Atlantic Ocean between Chesapeake Bay and Charleston—(1) Pasquotank River, N.C.: Norfolk Southern Railway Company bridge at Elizabeth City; from 3:30 p.m. to 11:30 p.m., the bridge will be operated in full open position. Between 11:30 p.m. and 3:30 p.m., the regulations prescribed in § 203.240 shall govern the operation of the drawspan.

(2) Kendrick (Mackay) Creek, N.C.; Norfolk South-

ern Railway Company bridge at Mackeys. At least eight hours' advance notice required.

(3) Scuppernong River, N.C.; North Carolina State Highway and Public Works Commission bridges at Creswell and Cross Landing. At least 24 hours' advance notice required.

(4) Pungo River, N.C.; North Carolina State Highway and Public Works Commission at Leechville. [Revoked]

(5) Bath Creek, N.C.; North Carolina State Highway and Public Works Commission bridge at Bath. At least 24 hours' advance notice required.

(6) Tar River, N.C.; Atlantic Coast Line Railroad Company bridge at Tarboro. At least 24 hours' advance notice required.

(7) Neuse River, N.C. [Revoked]

(8) Neuse River, N.C.; Atlantic and East Carolina Railway Company bridge at Kinston, and drawbridge upstream therefrom. At least 24 hours' advance notice required.

(9) Trent River, N.C.; Atlantic Coast Line Railroad Company bridge at Pollocksville, and drawbridges upstream therefrom. At least 24 hours' advance notice required.

(10) Contentnea Creek, N.C. [Revoked]

(10–a) Newport River, N.C.; Atlantic and East Carolina Railway Company bridge at Newport. 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–b) Smiths Creek, N.C.; North Carolina State Highway and Public Works Commission bridge in Wilmington. At least 24 hours' advance notice required.

(10–c) Northeast River, N.C.; Atlantic Coast Line Railroad Company bridge at Castle Hayne. Between 7:30 a.m. and 4:30 p.m., Monday through Friday of each week, the draw will be opened for the passage of vessels on signal. At all other times, the draw will be closed and the bridge unattended: Provided, That the draw will be opened for tugs with tows upon 24 hours advance notice.

(10–d) Northeast River, N.C.; North Carolina State Highway and Public Works Commission bridge at Rocky Point. [Revoked]

(11) Kingston Lake, S.C.; South Carolina State Highway Department bridge near Conway. At least 24 hours' advance notice required.

(12) Pee Dee River, S.C.; Seaboard Air Line Railway Company bridge near Poston. The draw need not be opened for the passage of vessels, and the special regulations contained in paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(13) Pee Dee River, S.C.; South Carolina State Highway Department bridge near Georgetown. (Pee Dee River drawspan of the Lafayette Bridge). At least 12 hours' advance notice required.

(14) Black River, S.C.; South Carolina State Highway Department bridge near Georgetown. At least 12 hours' advance notice required. South Carolina State Highway Department bridge at Brown's Ferry near Rhems. At least 24 hours' notice required. The agency controlling the above bridges shall arrange for its representative to be reached at the same place that the representative for the Lafayette Bridge (Great Pee Dee River) may be reached in order that one notice may suffice to secure the prompt opening of any or all of these bridges.

(15) Santee and Congaree Rivers, S.C.; drawbridges upstream from South Carolina State Highway Department bridge near Lanes. At least 24 hours' advance notice required.

(16) Wando River, S.C.; South Carolina State Highway Department bridge near Cainhoy. At least 12 hours' advance notice required.

(17) Cooper River, S.C.; Seaboard Air Line Railway Company bridge near Cordesville. At least 24 hours' advance notice required: Provided, That a draw tender shall be placed in constant attendance on 10 days' notice in writing from the District Engineer, Corps of Engineers.

(h) Waterways discharging into Atlantic Ocean south of Charleston. (1) Rantowles Creek, S.C.; Atlantic Coast Line Railroad Company bridge near Rantowles. 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.

(1–a) Edisto River, S.C.; Seaboard Air Line Railway Company bridge near Fenwick. At least 24 hours' advance notice required.

(2) Ashepoo River, S.C.; South Carolina State Highway Department bridge at Brickyard Ferry near Bennetts Point. At least 24 hours' advance notice required. Any vessel navigating Ashepoo River with the intention of making repeated trips shall notify the authorized representative of the owner of or agency controlling the bridge of the expected frequency of such trips. The bridge shall then be maintained in readiness to open promptly upon signal from the vessel without any further notice. Repeated trips shall be understood to mean trips not more than 24 hours apart.

(3) Ashepoo River, S.C.; Seaboard Air Line Railway Company bridge near Fenwick. At least 96 hours' advance notice required: Provided, That a draw tender shall be placed in constant attendance on 10 days' notice in writing from the District Engineer, Corps of Engineers.

(4) Harbor River, a tidal estuary in St. Helena Sound, S.C.; South Carolina State Highway Department bridge on State Highway No. 285 at Hunting Island. At least 24 hours' advance notice required.

(5) Combahee River, S.C.; Seaboard Air Line Railway Company bridge near Wiggins and South Carolina State Highway Department bridge near Sheldon. At least 12 hours' advance notice required.

(6) North Wimbee Creek, S.C.; Seaboard Air Line Railway Company bridge near Lobeco. At least 24 hours' advance notice required.

(7) Coosaw River (Whale Branch), S.C.; Charleston and Western Carolina Railway Company bridge near Seabrook and the South Carolina State Highway Department bridge on State Highway No. 28 between Beau-

fort and Yemassee near Lobeco. From 8:00 p.m. Saturday to 6:00 a.m. Monday and from 8:00 p.m. to 6:00 a.m. on all other days, at least 24 hours' advance notice required.

(8) Battery Creek, S.C.; South Carolina State Highway Department bridge between Beaufort and Parris Island. At least 24 hours' advance notice required.

(9) Broad River, S.C.; South Carolina State Highway Department bridge near Beaufort. At least 24 hours' advance notice required.

(9-a) Broad River, S.C.; Seaboard Air Line Railway Company bridge near Whale Branch. At least 24 hours' advance notice required.

(10) Savannah River, S.C. and Ga.; Charleston & Western Carolina Railway Company bridge near Augusta, Ga. At least three hours' advance notice required.

(11) Ogeechee River, Ga. The Atlantic Coast Line Railroad Company bridge near Richmond Hill (Ways Station). At least 15 days' advance notice required.

(11-a) Ogeechee River, Ga. The State Highway Department of Georgia bridge near Richmond Hill. 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.

(12) Altamaha River, Ga.; all drawbridges. At least 24 hours' advance notice required.

(12-a) Oconee River, Ga.; drawbridges downstream from Central of Georgia Railroad Company bridge at Oconee. At least 24 hours' advance notice required.

(12-b) Oconee River, Ga.; Central of Georgia Railway Company bridge at Oconee. At least 7 days' advance notice required. Paragraph (e) of this section shall not apply to this bridge.

(12-c) Ocmulgee River, Ga.; all drawbridges. At least 24 hours' advance notice required.

(13) Satilla River, Ga.; Seaboard Air Line Railroad Company bridge at Woodbine. (i) The owner of, or agency controlling, the bridge will not be required to keep a bridge tender in constant attendance between the hours of 7:00 p.m. and 3:00 a.m.

(ii) Whenever, in the event of an emergency, a vessel requires passage through the drawspan between the hours stated in subdivision (i) of this subparagraph the authorized representative of the owner of, or agency controlling, the bridge shall be given at least six (6) hours' advance notice of the time the opening is desired.

(iii) Upon receipt of such 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.

(iv) The owner of, or agency controlling, 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 the regulations of this subparagraph, together with a notice stating exactly how the representative specified in subdivision (ii) of this subparagraph may be reached.

(13-a) Satilla River, Ga.; State Highway Department of Georgia Bridge near Burnt Fort. At least 24 hours' advance notice required.

(13-b) St. Marys River, Ga. and Fla.; State Road Department of Florida and Seaboard Air Line Railway Company bridges at Kingsland, Ga. At least 48 hours' advance notice required.

(14) Nassau Sound, Fla; Fernandina Port Authority bridge on Toll Road No. 105 between Fernandina and Jacksonville. From one hour after sunset to one hour before sunrise, the times of sunset and sunrise being as published by the United States Hydrographic Office for latitude 30° north, the draw need not be opened for the passage of vessels.

(15) Clapboard Creek and Broward River (Cedar Creek), Fla.; bridges on Heckscher Drive. At least 12 hours' advance notice required.

(15-a) Trout River, Fla.; Seaboard Air Line Railroad Company bridge at Panama. Between 10:00 p.m. and 6:00 a.m., at least 12 hours' advance notice required. At all other times the regulations contained in § 203.240 shall govern the operation of this bridge.

(16) St. Johns River, Fla.; State Road Department of Florida bridge about one mile south of Lake Harney. At least 24 hours' advance notice required.

(17) Jupiter (Loxahatchee) River, Fla.; Florida East Coast Railway Company bridge at Jupiter. Between 7:00 p.m. and 7:00 a.m., at least 3 hours' advance notice required.

(18) Kissimmee River, Fla.; State Road Department of Florida bridge 0.5 mile above the mouth of the river on State Road 78, C. H. Carlton bridge 2.7 miles above the mouth, State Road Department of Florida bridge 19.5 miles above the mouth on State Road 70, and Seaboard Air Line Railroad bridge 37 miles above the mouth at Fort Basinger. At least 48 hours' advance notice required.

(18-a) [Revoked]

(19) [Revoked]

(20) Kissimmee River, Fla.; State Road Department of Florida bridge near Basinger (at Fort Basinger). At least 96 hours' advance notice required. Paragraph (e) of this section shall not apply to this bridge.

(21) [Revoked]

(i) Waterways discharging into Gulf of Mexico east of Mississippi River. (1) Caloosahatchee Canal, Fla.; Atlantic Coast Line Railroad Company bridge at Moore Haven. Between 10:00 p.m. and 6:00 a.m., the draw need not be opened for the passage of vessels.

(2) Orange River, Fla.; State Road Department of Florida bridge 0.9 mile above mouth and Seaboard Air Line Railway Company bridge 2.25 miles above mouth near Fort Myers. At least 24 hours' advance notice required, except during a hurricane alert issued by the United States Weather Bureau affecting the area adjacent to Caloosahatchee and Orange Rivers when a drawtender shall be constantly on duty and the bridge opened at any time for the passage of vessels giving the usual signal.

§ 203.404 Turner Creek, Tybee (Bull) River, and Lazarretto Creek, Ga.; highway bridges on U.S. Highway

80 between Savannah Beach and Thunderbolt, Ga. (a) The owner or agency controlling the above described bridges may keep the drawspans closed to navigation between 7:00 a.m. and 10:00 a.m., and between 4:00 p.m. and 7:00 p.m., except on the hour, when the bridges shall be opened to allow all accumulated vessels to pass, with the exception that on Saturdays, Sundays, and holidays, during the period 1 April to 30 September, both dates inclusive, the drawspans will remain closed to navigation between 7:00 a.m. and 10:00 p.m., except on the hour, when the bridges shall be opened to allow all accumulated vessels to pass.

(b) The draws shall be opened at any time to allow the passage of a tow, common carrier, Air Force Crash Boat, or vessel in distress.

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

§ 203.405 Wilmington River, Ga.; swing highway bridge on U.S. Route 80, at Thunderbolt, Ga. (a) During the period 1 May 1955 through 30 September 1955 the owner of or agency controlling this bridge will not be required to open the drawspan between the hours of 7:00 a.m. and 10:00 p.m., on Saturdays, Sundays, and holidays, except on the hour, when the bridge shall be opened to allow all accumulated vessels to pass.

(b) The draw shall be opened at any time for the passage of a tow, common carrier, or Air Force Crash Boat, or a vessel in distress.

(c) The owner of or agency controlling this bridge shall place appropriate signs, indicating the nature of the regulations, at such locations upstream and downstream from the bridge and in such manner as may be directed by the District Engineer, Savannah District, Corps of Engineers, Savannah, Georgia.

§ 203.430 St. Johns River, Fla.; Main Street and Acosta bridges, Jacksonville. (a) Between 7:30 a.m. and 9:00 a.m., and between 4:30 p.m. and 6:00 p.m., on all days other than Sundays and legal holidays, the draws need not be opened for the passage of vessels: Provided, That the draws shall be opened at any time for the passage of a vessel in an emergency involving danger of life or property, which shall be indicated by four blasts of a whistle, horn, or megaphone.

(b) In all other respects, the regulations contained in § 203.240 of this part shall govern the operation of these bridges.

§ 203.431 Ortega River, Fla.; State Road Department of Florida bridge (Roosevelt Boulevard) near Jacksonville, Florida. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the owner or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels between 6:30 a.m. and 8:30 a.m., and between 3:30 p.m. and 5:00 p.m. except that during these closure periods the bridge shall be opened on the hour and half-hour to allow any accumulated vessels to pass.

(b) The regulations in this section shall not be in force or effect on Saturdays, Sundays, or the following legal holidays:

New Year's Day.
Washington's Birthday.
Memorial Day (May 30).
Independence Day.
Labor Day.
Veterans Day (November 11).
Thanksgiving Day.
Christmas Day.

(c) The regulations in this section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of the bridge at any time on giving the usual signal.

(d) The draw shall be opened at any time for the passage of a tow or vessel in an emergency caused by rough weather or otherwise to an extent sufficient to endanger life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

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

§ 203.434 Dead River, Fla.; bridge of Seaboard Air Line Railway Company near Tavares, Fla. (a) The owner of or agency controlling the bridge will not be required to open the drawspan of the above-named bridge between the hours of 8:00 p.m. and 1:00 p.m. the following day, except as provided in paragraph (c) of this section.

(b) Whenever a vessel unable to pass under the closed bridge desires to pass through the draw between the hours of 1:00 p.m. and 8:00 p.m., thirty (30) minutes advance notice shall be given to the drawtender, who will be on duty at the bridge. Upon receipt of such notice, the said drawtender, or an authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw.

(c) The drawspan shall be opened daily between the hours of 7:00 a.m. and 8:00 a.m., and 5:00 p.m. and 6:00 p.m. to allow the passage of United States Coast Guard Reserve patrol boats operating in connection with Leesburg Army Air Base. In the event of an emergency which requires additional opening for passage of United States Coast Guard Reserve boats, the drawspan will be promptly opened upon receipt of notice given the bridgetender by the United States Coast Guard Reserve representative.

(d) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in a manner that it can easily be read at any time, a copy of the regulations in this section, together with a notice stating exactly how the

representative specified in paragraph (b) of this section may be reached.

§ 203.436 Indian River, Fla.; State Road Department of Florida bridges at Cocoa, Eau Gallie and Melbourne. (a) Except as provided in paragraphs (b) and (c) of this section, the owner of or agency controlling the bridges at Cocoa, Eau Gallie and Melbourne shall not be required to open the drawspans between 6:45 a.m. and 7:45 a.m. and between 4:15 p.m. and 5:45 p.m., Monday through Friday of each week.

(b) The draws shall be opened promptly upon the prescribed signal being given for the passage of towboats with tows and vessels owned or operated by the United States.

(c) The draws shall be opened promptly for the passage of a vessel in distress. Such vessels shall sound the opening signal two or more times at intervals of five (5) seconds. When weather conditions are such that sound signals may not be heard, such vessels shall signal for an opening by raising and lowering a number of times a lighted lantern by night and a flag by day.

(d) The owner of or agency controlling the bridges 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 section.

§ 203.440 Lake Worth (Intracoastal Waterway), Fla.; Flagler Memorial and Royal Park bridges, Palm Beach, Florida. (a) During the period 15 November to 30 April, both dates inclusive, the owners of or agencies controlling these bridges will not be required to open the drawspans between the hours of 7:30 a.m. and 9:30 a.m., and between the hours of 4:30 p.m. and 6:30 p.m., except that the drawspan of the Flagler Memorial Bridge shall be opened on the hour and half-hour and the drawspan of the Royal Park Bridge shall be opened 15 minutes before and 15 minutes after the hour to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) The draws shall be opened to allow the passage of a vessel in distress or of a commercial tow at any time upon the sounding by the vessel of four blasts of a whistle or horn.

(c) The owner of or agencies controlling the bridges shall place conspicuously on both sides of each bridge signs of such size that they can be easily read at any time, clearly indicating the nature of the regulations.

§ 203.442 Hillsboro Inlet, Fla.; State Road Department of Florida highway bridge (State Road No. A1A) near Pompano Beach, Fla. (a) During the period 1 December to 30 April, both dates inclusive, except as otherwise provided in paragraphs (b) and (c) of this section, the owner of or agency controlling the bridge shall not be required to open the drawspan between the hours of 7:00 a.m. and 7:00 p.m., except on the hour and half-hour when the drawspan shall be opened to allow all accumulated vessels to pass, and except that from 7:30 to 8:30 a.m., from 11:45 a.m. to 1:30 p.m., and from 4:45 to 5:30 p.m., the bridge will be opened at any time upon request.

(b) The regulations in this section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of the bridge at any time on giving the usual signal.

(c) The draw of the bridge shall be opened at any time for the passage of a tow or of a vessel in an emergency involving danger to life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

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

§ 203.443 Intracoastal Waterway, Fla.; State Road Department of Florida highway bridge at Atlantic Boulevard in Pompano Beach, Fla. (a) During the period November 1 to May 31, both dates inclusive, except as provided in paragraphs (b) and (c) of this section, the owner of or agency controlling this bridge shall not be required to open the drawspan between the hours of 7:00 a.m. and 6:00 p.m., both inclusive, except on the hour and the half-hour.

(b) The draw shall be opened promptly upon the prescribed signal being given for the passage of towboats with tows and vessels owned or operated by the United States.

(c) The draw shall be opened promptly for the passage of a vessel in distress. Such vessels shall sound the opening signal two or more times at intervals of five (5) seconds. When weather conditions are such that sound signals may not be heard, such vessels shall signal for an opening by raising and lowering a number of times a lighted lantern by night and a flag by day.

(d) The owner of or agency controlling the bridge shall erect and maintain on both sides thereof, signs acceptable to the District Engineer setting forth the salient features of the special regulations of this section.

§ 203.446 New River and New River Sound (Intracoastal Waterway), Fort Lauderdale, Fla.; bridges. (a) East Las Olas Boulevard Bridge across New River Sound. During the period November 15 to May 15, both dates inclusive, except as provided in paragraph (d) of this section, the owner of or agency controlling this bridge will not be required to open the drawspan between the hours of 7:00 a.m. and 6:00 p.m., except on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass.

(b) Sunrise Boulevard Bridge across New River Sound. During the period November 15 to May 15, both dates inclusive, except as provided in paragraph (d) of this section, the owner of or agency controlling this bridge will not be required to open the drawspan between the hours of 7:15 a.m. and 6:15 p.m., except on the quarter-hour and three-quarter-hour when the bridge shall be opened to allow all accumulated vessels to pass.

(c) Temporary detour bridges, Southeast 5th and Southeast 9th Avenues, across New River. (1) The owner or agency controlling the Southeast 5th Avenue detour bridge will not be required to open the drawspan between the hours of 7 a.m. and 6 p.m., for the passage of eastbound traffic except at the following scheduled times when the bridge shall be opened to allow all accumulated vessels to pass:

7:00 a.m.	1:00 p.m.
8:00 a.m.	1:30 p.m.
9:00 a.m.	2:00 p.m.
9:30 a.m.	2:30 p.m.
10:00 a.m.	3:00 p.m.
10:30 a.m.	3:30 p.m.
11:00 a.m.	4:00 p.m.
11:30 a.m.	4:30 p.m.
12:00 Noon	5:15 p.m.
12:30 p.m.	6:00 p.m.

Between the hours of 4:15 p.m. and 4:45 p.m. the bridge shall be opened at any time for the passage of eastbound sightseeing boats.

(2) The owner or agency controlling the Southeast 9th Avenue detour bridge will not be required to open the drawspan between the hours of 7 a.m., and 6 p.m., for the passage of westbound traffic except on the same schedule as set forth in subparagraph (1) of this paragraph.

(3) This section shall be in effect throughout the period of construction of the tunnel at Southeast 6th Avenue and it shall become null and void upon completion of the tunnel and removal of the detour bridges.

(d) The draws of the bridges listed in paragraphs (a), (b), and (c) of this section shall be opened at any time upon a signal of 4 blasts of a whistle or horn to allow the passage of a tow or vessel in distress.

(e) The owner of or agency controlling the bridges shall place signs, of a size and description designated by the District Engineer, at each side of these bridges and at a distance of one-half mile above and below each bridge indicating the nature of the regulations of this section.

§ 203.446a. Intracoastal Waterway, Fla.; Hollywood Boulevard bridge, Hollywood, Fla. (a) During the period November 15 to May 15, inclusive, the owner of or agency controlling the Hollywood Boulevard bridge will not be required to open the drawspan between the hours of 10:00 a.m. and 6:00 p.m., except on half-hour intervals, on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) Upon receipt of proper signal the draw shall be opened at any time to allow the passage of a tow, sailing vessel, vessel in distress, and cruise boats operating on regular schedules.

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

§ 203.446b Intracoastal Waterway, Fla.; Hallandale bridge at Hallandale, Fla. (a) During the period November 15, to May 15, both dates inclusive, the owner or agency controlling this bridge will not be required to open the drawspan between the hours of 10:15 a.m., and 6:15 p.m., except on half-hour intervals, on the quarter-hour and three quarter-hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) Upon receipt of proper signal the draw shall be opened at any time to allow the passage of a tow, sailing vessel, vessel in distress, and cruise boats operating on regular schedule.

(c) The owner of or agency controlling this bridge shall erect and maintain, on both sides thereof, signs acceptable to the District Engineer, Corps of Engineers, setting forth the salient features of the special regulations of this section.

§ 203.446c South Fork of New River, Fla.; State Road Department of Florida bridge (State Road No. 84) at Mile 4.4, near Fort Lauderdale, Fla. The owner or agency controlling the bridge will not be required to keep a draw tender constantly on duty. An advance notice of at least 24 hours will be required to open the drawspan.

§ 203.447 Biscayne Bay, Fla.; State Road Department of Florida highway bridge (MacArthur or 13th Street Causeway) and Dade County Port Authority highway bridge (Venetian or 15th Street Causeway), Miami, Fla. (a) During the period from November 1 to April 30, both dates inclusive, the owners of or agencies controlling these bridges shall not be required to open the west drawspans of the MacArthur and Venetian Causeways between 7:00 a.m. and 9:00 a.m. or between 4:30 p.m. and 6:30 p.m., except that both drawspans shall be opened on the half hour and even hour for sufficient time to pass any vessels awaiting passage.

(b) During the period from November 1 to April 30, both dates inclusive, the owner of or agency controlling Venetian Causeway shall not be required to open the east drawspan between 7:15 a.m. and 8:45 a.m., or between 4:45 p.m. and 6:15 p.m., except that the drawspan shall be opened at 7:45 a.m. and 8:15 a.m., 5:15 p.m. and 5:45 p.m. for sufficient time to pass any vessels awaiting passage.

(c) Any of the drawspans shall be opened at any time when required by a tow, or in an emergency. An emergency shall be indicated by four blasts of the signalling device.

(d) Officers of the Police Departments of Miami and Miami Beach shall be stationed at the respective draws and at the ends of the causeways during the above hours to regulate traffic in conjunction with the bridge tenders.

(e) Boat owners shall cooperate insofar as possible to facilitate the operation of the draws of the bridges.

(f) Signs indicating the nature of the regulations will be placed by the State Road Department and the Dade County Port Authority where and as directed by the District Engineer, Corps of Engineers, in charge of the locality.

§ 203.447a Biscayne Bay, Fla.; Dade County Bridge (Rickenbacker Causeway), Miami, Fla. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the owner or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels from 4:00 p.m. to 5:00 p.m. and from 5:15 p.m. to 6:00 p.m. on Saturdays, Sundays and the following legal holidays:

New Year's Day.
Independence Day.
Labor Day.
Veterans Day (November 11).
Thanksgiving Day.
Christmas Day.

(b) The regulations in this section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of the bridge at any time on giving the usual signal.

(c) During the display of small craft warnings or warnings for winds of greater force by the United States Weather Bureau affecting the area, the bridge shall be opened for the passage of vessels giving the usual signal at any time.

(d) The draw of the bridge shall be opened at any time for the passage of a tow or of a vessel in an emergency involving danger to life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

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

§ 203.448 Miami River, Fla.; highway bridges from mouth to and including City of Miami bridge at Northwest 27th Avenue, Miami. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the owners of or agencies controlling these bridges shall not be required to open the drawspans for the passage of vessels from 7:30 a.m. to 9:00 a.m. and from 4:30 p.m. to 6:00 p.m. on all days other than Sundays and the following legal holidays: New Year's Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day.

(b) This section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of any bridge at any time on giving the usual signal.

(c) During the existence of a hurricane alert duly issued by the United States Weather Bureau affecting the Miami area, all of the bridges shall be opened for the passage of vessels giving the usual signal at any time.

(d) The draw of any bridge shall be opened at any time for the passage of a vessel in an emergency involving danger to life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

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

(f) This section shall remain in full force and effect until revoked or modified by the Secretary of the Army.

PART 204—DANGER ZONE REGULATIONS:

§ 204.52 Atlantic Ocean south of entrance to Chesapeake Bay; firing range—(a) The danger zone. A sector extending seaward for a distance of 12,000 yards between two radial lines bearing 30° true and 75° true, respectively, from a point on the shore at latitude 36°46′48″, longitude 75°57′24″; and an adjacent sector extending seaward for a distance of 15 miles between two radial lines bearing 75° true and 150° true, respectively, from the same shore position.

(b) The regulations. (1) Fishing vessels may enter the danger zone only between the hours of midnight and 8:00 a.m. and shall be clear of the area by 8:00 a.m. Other vessels shall proceed through the area with caution and shall remain therein no longer than absolutely necessary for purposes of transit.

(2) On days when firing is in progress, red flags will be displayed at conspicuous locations on the beach. During night firing a red flag, illuminated by a vertical white light, will be shown from the tower controlling the fire.

(3) This section shall be enforced by the Commanding Officer, Antiaircraft Training and Test Center, Dam Neck, Virginia, and such agencies as he may designate.

§ 204.52a Atlantic Ocean south of entrance to Chesapeake Bay off Camp Pendleton, Virginia; naval prohibited area—(a) The area. Beginning at a point on the shore at Camp Pendleton at latitude 36°48′19″ N, longitude 75°57′49″ W; thence easterly 200 yards to latitude 36°48′20″ N, longitude 75°57′42″ W; thence northerly 400 yards to latitude 36°48′32″ N, longitude 75°57′45″ W; thence westerly 200 yards to latitude 36°48′31″ N, longitude 75°57′53″ W; and thence southerly 400 yards along the shore to the point of beginning.

(b) The regulations. (1) Vessels other than those owned and operated by the United States shall not enter the area except by permission of the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Virginia.

(2) This section shall be enforced by the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Virginia, and such agencies as he may designate.

§ 204.54 Albemarle Sound, Pamlico Sound, and adjacent waters, N.C.; danger zones for naval aircraft operations—(a) Target areas—(1) North Landing River (Currituck Sound). The waters of North Landing River within a radius of 1,000 yards from a target located at latitude 36°31′00″, longitude 76°01′40″.

(2) Northern part of Currituck Sound. Beginning at a point bearing 65°30′, 1,025 yards, from Currituck Sound Light 69; thence 86°, 6,000 yards; thence 193°, 4,425 yards; thence 267°30′, 2,775 yards; and thence to the point of beginning. The target is located at latitude 36°27′16″, longitude 75°56′30″.

(3) North of Currituck Beach Light. The waters of Currituck Sound and the Atlantic Ocean within a radius of 1,000 yards from a target located at latitude 36°25′24″, longitude 75°50′09″.

(4) South of Caffey Inlet Coast Guard Station. The waters of Currituck Sound and the Atlantic Ocean within a radius of 1,000 yards for a target located at latitude 36°12′15″, longitude 75°45′57″.

(5) Southeast of Caffey Inlet Coast Guard Station. The waters of Currituck Sound and the Atlantic Ocean within an area described as follows: Beginning at a point bearing 170°, 5,900 yards, from Caffey Inlet Coast Guard Station; thence 55°30′, 7,650 yards; thence 177°, 8,700 yards; and thence to the point of beginning. The target is located at latitude 36°10′28″, longitude 75°45′04″.

NOTE: All bearings in this section are referred to true meridian.

(b) Target and bombing areas—(1) Along north shore of Albemarle Sound—(i) Western area. Beginning at a point on the north shore of Albermarle Sound where the eastern highway bridge intersects the shore at Sandy Point; thence southerly along the eastern side of the bridge to the northern end of the draw; thence northeasterly to latitude 36°02′18″, longitude 76°19′30″; thence northwesterly to latitude 36°04′18″, longitude 76°20′20″; thence 23°15′ true to the shore; and thence southwesterly along the shore and across the mouth of Yeopim River, to the point of beginning.

(ii) Eastern area. Beginning on the north shore of Albemarle Sound at the easternmost tip of Harvey Point; thence southeasterly to Perquimans Bluff Flats Buoy; thence southeasterly to latitude 36°03′06″, longitude 76°16′43″; thence southwesterly to latitude 36°02′18″, longitude 76°19′30″; thence northwesterly to latitude 36°04′18″, longitude 76°20′20″; thence 23°15′ true to the shore; and thence northeasterly along the shore to the point of beginning.

(2) Along south shore of Albemarle Sound; target and bombing area. Beginning at the northernmost point of Laurel Point; thence to Laurel Point Light; then to latitude 36°02′40″, longitude 76°04′26″; thence to Lewis Point; thence westerly along the shore to a point bearing 68°, 2,200 yards from Scuppernong River Entrance Light; thence 263°, to the shore south of Bull Creek entrance; thence northerly along the shore and across the entrance to Bull Creek to the point of beginning; excluding from this area a passage 600 yards in width the center line of which extends due north from Scuppernong River Entrance Light.

(c) Naval Aviation Ordnance test area in Pamlico Sound in vicinity of Long Shoal. A circular area with a radius of one and one-half miles having its center at Latitude 35°32′18″, longitude 75°40′39″.

(d) The regulations—(1) Target areas. The area described in subparagraph (1) of paragraph (a) of this section will be used as a dive bombing target by naval aircraft. In peacetime, munitions will be limited to miniature bombs which contain only small explosive charges for producing smoke puffs to mark points of impact. All operations will be conducted during daylight hours, and the area will be open to navigation at night. No vessel shall enter this area during the hours of daylight without special permission from the enforcing agency. The area will be patrolled and vessels will be warned not to enter. "Buzzing" by plane will warn vessels that they are in a danger zone, and upon being so warned they shall immediately leave the area. The areas described in subparagraphs (2), (3), (4) and (5) of paragraph (a) of this section will be used as target areas by naval aircraft. The areas shall be closed to navigation at all times, except for vessels engaged in operational and maintenance work as directed by the enforcing agency. Prior to the conduct of operations the areas will be patrolled by naval aircraft. "Buzzing" by plane will warn vessels that they are in a danger zone, and upon being so warned vessels which have inadvertently entered one of the areas shall immediately leave the area or areas.

(2) Target and bombing areas. The areas described in paragraph (b) (1) (i) and (2) of this section will be used as target and bombing areas by naval aircraft during daylight only. The area described in paragraph (b) (1) (ii) of this section will be used as a target and bombing area for both day and night operations. No use will be made of these areas for target and bombing operations during the period 30 days prior to and during the annual duck hunting season as established by the State of North Carolina. Dummy ammunition, water-filled and smoke bombs will be used, except during wartime when live ammunition and bombs may be used. The areas will be open to navigation, except for brief periods when target and bombing exercises are being conducted by naval aircraft. The areas will be patrolled and vessels shall clear the area under patrol upon being warned by the surface patrol craft or when "buzzed" by patrolling aircraft. No vessel shall enter the areas described in paragraph (b) (1) (i) and (2) of this section until the surface patrol craft and patrol aircraft leave the area or areas. As a further means of warning vessels of naval aircraft operations in the area described in paragraph (b) (1) (ii) of this section a cluster of flashing red lights at night and a large red flag by day will be displayed from the range observation tower located in the approximate center of the shore side of this area. No vessel shall enter the area until the surface patrol craft and patrol aircraft leave the area and the tower signals are discontinued.

(3) Naval Aviation Ordnance test area. The area described in paragraph (c) of this section shall be closed to navigation except for such military vessels as may be directed by the enforcing agency to enter on assigned duties.

(4) Enforcing agency. The regulations in this section shall be enforced by the Commander, Naval Air Base, Fifth Naval District, and such agencies as he may designate.

§ 204.55 Pamlico Sound, Bogue Sound, and adjacent waters, N.C.; danger zones for Marine Corps operations— (a) Bombing and rocket firing area in Pamlico Sound in vicinity of Brant Island—(1) The area. The waters

within a circular area with a radius of 3.0 statute miles having its center on the southern side of Brant Island at latitude 35°12′30″, longitude 76°26′30″.

(2) The regulations. The area shall be closed to navigation at all times except for vessels engaged in operational and maintenance work as directed by the enforcing agency. Prior to bombing or firing operations the area will be "buzzed" by plane. Upon being so warned vessels working in the area shall leave the area immediately.

(b) Bombing, rocket firing, and strafing areas in Pamlico Sound and Neuse River—(1) The areas. (i) The waters within a circular area with a radius of 1.8 statute miles having its center at latitude 35°02′12″, longitude 76°28′00″.

(ii) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°00′30″, longitude 76°29′50″.

(iii) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°04′12″, longitude 76°28′24″.

(iv) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°01′42″, longitude 76°25′48″.

(v) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 34°58′48″, longitude 76°26′12″.

(2) The regulations. (i) The areas described in subparagraph (1) (i) and (ii) of this paragraph will be used as bombing, rocket firing, and strafing areas. Live and dummy ammunition will be used. The areas shall be closed to navigation at all times except for such vessels as may be directed by the enforcing agency to enter on assigned duties. 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 area immediately.

(ii) The areas described in subparagraph (1) (iii), (iv), and (v) of this paragraph will be used as bombing, rocket firing, and strafing areas. Practice and dummy ammunition will be used. All operations will be conducted during daylight hours, and the areas will be open to navigation at night. No vessel shall enter these areas during the hours of daylight without special permission from the enforcing agency. 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.

(c) Bombing area in Atlantic Ocean in vicinity of Bear Inlet—(1) The area. The waters within a rectangular area described as follows: Beginning at latitude 34°38′03″, longitude 77°10′06″; thence to latitude 34°32′53″, longitude 77°06′30″; thence to latitude 34°31′15″, longitude 77°09′41″; thence to latitude 34°36′33″, longitude 77°13′18″; and thence to the point of beginning. The area includes all of the entrance to Bear Inlet, and extends westward to a point approximately 1,000 yards east of Browns Inlet and seaward approximately five and one-half miles from Bear Inlet.

(2) The regulations. The area shall be closed to navigation at all times except for vessels proceeding along established waterways. Adequate safety precautions will be taken before and during each practice. Operations will be suspended, if necessary, to insure the safety of vessels proceeding along established waterways.

(d) Enforcing agency. The regulations in this section shall be enforced by the Commander, Marine Corps Air Bases, Cherry Point, North Carolina, or his authorized representatives.

§ 204.56 New River, N.C., and vicinity; Marine Corps firing ranges—(a) Atlantic Ocean east of New River Inlet. The water of the Atlantic Ocean within a sector bounded on the north by a line bearing 85° from latitude 34°35′35″, longitude 77°13′54″; on the east and south by the arc of a circle having a radius of 25,000 yards centered at latitude 34°34′15″, longitude 77°16′10″; on the west by a line bearing 205° from latitude 34°32′37″, longitude 77°18′34″; and on the northwest by the shore.

NOTE: All bearings in this section are referred to true meridian.

(b) New River. The firing ranges include all waters to the high water line within eight sectors described as follows:

(1) Traps Bay sector. Bounded on the south by a line running from Cedar Point 280° to New River Light 70, thence 254° to Hatch Point; and on the northwest by a line running from Wilkins Bluff 232° to Hall Point.

(2) Courthouse Bay sector. Bounded on the southeast by the northwest boundary of the Traps Bay sector; and on the west by Sneads Ferry Bridge.

(3) Stone Bay sector. Bounded on the east by Sneads Ferry Bridge; and on the north by a line running from a point on the east side of New River opposite the head of Sneads Creek 291°30′ to the south side of the mouth of Stone Creek.

(4) Stone Creek sector. The northwest portion of Stone Bay, bounded on the south by the north boundary of the Stone Bay sector; and on the east by longitude 77°26′.

(5) Grey Point sector. Bounded on the south by the north boundary of the Stone Bay sector; on the west by the east boundary of the Stone Creek sector; and on the northeast by a line running from Town Point 113° to the south side of the mouth of French Creek.

(6) Farnell Bay sector. Bounded on the south by the northeast boundary of the Grey Point sector, including French Creek up to longitude 77°20′; and on the north by a line running from Hadnot Point 285°30′ to Holmes Point.

(7) Morgan Bay sector. Bounded on the south by the north boundary of the Farnell Bay sector, including Wallace Creek up to longitude 77°22′; and on the northwest by a line running from Paradise Point 243°30′; to Ragged Point.

(8) Jacksonville sector. Bounded on the southeast by the northwest boundary of the Morgan Bay sector, including Southwest Creek up to the point where it narrows to 200 feet in width, and Northeast Creek up to longitude 77°23′30″; and on the north by an east-west line passing through New River Daybeacon 41.

(c) The regulations. (1) Sailing vessels and any watercraft having a speed of less than five knots shall keep clear of any closed sector at all times after notice of firing therein has been given. Vessels propelled by mechanical power at a speed greater than five knots may enter the sectors without restriction except when the firing signals are being displayed. When these signals are displayed, vessels shall clear the closed sectors immediately and no vessel shall enter such sectors until the signals indicate that firing has ceased.

(2) Firing will take place both day and night at irregular periods throughout the year. Insofar as training requirements will permit, underwater explosions will be restricted in the Atlantic Ocean sector (described in paragraph (a) of this section) during the periods May 1 to June 5, inclusive, and November 22 to December 15, inclusive.

(3) Two days in advance of the day when firing in any sector except the Stone Creek sector is scheduled to begin, the enforcing agency will warn the public of the contemplated firing, stating the sector or sectors to be closed, through the public press and the United States Coast Guard and, in the case of the Atlantic Ocean sector, the Cape Fear Pilots Association at Southport, and the Pilots Association at Morehead City, North Carolina. The Stone Creek sector may be closed without advance notice.

(4) Towers at least 50 feet in height will be erected near the shore at the northeast and southwest limits of the Atlantic Ocean sector, and the towers at least 25 feet in height will be erected near the easterly shore at the upper and lower limits of each New River sector. On days when firing is to take place a red flag will be displayed on each of the towers marking the sector or sectors to be closed. These flags will be displayed by 8:00 a.m., and will be removed when firing ceases for the day. Suitable range markers will be erected indicating the bearings of the north and west limits of the Atlantic Ocean sector.

(5) During night firing red lights will be displayed on the towers, and in the case of the Atlantic Ocean sector searchlights will be employed as barrier lights to enable safety observers to detect vessels which may attempt to enter the danger zone.

(6) The regulations in this section shall be enforced by the Commanding General, Marine Barracks, Camp Lejeune, North Carolina, and such agencies as he may designate.

§ 204.80 Archers Creek and Ribbon Creek, S.C.; United States Marine Corps Recruit Depot Rifle Range, Parris Island. (a) During periods when the rifle range on Parris Island is in use Archers Creek between Broad River and Beaufort River and Ribbon Creek from Broad River entrance will be restricted to navigation.

(b) Firing over this range will take place between the hours of 6 a.m. and 5 p.m. from Monday through Friday of each week and from 6 a.m. to 12 m. on Saturdays, legal holidays excepted.

(c) Vessels and other watercraft shall not enter the restricted waters when firing is in progress. At all other times these waters are open to navigation. Warning signs indicating the periods when the range is in use will be posted at the entrances to Archers Creek and Ribbon Creek.

(d) The regulations in this section will be enforced by the Commanding General, Marine Corps Recruit Depot, Parris Island, South Carolina, and such agencies as he may designate.

§ 204.81 Atlantic Ocean off Georgia Coast; air-to-air and air-to-water gunnery and bombing ranges for fighter and bombardment aircraft, United States Air Force—(a) The danger zones—(1) For fighter aircraft. An area approximately 30 miles off shore between Wassaw Sound and Brunswick, Georgia, described as follows: Beginning at latitude 31°55′30″, longitude 80°24′00″; thence 90° true to longitude 80°16′00″; thence southwesterly to latitude 31°10′00″, longitude 80°43′00″; thence 270° to longitude 80°51′00″; and then northeasterly to the point of beginning.

(2) For bombardment aircraft. An area approximately 70 miles off shore between Savannah Beach and Brunswick, Georgia, described as follows: Beginning at latitude 32°00′00″, longitude 79°43′00″; thence 90° true to longitude 79°07′00″; thence southwesterly to latitude 31° 10′00″, longitude 79°24′00″; thence 270° true to longitude 80°00′00″; and thence northeasterly to the point of beginning.

(b) The regulations. (1) The danger zones shall be open to navigation except when aerial gunnery or bombing practice is being conducted.

(2) Prior to conducting each practice the entire area will be patrolled by aircraft to warn any watercraft found in the vicinity that such practice is about to take place. The warnings will be by "buzzing," i.e., by flying low over the watercraft. Any watercraft shall, upon being so warned, immediately leave the area designated and shall remain outside the area until practice has ceased.

(3) The regulations in this section shall be enforced by the Commanding Officer, 2d Bombardment Wing, Hunter Air Force Base, Savannah, Georgia, and such agencies as he may designate.

§ 204.81a Lake George, Fla.; naval bombing area—(a) The danger zone. An area in the eastern part of Lake George described as follows: Beginning at latitude 29°13′ 16″, longitude 81°34′28″; thence along a line parallel to the navigation channel to latitude 29°20′05″, longitude 81°36′15″; thence along a line about three-fifths mile southerly from the Putnam-Volusia County line to latitude 29°20′19″, longitude 81°35′12″; thence to latitude 29°18′ 36″, longitude 81°33′53″; thence to latitude 29°13′22″, longitude 81°32′38″; and thence to the point of beginning. The area will be marked by appropriate warnings signs at the five corners and at the midpoint of the longer side.

(b) The regulations. (1) Bombing operations will be confined, as nearly as practicable, to the north-south center

line of the danger zone, keeping well clear of the navigation channel.

(2) Prior to each bombing operation the danger zone will be patrolled by naval aircraft which will warn vessels to leave the area by "zooming" a safe distance to the side and at least 500 feet above the surface. Upon being so warned such vessels shall leave the danger zone immediately, and no vessel shall enter the danger zone until bombing operations have ceased.

(3) At intervals of not more than three months, public notices will be issued that bombing operations are continuing. Such notices will appear in the local newspaper and in "Notice to Mariners".

(4) The regulations in this section shall not deny passage through Lake George by regular cargo-carrying vessels proceeding along established lanes for such vessels. When any such vessel is within the danger zone the officer in charge of the bombing operations will cause the cessation or postponement of such operations until the vessel has cleared the area. The vessel shall proceed on its normal course and shall not delay its progress.

(5) The regulations in this section shall be enforced by the Commander, Naval Air Bases, Sixth Naval District, Naval Air Station, Jacksonville, Florida, and such agencies as he may designate.

§ 204.81b Mosquito Lagoon, Fla., and adjacent waters in Atlantic Ocean; naval bombing and strafing areas—(a) The danger zones—(1) North area. The water of Mosquito Lagoon and the Atlantic Ocean within a circular area with a radius of one nautical mile having its center at latitude 28°50′23″, longitude 80°46′22″, about four miles southeasterly from Oakhill, Florida.

(2) South area. The waters of Mosquito Lagoon and the Atlantic Ocean within a circular area with a radius of one nautical mile having its center at latitude 28°48′25″, longitude 80°44′50″, about two and one-fourth miles southeasterly from the center of the north area.

(b) The regulations. (1) Bombing and gunnery practice will take place in the danger zones at frequent and irregular intervals throughout the year. At intervals of not more than three months, public notices will be issued that such practice is continuing. Such notices will appear in the local newspapers and in "Notice to Mariners".

(2) The danger zones are open to navigation except when bombing or gunnery practice is being conducted. At such times no vessel shall enter or remain within the limits of the danger zone being used.

(3) Prior to each practice the danger zone to be used will be patrolled by naval aircraft which will warn vessels to leave the area by "zooming" a safe distance to the side. Upon being so warned such vessels shall leave the danger zone immediately, and no vessel shall enter the danger zone until practice has ceased.

(4) The regulations in this section shall be enforced by the Commander, Naval Air Bases, Sixth Naval District, Naval Air Station, Jacksonville, Florida, and such agencies as he may designate.

§ 204.82 Banana River, Fla., northerly end; Navy prohibited area for aerial mining exercises—(a) The danger zone. The waters of Banana River at its northerly end within a rectangular area about three nautical miles long (north-south) and one and one-fourth nautical miles wide (east-west), bounded on the north by latitude 28°34′30″, on the east by longitude 80°35′00″, on the south by latitude 28°31′30″, and on the west by longitude 80°36′30″.

(b) The regulations. (1) No vessel or other watercraft shall enter or remain in the danger zone at any time. Fishing in the area is prohibited.

(2) The regulations in this section shall be enforced by the Commander, Fleet Air Jacksonville, Naval Air Station, Jacksonville, Florida, and such agencies as he may designate.

§ 204.82a Atlantic Ocean off Cape Canaveral, Fla.; Air Force Missile Testing Area, Patrick Air Force Base, Fla.—(a) The danger zone. An area in the Atlantic Ocean immediately offshore from Cape Canaveral defined by a line 3 nautical miles from shore, said area terminating in the north at a line on a bearing of 70° from a point on shore at approximate latitude 28°35′ north and in the south at a line on a bearing of 115° from a point on the shore at approximate latitude 28°25′ north.

(b) The regulations. (1) All unauthorized vessels of every kind are prohibited from operating within the danger zone during firing periods to be specified by the Commander, Air Force Missile Test Center, Patrick Air Force Base.

(2) When it is deemed necessary, warning signals will be used to clear that portion of the said area which is to be cleared for countdown activities. These signals will be in the form of a large red ball which will be displayed by day and a cluster of flashing red lights by night on a tower at a point approximately one-half mile south of the point on the high-water shoreline where the northerly limit of the said area meets the shoreline, and on a tower at the high-water shoreline at the southerly part of said area where the southerly limit meets the shoreline, as described in paragraph (a) of this section. In addition, boats will be used to patrol the zone during prohibited hours and will give oral warning by loud speaker.

(3) When the above described signals are displayed, all vessels in the zone shall leave the zone immediately by the shortest route, and shall remain outside the zone until allowed to return by the patrol boats and/or until the signals have been discontinued.

(4) The regulations in this paragraph shall be enforced by the Commander, Air Force Missile Test Center, Patrick Air Force Base, Fla., and such agencies as he may designate.

§ 204.84 Florida Bay northeast of Pine Islands, Fla., live firing area for strafing—(a) The danger zone. (1) Bounded on the north by latitude 24°51′08″; on the east by longitude 81°13′52″; on the south by latitude 24°48′52″; and on the west by longitude 81°16′21″

(2) The hull of an ex-naval vessel (PE–19) is located in the center of the area and is used by United States Fleet Aircraft for live strafing.

(b) The regulations. (1) The area is closed to all vessels at all times.

(2) This section shall be enforced by the Captain of the Port, Key West, Florida.

PART 207—NAVIGATION REGULATIONS:

§ 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.

§ 207.158 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.

§ 207.160 All waterways tributary to the Atlantic Ocean south of Chesapeake Bay and all waterways tributary to the Gulf of Mexico east and south of St. Marks, Fla: use, administration, and navigation—(a) Description. This section applies to the following:

(1) Waterways. All navigable waters of the United States, natural or artificial, including bays, lakes, sounds, rivers, creeks, intracoastal waterways, as well as canals and channels of all types, which are tributary to or connected by other waterways with the Atlantic Ocean south of Chesapeake Bay or with the Gulf of Mexico east and south of St. Marks, Fla.

(2) Locks. All Government owned or operated locks and hurricane gate chambers and appurtenant structures in any of the waterways described in subparagraph (1) of this paragraph.

(3) United States property. All river and harbor lands owned by the United States in or along the waterways described in subparagraph (1) of this paragraph, including lock sites and all structures thereon, other sites for Government structures and for the accommodation and use of employees of the United States, and rights of way and spoil disposal areas to the extent of Federal interest therein.

(4) Vessels and rafts. The term "vessel" as used in this section includes all floating things moved over these waterways other than rafts.

(b) Authority of District Engineers. The use, administration, and navigation of these waterways, Federal locks and hurricane gate chambers shall be under the direction of the officers of the Corps of Engineers, United States Army, detailed in charge of the respective sections, and their authorized assistants. The cities in which the United States District Engineers are located are as follows:

United States District Engineer, Norfolk, Va.
United States District Engineer, Wilmington, N.C.
United States District Engineer, Charleston, S.C.
United States District Engineer, Savannah, Ga.
United States District Engineer, Jacksonville, Fla.

(c) Commercial statistics. (1) As required by section 11 of the River and Harbor Act of September 22, 1922 (42 Stat. 1043; 33 U.S.C. 555), owners, agents, masters and clerks of vessels plying upon the waterways described in paragraph (a)(1) of this section shall submit a report on such activities for statistical purposes which must contain the following information:

(i) Name of vessel.

(ii) Name and address of owner or operator.

(iii) Type of vessel—steam, motor, sail, barge, or other type.

(iv) Net registered tonnage—if not registered, approximate net tonnage.

(v) Maximum draft at time of passage.

(vi) Number of passengers.

(vii) Cargo—by commodities, expressed in short tons, or other units by which such commodities are customarily measured, giving origin and destination.

(2) All persons rafting and towing logs shall submit a report of their activities containing such information as may be called for by the District Engineer concerned.

(3) The report should be presented to the lockmaster of the federally operated locks for each trip made. Where no federally operated lock is passed, they shall be mailed promptly to the District Engineer. On written request, persons or corporations making frequent use of these waterways may be granted permission to submit monthly statements in lieu of reports by trips. Reports may be submitted on forms furnished free of charge by the District Engineer.

(d) Bridges—(1) General. As required by law, and general regulations to govern the operation of drawbridges crossing all navigable waterways of the United States discharging their waters into the Atlantic Ocean south of and including Chesapeake Bay and the Gulf of Mexico, excepting the Mississippi River and its tributaries, prescribed by the Secretary of War, all corporations or persons owning, operating and tending drawbridges 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 and other water craft. The owner shall keep the operating machinery of the draw in serviceable condition, and shall have the draw opened and closed at intervals frequent enough to make certain that the machinery is kept in proper condition for satisfactory operation. Bridges and fender systems shall be constructed and maintained so as to afford at all times reasonably free, easy and unobstructed navigation of the draw opening or the drawspan. Any accident or damage to the bridge, the fenders or the operating mechanism, shall be promptly reported to the District Engineer, giving the cause and the probable period required for repairs. All bridges will be lighted in accordance with the rules and regulations of the United States Coast Guard. (See Part 68 of this title.)

(2) Signals for drawbridges. The signals for vessels desiring to pass bridges shall be those prescribed in the general regulations referred to in subparagraph (1) of this paragraph.

(3) Passage through drawbridges. Trains, wagons, and other vehicles shall not be stopped on a drawbridge for the purpose of delaying its opening, nor shall water craft or vessels 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 unnecessary delay to either land or water traffic.

(e) Locks—(1) Authority. The locking of all vessels and rafts and their movements while in a lock, or in the approaches thereto, shall be under the direction of the lockmaster. The term "lockmaster," as used in this section, shall mean the lock official present who is in charge of the operation of the lock.

(2) Signals. Vessels desiring lockage in either direction shall give notice to the lockmaster at not more than three-quarters of a mile nor less than one-quarter of a mile from the lock, by two long and two short blasts of a whistle. When the lock is available, a green light, semaphore or flag will be displayed; when not available, a red light, semaphore or flag will be displayed. No vessels or rafts shall approach within 300 feet of any lock entrance unless signalled to do so by the lockmaster.

(3) Precedence at locks. Ordinarily, vessels or rafts arriving at the lock shall take precedence in order of their arrival, but in all cases, vessels belonging to the United States or employed on public work shall have precedence over all others; passenger vessels shall have precedence over freight vessels, individual vessels over tows or rafts. Small vessels will not be granted separate lockage when larger vessels are awaiting lockage, and they will be required to lock through with other vessels. When two vessels approach the lock from opposite directions at approximately the same time, preference will ordinarily be given to the one for which the lock is prepared. In all cases, the order of actual entry shall be determined by the lockmaster.

(4) Entrance to and exit from locks. No vessel or raft shall enter or leave the locks before being signalled to do so. While waiting their turns, vessels or rafts must not obstruct traffic and must remain at a safe distance from the lock. They shall take position in rear of any vessels or rafts that may precede them, and there arrange the tow for locking in sections if necessary. Masters and pilots of vessels or in charge of rafts shall cause no undue delay in entering or leaving the lock, and will be held to a strict accountability that the approaches are not at any time unnecessarily obstructed by parts of a tow awaiting lockage or already passed through. They shall provide sufficient men to move through the lock promptly without damage to the structures. Vessels or tows that fail to enter the locks with reasonable promptness after being signalled to do so will lose their turn.

(5) Lockage of vessels. (i) Vessels must enter and leave the locks carefully at slow speed, must be provided with suitable lines and fenders, must always use fenders to protect the walls and gates, and when locking at night must be provided with suitable lights and use them as directed.

(ii) Vessels which do not draw at least six inches

less than the depth on miter sills or breast walls, or which have projections or sharp corners liable to damage gates or walls, shall not enter a lock or approaches.

(iii) No vessel having chains or lines either hanging over the sides or ends, or dragging on the bottom, for steering or other purposes, will be permitted to pass a lock or dam.

(iv) Power vessels must accompany tows through the locks when so directed by the lockmaster.

(v) No vessel whose cargo projects beyond its sides will be admitted to lockage.

(vi) Vessels in a sinking condition shall not enter a lock or approaches.

(vii) The passing of coal from flats or barges to steamers while in locks is prohibited.

(viii) Where special regulations for safeguarding human life and property are desirable for special situations, the same may be indicated by printed signs, and in such cases such signs will have the same force as other regulations in this section.

(ix) The lockmaster may refuse to lock vessels which, in his judgment, fail to comply with this paragraph.

(6) Lockage of rafts. Rafts shall be locked through in sections as directed by the lockmaster. No raft will be locked that is not constructed in accordance with the requirements stated in paragraph (g) of this section. The party in charge of a raft desiring lockage shall register with the lockmaster immediately upon arriving at the lock and receive instructions for locking.

(7) Number of lockages. Tows or rafts locking in sections will generally be allowed only two consecutive lockages if one or more single vessels are waiting for lockage, but may be allowed more in special cases. If tows or rafts are waiting above and below a lock for lockage, sections will be locked both ways alternately whenever practicable. When there are two or more tows or rafts awaiting lockage in the same direction, no part of one shall pass the lock until the whole of the one preceding it shall have passed.

(8) Mooring. (i) Vessels and rafts when in the lock shall be moored where directed by the lockmaster by bow, stern and spring lines to the snubbing posts or hooks provided for that purpose, and lines shall not be let go until signal is given for vessel or raft to leave. Tying boats to the lock ladders is prohibited.

(ii) The mooring of vessels or rafts near the approaches to locks except while waiting for lockage, or at other places in the pools where such mooring interferes with general navigation of the waterway, is prohibited.

(9) Maneuvering locks. The lock gates, valves, and accessories will be moved only under the direction of the lockmaster; but if required, all vessels and rafts using the locks must furnish ample help on the lock walls for handling lines and maneuvering the various parts of the lock under the direction of the lockmaster.

(f) Waterways—(1) Fairway. A clear channel shall at all times be left open to permit free and unobstructed navigation by all types of vessels and rafts that normally use the various waterways or sections thereof. The District Engineer may specify the width of the fairway required in the various waterways under his charge.

(2) Stoppage in waterway, anchorage or mooring. (i) No vessels or rafts shall anchor or moor in any of the land cuts or other narrow parts of the waterway, except in case of an emergency. Whenever it becomes necessary for a vessel or raft to stop in any such portions of the waterway it shall be securely fastened to one bank and as close to the bank as possible. This shall be done only at such a place and under such conditions as will not obstruct or prevent the passage of other vessels or craft. Stoppages shall be only for such periods as may be necessary.

(ii) No vessel or raft will be allowed to use any portion of the fairway as a mooring place except temporarily as authorized above without the written permission from the District Engineer.

(iii) When tied up, all vessels must be moored by bow and stern lines. Rafts and tows shall be secured at sufficiently close intervals to insure their not being drawn away from the bank by winds, currents or the suction of passing vessels. Tow lines shall be shortened so that the different parts of the tow shall be as close together as possible. In narrow sections, no vessel or raft shall be tied abreast of another.

(iv) Lights shall be displayed in accordance with provisions of the Federal Pilot Rules.

(v) No vessel, even if fastened to the bank as prescribed in subdivision (i) of this subparagraph, shall be left without a sufficient crew to care for it properly.

(vi) Vessels will not be permitted to load or unload in any of the land cuts except at a regular established landing or wharf without written permission secured in advance from the District Engineer.

(vii) No vessel, regardless of size, shall anchor in a dredged channel or narrow portion of a waterway for the purpose of fishing, if navigation is obstructed thereby.

(viii) Except in cases of emergency, the dropping of anchors, weights, or other ground tackle, within areas occupied by submarine cable or pipe crossings, is prohibited. Such crossings will ordinarily be marked by signboards on each bank of the shore or indicated on coast charts.

(3) Speed. (i) Vessels shall proceed at a speed which will not endanger other vessels or structures and will not interfere with any work in progress incident to maintaining, improving, surveying or marking the channel.

(ii) Official signs indicating limiting speeds through critical portions of the waterways shall be strictly obeyed.

(iii) Vessels approaching and passing through a bridge shall so govern their speed as to insure passage through the bridge without damage to the bridge or its fenders.

(iv) A vessel being overtaken by another shall slacken speed sufficiently to permit the passage to be effected with safety to both vessels.

(4) Assembly and handling of tows. All vessels drawing tows not equipped with rudders shall use two tow lines or a bridle and shorten them to the greatest possible extent so as to have full control at all times. The various

parts of a tow shall be securely assembled with the individual units connected by lines as short as practicable. If necessary, as in the case of lengthy or cumbersome tows or tows in restricted channels, the District Engineer may require that tows be broken up and may require the installation of a rudder, drag or other approved steering device on the tow in order to avoid obstructing navigation or damaging the property of others, including aids to navigation maintained by the United States or under its authorization, by collision or otherwise.

No tow shall be drawn by a vessel that has insufficient power or crew to permit ready maneuverability and safe handling.

Tows desiring to pass a bridge shall approach the opening along the axis of the channel so as to pass through without danger of striking the bridge or its fenders. No vessel or tow shall navigate through a drawbridge until the movable span is fully opened.

In the event that it is evident to the master of a towing vessel that a tow cannot be safely handled through a bridge, it will be brought to anchor and the towed vessels will be taken through the bridge in small units, or singly if necessary, or the tow will wait until navigation conditions have improved to such an extent that the tow can pass through the bridge without damage.

(5) Projections from vessels. No vessel carrying a deck load which overhangs or projects over the side of said vessel, or whose rigging projects over the side of the vessel so as to endanger passing vessels, wharves or other property, will enter or pass through any of the narrow parts of the waterway.

(6) Meeting and passing. Vessels, on meeting or overtaking, shall give the proper signals and pass in accordance with Federal Pilot Rules. Rafts shall give to vessels the side demanded by proper signals. All vessels approaching dredges, or other plant engaged on improvements to a waterway, shall give the signal for passing and slow down sufficiently to stop if so ordered or if no answering signal is received. On receiving the answering signal, they shall then proceed to pass at a speed sufficiently slow to insure safe navigation.

(g) Rafts, logging. (1) Rafts will be permitted to navigate a waterway only if properly and securely assembled. The passage of "bag" or "sack" rafts, "dog" rafts, or of loose logs over any portion of a waterway, is prohibited. Each section of a raft will be secured within itself in such a manner as to prevent the sinking of any log, and so fastened or tied with chains or wire rope that it cannot be separated or bag out so as to materially change its shape. All dogs, chains and other means used in assembling rafts shall be in good condition and of ample size and strength to accomplish their purposes.

(2) No section of a raft will be permitted to be towed over any portion of a waterway unless the logs float sufficiently high in the water to make it evident that the section will not sink en route.

(3) Frequent inspections will be made by the person in charge of each raft to insure that all fastenings remain secure, and when any one is found to have loosened, it shall be repaired at once. Should any log or section be lost from a raft, the fact must be promptly reported to the District Engineer, giving as definitely as possible the exact point at which the loss occurred. In all cases the owner of the lost log or section will take steps immediately to remove the same from the waterway.

(4) The length and width of rafts shall not exceed such maximum dimensions as may be prescribed by the District Engineer.

(5) All rafts shall carry sufficient men to enable them to be managed properly, and to keep them from being an obstruction to other craft using the waterway. To permit safe passage in a narrow channel rafts will, if necessary, stop and tie up alongside the bank. Care must be exercised both in towing and mooring rafts to avoid the possibility of damage to aids to navigation maintained by the United States or under its authorization.

(6) When rafts are left for any reason with no one in attendance, they must be securely tied at each end and at as many intermediate points as may be necessary to keep the timbers from bagging into the stream, and must be moored so as to conform to the shape of the bank. Rafts moored to the bank shall have lights at 500-foot intervals along their entire length. Rafts must not be moored at prominent projections of the bank, or at critical sections.

(7) Logs may be stored in certain tributary streams provided a clear channel at least one-half the width of the channel be left clear for navigation along the tributary. Such storage spaces must be protected by booms and, if necessary to maintain an open channel, piling should also be used. Authority for placing these booms and piling must be obtained by written permit from the District Engineer.

(8) The building, assembling, or breaking up of a raft in a waterway will be permitted only upon special authority obtained from the District Engineer, and under such conditions as he may prescribe.

(h) Dumping of refuse or oil in waterway, obstructions. Attention is invited to the provisions of sections 13 and 20 of the River and Harbor Act of March 3, 1899 (30 Stat. 1152, 1154; 33 U.S.C. 407, 415), and of sections 2, 3, and 4 of the Oil Pollution Act of June 7, 1924 (43 Stat. 604, 605; 33 U.S.C. 432–434), which prohibit the depositing of any refuse matter in these waterways or along their banks where liable to be washed into the waters; authorize the immediate removal or destruction of any sunken vessel, craft, raft, or other similar obstruction, which stops or endangers navigation; and prohibit the discharge of oil from vessels into the coastal navigable waters of the United States.

(i) Damage. Masters and owners of vessels using the waterways are responsible for any damage caused by their operations to canal revetments, lock piers and walls, bridges, hurricane gate chambers, spillways, or approaches thereto, or other Government structures, and for displacing or damaging of buoys, stakes, spars, range lights or other aids to navigation. Should any part of a revetment, lock, bridge, hurricane gate chamber, spillway or approach thereto, be damaged, they shall report the fact, and furnish a clear statement of how the dam-

age occurred, to the nearest Government lockmaster or bridge tender, and by mail to the District Engineer, United States Engineer Office, in local charge of the waterway in which the damage occurred. Should any aid to navigation be damaged, they shall report that fact immediately to the Superintendent of Lighthouses at Norfolk, Va., if north of New River Inlet, N.C.; to the Superintendent of Lighthouses at Charleston, S.C., if between New River Inlet, N.C., and St. Lucie Inlet, Fla.; to the Superintendent of Lighthouses at Key West, Fla., if between St. Lucie Inlet and Suwanee River, Fla.; and to the Superintendent of Lighthouses, New Orleans, La., if between Suwanee River and St. Marks, Fla.

(j) Trespass on property of the United States. Trespass on waterway property or injury to the banks, locks, bridges, piers, fences, trees, houses, shops or any other property of the United States pertaining to the waterway, is strictly prohibited. No business, trading or landing of freight or baggage will be allowed on or over Government piers, bridges, or lock walls.

(k) Copies of regulations. Copies of the regulations in this section will be furnished free of charge upon application to the nearest District Engineer.

(l) Effective date. This section shall take effect and be in force on and after June 15, 1938.

§ 207.162 Pasquotank River, N.C.; seaplane restricted area—(a) The restricted area. That part of the Pasquotank River bounded on the east by a line from Pasquotank River Obstruction Light B (approximately latitude 36°16′18″, longitude 76°07′16″) to Pasquotank River Light 5 (approximately latitude 36°15′14.5″, longitude 76°07′44.5″); on the west by a line bearing due north from Pasquotank River Light 7 (approximately latitude 36°17′19″, longitude 76°11′20.5″); and on the north and south by the lines of seven-foot depth.

(b) The regulations. (1) Vessels without proper lights shall not operate within the area.

(2) Vessels shall not anchor or moor within the area.

(3) Fishing, oystering, clamming, crabbing, and similar activities are prohibited within the area.

(4) All vessels traversing the area shall navigate as near the northeast shore of the river as practicable, and shall remain in the area a minimum length of time.

(5) The regulations in this section shall be enforced by the Commanding Officer, Coast Guard Air Station, Elizabeth City, North Carolina, and such agencies as he may designate.

§ 207.164 Neuse River and tributaries at Marine Corps Air Station, Cherry Point, N.C.; restricted area—(a) The area. That portion of Neuse River within 500 feet of the shore along the reservation of the Marine Corps Air Station, Cherry Point, North Carolina, extending from the mouth of Hancock Creek to a point approximately 6,800 feet west of the mouth of Slocum Creek, and all waters of Hancock and Slocum Creeks and their tributaries within the boundaries of the reservation.

(b) The regulations. (1) Except in cases of extreme emergency, all vessels other than those operated by the United States Navy or Coast Guard are prohibited from entering this area without prior permission of the enforcing agency.

(2) The regulations in this section shall be enforced by the Commanding General, United States Marine Corps Air Station, Cherry Point, North Carolina, and such agencies as he may designate.

§ 207.164a Cape Fear River and tributaries at Sunny Point Army Terminal, Brunswick County, North Carolina; restricted area. (a) The area: That portion of Cape Fear River due west of the main ship channel extending from U.S. Coast Guard buoy No. 31A at the north approach channel to Sunny Point Army Terminal to U.S. Coast Guard buoy No. 23A at the south approach channel to Sunny Point Army Terminal and all waters of its tributaries therein.

(b) Except in cases of extreme emergency, vessels of any size or rafts other than those authorized by the Commander, Sunny Point Army Terminal, are prohibited from entering this area without prior permission of the enforcing agency.

(c) The regulations in this section shall be enforced by the Commander, Sunny Point Army Terminal, Southport, North Carolina, and such agencies as he may designate.

§ 207.165 St. Johns River, Fla., Ribault Bay; prohibited area—(a) The area. All waters constituting the Turning Basin within the Naval Air Base Reservation, Mayport, Florida, and inclosed by a line bearing approximately 180° true from Ribault Channel Light 4 to the shore at a point connecting with the Naval Base boundary line fence.

(b) The regulations. (1) All vessels and craft except those operated by the United States Navy or Coast Guard are prohibited from entering this area except in cases of extreme emergency.

(2) This section shall be enforced by the Commander, United States Naval Air Station, Jacksonville, Florida, and such agencies as he may designate.

§ 207.166 St. Johns River, Fla.; naval restricted area, United States Naval Station, Green Cove Springs, Fla.—(a) The area. The waters of the St. Johns River within the following described area: Beginning on the shore at latitude 29°59′20″, longitude 81°40′00″; thence to latitude 29°59′40″, longitude 81°39′49.5″; thence to latitude 29°59′42″, longtitude 81°39′39″; thence to latitude 29°59′11″, longitude 81°38′39″; thence to latitude 29°58′56″, longitude 81°38′41″; thence along a line 50 feet south of and parallel to pier "A" to the shore; thence with the shore and bulkhead line to the point of beginning.

(b) The regulations. (1) No vessel or other craft except vessels operated by the Navy shall enter the restricted area or within 300 feet of piers Nos. 1 through 12 and ships moored in the area, or within 50 feet of pier "A", unless specific permission to enter has been granted the vessel or craft by the enforcing agency.

(2) Fishing is prohibited in the area.

(3) This section shall be enforced by the Commanding Officer, U. S. Naval Station, Green Cove Springs, Florida, and such agencies as he may designate.

§ 207.170 Federal Dam, Oklawaha River, Moss Bluff, Fla.; pool level. (a) The level of the pool shall normally be maintained at elevation 56.5 feet above sea level: Provided, That the level of the pool may be raised to not exceeding 58.5 feet above sea level at such times as may be authorized in writing by the district engineer, Jacksonville, Fla., and subject to such conditions as he may specify.

(b) When, in the opinion of the district engineer, an emergency exists requiring the lowering of the pool level to an elevation less than 56.5 feet above sea level, either to safeguard the dikes or to increase the discharge from Lake Griffin in times of high water, the discharge past the dam shall be regulated in such manner as he may direct until he shall declare the emergency passed.

§ 207.170a Eugene J. Burrell Navigation Lock in Haines Creek near Lisbon, Florida; use, administration and navigation. (a) The owner of or agency controlling the lock shall not be required to operate the navigation lock except from 7 a.m. to 12 noon, and from 1 p.m. to 7 p.m., during the period of February 15 through October 15 each year; and from 8 a.m. to 12 noon, and from 1 p.m. to 6 p.m., during the remaining months of each year. During the above hours and periods the lock shall be opened upon demand for the passage of vessels.

(b) The owner of the lock shall place signs, of such size and description as may be designated by the District Engineer, U.S. Army Engineer District, Jacksonville, Florida, at each side of this lock indicating the nature of the regulations of this section.

§ 207.170b Apopka-Beauclair Navigation Lock in Apopka-Beauclair Canal in Lake County, Florida; use, administration and navigation. (a) The owner of or agency controlling the lock shall not be required to operate the navigation lock except from 7:00 a.m. to 12:00 noon, and from 1:00 p.m. to 7:00 p.m., during the period of February 15 through October 15 each year; and from 8:00 a.m. to 12 noon, and from 1:00 p.m. to 6:00 p.m., during the remaining months of each year. During the above hours and periods the lock shall be opened upon demand for the passage of vessels.

(b) The owner of the lock shall place signs, of such size and descriptions as may be designated by the District Engineer, U.S. Army Engineer District, Jacksonville, Florida, at each side of this lock indicating the nature of the regulations.

§ 207.171 Banana River, Fla.; naval restricted area.—(a) The area. The waters within 300 yards of the easterly shoreline of Banana River adjacent to the Banana River Naval Air Station, between the northerly property line thereof which lies along the northerly boundary of Government lot 4, section 35, township 25 South, range 37 East, approximate latitude 28°15′52″, and the southerly property line which lies along the southerly boundary of Government lot 3, sections 10, and 11, township 26 South, range 37 East, a distance of approximately 2.1 miles. The area will be marked by appropriate buoys.

(b) The regulations.—(1) This area shall be closed to all classes of navigation, except vessels of the United States Government.

(2) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Air Station, Banana River, Fla., and such agencies as he may designate.

§ 207.171a Banana River at Patrick Air Force Base, Fla.; seaplane restricted area. (a) The area. Beginning at a point approximately 4 miles south of Casino at Cocoa Beach, Florida, latitude 28°15′38″, longitude 80°36′40″; thence northwesterly a distance of 2,050 yards to a point latitude 28°16′12″, longitude 80°37′38″; thence northeasterly a distance of 990 yards to a point latitude 28°16′41″, longitude 80°37′33″; thence westerly a distance of 1,900 yards to a point latitude 28°16′41″, longitude 80°38′38″; thence south a distance of 3,975 yards to a point latitude 28°14′43″, longitude 80°38′38″; thence easterly a distance of 1,450 yards to a point latitude 28°14′43″, longitude 80°37′49″; thence northeasterly a distance of 2,400 yards to a point latitude 28°15′53″, longitude 80°37′40″; thence southeasterly a distance of 1,900 yards to a point latitude 28°15′21″, longitude 80°36′49″; thence northeasterly a distance of 600 yards along the westerly edge of a prohibited area to the point of beginning.

(b) The regulations. (1) Watercraft may navigate, anchor, or moor within the operating area when area is not in use by seaplanes.

(2) The area may be utilized by seaplanes at any hour between 8:00 a.m. and 4:00 p.m. during Monday through Friday. Training will be limited to two hours during any one training period.

(3) The enforcing agency will send a patrol boat to warn watercraft in or near the area of impending operations. The patrol boat will utilize a power amplifier to orally request all watercraft to vacate the area.

(4) Watercraft shall promptly clear the area when seaplanes are observed approaching the area, or when requested to do so, and shall remain clear of the area while seaplanes are operating therein.

(5) The regulations shall be enforced by the Commander, Air Force Missile Test Center, Patrick Air Force Base, Florida, and such agencies as he may designate.

§ 207.171b Atlantic Ocean near Port Everglades, Fla., Naval restricted area—(a) The area. An area defined by lines along latitude 26°05′33.5″ and 26°03′00″ N, a line along longitude 80°03′30″ W, and the beach south of Port Everglades Entrance Channel.

(b) The regulations. (1) Anchoring of ocean-going vessels or any vessel with draft in excess of 12 feet shall be prohibited in the area.

(2) The regulations of this section shall be enforced by

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the Officer-in-Charge, U.S. Naval Ordnance Laboratory Testing Facility, Fort Lauderdale, Fla., and such agencies as he may designate.

§ 207.172 Biscayne Bay, Fla.; seaplane restricted and operating areas, Coast Guard Air Station, Miami, Fla.—(a) The seaplane restricted area—(1) The area. The waters of Biscayne Bay in the vicinity of Dinner Key Channel within an irregular area described as follows: Beginning at the intersection of the easterly extension of the line of the north wall of the Coast Guard hangar and the sheet steel bulkhead; thence 13°33′, along the bulkhead, 160 feet; thence 51°00′, 128 feet; thence 141°00′, 390 feet; thence 74°02′, 257 feet; thence 136°53′, 186 feet; thence 74° 02′, 945 feet; thence 151° 49′, 1,041 feet; thence 214°07′, 250 feet; thence 124°08′, 2,680 feet; thence 214°07′, 600 feet; thence 304°08′, 2,680 feet; thence 214°07′, 290 feet; thence 304°08′, 1,615 feet, to the sheet steel bulkhead, thence 341°48′, along the bulkhead, 701 feet; and thence 13°33′, along the bulkhead, 166 feet, to the point of beginning.

NOTE: All bearings are referred to true meridian.

(2) The regulations. (i) Watercraft shall not anchor or moor within the restricted area. Fishing in the area is prohibited.

(ii) Watercraft shall use the area to the minimum extent practicable, and only for the purpose of passing through as expeditiously as possible. No watercraft shall use the channel from one-half hour after sundown to one-half hour before sunrise except in the case of an emergency involving danger to life or property.

(iii) Watercraft in the area shall give seaplanes the right-of-way at all times. All watercraft shall promptly clear the area when seaplanes are observed approaching the area or when warned by the siren of a crash boat, and shall remain clear of the area while seaplanes are operating in the area.

(iv) The enforcing agency will send out a crash boat or boats to warn watercraft in or near the area of impending operations within the area. Each crash boat will sound a siren to attract the attention of watercraft, and the crew will display a sign reading "Plane Approaching: Clear Channel at Once".

(v) The enforcing agency will post at each end of the area a large sign reading "Danger! Coast Guard Planes Have Right-of-Way in This Channel. Use Channels to South if Practicable. Clear Channel Promptly When Planes Are Observed Approaching Or When Warned By Siren of Crash Boat."

(b) The seaplane operating area—(1) The area. Beginning at Dinner Key Seaplane Channel Lighted Buoy 2A marking the entrance to the seaplane restricted area, thence 105° for approximately 4,350 feet to Dinner Key Seaplane Channel Approach Light 2; thence 54° for approximately 9,900 feet to Miami South Channel Entrance Range Front Light; thence 178° for approximately 4,350 feet to Miami South Channel Entrance Range Rear Light; thence 182° for approximately 12,750 feet to Southwest Point Daybeacon 26; thence 270° for approximately 13,500 feet to a position in Biscayne Bay at latitude 25°41′24″, longitude 80°13′30″; thence 30° for approximately 9,900 feet to Dinner Key Channel Daybeacon 2; thence 313° for approximately 4,920 feet to Dinner Key Seaplane Channel Lighted Buoy 1 marking the southernmost portion of the entrance to the seaplane restricted area; thence 34° for approximately 600 feet to the point of beginning.

NOTE: All bearings are referred to true meridian.

(2) The regulations. (i) Watercraft may navigate, anchor, or moor within the operating area. Fishing will be permitted. (ii) Watercraft utilizing the area during hours from sunset to sunrise, or during periods of low visibility, shall comply strictly with existing regulations of the Rules of the Road applicable to Inland Waters and Motorboat regulations pertaining to required lighting while underway or at anchor.

(iii) Watercraft within the operating area must recognize the fact that the maneuverability of aircraft on the surface is relatively limited as compared to that of vessels or vehicles specifically designed for surface operations. Therefore, it is essential that occupants of all watercraft shall, when in the seaplane operating area, exercise due vigilance and be alert for the presence of aircraft either taxiing on the surface, or approaching for landings and takeoffs within the area.

(iv) Seaplane landings and takeoffs will be covered by the presence of a station crash boat whenever possible. Under unusual and infrequent circumstances seaplanes may be limited to a particular heading or portion of the operating area, and watercraft in that vicinity may be requested by the crash boat to yield right-of-way to the aircraft for the particular maneuver involved. Under such unsual conditions watercraft shall comply with the request made by the crash boat for the mutual safety of boats and aircraft.

(c) Notices. Notices covering the regulations in this section will be posted at the nearby marina and wharves and at boat basins in Miami and adjoining towns.

(d) Enforcement. The regulations in this section shall be enforced by the Commanding Officer, United States Coast Guard Air Station, Miami, Florida, and such agencies as he may designate.

§ 207.173 Key West Harbor, Fla.; dummy mine field, U.S. Naval Station, Key West, Florida—(a) The area. The waters of Key West Harbor within a 500-yard square and marked by unlighted can buoys, the coordinates of which are as follows: Buoy No. 1, latitude 24°32′17″, longitude 81°48′07″; Buoy No. 2, latitude 24°32′32″, longitude 81°48′07″; Buoy No. 3, latitude 24°32′32″, longitude 81°47′50″; Buoy No. 4, latitude 24°32′17″, longitude 81°47′50″. The northerly limits of the area are about 450 yards south of Key West Island.

(b) The regulations. (1) All craft shall proceed with caution when underway in the area taking particular care to stand well clear of all navigational aids.

(2) All craft underway in this area shall stay well clear of naval craft (LCPR) displaying the Seven flag and be particularly alert to detect and obey all signals from such vessels. The display of the Seven flag is an indication that divers are operating.

(3) Anchoring, grapneling, and fishing, including the use of lobster pots, are prohibited in the area.

(c) The regulations shall be enforced by the Commanding Officer, U.S. Naval School Underwater Swimmers, U.S. Naval Station, Key West, Florida, and such agencies as he may designate.

§ 207.174 Gulf of Mexico, seaplane restricted area, Naval Air Station, Key West, Fla.—(a) The area. An irregular area north of Key West Island, east of Fleming Key, and north and west of Dredgers Key, bounded as follows: Beginning at latitude 24°34′01″, longitude 81° 47′36″; thence due north to latitude 24°35′30″; thence to latitude 24°35′55″, longitude 81°47′50″; thence to latitude 24°35′59″, longitude 81°47′41″; thence due east to longitude 81°47′24″; thence to latitude 24°35′52″, longitude 81°46′33″; thence to latitude 24°35′40″, longitude 81°46′16″; thence to latitude 24°35′26″, longitude 81° 46′33″; thence due south to latitude 24°35′16″; thence due east to longitude 81°46′00″; thence due south to latitude 24°35′09″; thence due west to longitude 81°46′29″: thence to latitude 24°34′27″, longitude 81°47′14″; thence to latitude 24°33′58″, longitude 81°47′21″; and thence to the point of beginning. The area is defined by boundary markers on approximately 500-foot centers extending around and about 300 feet outside the perimeter. The boundary markers have a square pyramidal top with a four-foot base and a light with green-colored lenses mounted on 12-inch piling with a top elevation of about nine feet. The ends of the north-south, northeast-southwest, east-west, and northwest-southeast takeoffs are clearly identified by runway markers with amber-colored lenses located on 100-foot centers. A navigation channel 300 feet wide around the entire perimeter of the area, contiguous to and inside the line of boundary markers, is provided for the passage of surface craft.

(b) The regulations. (1) No vessels shall cross or enter the seaplane restricted area.

(2) Vessels using the perimeter channel along the east side of Fleming Key and along the north side of the Naval Air Station shall travel at a slow speed.

(3) Vessels using the perimeter channel shall lie to as close to the boundary markers as possible during landings or takeoffs of aircraft in the restricted area.

(4) Vessels using the perimeter channel past the seaplane ramp shall give wide berth to seaplane equipment located adjacent to the ramp, and shall lie to if in the vicinity of the ramp when beaching or launching operations are in progress.

(5) No object that might endanger seaplane operations shall be cut adrift or thrown overboard.

(6) This section shall be enforced by the Commanding Officer, United States Naval Air Station, Key West, Florida, and such agencies as he may designate.

§ 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. ATLANTIC COAST, CAPE HENRY TO KEY WEST

The Atlantic Coast of the United States from Cape Henry to Cape Florida is low and sandy, backed by woods. Southward of Cape Henry the highest land near the coast is Mount Cornelia, 63 feet high, just northward of the entrance to St. Johns River. From Cape Florida to Key West the coast is formed by a long chain of small islands known as Florida Keys. The Florida Reefs extend seaward of the keys and are nearly parallel to them.

The coastline of Virginia from Cape Henry southward to the boundary of North Carolina is firm land for 13 miles; then it becomes a barrier beach, covered with sand dunes for 11 miles. The boundary between Virginia and North Carolina is the only marked boundary on this section of the coast. The easternmost boundary monument is a granite shaft 6 feet high about 0.5 mile west of the beach.

The coastline of North Carolina is a long barrier beach. The islands are known as **banks.** The banks are constantly shifting sand dunes varying in height. Three capes, with their offshore shoals, project from the islands, namely: Hatteras, Lookout, and Fear. Behind the barrier beach a chain of sounds, including Currituck, Roanoke, Albemarle, Pamlico, Core, and Bogue, stretch along the entire 300 miles of coastline of the State.

Bordering the sounds on the mainland is a belt from 30 to 80 miles wide, where the land is level and sometimes swampy. On the north a portion of the Great Dismal Swamp spreads across the border of Virginia into North Carolina. Between Albemarle Sound and Pamlico River the swamplands are locally known as **dismals** and **pocosins.** They occur on the divides or watersheds between the rivers and sounds. In the southeast section of North Carolina are the **savannas,** treeless prairie land with a thick growth of grass and wild flowers; they have been formed by a lack of drainage and a close impervious soil.

The coastline of South Carolina from Little River Inlet to Winyah Bay is practically an unbroken beach. Cape Romain, just south of Winyah Bay, and the shoal extending seaward from it, form the southern point of the indentations which had its northern point at Cape Fear. From Winyah Bay to Savannah River, the boundary between South Carolina and Georgia, the coastline is a border of sandy barrier islands. The large sounds so characteristic of the North Carolina coast are missing.

The coastline of Georgia between Savannah River on the north and St. Marys River on the south is partly submerged at flood tide, and is broken by tidal rivers and marshes covered with dense grasses. The most important sandy islands off the coast are Tybee, Wassaw, Ossabaw, St. Catherines, Sapelo, St. Simons, Jekyll, and Cumberland.

The coastline of Florida is a long, low, barrier beach, from the border of Georgia south to Cape Florida. Many of the leading tourist towns have been built on this beach, while the business districts are often on the mainland.

Under the sand and the lagoons is a limestone called **coquina,** which is soft while in its native state, but becomes a hard building stone when exposed to the air.

Below Cape Florida the Florida Keys and Florida Reefs extend for about 134 miles in a southwesterly curve to Sand Key Light, and about 58 miles in a westerly direction to Loggerhead Key. These keys and reefs are of sand, shell, and coral formation. The keys are generally low and covered with mangrove.

Aids to Navigation.—Lights are on or near the dangerous capes, at the entrance to the harbors, and along the Florida Reefs. Lightships are stationed off Diamond Shoals, Frying Pan Shoals, and Savannah River. Radiobeacons are at the lightships and most of the principal light stations. This section of the coast is well covered by Loran. The critical dangers are buoyed.

There are numerous aviation lights along the coast that are useful for navigation purposes, but they should not be confused with the marine lights.

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.**

Harbor entrances.—The entrance to every harbor on this stretch of the coast is more or less obstructed by a shifting sand bar over which the channel depth is changeable. The entrance channels of the larger and more important harbors have been improved by dredging; in some cases jetties have been built from both sides of the entrance.

The buoys on many of the bars are not charted because they are moved from time to time to indicate the changing channel. They are liable to be dragged out of position and cannot always be replaced immediately, so a stranger must use the greatest caution. If possible, a stranger should enter a harbor or inlet on a rising tide.

The tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind; sailing vessels entering the harbors and sounds require a fair working breeze during the ebb.

Strangers should not attempt to enter the harbors without the assistance of a pilot during easterly gales when the sea breaks on most of the bars.

Depths.—Between Cape Henry and Jupiter Inlet frequent soundings will give the mariner timely warning of his approach to the land from seaward.

Northward of Cape Hatteras the 20-fathom curve is from 13 to 45 miles offshore, but inside of 15 fathoms the depths are irregular and many holes of limited extent lie inside the general limits of corresponding depths; 10 to 14 fathoms are found in places only 1.5 miles offshore. This irregularity of depth is apt to confuse the mariner and lead him into danger in thick weather; the greatest caution should therefore be used inside of a depth of 20 fathoms. By keeping over 5 miles from the beach all dangers will be avoided, but the strong currents which sometimes set along the shore must be considered, especially after a gale.

Southeastward of Cape Hatteras, and off the end of the shoals which extend seaward about 8 miles, the 20-fathom curve is from 12 to 15 miles offshore, and the 30-fathom curve is only a short distance farther. In thick weather, soundings of 20 fathoms or less should warn the mariner to keep offshore.

From Cape Hatteras to Jupiter Inlet, the 20-fathom curve is fairly regular and for a greater part of the distance is from 40 to 50 miles offshore. Northward of St. Johns River, the water shoals uniformly to the 10-fathom curve, which, excepting in the two great bights between Cape Hatteras and Cape Fear, is from 10 to 20 miles offshore. Vessels bound for any of the harbors between Cape Fear and St. Johns River should approach the land with caution when in 10 fathoms of water; inside the 10-fathom curve depths are irregular and spots of 5 fathoms or less will be found from 6 to 12 miles offshore. In thick weather vessels standing along the coast should keep a general depth of 10 fathoms between Cape Fear and St. Johns River.

In a heavy sea, depths of less than 6 fathoms show discolored water; deep-draft vessels should be cautious about passing over such spots.

Southward of St. Johns River, the 20-fathom curve draws inshore gradually and at Jupiter Inlet is only 4 miles from the beach, and the 100-fathom curve a little over 8 miles. Southward of Jupiter Inlet, both curves draw closer inshore, and along the Florida Reefs the 20-fathom curve is close in to the reefs, while the 100-fathom curve is at an average distance of about 7 miles outside the reefs. The 10-fathom curve between St. Johns River and Jupiter Inlet is irregular and of no use in determining distance from shore. Approaching Florida Reefs southward of Jupiter Inlet, soundings are of little use unless taken frequently as the water shoals rapidly from seaward.

When approaching the Bahama Banks along the Straits of Florida, the discolored water is the best indication the mariner has to warn him of shoal water; the 100-fathom curve at some points is only 1 or 2 miles from the shoal water of the banks.

Tropical waters.—The most remarkable feature is the exceeding clearness of the sea water, enabling the bottom to be seen from aloft at considerable depths and at some distance. The navigation of the banks is consequently conducted almost entirely by the eye, but care must be taken not to run with the sun ahead of the vessel as that prevents the banks from being seen.

The charts indicate clearly the positions of the many shoal heads; but considerable experience is required in identifying the patches by the color of the water. Small clouds, moving slowly and known to the pilots as **flyers**, are apt to deceive the inexperienced, their reflection on the surface of the sea over the clear white sandy bottom having every appearance of rocky shoals. It is prudent to avoid a dark spot.

Bank Blink is a phenomenon in tropical waters described as a bright reflected light hanging over the clear white sandbanks, serving to point them out from a considerable distance. From experience, it has been found to be untrustworthy, however, and should not be depended on in place of a lookout aloft. Soundings, the reckoning, and especially the latitude, should be unremittingly checked.

Anchorages.—Vessels may find refuge at a number of places along the coast according to draft. The more important places are Lookout Bight, Beaufort Inlet, Cape Fear River, Winyah Bay, Charleston Harbor, Port Royal Sound, Savannah River, Sapelo Sound, St. Simons Sound, Cumberland Sound, St. Johns River, Fort Pierce Inlet, Lake Worth Inlet, Port Everglades, Miami, and Key West.

Dangers.—A number of wrecks are located along the coast which are obstructions to navigation. Most of the dangerous wrecks are marked with lighted buoys. A careful check should be made of the chart to insure that dangerous wrecks are not along the routes selected.

Fishweirs.—Regulations prescribe that fishing structures and appliances in navigable waters of the United States shall be lighted for the safety of navigation. The lights shall be displayed between sunset and sunrise. They shall be placed at each end of the structure excepting where the inner end terminates in such situation that there is no practicable navigation between it and the high waterline of the adjacent coast, in which case no inner light shall be displayed. The outer light shall be white and the inner light shall be red. The size, capacity, and manner of maintenance of the lights shall be such as may be specified in the Army Department permit authorizing the erection of the structure or appliance. When several structures or appliances are placed on one line with no navigable passage between them, they will be considered, for lighting purposes, as one structure.

The areas within which fishweirs are permitted are shown on the 1200 series charts, and where no 1200 chart covers the area, they are shown on the next larger scale chart. The exact location of the weirs within the designated areas is not shown on the charts.

Along the outer coasts the limits of the areas are not marked. Strangers should proceed with caution when crossing areas of possible fishweirs, and should avoid crossing such areas at night whenever possible.

Crawfish traps.—Numerous crawfish traps or pots usually marked by floats secured by small lines are located in the inshore waters. In some cases they extend from the shore across waters used by small yachts and motorboats.

Caution should be exercised to avoid fouling of the propeller when navigating in areas where these obstructions exist.

ROUTES.—East coast of the United States to Key West.—Proceed as direct as safe navigation permits to 35°08′ N., 75°15′ W., off Diamond Shoal Lightship, thence on rhumb lines through the following positions:

Outer route to Jupiter Inlet Light
33°00′ N., 75°35′ W.
28°00′ N., 79°00′ W.
26°57′ N., 80°00′ W., off Jupiter Inlet Light

Inner route to Jupiter Inlet Light
33°27′ N., 77°32′ W., off Frying Pan Shoals Lightship
32°00′ N., 80°00′ W.
31°00′ N., 80°30′ W.
29°30′ N., 80°30′ W.
28°39′ N., 80°17′ W., off Hetzel Shoal lighted whistle buoy 8
27°24′ N., 80°02′ W., off wreck lighted buoy 12A
26°57′ N., 80°00′ W., off Jupiter Inlet Light

Thence follow the coast of Florida and the Florida Keys as close as safe navigation permits to Key West.

Key West to east coast of the United States via Gulf Stream.—Follow the Gulf Stream in the Straits of Florida about 8 miles off the Florida Reefs, passing Fowey Rocks Light at a distance of 10 to 12 miles and Jupiter Inlet Light 15 miles, thence follow the main axis of the Gulf Stream in the Atlantic Ocean through the following positions:

30°25′ N., 79°40′ W.
31°11′ N., 79°15′ W.
34°00′ N., 75°49′ W.
35°08′ N., 75°15′ W., off Diamond Shoal Lightship

Thence as direct as safe navigation permits to destination.

Southbound vessels from Diamond Shoal Lightship to Jupiter Inlet Light use either the outer route or the inner route to avoid the full northerly set of the Gulf Stream. Most of the regular lines bound for the Straits of Florida use the route outside the Gulf Stream. All vessels bound to any port as far south as the St. Johns River follow the coast inside the Gulf Stream. Currents up to 4½ knots have been observed at Diamond Shoal Lightship. High current velocities usually occur during heavy or long continued gales. Currents produced by onshore winds are likely to set toward the shore. Details of the wind-driven currents are given in the Tidal Current Tables.

The course from Diamond Shoal Lightship to 33°00′ N., 75°35′ W., along the outer route crosses the Gulf Stream. Under ordinary conditions an average allowance should be made for a 1-knot current setting northeastward for the entire run; with northeasterly winds there may be practically no current, while southerly, and especially southwesterly winds, may increase it considerably. Frequent fixes should be obtained.

There is uncertainty as to the currents that may be expected on the course from 33°00′ N., 75°35′ W., to 28°00′ N., 79°00′ W., along the outer route. Frequent fixes should be obtained to guard against being set off course by the variable currents and also to insure clearing Matanilla Shoal.

When crossing the Gulf Stream for Jupiter Inlet Light, **Matanilla Shoal** should be given a wide berth. The northwestern end of the shoal is marked by a lighted whistle buoy, but it is often difficult to find owing to atmospheric conditions. The bank in the vicinity of the shoal is extremely dangerous, as the bottom is rocky and covered with dark seaweed, the water is not discolored, and the sea does not break. The current for some distance northward of the shoal is very uncertain and near the edge of the bank sets strongly toward it.

In case of doubt as to the position when southward of latitude 28° N., vessels can stand to the westward, checking the depths carefully in order to pick up the edge of the bank on the Florida coast northward of Jupiter Inlet Light.

When on the course northwestward of Matanilla Shoal an allowance should be made for a northerly current, averaging about 2¼ knots for the entire run of about 80 miles. It will, therefore, be necessary to shape the course sufficiently southward of Jupiter Inlet Light to allow for the northerly set. When fixing the position by bearings on the light, keep in mind that while outside the 100-fathom curve the vessel is probably in the full strength of the Gulf Stream, where the northerly current may average a velocity of 4 knots. If the light is on the starboard bow, the vessel will be much closer to it than indicated by the distance run between the successive bearings on it.

The courses southward of Diamond Shoal Lightship on the inner route to Hetzel Shoal lighted whistle buoy 8 have depths of 17 to 20 fathoms. In approaching and passing the shoals off Cape Canaveral, care must be exercised. The current of the Gulf Stream may be expected under ordinary conditions to set against the vessel for the entire run with a velocity of about ½ to ¾ knot, the direction of the current following the curve of the coast. It must be remembered, however, that the effect of winds is almost immediately felt on the currents, and that with northerly, and especially northeasterly winds, a current of possibly 1 knot will set southward along the coast. Southerly, and especially southwesterly winds, increase the velocity of the Gulf Stream.

On the inner route from Hetzel Shoal to Jupiter Inlet Light, the 15-fathom curve is a good guide. The current of the Gulf Stream may be expected under ordinary conditions to have a velocity of about ¾ knot off Cape Canaveral, increasing to 1½ or 2 knots off Jupiter Inlet Light.

Southbound vessels from Jupiter Inlet Light to Fowey Rocks Light usually follow the coast at a distance offshore of 1 to 1.5 miles to Hillsboro Inlet Light, thence 1.5 to 2 miles offshore, passing 1 mile eastward of Miami lighted whistle buoy 2 and Fowey Rocks Light. A northward current can be expected near the coast from northward of Jupiter Inlet to Fowey Rocks. The velocity of the current gradually increases as the axis of the Gulf Stream is approached.

Southbound vessels from Fowey Rocks Light to Key West usually follow a course 1 to 2 miles off the Florida Reefs in the daytime and 2 to 4 miles off at night. The

position should be checked on the aids as passed and on the lights and sectors at night. Care must be taken not to get inside of the line of reefs, daybeacons, buoys, or lights, especially when passing parts of the reef that lie well back of the edge and do not break or show near the surface. The color of the water does not always mark the edge of the reefs.

Except in the vicinity of Fowey Rocks, where the 100-fathom curve is only about 2 miles outside the reef, the 50-fathom curve lies from 2 to 3 miles from Florida Reefs, and this is about the least depth that can be depended upon to insure safety in skirting them. The hand lead is practically of no value as an aid and should not be depended on, but vessels equipped with echo-sounding apparatus should find this equipment of great value in navigating this region.

The reefs are fringed in places with broken ground, which, as a measure of safety, should be avoided by deep-draft vessels where the depths are less than 10 or 12 fathoms.

A number of vessels have been lost on the reefs between The Elbow and Molasses Reef, and extra caution should be observed in this locality. The extremely variable current against the vessel should be carefully considered in determining the position off Carysfort Reef Light from which to shape the course to lead well clear of The Elbow.

Vessels bound for Habana generally shape the course for that port when abreast of Alligator Reef Light.

Any crossing of the Gulf Stream should be regarded as difficult, on account of the strong current of variable velocity, for which it may not be possible to make a proper allowance, and the abrupt shoaling inside the 100-fathom curve. The axis of the Gulf Stream is nearest the reefs from about 10 miles northward of Carysfort Reef Light to Molasses Reef Light.

Northbound vessels from Key West to Cape Hatteras follow the Gulf Stream. The velocity of the current varies greatly in different localities and is also subject to sudden changes, due to wind, differences in barometric pressure, and the like, so that no fixed hourly rate can be given. Often high velocities will be carried between certain points and will suddenly drop off between others. Frequent fixes should be obtained to determine accurately the speed of advance. The greatest velocity is between Carysfort Reef and Jupiter Inlet, ranging from 2 to 4½ knots.

The course between Jupiter Inlet Light and 30°25′ N., 79°40′ W., should lead from 6 to 30 miles outside the 100-fathom curve. Northward currents of 1½ to 3½ knots may be expected. It is reported that between latitude 30°30′ and 32°30′ N. heavy tide rips will be experienced, indicating a change in the direction of the stream and not an increase in the velocity, and creating in stormy weather a very uncomfortable sea.

When approaching Diamond Shoal great care must be taken to determine accurately the position of the vessel. The currents are subject to wide variations as indicated by the observations on the lightship. At times during both summer and winter the Gulf Stream has great velocity; at other times none will be found, or a southerly set may be experienced with northerly winds. The general direction of the stream is northeast with a velocity of 1 to 2 knots, but on nearing Diamond Shoal Lightship the current is reported to set well to the east-northeast and at other times nearly north. In northerly and northeasterly weather a dangerous heavy cross and confused sea usually is encountered in the stream between Jupiter Inlet and Cape Hatteras.

INSIDE NAVIGATION.—Navigation on the waterways covered by this volume requires a knowledge of the channel conditions and other factors restricting navigation. General items of interest to the vessel operator are indicated in the paragraphs that follow; details are given in the text.

Speed.—Regulations are given in **§ 207.160,** Chapter 2.

Bends or curves.—In the Intracoastal and adjoining waterways there are many sharp bends which are dangerous to vessels meeting or passing. On approaching a bend, a vessel should reduce speed sufficiently to be able to stop within half the distance to a ship coming from the opposite direction. Under no circumstances should a vessel attempt to overtake and pass another at a bend. Even with sufficient view of the channel ahead and after proper exchange and understanding of signals, the overtaken vessel may suddenly sheer from current action. This is even more pronounced with larger vessels and tows.

Cross currents.—Where two streams cross, the current will have a greater velocity in the deeper channel. This is noticeable along the Intracoastal Waterway where it follows a dredged canal cutting across a winding stream. Cross currents will also be noticed where either an inlet from the ocean or a drainage canal enters the waterway.

Bridges.—Many of the drawbridges are hand-operated and move very slowly. Some open in the direction toward a vessel using the right-hand opening; however, this is no reason for using the left opening. Also many of the swing spans, even when the clearances are the same, do not make a complete turn but close in the opposite direction to that of opening. Vessels equipped with whistles of the same or nearly the same tone as an automobile horn may have difficulty in making themselves heard or understood at highway bridges.

Spoil banks.—Nature quickly covers its scars. This is true of the spoil banks made by dredging. In the northern areas when awash these banks are often covered by grass, while in the southern areas they are covered by bushes and sometimes fairly large trees.

Water hyacinth is a floating fresh-water plant which infests numerous streams tributary to the South Atlantic and Gulf coasts. It has bright green leaves and a purple flower. It propagates from seeds and suckers, spreads quickly in most localities, and may cause entire suspension of navigation if not removed. The hyacinths form in mats or jams and float around driven by the wind or current. In open water these mats often resemble small islands. At times some of the bays and tributaries may be changed in appearance due to hyacinth jams. Where the water is apt to be brackish, an attempt can

be made to force a boat through the mat. In doing so, however, care should be taken that any logs that might be floating in the weeds are not struck with force enough to damage the hull. Snakes may also be found on the hyacinth mats. The work of removing this growth is undertaken by the various Corps of Engineers districts by the processes of spraying, cutting, and the use of booms.

Mangrove.—Three distinct types of mangrove are found in the southern section of this area. Yellow mangrove grows to a height of about 4 feet and is found principally on the sand flats in front of the fast land. Red mangrove grows to a height of 10 to 15 feet and is rooted in water most of the time. Black mangrove grows on sand ridges and higher ground which cover only at very high water or storm tides. The black mangrove sometimes grows to a height of 50 to 60 feet.

Stumps and sunken logs.—Reports are frequently made that vessels have struck shoals or rocks in rivers which have later proved to be stumps or sunken logs. Mariners are warned against navigating too close to the banks of streams where submerged stumps are known or may be expected to exist.

The term **marina** in its original conception was to be a sheltered harbor for recreational craft of all sizes, wherein the owner of a boat might buy his fuel, provisions, accessories, and the like, as well as spend the night or a longer period. The type of ownership may be municipal, club, or private. In this publication the term is used to indicate a sheltered harbor for the docking or mooring of recreational craft. The facilities and services available are generally listed in the description of the place.

Hurricane moorings.—On receiving advisory notice of a tropical disturbance small boats should seek shelter in a small winding stream whose banks are lined with trees, preferably cedar or mangrove. Moor with bow and stern lines fastened to the lower branches; if possible snug up with good chafing gear. The knees of the trees will act as fenders and the branches, having more give than the trunks, will ease the shocks of the heavy gusts. If the banks are lined only with small trees or large shrubs, use clumps of them within each hawser loop. Keep clear of any tall pines as they generally have shallow roots and are more apt to be blown down.

Currents.—It appears that, except during northerly and northeasterly winds, a current of about ½ knot average velocity, setting northeastward with the trend of the coast, may be expected outside the 10-fathom curve between Cape Canaveral and Cape Hatteras. Farther offshore the velocity of the northeastward flow increases as the axis of the Gulf Stream is approached. Current observations taken at lightships off Cape Hatteras and Cape Fear show that at those locations the northeastward current is much stronger in summer than in winter.

Strong currents are produced by the wind along the coast during northeasterly and southerly gales, reversing or greatly increasing the normal current. Their velocity and direction depend upon the direction, strength, and duration of the wind. Details of the velocities and directions of currents caused by winds for a number of locations along the Atlantic coast are given in the Tidal Current Tables.

The **Gulf Stream** is the most famous of the principal ocean currents. The name was first used by Benjamin Franklin in 1769. In general, as the swift current of the Gulf Stream issues into the sea through the Straits of Florida, its waters are characterized by a deep blue color, high salinity, great clearness, high temperature in the upper stratum, and absence of phosphorescence. The eye can penetrate it to considerable depths. At its junction with ordinary sea water, the edges may frequently be recognized in moderate weather by ripples as well as by the difference in color. Northward, in the cooler regions, the evaporation from its surface, when the temperature of the air is lower than that of the water, is apparent to the eye. In addition, in the lower latitudes, the stream carries with it a quantity of gulf weed, which is olive brown, branched seaweed with berrylike air vessels. Surface debris such as logs and other material tend to drift toward the eastern edge of the stream but not toward the western edge.

The region where the Gulf of Mexico narrows to form the channel between Florida Keys and Cuba may be regarded as the head of the Gulf Stream. From here the stream sets eastward and northward through the Straits of Florida and, after passing Little Bahama Bank, it continues northward and then northeastward, in the general direction of the 100-fathom curve as far as Cape Hatteras. The flow in the Straits is frequently referred to as the **Florida Current.**

Shortly after emerging from the Straits of Florida, the stream is joined by the **Antilles Current,** which flows northwesterly along the open ocean side of the West Indies before uniting with the water which has passed through the straits. The Antilles Current, like the Gulf Stream, carries warm, highly saline water of clear indigo blue. The union of the two currents gives rise to a broad current possessing about the same characteristics as the Gulf Stream within the Straits except that the velocity is much reduced. Beyond Cape Hatteras the combined current turns more and more eastward under the combined effects of the deflecting force of the earth's rotation and the eastwardly trending coastline, until the region of the Grand Banks of Newfoundland is reached.

Eastward of the Grand Banks the whole surface is slowly driven eastward and northeastward by the prevailing westerly winds to the coastal waters of northwestern Europe. For distinction, this broad and variable wind-driven surface movement is sometimes referred to as the **North Atlantic Drift** or **Gulf Stream Drift.**

On its western or inner side, the Gulf Stream is separated from the coastal waters by a zone of rapidly falling temperature, to which the term **cold wall** has been applied. The abrupt change in the temperature of the waters separated by the cold wall is frequently very striking and is a definite indication of the edge of the stream. It is most clearly marked north of Cape Hatteras but extends, more or less defined, from the Straits to the Grand Banks. In the vicinity of the Banks of Newfoundland

the cold wall represents the dividing line between the warm current of the Gulf Stream and the cold waters of the **Labrador Current** which, according to observations, turns sharply, between parallels 42 and 43 and meridians 51 and 52, and flows easterly, parallel to the Gulf Stream.

Off Cape Hatteras the wide-spreading current separates into numerous bands which are indicated by the juxtaposition of warm and cold bands of water of varying widths. This feature, though not so marked, is also noticed below Cape Hatteras.

Throughout the whole stretch of 400 miles in the Straits of Florida, the stream flows with considerable velocity. Abreast of Habana, the average surface velocity in the axis of the stream is about 2½ knots. As the cross-sectional area of the stream decreases, the velocity increases gradually, until abreast of Cape Florida, it becomes about 3½ knots. From this point within the narrows of the straits, the velocity along the axis gradually decreases to about 2 knots off St. Augustine, and 1 knot off Cape Hatteras. These values are for the axis of the stream where the current is a maximum, the velocity of the stream decreasing gradually from the axis as the edges of the stream are approached. The velocity of the stream, furthermore, is subject to fluctuations brought about by variations in winds and barometric pressure.

Crossing the Gulf Stream at Jupiter or Fowey Rocks, an average allowance of 2½ knots in a northerly direction should be made for the current.

Crossing the stream from Habana, a fair allowance for the average current between 100-fathom curves is one knot in an east-northeasterly direction.

A vessel bound from Cape Hatteras to Habana, or the Gulf ports, crosses the stream off Cape Hatteras. A fair allowance to make in crossing the stream is 1 to 1½ knots in a northeasterly direction for a distance of 40 miles from the 100-fathom curve.

From within the straits, the axis of the Gulf Stream runs approximately parallel to the 100-fathom curve as far as Cape Hatteras. Since this stretch of coastline sweeps northward, then eastward, in a sharper bend than does the 100-fathom curve, the stream lies at varying distances from the shore.

Earlier systematic observations on the Gulf Stream dealt with the temperature of the water rather than its motion and the axis was taken to be along the line of highest temperature obtained. Later the axis was taken to mark the line of greatest velocity. Ordinarily it is assumed that the two axes coincide but this is by no means certain. The thermometer, although it indicates the limits of the stream in a general way, is therefore only an approximate guide to the velocity of the current, nor is it to be assumed that the northerly set will be lost when the thermometer shows a region of cold sea water.

The lateral boundaries of the current within the straits are fairly well fixed, but when the stream flows into the sea the eastern boundary becomes somewhat vague. On the western side the limits can be defined approximately since the waters of the stream differ in color, temperature, salinity, and flow from the inshore coastal waters. On the east, however, the Antilles Current combines with the Gulf Stream, so that its waters here merge gradually with the waters of the open Atlantic. Observations of the Coast and Geodetic Survey indicate that, in general, the average position of the inner edge of the Gulf Stream as far as Cape Hatteras lies inside the 50-fathom curve. The Gulf Stream, however, shifts somewhat with the seasons, and is considerably influenced by the winds which cause fluctuations in its position, direction, and velocity; consequently, any limits which are assigned refer to mean or average positions. A further cause of fluctuation is found in the variations of the currents which feed it or which, like the Labrador Current, come in conflict with it.

At the western end of the Straits of Florida the limits of the Gulf Stream are not well defined. Between Fowey Rocks and Jupiter Inlet the inner edge is deflected westward and lies very close to the shoreline.

Along the Florida Reefs between Alligator Reef and Dry Tortugas the distance of the northerly edge of the Gulf Stream from the edge of the reefs gradually increases toward the westward. Off Alligator Reef it is quite close inshore, while off Rebecca Shoal and Dry Tortugas it is possibly 15 to 20 miles south of the 100-fathom curve. Between the reefs and the northern edge of the Gulf Stream the currents are ordinarily tidal and are subject at all times to considerable modification by local winds and barometric conditions. This neutral zone varies in both length and breadth; it may extend along the reefs a greater or less distance than stated, and its width varies as the northern edge of the Gulf Stream approaches or recedes from the reefs.

The approximate position of the axis of the Gulf Stream for various regions is shown on the following Coast and Geodetic Survey charts: No. 1002, Straits of Florida; No. 1007, South Carolina to Cuba; No. 1112, Cape Canaveral to Key West; No. 1113, Alligator Reef to Habana. Chart No. 1001 shows the axis and the position of the inner edge of the Gulf Stream from Cape Hatteras to Straits of Florida.

Wind currents are very complicated. Their velocities and directions depend upon a number of factors such as the velocity, direction, and duration of the wind, the proximity of the coast and the direction of the coastline. Generally in the Northern Hemisphere the wind-driven current sets somewhat to the right of the wind but in coastal waters there are many exceptions to this general rule, the current often setting to the left of the wind, due to the tendency of the current to follow the direction of the coastline or to other local conditions.

The velocity of the wind current relative to that of the wind also varies with the locality. Wind-current information is given in the Tidal Current Tables.

WEATHER.—The Appendix includes climatological tables for twelve Atlantic coast localities and a table of fog-signal operation. Also listed are Weather Bureau offices, storm warning displays, and radio stations which transmit weather information.

General.—The coastal area from Cape Henry to Key West is low and flat. The entire shoreline is marked by innumerable indentations and irregularities, many of

which cause important local climatic variations. In the area north of the Florida Peninsula there is an abrupt rise from this coastal plain which continues in an irregular terraced pattern westward, and culminates in the Blue Ridge Mountains, the Great Smokies, and other ranges of the Appalachian chain. The mountainous area, though at a considerable distance from the ocean, forms a partial barrier to the cold waves that move southeastward from the interior.

The climate of the region varies from temperate and semimarine in southern Virginia to humid and subtropical in southern Florida.

Pressure.—Over the ocean east of the southeastern seaboard there is a region of high pressure. This Azores or Atlantic HIGH is the center of the surface circulation system in this area. During the year it migrates a limited distance to the north or south and to the east or west, but is persistent throughout the year. The circulation over the eastern seaboard is controlled largely by the proximity of the Azores HIGH.

During the winter the mean position of the Azores HIGH is far out to sea. Major frontal systems developing over the continent and the Gulf of Mexico sweep over the Middle Atlantic States until the mountain ranges to the westward partly obstruct their progress and cause considerable modification. Usually only the strongest polar outbreaks penetrate to the southernmost points in the area. The rapidly changing air masses in the northern part of the area may be observed in variable temperatures from day to day and in the alternation between brief stormy periods followed by crisp, clear days. The contract between polar air masses of continental and maritime origin and tropical maritime air is greatest at this time. Consequently, winter storms are generally severe and are accompanied by strong, gusty winds. Northers, when they do occur, cause rough seas in the Straits of Florida.

During the spring the Azores HIGH begins to move westward and northward. It affects the southern Atlantic coast where the frequency of passing cyclonic storms decreases and the weather becomes more uniformly warm and humid. The northern part of the area, still at the outer edge of the HIGH, is subject to frontal activity and changing air masses. Warm spring rains usually alternate with mild weather. It is not uncommon, however, for the Azores HIGH to dominate the entire area in this season, bringing summer heat and enervating humidities.

In summer the center of the Azores HIGH has moved to its northern limit and extends over the entire eastern seaboard. The intensity is moderate but persistent, blocking the eastward movement of the continental pressure systems. For weeks at a time the weather on the coast may not change significantly. This season is characterized by frequent instability, showers and thunderstorms, high temperatures and humidities, and relatively low wind velocities. The summer months also mark the beginning of the hurricane season, which reaches its peak in late summer and early fall. All of the coastal states have felt the effect of tropical disturbances.

During the fall the Azores HIGH retreats southward and eastward, leaving the Atlantic coast under the influence of a weak continental high-pressure zone. The weakening of the pressure system indicates the gradual transition to the winter pattern accompanied by increased frontal activity, particularly in the northern part. The weather is usually cool and fine, interrupted by brief rainy periods associated with the passage of fronts.

The pressure pattern changes considerably over the area from winter to summer. At individual stations, however, the seasonal variation in mean pressure is only 0.12 inch to 0.17 inch throughout the year. Extremes vary considerably more than this. During the summer the mean pressure remains low and steady, but begins to rise again in September and continues to rise through the remainder of the year.

The extreme lowest pressure from a hurricane was 26.35 inches at Long Key during the "Labor Day hurricane" of 1935. The lowest pressure from an extratropical cyclone (28.32 inches) occurred at Cape Henry in March. The seasonal range from extreme highest to extreme lowest is greater during winter and smaller during summer, an indication of the numerous LOWS and HIGHS that traverse the area during the winter.

Winds.—In winter over the northern part of the sea area (north of latitude 30°) predominant winds are from the north and northwest. West and southwest winds are also frequent. Along the coast north of latitude 35° wind directions are variable, though predominantly from the westerly quadrant. Along the middle coast, directions are mostly northerly to westerly. Off and along the Florida coast, south of latitude 30°, easterly winds predominate throughout the year.

Winter storms over the entire area are modified by the Appalachian Mountain ranges. However, even the extreme southern portion occasionally experiences northwesterly winds when the severest of the winter storms penetrate this far south.

In spring, over the northern part of the sea area (north of latitude 30°), winds from the southwest, south, and northeast are about equal in frequency. Along the coast (north of latitude 35°) south winds predominate. North and southwest winds are also frequent. Along the middle coast south and southwest winds predominate.

In summer the persistence and dominance of the Azores HIGH is shown in the increasing frequency of southwesterly winds over the northern part of the sea area. Along the coast (north of latitude 35°) south winds predominate except at Cape Henry, where the prevailing direction for the year and most of the months is from the southwest. Along the middle coast southwest winds predominate.

In autumn the recession of the Azores HIGH, accompanied by changing pressure systems along the coast, results in a sharp increase in the frequency of northerly winds, which are recorded about 50 percent of the time over the northern part of the sea area. Along the coast (north of latitude 35°) and the middle coast (between 30° and 35° latitude) north winds prevail except at Norfolk, where northeast winds are more frequent.

Along the coast a daily shift in wind direction is observed. During the warmest part of the day winds blow

from the ocean toward shore (known as **onshore winds**), and during the coolest, from the land toward the sea (**offshore winds**). Offshore winds, unless they are exceptionally strong, are generally considered most favorable for coastal navigation. Onshore winds have a more pronounced effect upon the sea surface, particularly when they have been blowing from the same direction for a long period of time. Strong onshore winds cause heavy or choppy seas and swell, and frequently make navigation difficult for small vessels.

Wind velocities along the southeastern coast are generally moderately light, averaging 8 to 12 knots over the year. Monthly averages vary in summer from 6 to 10 knots, and 8 to 15 knots in winter. Wide departures from these averages should be expected in all seasons. In the immediate coastal area the windward side of the promontories may be lashed by gales and heavy seas, while the lee side is relatively protected. Averages do not show these variations. The area from Cape Hatteras to Cape Henry, exposed as it is to the ocean, is subject to severe northeasterly storms as well as moving continental pressure systems. Cape Hatteras is particularly exposed to the winds, with open sea from north through east to southwest. South of Cape Hatteras gale winds are much less frequent, occurring generally on less than 15 days a year. The frequency of calms is less than 1 percent in the north and from 15 to 20 percent during the year at most places in the middle and south.

Extreme wind velocities are a hazard in any month. Though winds greater than 34 knots are comparatively infrequent, they have been recorded at all stations in this stretch of coast and at almost any time of the year. Gale winds usually accompany sharply defined frontal systems, severe cyclonic storms, hurricanes, or occasionally severe local thunderstorms.

The seasonal variation in wind velocity is slightly greater in the north than in the south. An idea of the magnitude of the difference is given by the monthly averages as indicated in the tables in the Appendix. Highest mean velocities occur during the month of March in the north and in October and November in the extreme south; lowest velocities occur during July and August over the entire area. Over the ocean winds are slightly stronger than at most land stations during the winter months and about the same during the summer.

Temperature.—The temperature regime of the southern Atlantic coast varies from temperate in the northern part of the area to subtropical in the southern part. The gradation from north to south is regular, decreasing with increasing latitude. Another interesting variation is the general modification process of the ocean and coastal temperatures by each other. Along the coast the sheltered land stations have warmer summers and cooler winters than do exposed points.

Temperatures along the southeastern seaboard region are conducive to a long period of small-craft operation. The southern Atlantic coast annual mean air temperatures range from 59.2° F. at Norfolk and Cape Henry, Virginia, to 77.6° F. at Key West, Florida. January is the coldest month at most stations; July the warmest. The range in mean monthly air temperature over the area is from 41.5° F. at Norfolk in January to 83.9° F. at Key West in August.

Over the water area the coldest month is February and the warmest is August. Exposed coastal stations experience mean air temperatures more like those over the water than those over land, and have annual extremes in February and August.

The daily range in temperature averages from 10° to 17° F. at coastal stations throughout the year, and is likely to be less over the water. The greatest daily variation occurs at most stations during the winter and early spring months and the lowest during late summer and fall.

Very little data on extreme temperatures for the ocean areas are available. At coastal stations temperatures above 100° F., while not common, have been recorded. The highest during the period of record considered was 105° F. at Norfolk, Va., Savannah, Ga., and Jacksonville, Fla. The lowest recorded temperature was 2° F. at Norfolk, Va., in February.

Humidity.—Mean relative humidity is highest from July through September and lowest in April and May. Data are not summarized for water areas, but the relative humidities are known to be uniformly high. The presence of minute particles of salt in the air over the ocean together with the high moisture content in the air results in a very corrosive effect upon equipment and supplies, both on the water and at nearby shore points.

Cloudiness.—Mean cloudiness over the area is moderate to moderately high throughout the year, averaging from 35 to 65 percent sky cover. In general, however, the cloudiest month is January in the northern sections and over most of the water areas, and may be any month from June through September in the southern section. At most of the individual stations in the northern part of the area the least average cloudiness occurs in October, and in the extreme southern part least cloudiness occurs in February or March.

Since the air is usually moist, only a small decrease in temperature may cause condensation and cloud formation. At the edge of the warm northward-moving Gulf Stream and the cool southward moving countercurrent which skirts the shore from Cape Hatteras, N.C., to Jacksonville, Fla., sharp contrasts in temperature result in the formation of heavy stratus clouds which may appear very much as a cold front. These clouds may persist for days at a time if the wind is light and may be carried inland by northeasterly winds. Such cloudiness is common during the spring when the gradient between shore water and Gulf Stream temperatures is steepest.

The fact that maximum cloudiness for the year occurs during the winter at northern coastal stations may be explained by the maximum frequency of cyclonic storms passing northward or northeastward from the central or south-central section during that season. These rarely affect the extreme southern part of the area.

Much of the cloudiness over the entire area is of the cumulus type, resulting from either the unstable condi-

tions that accompany cyclonic activity in all seasons, or the general air mass instability during the summer months. Such clouds frequently form over land during the day and drift seaward at night.

Sunshine.—The area as a whole experiences monthly averages of from 47 to 78 percent of possible hours of sunshine during the year. In the north the largest percentage of possible sunshine occurs in spring and fall and the smallest percentage in winter. In the overall picture, the extreme south and a narrow belt in the north-central part of the area show a greater percentage of possible sunshine than the northern and south-central sections.

Precipitation.—Over the southeastern seaboard region precipitation is moderately heavy, averaging about 45 to 60 inches a year. Monthly departures may be large in any individual year, but over a long period of record, 50 to 75 years, a fairly uniform pattern prevails. Since the area lies within both temperate and subtropical regions, the precipitation pattern shows differences in both type and amount from north to south. Irregularities from station to station in the idealized pattern are due to differences of exposure at the observing stations. Year-to-year variation is caused by overall departures from the average general circulation.

In the northern part of the area the heaviest precipitation occurs normally during July and August, and the least in November. In the southern section, however, heaviest precipitation falls in September or October, and the least in February. Average monthly totals at most stations range from 2 to 6 inches throughout the year. During the months of greatest hurricane frequency, excessive rains of 9 to 15 inches in a 24-hour period have been recorded. These may occur at any point along the coast but are most common in the southern part of the area.

The monthly mean number of days with 0.01 or more of precipitation in the northern part of the area ranges from about 6 to 9 days a month in the fall to 10 to 12 days a month in the summer and winter. In the central part of the area the most rainy days are in summer, 11 to 16 days a month, and the least in spring and fall, 6 to 9 days a month. The most rainy days along the Florida coast, 14 to 18 days a month, generally occur in late summer and early fall, and the minimum number, 5 to 8 days a month, from February through April.

Much of the precipitation, like cloudiness, is associated with cyclonic activity throughout the year. During the winter, precipitation is usually general but may come with occasional thunderstorms along fronts. Frontal systems originating or developing in the Gulf region result from the interaction of a moist tropical air mass with colder continental masses. These move eastward or northeastward and bring extensive precipitation to the seaboard region. During the summer, when the area is dominated by the Azores HIGH and cumulus clouds predominate, precipitation is localized and is showery in nature.

The intensity of ordinary cyclonic storms and showers is usually greater over land than over water. Heaviest precipitation occurs over land and near coastal waters in the afternoon; over open water during the night.

Thunderstorms along the coast occur on an average of from 30 days a year in the north to 80 days a year in the south. Maximum occurrence is from June through August, and an average of 7 to 18 thunderstorms a month occur during this season. In summer, cumulus clouds frequently develop into thunderstorms over the land and drift seaward late in the afternoon.

Snow falls from December through March in the northern part of the area on 1 or 2 days a month. So far as coastal operations are concerned, snow conditions are not significant since most of the area is entirely free from snow the year round.

Visibility.—Visibility is generally good throughout the year over the entire area. Fog is the principal restriction to visibility. Fog reducing visibility to 550 yards or less is very irregular, ranging from practically no days a year at some stations to 24 days a year at others. Differences in exposure account for the considerable variation between locations. In general, however, fog decreases from north to south, and the worst fog conditions occur during the winter months when air masses change frequently. Visibility is usually poorest during the night and early morning hours.

Along the coast radiation fog is frequent, forming shortly after sunset. These fogs generally do not extend any great distance seaward, but may seriously restrict harbor activities. Sea fogs sometimes drift onshore on hot summer days, persisting for many hours in a shallow layer along the coast. Over the land, dispersal usually begins at the surface giving the effect of lifting. Over the water, fog generally persists at the surface and restricts visibility until the last vestige of the formation disappears.

In addition to fog, precipitation occasionally reduces visibility over both land and water, and haze and smoke sometimes restrict visibility over land.

HURRICANES.—Severe tropical cyclones of the North Atlantic Ocean are ordinarily referred to as West Indian Hurricanes, though actually many of theses 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, these 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.

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

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing. In receding from the center of a hurricane the barometer will rise and the wind and sea 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.

Pilotage is compulsory for certain vessels entering from sea, but is not compulsory for the interior waters inside the inlets. Information about pilotage is shown in the text for the ports concerned. Pilots will usually come out to vessels making a signal by the International Code, but to insure that they are available at the time of arrival, arrangements should be made in advance.

Local boatmen competent to act as pilots for parts of the Intracoastal Waterway and interior waters can usually be found at the larger cities and towns along the route or near the entrances to the various tributaries.

Towboats are available at the principal ports. Arrangements for towboats should be made in advance.

Harbormasters are appointed for the principal ports. They have charge of the anchorage and berthing of vessels.

Repairs.—Charleston, Savannah, and Jacksonville are the principal places where extensive repairs to the hulls and machinery of large vessels can be made. Limited repairs can be made at a number of other ports as shown in the text.

Supplies.—Coal, fuel oil, diesel oil, gasoline, fresh water, and supplies of all kinds can be obtained at Wilmington, Charleston, Savannah, and Jacksonville. Gasoline, diesel fuel, water, and provisions are available at most of the other ports.

Standard time.—The areas covered by this volume use Eastern Standard Time, which is 5 hours slow of Greenwich Mean Time. Daylight saving time is not observed.

4. CAPE HENRY TO CAPE LOOKOUT

Charts 1109, 1110.—Between Cape Henry and Cape Lookout, a distance of 190 miles, the seacoast of Virginia and North Carolina is a line of long, low, and narrow islands, backed by a series of sounds and tributary rivers, through which the Intracoastal Waterway passes from Chesapeake Bay southward.

Chart 1227.—The summer resort of **Virginia Beach** is 5 miles southward of Cape Henry Light. The buildings are conspicuous, the most prominent being the Cavalier Hotel, which is distinguished by its size and cupola. A Coast Guard station is on the beach about 1 mile south of the hotel, and a checkered water tank 158 feet above the water is near the beach about 10 miles south of Cape Henry.

A **danger zone** of a firing range is just southward of Cape Henry extending 15 miles offshore; limits and regulations are given in **§ 204.52,** Chapter 2. A **naval prohibited area** is off Camp Pendleton, 7.4 miles southward of Cape Henry Light; limits and regulations are given in **§ 204.52a,** Chapter 2. A Coast Guard station is at **Little Island,** 14.5 miles southward of Cape Henry Light.

About 22 miles southward of Cape Henry are **Wash Hill** and **Sheep House Hill,** sand hills about 60 and 40 feet high, respectively. This locality is known as **False Cape** because of its resemblance to Cape Henry when approaching from southward. Several spots with depths of 10 to 17 feet are 0.8 to 1.5 miles offshore from False Cape.

Chart 1229.—Currituck Beach Light (36°22.6′ N., 75°49.8′ W.), 158 feet above the water and visible 19 miles, is shown from a red conical tower on the beach near the settlement of **Corolla.** A Coast Guard station is at **Caffey Inlet,** 9.8 miles southward of Currituck Beach Light.

Danger zones between Currituck Beach Light and Oregon Inlet are described in **§ 204.54,** Chapter 2.

A conspicuous steel tower is just eastward of Kitty Hawk, 20 miles southward of Currituck Beach Light. **Wright Monument,** a high stone memorial on the highest of the **Kill Devil Hills,** 3.5 miles southward of Kitty Hawk, is very prominent and is a good landmark on this low sandy coast where there are very few conspicuous objects. A Coast Guard station is southeast of the monument.

Defensive sea area.—A rectangular area comprising approximately two-thirds of a square mile 2.5 miles offshore at Kill Devil Hills is reserved as a defensive sea area for purposes of national defense. The area is bounded by the following lines: beginning at a point in latitude 36°03′00″ N., 75°37′24″ W.; a line drawn to a point in latitude 36°03′18″ N., longitude 75°36′42″ W., thence to a point in latitude 36°02′17″ N., longitude 75°36′09″ W.: thence to a point in latitude 36°02′00″ N., longitude 75°36′48″ W., and thence to the point of beginning.

At no time shall vessels or other craft be navigated within the area above defined, except such as are authorized by the Secretary of the Navy.

Any violation of the provisions of this order shall be subject to the penalties provided by law.

Bodie Island Light (35°49.2′ N., 75°33.8′ W.), 156 feet above the water and visible 19 miles, is shown from a conical tower, with alternate white and black horizontal bands above a granite base, 36 miles southward of Currituck Beach Light.

Oregon Inlet, about 2 miles southward of Bodie Island Light, is entered over a shifting bar. The inlet, which deepens with northwest winds and fills in with northeast winds, is used by local fishing boats but is not recommended to strangers. In November 1957 the controlling depth over the bar was 10½ feet. Tidal currents in the inlet are reported to be as much as 5 knots.

A ferry crosses the inlet connecting Bodie Island with the Hatteras highway on Pea Island. A Coast Guard station is 1 mile south of the entrance to the inlet.

Two channels, **Old House Channel** and **Davis Slough,** lead southwest from Oregon Inlet to deep water in Pamlico Sound. Federal project depth in Old House Channel is 12 feet; in May 1959 the controlling depth was 5½ feet. It is marked by lights, buoys, and daybeacons. Depths in Davis Slough are from 3 to 5 feet.

A Federal project provides for a channel 12 feet deep from Oregon Inlet through **Roanoke Sound** to a turning basin at Manteo, and connecting channels 12 feet deep to a turning basin at Wanchese and 6 feet deep to Albemarle Sound. In June 1958 the controlling depths were 3 feet from Oregon Inlet to Manteo, 6 feet in the side channel to Wanchese, and 6 feet from Manteo to Albemarle Sound. The channels are well marked.

On the southern end of Bodie Island, just east of the ferry slip, there is a small-boat basin with depths of 6 to 8 feet. Gasoline, diesel fuel, water, and ice are available. The service station and store are prominent.

Wanchese is a village near the south end of **Roanoke Island** west of the entrance to Mill Creek. Gasoline, water, groceries, and small charter boats can be obtained at the fishhouses and small docks. The largest of four marine railways in Mill Creek can haul out craft up to 68 feet in length and 6 feet in draft for hull and engine repairs.

The causeway over Roanoke Sound connects Roanoke Island with the outer beach and the highway to Norfolk. It has a swing span with a horizontal clearance of 50 feet and a vertical clearance of 11½ feet. An overhead power cable at the bridge has a clearance of 60 feet.

Manteo, the principal town on Roanoke Island and the seat of Dare County, is at the head of **Shallowbag Bay.** A large elevated tank in the town is conspicuous. Gasoline, diesel fuel, water, some supplies, and berthing facilities are available. See Appendix for **storm warning** display.

Historic **Fort Raleigh,** site of the **Lost Colony,** is at the northern end of Roanoke Island.

Nags Head is a summer resort on the east side of Roanoke Sound, 3.5 miles northeastward of Manteo. Other inland waters are described in another section.

Platt Shoals, consisting of several spots covered by from 27 to 34 feet, are east-southeastward of Oregon Inlet and 2.5 to 4 miles offshore. Between the shoals and the shoal water off the shore the depths are 39 to 85 feet. In easterly gales the shoaler spots are marked by breakers.

Wimble Shoals, about 15 miles southward of Oregon Inlet, are a number or ridges extending offshore about 4 miles, with depths ranging from 21 to 36 feet. In easterly gales the shoaler parts are marked by breakers. A lighted whistle buoy is outside the shoals.

Chart 1232.—Cape Hatteras, where the coast makes a sharp turn westward, is low and sandy. **Cape Hatteras Light (35°15.3′ N., 75°31.2′ W.),** 191 feet above the water and visible 20 miles, is shown from a black and white spirally banded tower on a red brick base. About 0.8 mile north of the light are a radio tower and a tank, and about 1.2 miles west-northwest of the light is the skeleton tower of a former light. A Coast Guard station is 0.8 mile southwest of the light.

Diamond Shoals extend off Cape Hatteras in a southeasterly direction for about 9 miles. Depths of 3 feet have been found on the shoaler parts. Diamond Shoals include **Hatteras Shoals, Inner Diamond Shoal,** and **Outer Diamond Shoal.** Hatteras Shoals, with little water over it, is usually marked by breakers. Outer Diamond Shoal consists of irregular patches, with depths of 3 to 18 feet, which are usually marked by breakers and sometimes by wrecks. Between Outer Diamond Shoal and Inner Diamond Shoal is **Diamond Slough,** with least depths of about 22 feet. This passage should not be attempted by strangers; during strong winds the currents set across the shoals with great velocity.

Most of the wrecks on Outer Diamond Shoal were of northbound vessels in thick weather. The difficulty of making proper allowance for the Gulf Stream, and the strong currents near the shoals, may cause considerable error in the reckoning. When approaching, and uncertain of the position, care should be taken to stay in at least 20 fathoms, or preferably 30 fathoms. Diamond Shoal Lightship is the guide for clearing the shoals.

Diamond Shoal Lightship (35°05.3′ N., 75°19.7′ W.), in 174 feet 13.8 miles southeast of Cape Hatteras Light, has a red hull with the word DIAMOND on each side, and two masts with a circular gallery on each mast and a lantern at the foremast. The light is 66 feet above the water and visible 14 miles. The radiobeacon and fog signal are synchronized for distance finding. The code flag signal and radio call is NNBJ. **Storm warnings** are displayed daytime only.

From Cape Hatteras to Cape Lookout the coast trends generally southwestward for 64 miles and is broken by several inlets. For 6 miles from Cape Hatteras it is thickly wooded near the beach, and between the woods and the beach is a range of sand hills 10 to 40 feet high. For the remainder of the distance the coast is a narrow barrier beach with numerous sand hills. The coast is fairly bold, and depths of 4 to 7 fathoms will be found within 0.5 mile of shore, except off Hatteras Inlet, where shoals extend out 1.2 miles, and off Ocracoke Inlet, where they make out 1.6 miles.

Hatteras Inlet, 11 miles westward of Cape Hatteras Light, is entered over a shifting bar on which the depth varies from about 5 to 11 feet; the approach is marked by a buoy. The inlet is used as a harbor of refuge by small coasting vessels and by fishermen, there being fair anchorage inside the bar in depths of 2 to 3 fathoms. Strangers should not enter as the aids may not mark the best water. A small ferry carries vehicles and passengers across Hatteras Inlet to Ocracoke Island.

The channel from the inlet to Pamlico Sound, used chiefly by local fishermen, is subject to change both in position and depth, and is not safe to navigate without local knowledge.

Hatteras, a village 3 miles east of Hatteras Inlet, has several stores and a year-round hotel. A Coast Guard station is on the southwest side of the village. See Appendix for **storm warning** display.

There are several small wharves in the basin at Hatteras where gasoline, diesel fuel, and fresh water are available. A marine railway can haul out vessels up to 50 feet in length and 4½ feet in draft, for hull and motor repairs.

Tides.—The range of tide is about 2 feet on the bar. In the channels the height of the water depends upon the direction and force of the wind.

Currents.—The tidal currents in the channel through the inlet are influenced by winds, and attain velocities of 2 to 5 knots. For predicted times and velocities see the Tidal Current Tables.

Other channels in Pamlico Sound are described in another part of this chapter.

Ocracoke Light (35°06.5′ N., 75°59.2′ W.) 75 feet above the water and visible 14 miles, is shown from a white tower near a clump of woods on the western part of Ocracoke Island and about 3 miles northeastward of Ocracoke Inlet. A Coast Guard station is 0.4 mile north of the light. See Appendix for **storm warning** display.

Chart 419.—Ocracoke Inlet, about 27 miles west-southwestward of Cape Hatteras Light, is entered over a shift-

ing bar, on which the depth varies from about 7 to 12 feet. Strangers should not enter without a pilot, as the buoys may not always mark the best water.

Several channels or sloughs lead from Ocracoke Inlet through the shoals to deep water in Pamlico Sound. **Teaches Hole Channel** follows the western side of Ocracoke Island and connects with Silver Lake through a dredged channel. It also joins **Big Foot Slough Channel** northwest of Ocracoke which leads to Pamlico Sound. The controlling depth from the inlet to Silver Lake is about 10 feet. The controlling depth through Big Foot Slough Channel is limited to about 3 feet by the bar at the northwest end. Strong currents have been experienced in these channels; the buoys and lights must be followed closely.

A swash channel connects Big Foot Slough Channel with **Nine Foot Shoal Channel,** which leads off in a northwesterly direction. The controlling depth is about 5 feet through the swash channel to Pamlico Sound. Some local vessels use this channel because of the limited depth over the bar at the northwest end of Big Foot Slough Channel.

Wallace Channel leads northwestward from Ocracoke Inlet to a dredged channel which leads to Pamlico Sound. In April 1958 the controlling depth was 10 feet. The channel is marked by lights and buoys. **Sheep Island Slue,** leading westward from Wallace Channel, has a controlling depth of about 2 feet. It is well marked.

The village of **Ocracoke,** 3.5 miles inside the inlet, is frequented by numerous fishing vessels. Supplies in limited quantities are available, and gasoline in considerable quantities can be obtained at any time. A hotel is open all year. Mail and passengers are transported daily by boat to Portsmouth and Atlantic. At Atlantic there is motorbus connection with the railhead at Beaufort. Boats also run at intervals to Washington. Facilities for repairing boats are limited.

Silver Lake, a circular basin at Ocracoke, affords good anchorage in depths of 14 feet, and has several small wharves extending from the shore to depths of about 10 feet.

Portsmouth is a village on the west side of Ocracoke Inlet. A spire here is a prominent landmark. The inactive Coast Guard station, the largest building, is near the inlet.

Tides.—The range of tide is about 2 feet over the bar at Ocracoke Inlet and about 1 foot in Silver Lake. In the channels the height of the water depends upon the direction and force of the wind.

Currents.—The currents in the inlet and connecting channels are influenced by the winds. The ebb current usually has a greater velocity than the flood, sometimes attaining a velocity of 2 to 2½ knots. Current predictions for several locations in the channels may be obtained from the Tidal Current Tables.

Drum Inlet is an opening through the barrier beach 17 miles southwestward of Ocracoke Inlet. Several aids mark the inlet, but the channel is constantly shifting and should be used only with local knowledge. The controlling depth over the bar is about 7 feet, but depths of less than 2 feet are reported inside the entrance.

Chart 1233.—Cape Lookout is the extremity of a long and very narrow sand beach projecting into the sea where the coast angles sharply westward. **Cape Lookout Light (34°37.3′ N., 76°31.5′ W.),** 156 feet above the water and visible 19 miles, is shown from a black-and-white diagonally checkered tower on the north point of the cape. A radiobeacon is about 1.5 miles south-southwestward of the light, and a Coast Guard station is 0.2 mile north of the radiobeacon.

Cape Lookout Shoals extend about 9 miles south-southeastward from the cape. Their greatest width is about 2 miles, and depths over them range from 2 to 18 feet. **Lookout Breakers** is the local name for the ridge, covered 2 feet, about 5 miles out on the shoals from the cape. Between Lookout Breakers and the cape are several other spots which break heavily.

Outside the shoals proper are two irregular shoals with depths of 28 feet over them. These can be avoided by passing close to the outermost lighted buoy. In thick weather a vessel should stay in depths of 14 fathoms or more if uncertain of its position.

Chart 420.—Lookout Bight, on the west side of the cape, affords good anchorage for large vessels, except with winds from south through west to northwest. This harbor of refuge is protected by a rubblestone breakwater which is awash at low water and hardly visible when a heavy sea is running; its outer end is marked by a lighted buoy. Mariners should give it a wide berth in bad weather.

Good anchorage, with ample swinging room, may be had northeast of the breakwater in 30 to 35 feet, soft mud bottom. This anchorage is not free from swell, however, and small vessels at anchor may be uneasy if the seas are high. Large oceangoing vessels usually anchor north or northwest of the breakwater in 39 to 45 feet, soft sand and mud bottom.

Good anchorage for small vessels can be had in the inner bight south of **Wreck Point** in 14 feet, good holding ground of soft mud. Prevailing swell from the southwest is effectively excluded, but the surrounding terrain is too low to greatly restrain the force of wind. A severe blow from a northerly direction may cause a vessel to drag, but most boats drop an extra anchor if the wind reaches gale force from any direction.

A Federal project provides for a channel 7 feet deep and 100 feet wide from deep water in Lookout Bight through **Barden Inlet** and **Lighthouse Bay** to deep water in Back Sound. In September 1958 the controlling depth was 7 feet. The channel is well marked.

The channels in Back Sound and Core Sound are described in another section.

INLAND WATERS

Charts 1227, 1229.—Currituck Sound is a narrow and shoal body of water which extends for 25 miles in a

north-south direction behind the barrier beach near Currituck Beach Light. The southern part of the sound is navigable for craft drawing 4 or 5 feet to the junction with Albemarle Sound, but navigation among the extensive shoals depends on local knowledge of the channels and on the level of the water. There are no periodic tides in Currituck Sound, the water level depending upon the force and direction of the winds.

Chart 1227.—Back Bay and its connection with Currituck Sound extend a little over 10 miles northward from the northeastern end of the sound. This shoal bay is navigable only for small boats. Northward of Back Bay are shallow **Shipps Bay** and **North Bay.**

North Landing River extends in a north-northwesterly direction from the north end of Currituck Sound. The river is a part of the Intracoastal Waterway and is decribed in Chapter 12.

Naval aircraft bombardment **target areas** are in North Landing River off Troublesome Point, in Currituck Sound east of Bell Point, and north of Currituck Beach Light; limits and regulations are given in **§ 204.54,** Chapter 2.

Chart 1229.—Several small landings are on the east side of **Whale Head Bay,** just southward of Currituck Beach Light.

The landing at **Poplar Branch,** on the western side of the bay, is frequented by local fishermen and duck hunters; gasoline is available. Drafts of 3 feet can come alongside, and craft drawing 2 feet can pass through the channel into **Gaffy Landing,** about 2 miles south of Poplar Branch.

Piper Hill, on the outer beach, about 4 miles east of Poplar Branch, is approached through **Lone Oak Channel** and **Beasley Bay.** Three lights mark the channel. A draft of 2 feet can be carried through the channel but local knowledge is required to make the crossing of Poyner Bar.

Wright Memorial Bridge, over the south end of Currituck Sound between **Sampson Point** and the outer beach, has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 4 feet.

Charts 1228, 1229.—Albemarle Sound is about 45 miles long in an east-west direction, and in width ranges from 11 miles near its eastern end to 3 miles about 10 miles from the western end. The sound has good navigable depths for any vessel able to pass through the canals and, with its numerous tributaries, forms the approach to many towns and landings.

There are depths of 10 to 18 feet along the routes from North River and Pasquotank River to Croatan Sound and Alligator River, and less water farther eastward. Fish stakes and nets, extending long distances from shore are often found on the shoals, especially at the northern entrance to Croatan Sound. The shores of Albemarle Sound are low and generally wooded; there are no prominent natural features.

The eastern end of Albemarle Sound, which is separated from the Atlantic Ocean by the barrier beach about 15 miles north of Bodie Island Light, is connected northward with Currituck Sound and southward with Croatan and Roanoke Sounds, and by the latter sounds with Pamlico Sound.

Westward of Laurel Point, about 33 miles from the east end Albemarle Sound, the water is usually fresh or slightly brackish. The rise and fall of the water level depends on the direction of the winds.

Chart 1229.—Kitty Hawk Bay is at the east end of Albemarle Sound. **Kitty Hawk** is a village just north of the bay. There are several private landings, but not more than about 2 feet can be taken to them.

North River, on the north side of Albemarle Sound near the eastern end, is a part of the Intracoastal Waterway and is described in Chapter 12.

Chart 1228.—Pasquotank River, about 4 miles westward of North River, is marked at its entrance by a light on **Wade Point.** The river and Elizabeth City are described in connection with the Dismal Swamp route of the Intracoastal waterway, Chapter 12. **Flatty Creek,** 3 miles westward of Wade Point, is shoal and little used; depths are about 2 feet over the bar and 3 to 4 inside.

Little River is on the north side of Albemarle Sound and 4 miles westward of Flatty Creek. The channel at the entrance is about 0.3 mile wide between shoals, and is buoyed. The river has a general northwesterly trend to the village of **Nixonton,** which is on the east bank 7 miles above the entrance. The only dock at the village is in ruins. About 7 feet is the deepest draft that can be taken to the village. Spits, with little water over them and generally steep-to, make out some distance in places from the shores, especially off the points. The channel in the upper reaches of the river is well marked by the outer ends of the fish stakes which make out from shore.

Perquimans River, on the north side of Albermarle Sound, has its entrance 3 miles northwestward of **Reed Point Light.** For a distance of 10 miles to the town of Hertford, the river is from 1.5 to 0.8 miles in width and has navigable depths of 11 to 9 feet. At Hertford the narrow part of the river is crossed by a highway swing bridge which has a horizontal clearance of 55 feet in the north draw and 60 feet in the south draw and a vertical clearance of 3½ feet.

Hertford, on the southwest side of Perquimans River, has rail connections and a paved highway leads to Edenton and Elizabeth City. Gasoline, fresh water, and some supplies are available. The wharves at Hertford are above the highway bridge, and except for oil-receiving piers, are in ruins. The river water is fresh at Hertford.

Above Hertford the river is narrow and crooked, but has fairly good depths for about 8 miles to a point near **Goodwin Creek.** Navigation is restricted to very small boats, however, by a closed railroad swing bridge 1 mile above the highway bridge. The railroad bridge has a horizontal clearance of 40 feet and a vertical clearance of 2 feet.

Yeopim River, about 6 miles west of Perquimans River,

is shoal and unimportant. The depth over the bar between **Batts Island** and **Drummond Point** is about 4 feet.

Six miles southwestward from Drummond Point, a highway bridge crosses Albemarle Sound from **Sandy Point** to the south shore. The swing span, near the middle of the bridge, has a horizontal clearance of 140 feet in both openings and a vertical clearance of 14 feet. The fixed spans have a horizontal clearance of 23 feet and a vertical clearance of 14 feet. Four miles westward of the highway bridge, a railroad trestle crosses the sound. About 1.5 miles from the northern end of the bridge is a bascule span with a horizontal clearance of 140 feet and a vertical clearance of 6 feet. Five fixed girder spans, at intervals of about 0.5 mile, have horizontal clearances of 35 feet and vertical clearances of about 8 feet. A bell is struck by hand at the drawspan when the weather is thick or foggy.

Edenton Bay is a small bay on the north side of Albemarle Sound, just westward of the railroad trestle which crosses the sound. The channel into Edenton Harbor is marked by buoys and range lights. The large water tank just west of the rear range light is most prominent from the sound. Also prominent are a brick chimney near the front range and a water tank on the east side of the bay. The reported depth available in the bay was 7 feet in May 1957.

Edenton, a town at the head of the bay, has rail and highway communications with Norfolk and the south. Lumber is shipped by rail and by barge. The main industries are: peanuts, lumber, cotton oil, veneer, and plywood. Gasoline, diesel fuel, water, ice, and supplies are available. The river water is fresh. A U.S. Public Health Service outpatient office is in the town. See Appendix for **storm warning** display.

The city wharf, on which the front range light is located, has 12 feet of water alongside the west bulkhead. The fishhouse wharf and the fuel wharf also have depths of 12 feet. A marine railway can haul out vessels up to 50 feet in length, 5½ feet in draft, and 30 tons in weight. The inner anchorage, which is small and has a depth of about 9 feet, is close eastward of the range line. The larger anchorage is on the west side of the range line. The range lights are difficult to make out because of the automobile lights in town. The range is also hard to see in hazy weather.

Pembroke Creek is a small nontidal stream flowing easterly into the head of Edenton Bay. A row of piles which are submerged at high water bisects the lower part of the creek for some 2,000 feet. About 0.5 mile above the mouth there is a U.S. Fish Hatchery with a small wharf and boathouse. A fixed highway bridge just above the hatchery has a horizontal clearance of 20 feet and a vertical clearance of 6 feet. With local knowledge, a draft of about 5 feet can be carried to the fish hatchery. At a marina opposite the fish hatchery, berthage, gasoline, water, and some supplies are available. Engine repairs are made at the marina.

Chowan River empties into the western end of Albemarle Sound from northward, and with its tributaries forms one of the largest rivers in North Carolina. A controlling depth of about 11 feet is available to the confluence of Blackwater and Nottoway Rivers, 45 miles above the mouth. For about 17 miles above its mouth the river has an average width of 1.5 miles. Snags, many of which are under water, are generally found on the shoals in this part of the river; the worst place, known as **Stumpy Reach,** is between Colerain Landing and **Bennetts Creek,** a distance of about 6 miles.

Salmon Creek is a small stream which flows easterly into Chowan River just above the mouth. The entrance to the creek is a good harbor for boats of drafts up to 6 feet. **Avoca** is a village on the south bank about a mile above the entrance.

The highway bridge about 2 miles above the mouth of Chowan River has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 4 feet.

Colerain Landing, on the west bank about 12 miles above the entrance, is the site of a large herring factory. Just above it is an oil-pumping dock, in poor condition. The village of **Colerain** is on a hill 0.5 mile inland.

Tunis, a landing on the south bank of Chowan River and east of the Atlantic Coast Line Railroad crossing, is about 30 miles above the river mouth. The railroad bridge has a hand-operated swing span with a horizontal clearance of 54 feet and a vertical clearance of 5 feet. A bridge tender is on duty from 6 a.m. to 10 p.m.

Tuscarora Beach is about a mile above the railroad bridge at Tunis. A yacht basin has a service pier with depths of 10 feet alongside and berthage for boats with drafts up to 6 feet; gasoline, water, electricity, and groceries are available.

Winton is a small town on the west bank of the river 32 miles above its mouth. Gasoline and some supplies can be obtained in the town. The highway bridge across the river at Winton has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 5 feet. A small wharf is above the bridge, and another is below the bridge and eastward of a ramp used by barges for loading plywood.

Meherrin River joins the Chowan River from westward about 2.5 miles above Winton. About 0.4 mile above the mouth of the river there is a cable ferry. **Murfreesboro,** a village 10.5 miles above the mouth, has a fixed highway bridge with a horizontal clearance of 80 feet and a vertical clearance of 24 feet. In April 1958 it was reported that drafts of about 7 feet could be taken to Murfreesboro, and the turning basin there had a reported depth of 6 feet.

About 13 miles above Winton, Chowan River is formed by the confluence of **Blackwater River** and **Nottoway River.** In April 1958 the controlling depth in Blackwater River was reported to be 7 feet to **Franklin,** where there is a wharf. Small craft are able to reach **Burdette,** 10.5 miles above Franklin. A highway bridge across Blackwater River 8 miles above its mouth has a horizontal clearance of 60 feet and a vertical clearance of 15 feet. Navigation of Nottoway River is restricted by fixed bridges; the minimum vertical clearance is 10 feet.

Roanoke River rises in the Blue Ridge mountains, west of Roanoke, Virginia, and flows southeasterly for about

175 miles to Clarksville, Virginia, where it is joined by **Dan River,** its principal tributary; thence it flows in the same general direction for about 170 miles and empties into **Batchelor Bay,** a shoal bight at the southwestern end of Albemarle Sound. The river is subject to frequent and sudden freshets which overflow large areas of the lowland on both banks. Strangers are advised to take a pilot at Edenton.

A Federal project provides for a channel 12 feet deep and 150 feet wide to a mile above Plymouth, thence 10 feet deep and 100 feet wide to **Hamilton,** and thence 8 feet deep to **Palmyra Landing,** with a cutoff channel 8 feet deep about 1.7 miles above Hamilton. Controlling depths in July 1958 were 11½ feet to Plymouth, 8 feet to Hamilton, and thence, in 1952, 2½ feet to Palmyra Landing.

Plymouth is an important town 6 miles above the mouth of Roanoke River. The town has good highway and rail connections. Fresh water, gasoline, diesel fuel, and provisions are available. There are several small wharves at Plymouth. A veneer factory is on the river front below the town, and 1 mile above the town is the large wharf of a pulp mill.

Williamston is 26 miles above the mouth of the river. The highway bridge at Williamston has a swing span with a horizontal clearance of 83 feet and a vertical clearance of 17½ feet at low water and 4½ feet at high water. Just below the bridge are a fertilizer plant and an oil dock. Several oil piers are above the bridge. Logs and oil comprise most of the shipping.

Cashie River flows southeasterly about 50 miles to its intersection with the **Thorofare,** connecting Cashie and Roanoke Rivers; thence it flows northeasterly about 6 miles and empties into Batchelor Bay. In October 1956 the controlling depth was 9½ feet to Windsor.

The Thorofare has several sharp bends, and at its junction with the Cashie River there are two small islands. Pass eastward of the islands. The head of navigation in Cashie River is the fixed highway bridge at **Windsor.** Gasoline and some supplies are available.

Kendrick Creek is on the south side of Albemarle Sound just westward of the railroad trestle which crosses the sound. Several fishhouses and a small cannery are here. Gasoline, fresh water, and groceries are available. In May 1958 the available depth was reported to be 7 feet.

The channel into Kendrick Creek is marked on either side by rows of piles. There are stumps in places on the shoals at the mouth of the creek. The Norfolk Southern Railway bridge just above the mouth has a swing span with a horizontal clearance of 32 feet and a vertical clearance of 9 feet. Operating regulations are given in **§ 203.245,** Chapter 2. **Mackeys** is a village 0.5 mile above the entrance. The fixed highway bridge about 0.5 mile above Mackeys has a horizontal clearance of 34 feet and a vertical clearance of 8 feet. The head of navigation is at **Roper,** 6 miles above the mouth.

Bull Bay is on the south side of Albemarle Sound, 7 miles eastward of the highway bridge which crosses the sound. Several small creeks empty into the western side of the bay. A channel with a depth of about 7 feet leads through the flats to the entrances of the creeks.

Scuppernong River empties into the eastern end of Bull Bay from southeastward. Lights mark the entrance from the bay, and there are buoys at critical points between the entrance and Columbia. The controlling depth in June 1959 was 10 feet from the mouth to Columbia, and thence about 8 feet to Spruills Bridge and 4 feet to Cherry.

Columbia, a village 4 miles above the mouth of the river, has two oil docks and several landings. The landings have a depth of 9 feet alongside, but are in poor condition and not able to accommodate more than one boat at a time. Gasoline, diesel fuel, and some supplies are obtainable.

The first of two highway bridges at Columbia has a swing span with a horizontal clearance of 38 feet in the east draw and 43 feet in the west draw, and a vertical clearance of 2½ feet. The fixed highway bridge has a horizontal clearance of 35 feet and a vertical clearance of 12 feet; the navigation span of this bridge is removable. See Appendix for **storm warning** display. An overhead power cable at Columbia has a clearance of 76 feet.

Cross Landing Bridge, 12 miles above the mouth of Scuppernong River, has a swing span with a horizontal clearance of 42 feet and a vertical clearance of 1½ feet. **Spruills Bridge,** 15 miles above the mouth near **Creswell,** has a swing span with a horizontal clearance of 30 feet and a vertical clearance of 3½ feet; operating regulations for these bridges are given in **§ 203.245,** Chapter 2.

Alligator River is on the south side of Albemarle Sound directly opposite Pasquotank River. For about 18 miles above the mouth (see also Chart 1231), Alligator River has a southerly direction, is 2 to 3 miles wide, and has general depths of 8 to 11 feet. Above this, the river has a further length of about 24 miles, is narrow and crooked, but has depths of 6 feet or more nearly to its head; the upper part, however, is too narrow to turn in. Logs are towed from the river in barges and rafts.

The entrance to Alligator River is full of shoals, but the channel of the Intracoastal Waterway, described in Chapter 12, has been dredged through the shoals and along the entire length of the wider part of the river.

On the eastern side of Alligator River and just above the mouth is the entrance to **East Lake** and **South Lake,** which have general depths of 6 to 8 feet. The village of **East Lake** is on the east side of the river, 4 miles above the mouth. There is regular ferry service between East Lake Landing and Sandy Point on Alligator River.

Little Alligator River empties into Alligator River from westward just inside the entrance. The narrow, crooked channel of Little Alligator River has depths of 6 feet for about 6 miles to a landing at the head of the river where gasoline, diesel fuel, water, and provisions are obtainable.

Chart 1229.—Croatan Sound, between Roanoke Island and the mainland, connects Albemarle and Pamlico Sounds. In November 1957 the controlling depth through the dredged channel was 9 feet. The channel is well marked by lights and buoys, but strangers should not

attempt passage at night. Fish stakes are numerous in season.

Height of water in Croatan Sound depends entirely on the wind, which may under exceptional conditions lower or raise the level as much as 1½ feet from the normal; easterly winds lower the water and westerly winds raise it. Strong northerly or southerly winds produce currents which are especially marked when the wind shifts suddenly to the opposite direction.

There is a good harbor in **Peter Mashoes Creek,** westward of Croatan Light, but entrance is possible only for small craft. The fixed highway bridge between **Redstone Point** on the mainland and **Weir Point** on Roanoke Island has a horizontal clearance of 80 feet and a vertical clearance of 40 feet.

Roanoke Sound and the towns on the east side of Roanoke Island are described in another section.

Charts 1229, 1231, 1232.—Pamlico Sound, the largest body of water in North Carolina, is separated from the Atlantic Ocean by a narrow beach extending from Bodie Island Light to Cape Hatteras, a distance of about 35 miles. From Croatan Sound to the mouth of Neuse River, the distance through the middle of Pamlico Sound is about 65 miles; maximum width is about 25 miles. Oregon, Hatteras, and Ocracoke Inlets pierce the narrow beach, giving access to the ocean, but all are blocked by inside bars with little depth over them; they are described in another section.

The northern and western shores of Pamlico Sound are broken by numerous small bays and two large rivers, Pamlico River and Neuse River. General depths in the middle of the sound are 14 to 24 feet, but shoals extend miles from shore in many places. Bluff Shoal, northward of Ocracoke Inlet, has 7 to 12 feet over it and extends completely across the sound.

In the exposed parts of the sound, strong winds from any direction raise a short, choppy sea uncomfortable to small craft and even dangerous to open boats; but protected anchorage for small craft can be found in the many bays along the northern shore, and along the southern shore in several sloughs which lead to sheltered berths in the lee of shoals. Middletown Anchorage and the anchorage in the bight formed by the hook of Royal Shoal can be made either day or night.

Tides at the inlets have a range of about 2 feet. In other parts of the sound the periodic tide is less than ½ foot. Easterly and westerly winds produce the greatest change in water level. **Currents** are negligible except in the vicinity of the inlets.

Chart 1229.—Stumpy Point Bay, on the west side of Pamlico Sound 10 miles from the south end of Roanoke Island, affords good anchorage in depths of 3 to 4 feet. A Federal project provides for a channel 7 feet deep from Pamlico Sound through Stumpy Point Bay to a basin of the same depth at **Lake Worth,** the village at the head of the bay. The controlling depth was 5½ feet in the channel in June 1958, and shoaling to 3 feet at the junction of the channel and the basin was reported in April 1958. A fishhouse and landing at the upper end of the basin have gasoline and diesel fuel available.

Stumpy Point is a small village on the east side of Stumpy Point Bay. At the village there is a fishhouse where gasoline, diesel fuel, and water are available, and a marine railway can haul out vessels up to 50 feet in length, 15 tons in weight, and 5 feet in draft.

Long Shoal River, which flows southerly into Pamlico Sound about 8 miles southwestward of Stumpy Point Bay, is 1.5 miles wide at the mouth, and is a good anchorage for vessels with drafts of 8 feet or less. Shoals with 1 to 2 feet over them on both sides of the entrance break up the sea from southward. The channel has a depth of 9 feet to an anchorage off **Pains Bay,** thence 7 feet for 1 mile, thence 4 feet for 2 miles. **Long Shoal,** to the east of the entrance, and **Pingleton Shoal,** on the west, are marked by lights, and buoys mark the points of shoals in the entrance. In a smooth sea vessels of less than 7-foot draft can cross Long Shoal just northwest of the light. With the aid of the chart, strangers should have little difficulty entering Long Shoal River in daytime.

The village of **Rodanthe** is on the narrow barrier beach 12 miles southward of Oregon Inlet on the east side of Pamlico Sound. Two landings are in the basin at the village in addition to the bulkheaded area. In April 1958 the controlling depth was reported to be 3½ feet in the channel and 7 feet in the basin.

Chart 1232.—The village of **Avon** is on the barrier beach, 6 miles north of Cape Hatteras on the southeast side of Pamlico Sound. Gasoline and diesel fuel can be obtained at the fishhouse landing. Hotel accommodations are available. Shoal water extends about 3 miles from shore. **Cape Channel,** a natural opening in the shoal southwest of the village, has a controlling depth of about 6 feet.

A Federal project provides for a channel 6 feet deep and 100 feet wide from the sound to Avon, with a basin at the shore end. In 1958 the controlling depth was 6 feet. The channel is well marked.

Buxton is a small village about a mile north-northwest of Cape Hatteras Light. The village of **Frisco** is about 4 miles westward, on the southeast side of Pamlico Sound. There are no wharves at either place, and anything but a light-draft boat must anchor well offshore. Local fishermen usually approach Buxton through Cape Channel.

Rollinson Channel extends from deep water in Pamlico Sound to the basin at Hatteras, and is well marked. A Federal project provides for a channel 6 feet deep from the sound to the basin. In July 1958 the controlling depth was 5½ feet in the channel, and in March 1958 a depth of 8 feet was reported in the basin. Hatteras Inlet and the facilities at Hatteras are described in another section.

Far Creek, on the northwest side of Pamlico Sound between Pingleton Shoal and **Gibbs Shoal,** leads to the town of **Engelhard,** which is connected with the interior by a paved highway. An oil dock and several small landings are just below the fixed highway bridge. Barges go

to the grain elevator landing. Gasoline, diesel fuel, ice, and some supplies are available in the town.

A Federal project provides for a channel 12 feet deep from Pamlico Sound to about 200 feet below the highway bridge at Engelhard, with a turning basin of the same depth. In June 1959 the controlling depth was 9 feet. The channel is well marked.

Middletown Anchorage, a broad open bight in the northwestern shore of Pamlico Sound, has depths of 9 to 13 feet and is sheltered from eastward by Gibbs Shoal, which has 1 to 4 feet over it. There is no shelter from southeasterly or southerly winds. The anchorage is large and easy of access, and is used by tows and other vessels. **Middletown** is a short distance inland from the anchorage, and is reached by light-draft boats by way of **Middletown Creek.** Vessels must pass south of the light on the southeast end of Gibbs Shoal in entering. The entrance to Middletown Creek is restricted as there is only 1 foot of water on the bar. Gasoline is obtainable in the village.

Caution should be used in approaching Middletown Anchorage at night, as the low marshy shore extends long distances from the woods in places and does not show well. In rough weather vessels with drafts less than 5 feet prefer to pass inside Gull Shoal Light when bound southwestward from Middletown Anchorage. They enter Wysocking Bay, pass westward of Gull Rocks, and thence eastward of the light 0.4 mile eastward of **Hog Island.**

Wysocking Bay indents the north shore of Pamlico Sound northwestward of Gull Shoal Light. It is a convenient anchorage for small craft drawing less than 6 feet when following the north shore of the sound. The entrance is obstructed by shoals, through which a buoyed channel leads northward of **Gull Shoal** and into the bay. **Gull Rocks,** on the south side of the entrance to the bay, are covered at ordinary water levels.

A canal with a depth of about 2 feet leads from the head of Wysocking Bay to **Nebraska,** a village 2 miles inland where gasoline and supplies can be obtained. The lower part of the canal has filled in so that boats going to Nebraska must enter the old cut at the upper light; local knowledge is required. A fixed bridge crosses the canal at Nebraska.

Chart 1231.—Bluff Point, low and marshy, separates **East Bluff Bay** and **West Bluff Bay,** two unimportant bights southwestward of Wysocking Bay. A light marks the end of the shoal making eastward from Bluff Point. Extending southward from Bluff Point is a large area of shoal water, a tongue of which, called **Bluff Shoal,** extends completely across Pamlico Sound. Depths on Bluff Shoal are 7 to 12 feet, and the best crossing is marked by **Bluff Shoal Light.** A 12-foot slough through the shoal is 1 mile northward of the light and is marked on its south side by a buoy. A buoy also marks the 4-foot shoal 2 miles south-southeastward of Bluff Point.

Juniper Bay, on the north side of Pamlico Sound 4 miles westward of Bluff Point, is about 1.5 miles wide at the entrance, but narrows gradually toward its head, and dwindles to a narrow, crooked stream 3 miles above the entrance. Shoals extend from both shores, but the middle of the bay has depths of 7 to 10 feet. The bay has considerable traffic in small craft with drafts less than 5 feet; these make the passage to and from Belhaven by way of Swanquarter Narrows, Swanquarter Bay, and the canal to Deep Bay.

Great Island, on the west side of the approach to Juniper Bay, is low and grassy. **Swanquarter (Great Island) Narrows,** between the island and the mainland to the north, is navigable for vessels of 6-foot draft. A light marks the western entrance to the narrows.

Swanquarter Bay, northwestward of Great Island, is about 2 miles wide at the mouth, but narrows gradually toward its head 4 miles above. Depths in the bay are 7 to 12 feet to abreast the town of Swanquarter. The natural channel is marked by lights and buoys. Oyster beds are numerous in the bay.

Swanquarter, the seat of Hyde County, is the center of trade for much of this area. The town connects with the interior by a hard-surfaced highway via Bellhaven and Washington. Gasoline, diesel fuel, and water are obtainable at the town.

Swanquarter Canal connects Swanquarter Bay with Deep Bay. In April 1958 the reported depth was 5½ feet in the canal, but shoaling in the cut makes navigation dangerous and it should be attempted only with local knowledge.

Rose Bay, westward of Swanquarter Bay on the north side of the entrance to Pamlico River, is 1.8 miles wide at the entrance, but shoals extending from both sides restrict the entrance channel to a width of 0.6 mile. The channel has depths of 8 feet or more for 4 miles from the entrance, is marked by the entrance light and several buoys, and is used mostly by local fishing boats.

Deep Bay, leading eastward from just inside the entrance of Rose Bay, is the approach to the land cut to Swanquarter Bay. Local vessels of 4 to 5 feet draft generally use this route. A narrow channel, locally known as **The Blowout,** has been cut through the narrow neck of **Judith Island** from Deep Bay to **Deep Cove** on the Pamlico Sound side. The channel is used considerably by local fishermen, but strangers should not attempt it.

Pamlico River and Tar River are the two names applied to the same river; it is known as the Pamlico below Washington, North Carolina, and as the Tar above that point. The river rises in Person County, flows in a general southeasterly direction for 190 miles, and empties into the northwestern part of Pamlico Sound. Pamlico River has depths of 12 feet or more for a distance of 20 miles above the mouth; above that point the river has been improved by dredging.

Pamlico River is nontidal; variations in the water level at Washington, due to prevailing winds, seldom exceed 2 feet. The extreme range of the flood or freshet stage for Tar River is 34 feet at Tarboro, 75 miles above the mouth. For the lower section, the extreme range due to winds is 8½ feet.

Pungo River, which empties into Pamlico River from northward about 5 miles above the mouth, has a channel well marked by buoys and lights, and can be readily followed by a stranger for 15 miles. The river then nar-

rows, but the least channel depth is about 8 feet to **Leechville,** a village 18 miles above the mouth. The fixed highway bridge over the river at Leechville has a horizontal clearance of 30 feet and a vertical clearance of 9 feet. Tributaries to the Pungo River include several navigable creeks from which logs are towed to Belhaven. The most important are Slade, Scranton, Wilkerson, Pungo, and Pantego Creeks. The route of the Intracoastal Waterway, described in Chapter 12, follows Pungo River from Wilkerson Creek to and across Pamlico River.

Slade Creek, which empties into Pungo River from eastward about 4 miles above the mouth, has depths of 8 feet or more for 2 miles from the mouth, and 4 feet for 2 miles farther.

Pungo Creek empties into Pungo River from westward about 8 miles above the mouth of the river and 1.5 miles southwestward of Belhaven. A highway bridge 2.5 miles above the mouth of the creek has a fixed span with a horizontal clearance of 32 feet and a vertical clearance of 8 feet. The creek has depths of 7 feet or more to the bridge and thence 6 feet for about 2 miles.

Pantego Creek empties into Pungo River from northward about 9 miles above the mouth of the river. Timber breakwaters extend from both shores of the entrance. The outer end of the north breakwater is marked by a light.

Belhaven, on the northeastern side of the entrance to Pantego Creek, has an excellent harbor for small craft. There are several wharves at the town; the cooperage company wharf has a depth of about 10 feet at the outer end, and an oil dock has a depth of about 9 feet alongside.

Belhaven is connected with the interior by highway and railroad; oysters, crabs, and lumber are shipped from the town. Gasoline, diesel fuel, water, ice, provisions, ship chandlery, and hotel accommodations are available. A marine railway at the town can haul out vessels up to 55 feet in length and 4 feet in draft.

The breakwaters are in fair condition. In December 1957 the controlling depth was 11 feet in the channel and at the upper end of the basin. A fixed highway bridge over Pantego Creek just above Belhaven has a horizontal clearance of 32 feet and a vertical clearance of 14 feet. The creek has a depth of 7 feet for a distance of about a mile above the bridge.

Goose Creek empties into Pamlico River from southward about 7 miles above the mouth of the river. The dredged channel of the Intracoastal Waterway crosses the shoals which obstruct the mouth of the creek, and passes southward to **Upper Spring Creek** and the land cut which connects with Bay River. Logs are towed from Goose Creek.

Chart 537.—South Creek empties into Pamlico River from southward about 9 miles above the entrance. The deeper entrance is southward of **Indian Island** and the shoal extending westward from that island to **Hickory Point.** South Creek has depths of 7 feet or more for 4 miles above Hickory Point; above this the creek has been improved by dredging. A depth of about 6½ feet can be taken across the shoal west of Indian Island; a light and buoys mark the best water.

In July 1958 a depth of 6 feet could be taken to Aurora, and thence about 5 feet to Idalia.

Bond Creek, on the south side of South Creek opposite Hickory Point, has depths of about 6 feet to the small fish wharf at the village of **South Creek.** Buoys mark the entrance to Bond Creek.

Aurora, a village with rail connections, is 7 miles above Hickory Point. Gasoline and some supplies are available. There are depths of about 7 feet alongside the docks. The fixed highway bridge over South Creek at Aurora has a horizontal clearance of 38 feet and a vertical clearance of 9 feet; about 500 yards below this bridge is an overhead power cable with a clearance of 33 feet. Small boats use the creek as far as **Idalia,** 2.3 miles above Aurora.

North Creek empties into Pamlico River directly opposite South Creek. The channel has depths of 6 feet or more for about 1.5 miles and is buoyed at the entrance, but its navigation should not be attempted by strangers. Some lumber is shipped from North Creek.

Durham Creek empties into Pamlico River from southward 17.5 miles above the mouth and 2.5 miles westward of **Rumley Marsh Light.** The creek has depths of 3 feet or more nearly to **Bonnerton,** 4 miles above the entrance.

Bayview is a pleasure resort on the north bank of Pamlico River 2 miles above Rumley Marsh Light. Small tourist cabins are available, and a good secondary road connects with the paved highway about 7 miles northward. The nearest rail connections are at Washington, about 20 miles distant by highway. Several privately owned docks at Bayview can accommodate small yachts.

Bath Creek flows southerly into Pamlico River 3.5 miles above Rumley Marsh Light and has depths of 7 feet or more for 1.8 miles to the bridge at the village of **Bath,** and 5 feet for about 1.7 miles farther. The most difficult part of the channel to Bath is the entrance, where a shoal with grass showing extends halfway across from the west side and drops off abruptly. The outer edge of the shoal is marked by a light.

The highway bridge at Bath has a swing span with a horizontal clearance of 39 feet and a vertical clearance of 4½ feet; operating regulations are given in **§ 203.245,** Chapter 2. An overhead cable at the bridge has a clearance of 60 feet. The dock below the bridge has a depth of about 9 feet alongside, and the depth along the bulkhead north of the bridge is about 6 feet. Gasoline and some supplies are available at Bath.

Blounts Creek flows northerly into **Blounts Bay,** which is on the south side of Pamlico River, about 25 miles above the mouth. A fixed bridge 0.2 mile above the entrance to the creek has a horizontal clearance of 33 feet and a vertical clearance of 14 feet. The creek has depths of 6 feet or more for about 1 mile above the bridge and 3 feet for an additional 2 miles.

Washington, 32 miles above the mouth of Pamlico River, is the seat of Beaufort County and an important business center with communications extending to nearly all points on Pamlico River and Pamlico Sound. The city has excellent rail and highway connections, and there is weekly freight-boat service to Ocracoke Island. Gasoline, oil, grain, and sugar are the principal items shipped by water.

Washington has hotel accommodations. Gasoline, diesel fuel, water, ice, and ship chandlery are available. A small marine railway can haul out vessels up to 75 feet in length and 8 feet in draft, and minor repairs are made on hulls and engines. The river water above Bath Creek is usually fresh enough for boilers. A U.S. Public Health Service outpatient office is here. Marine documents are issued. See Appendix for **storm warning** display. The Coast Guard Depot is just eastward of the highway bridge.

The channel to Washington is well marked. Controlling depths in January 1958 were 11 feet from the mouth to Washington, and 7 feet from Washington to Hardee Creek, a distance of 15 miles; and thence, in July 1956, 2½ feet to Greenville an additional distance of 4 miles. Two bridges at Washington have swing spans with minimum clearances of 60 feet horizontally and 7 feet vertically. The overhead power cable at the upper bridge has a permit clearance of 75 feet. The highway bridge about 7 miles above Washington has a swing span with a horizontal clearance of 55 feet and vertical clearances of 5½ feet at extreme high water and 10½ feet at low water.

Chart 1231.—Mouse Harbor, Big Porpoise Bay, and **Middle Bay** are small unmarked shallow bays on the east side of Goose Creek Island on the western side of Pamlico Sound between Pamlico River and Jones Bay. Small-boat passages connect Mouse Harbor with Clark Creek, on Pamlico River, and Big Porpoise Bay with Middle Bay. Neither is over 2 feet deep. The three bays are frequented only by local fishermen.

Jones Bay, on the western side of Pamlico Sound just northward of the entrances of Bay and Neuse Rivers, has depths of 7 feet or more for 4 miles above its mouth. The entrance is somewhat obstructed by shoals through which a marked channel leads into the bay. On the north side, near the head of the bay, is the village of **Hobucken.** Small craft bound for the village can land in the cove 0.8 mile above **Drum Creek. Ditch Creek,** on the opposite side of the bay from Drum Creek, leads to an old canal through which small boats can be taken at high water to Bay River. Hobucken is discussed further in Chapter 12 in connection with the Intracoastal Waterway which crosses the head of Jones Bay and links it with Goose Creek on the north and Bay River on the south.

The approach to Jones Bay from eastward is over or around **Brant Island Shoal,** which extends for 10 miles in a southeasterly direction from the north side of the entrance to the bay. For 6 miles to Brant Island Slue Light the shoal has depths of 2 to 3 feet; between that light and Brant Island Shoal Light at the outer end are depths of 5 to 8 feet.

The **danger zone** of a bombing and rocket firing area is in Pamlico Sound near Brant Island; limits and regulations are given in **§ 204.55,** Chapter 2.

Bay River empties into the western part of Pamlico Sound between Jones Bay and the mouth of Neuse River. The entrance is marked on the south side by a lighted bell buoy, and on the north side by Bay Point Light. For 11 miles above the entrance, the channel is marked by lights and buoys, has depths of 9 feet or more, and can be followed readily. Above this point a channel has been dredged to Bayboro, which is practically the head of navigation. The route of the Intracoastal Waterway is along Bay River for 4 miles from the mouth, thence northward through **Gale Creek.**

Vandemere is a village on the north side of Bay River 8 miles above the mouth. Gasoline, diesel fuel, and some supplies are available. There is a marine railway that can haul out vessels up to 60 feet in length and 6 feet in draft, and machine shop with engine repair service.

Stonewall is a small village on the south side of the river 13 miles above the mouth; most of its docks are in ruins. About 0.7 mile above Stonewall is an overhead cable with permit clearance of 65 feet.

Bayboro, 14 miles above the mouth of the river, has docks in fair condition on the east side of the creek leading to Mill Pond. Depths at the oil and fish docks are 8 to 10 feet. Gasoline, ice, and some supplies are obtainable here. Lumber and pulpwood are shipped out by rail. Navigation above Bayboro is restricted by fixed bridges at the village. In 1953 the controlling depth was 10 feet to Bayboro and 9½ feet to Vandemere.

Neuse River rises in the northern part of North Carolina and flows for about 250 miles in a general east-southeasterly direction into the western end of Pamlico Sound. Its mouth is about 5 miles wide, but is reduced to a navigable width of about 2 miles by shoals which extend from either side. The river has depths of 13 feet or more for 25 miles above the mouth; above that point it has been improved by dredging. Lights and buoys mark the channel as far as New Bern.

Tides.—Neuse River has practically no tide, the variation in water level being due principally to winds. Easterly winds cause high water and westerly winds low water, the maximum variations with heavy gales amounting to about 2 feet above or below the normal in the lower part of the river, and about 3 or 4 feet at New Bern. Freshets of 10 to 20 feet occur in the upper reaches of the river above New Bern, but have little effect at or below the town.

Broad Creek empties into the north side of Neuse River about 4 miles above the mouth. A light marks the west side of the entrance to the creek. **Pamlico** is a village on the south side of the creek, 2.5 miles above the entrance; **Whortonsville** is about 0.5 mile northeast of Pamlico, on the opposite side of the creek. Gasoline is available at the piers in both villages, but only small craft drawing 2 feet or less should attempt to go to either place. Minor logging operations are conducted in Broad Creek.

South River flows into the south side of Neuse River about 8 miles above the mouth. The entrance is marked by buoys and a light. The channel has depths of 8 feet or more for about 6 miles above the entrance.

Chart 538.—Garbacon Shoal extends halfway across Neuse River from the southern shore 10 miles above the mouth, leaving a clear width of about 0.8 mile between the 12-foot contours. The outer end of the shoal is marked by a lighted bell buoy.

Oriental is a small town on the north side of Neuse River about 11 miles above the mouth. In March 1958 the controlling depth was 10 feet to the village. Gasoline, diesel fuel, water, ice, and some supplies are available. There is excellent anchorage for small boats. A marine railway can haul out vessels up to 50 feet in length and 6 feet in draft, and some engine repairs can be made. Oysters and fish are trucked to the interior.

On the west side of Oriental is the entrance to **Smith Creek,** which is joined just inside the entrance by **Greens Creek.** A fixed highway bridge 0.2 mile above the entrance to Smith Creek has a horizontal clearance of 36 feet and a vertical clearance of 17 feet. An overhead cable with a clearance of 28 feet crosses the creek at Blackwell Point. An abandoned railroad bridge across Morris Creek about 1 mile above the highway bridge has a fixed span with a horizontal clearance of 11 feet and a vertical clearance of 6 feet.

Adams Creek empties into the south side of Neuse River about 13 miles above the mouth. The creek is part of the Intracoastal Waterway and is described in Chapter 12.

Clubfoot Creek flows into Neuse River from southward about 15 miles above the mouth. The entrance is marked by a light. The channel southward of the light is narrow with shoals rising abruptly on both sides. Depths in the channel are 5 feet or more for 2 miles above the light.

Hancock Creek is on the south side of Neuse River about 20 miles above the mouth. A depth of about 8 feet can be carried through the narrow entrance to the **Cherry Point** wharf just inside by following the lighted range. The depth at the wharf is about 12 feet. A **restricted area** at the Cherry Point Marine Air Corps station is described in § **207.164,** Chapter 2.

Slocum Creek, on the south side of Neuse River 22 miles above the mouth, has depths of 4 feet or more for 4 miles to the forks, and up the west branch for 1 mile farther to **Havelock,** a village with rail connections. Lights, daybeacons, and buoys mark the critical part of the channel at the entrance to the creek. An overhead cable with a permit clearance of 39 feet crosses the creek 2.9 miles above the entrance, and a fixed highway bridge with a horizontal clearance of 12 feet and a vertical clearance of 11½ feet crosses 3 miles above the entrance.

Beard Creek is on the north side of Neuse River opposite Slocum Creek. The mouth of the creek is marked by a daybeacon. Good anchorage may be found off the eastern side of the entrance.

Goose Creek, on the northeast side of Neuse River 27 miles above the mouth, has depths of 5 feet or more for 3 miles above the entrance. **Upper Broad Creek,** on the northeast side of Neuse River 28 miles above the mouth, has depths of 5 feet or more for several miles above the entrance. The overhead cable 3.8 miles above the mouth at **Lees Landing** has a clearance of 40 feet.

New Bern, a city on the west bank of Neuse River 34 miles above the mouth, is the seat of Craven County and an important commercial center for this area. The rectangular lighted clock tower atop City Hall is visible for 10 miles down river and is an excellent landmark. Vessels proceeding up the river to New Bern are advised to stay in the channel because of the numerous fish traps scattered indiscriminately throughout the unmarked areas. The river is slightly brackish except during freshets. Some lumber is shipped by barge. Gasoline, diesel fuel, water, ice, and some supplies are available. Two shipyards are on Trent River; the larger, just eastward of the highway bridge, has five marine railways that can haul out vessels up to 205 feet in length, 38 feet in width, 12 feet in draft, and 1,000 tons in weight. Major hull and engine repairs can be made, and ship chandlery is available. On the south side of the river just westward of the highway bridge, a boat repair and storage yard has a marine railway that can haul out vessels up to 50 feet in length, 4 feet in draft, and 25 tons in weight for general hull and engine repairs. Three piers 200 feet long have depths of 11 feet alongside. Dry storage for 50 boats is available.

A U.S. Public Health Service outpatient office is here. See Appendix for **storm warning** displays. A Coast Guard patrol boat is based at the city.

A Federal project provides for a channel 12 feet deep to New Bern. In October 1957 the controlling depths were 12 feet to the highway bridge at New Bern, thence 4 feet to 20 miles above the bridge, thence 2½ feet for 8 miles to the mouth of **Contentnea Creek,** and thence 1 foot for 37 miles to **Seven Spring.** Strangers should not attempt to navigate the river above New Bern.

The highway bridge over Neuse River at New Bern has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 13 feet. The railroad bridge 0.9 mile above the highway bridge has a swing span with a horizontal clearance of 58 feet and vertical clearance of 0 feet at extreme high water and 2½ feet at low water. The overhead power cable at the railroad bridge has a permit clearance of 50 feet over the main channel.

Trent River empties into Neuse River on the south side of New Bern. In 1957, depths available were 12 feet along the New Bern waterfront, thence 6 feet for about 14 miles to Pollocksville, and thence 3½ feet for 19 miles to Trenton.

The highway swing bridge over Trent River at the mouth has a horizontal clearance of 78 feet and a vertical clearance of 13 feet. The railroad bridge has a swing span with a horizontal clearance of 39 feet and a vertical clearance of 0 feet. An overhead power cable 4.3 miles above the mouth has permit clearance of 48 feet.

At **Pollocksville,** 15 miles above the mouth, there is a railroad bridge with a lift span that has a horizontal clearance of 40 feet and a vertical clearance of 2 feet down and 25 feet up, and a highway swing bridge that has horizontal clearance of 34 feet and vertical clearance of 3 feet.

Operating regulations governing the drawbridges above New Bern are given in § **203.245,** Chapter 2.

Brice Creek enters Trent River from the east about 1.7 miles above the mouth. The natural depths in the creek are 8 to 26 feet for 2.6 miles. A highway bridge 1 mile above the mouth has a swing span with a horizontal clearance of 58 feet and vertical clearance of 6 feet.

Chart 1231.—West Bay is a large irregularly shaped body of water on the southwest side of Pamlico Sound just southward of Neuse River entrance. The shores of the bay and its numerous branches are marshy, and it is of little importance other than for its oyster beds. A depth of 9 feet can be taken into the three principal arms of the bay through narrow and devious channels. Lights and buoys mark the entrance to West Bay and the channel in the middle arm.

Hook-shaped **Royal Shoal** extends northwestward from the vicinity of Ocracoke Inlet. The shoal is marked by lights. Tows and other vessels sometimes anchor inside the hook when the seas are too rough to make headway in the sound. The shoal, which bares in one place and elsewhere is covered 1 to 4 feet, breaks the seas so as to leave comparatively smooth water in the anchorage. Depths in the anchorage are 9 to 14 feet over good holding ground.

Charts 419, 420.—Core Sound extends southwesterly along and just inside the barrier beach from the south side of Pamlico Sound to Cape Lookout, a distance of about 27 miles; the width varies between 2 and 3 miles. The sound is mostly shoal but an improved channel, well marked by lights, extends along its entire length. Behind Cape Lookout, Core Sound is joined by Back Sound and The Straits, both of which connect with Beaufort Harbor.

Tidal currents of 1 to 2 knots may be found in the southern part of Core Sound. A mean range of about 1 foot of tide is now experienced in the sound due to the forming of Drum Inlet.

A Federal project provides for a channel 7 feet deep and 75 feet wide from Pamlico Sound to Beaufort Harbor by way of Wainwright Slue, Core Sound, The Straits, and Taylor Creek. Project depth obtained in 1958.

Chart 419.—Wainwright Slue is a small anchorage in the northeastern entrance to Core Sound. Shelter from the sea is provided by surrounding shoals, which have depths of 1 to 3 feet over them. Depths in the anchorage are 8 to 10 feet. The channel into Core Sound is through Wainwright Slue and east of **Wainwright Island.**

Thorofare Bay is on the northwest side of Core Sound and 8 miles from the northeastern entrance. In June 1957 the controlling depth was 4 feet.

The **Thorofare,** a convenient passage from Core Sound to the mouth of Neuse River, is used by local fishermen. The critical part of the channel is marked by daybeacons and lights. A highway bridge near its eastern end has a swing span with a horizontal clearance of 30 feet and a vertical clearance of 8 feet.

Atlantic is a town on the northwest side of Core Sound about 2 miles southwestward of the eastern entrance to Thorofare Bay. The fish pier extends eastward about 100 feet. A depth of 2 feet is along the face at low water. Two aluminum-colored tanks on the beach are prominent from seaward. A highway connects Atlantic with Beaufort and Morehead City. A marine railway can haul out boats up to 25 tons, 45 feet in length, and 4 feet in draft. Fresh water, gasoline, provisions, and marine supplies are available. A passenger and mail boat operates daily to Ocracoke on the outer beach.

A Federal project provides for a channel 7 feet deep from the main channel in Core Sound to the town of Atlantic; project depth obtained in 1958.

Chart 420.—Sealevel is a small fishing community about 3 miles southwest of Atlantic and on the same side of Core Sound. Gasoline and some supplies are available, and the village has a small machine shop but no railway. A Federal project provides for a channel 7 feet deep and 75 feet wide from the main channel in Core Sound to Sealevel. Project depth was available in 1958.

Davis, another small community, 5 miles southwest of Sealevel, ships fish and crabs to the interior by truck. Gasoline and some supplies are available at the village. A Federal project provides for a channel 5 feet deep and 75 feet wide from the main channel in Core Sound to the piers at Davis. Project depth obtained in 1958.

Marshallberg is on the west side of Core Sound and on the north side of the eastern entrance to The Straits. A Federal project provides for a channel 6 feet deep from the main channel in Core Sound to a harbor 6 feet deep and 100 feet wide in the natural drain between the mouth of Sleepy Creek and the highway at Marshallberg. Project depth was available in 1958. A light and daybeacons mark the channel. Gasoline and some supplies are available. There is a small marine railway limited to a weight of 15 tons and a length of 50 feet. Fish are shipped from Marshallberg to the interior.

Back Sound leads westward from Core Sound for 6 miles to Beaufort Inlet, and varies in width from over 2 miles to 0.5 mile. A Federal project provides for a channel 7 feet deep and 75 feet wide through Back Sound by way of channels at the east and west ends of Harkers Island. Project depth obtained in 1958.

The improved channel from Back Sound to Lookout Bight has been discussed previously.

The Straits parallel Back Sound on the opposite side of Harkers Island and afford a through passage from Core Sound to Beaufort. The average width is about 0.5 mile, but in places the channel is only 100 yards wide. The channel is well marked by lights. A highway bridge over the western end of The Straits has a swing span with a horizontal clearance of 35 feet and a vertical clearance of 7½ feet; the nearby overhead power cable has a permit clearance of 71 feet.

Westmouth Bay is a cove on The Straits side of Harkers Island. A marine railway at a boatbuilding yard at the head of the bay can haul out vessels up to 45 feet in length and 4 feet in draft for hull repairs. The town of **Harkers Island,** in the central part of the island, has piers both on Back Sound and at the head of Westmouth Bay; depths to the piers are only 2 feet. Gasoline is available at the town, and there is also a small machine

shop. Gasoline and diesel fuel are available at the eastern end of the island. Fish are shipped by truck and boat from Harkers Island.

From The Straits, the improved channel to Beaufort leads southwestward and along the north side of **Middle Marshes,** thence westward to abeam of **Lenoxville Point** where it turns sharply northward and then westward into **Taylor Creek.** The route is then westward through Taylor Creek to the wharves at Beaufort. The east entrance to Taylor Creek has a controlling depth of about 7 feet, thence in 1958 a controlling depth of 10 feet in the channel west of Lenoxville Point.

5. CAPE LOOKOUT TO CAPE FEAR

Chart 1110.—From Cape Lookout the coast extends 8 miles in a northwesterly direction, and then curves gradually westward and southward to Cape Fear. This section, nearly 100 miles long, is similar to that between Capes Hatteras and Lookout, but the strips of land which form it are separated from the mainland by much narrower bodies of water. As a consequence, the thick woods of the mainland can be seen from much farther seaward.

Depths along this stretch of coast are regular, and 4 to 6 fathoms can be taken to within 1.5 miles of the beach. The 10-fathom curve about 10 miles offshore is nearly parallel to the shore until eastward of Cape Fear where it bends southeastward around Frying Pan Shoals. The 20-fathom curve is from 20 to 45 miles offshore.

Between Beaufort Inlet and Cape Fear River there are several inlets through which 2 to 6 feet can be carried to sheltered anchorage, but all are obstructed by shifting bars on which the sea breaks when at all rough. An onshore wind, even if light, will cause a heavy break on the bars, while an offshore wind may be heavy without making the bars dangerous. Strangers bound southward in small craft should not leave a sheltered anchorage with the wind anywhere between southeast and southwest, and should find anchorage as soon as possible after the wind begins to blow from those directions. The best guide for entering or leaving the inlets is the appearance of the water, as breakers always form on the shoal areas; strangers should not attempt to enter an inlet when breakers form entirely across it.

Chart 423.—Beaufort Inlet is about 220 miles southwestward of the Chesapeake Bay Entrance and the same distance northeastward of Charleston. It is the approach to **Morehead City Harbor,** the most important coastal harbor between Cape Henry and the Cape Fear River.

Morehead City, 2 miles inside the entrance on the western side of the harbor, is a shipping point for oysters and seafood products. Cargo handled at the terminal includes principally bulk fertilizer, general merchandise, and petroleum products.

Prominent features.—A hotel 3 miles west of Morehead City, a standpipe at the eastern end of the city, a water tank in Beaufort, and the cupola of the Coast Guard station on the west side of the entrance are prominent from seaward. **Fort Macon,** a state park, is just east of the Coast Guard station.

Channels.—A Federal project provides for a channel 30 feet deep from the ocean bar to and including the turning basin at Morehead City, thence 12 feet deep for about 1 mile to opposite 10th Street on the south side of Morehead City, and thence 6 feet deep westward to the Intracoastal Waterway in Bogue Sound. The channels are maintained at or near project depths. The controlling depths of the 30-foot channel are published frequently in the Notice to Mariners. The channels are marked by range lights, lighted and unlighted buoys, and daybeacons.

Tides and currents.—The mean range of tide at Morehead City is 2¾ feet. Tidal currents in the entrance attain velocities of 2 to 3 knots. They usually set along the channel, but near the end of the flood and the beginning of the ebb they may set across the channel. See Tidal Current Tables for predicted times and velocities.

See Appendix for **storm warning** displays.

Pilotage from the sea to the terminal is compulsory for vessels engaged in the foreign trade and for vessels in the domestic trade, except those under 60 tons lawfully engaged in the coastwise trade and coastwise vessels with a pilot aboard licensed by the Federal Government. Pilots board vessels at the sea buoy.

Towage.—Docking and other towing services are available in the port.

Quarantine.—Vessels subject to quarantine inspection are boarded upon arrival at berth. A U.S. Public Health Service outpatient office is in Beaufort, and a marine ward is maintained in the Morehead City General Hospital.

Customs.—Beaufort is a customs port of entry and marine documents are issued. A deputy collector will come to Morehead City upon request.

Immigration officials will come from Wilmington when requested.

Terminal facilities.—The North Carolina State Ports Authority owns and operates the modern Morehead terminal. These facilities are large enough to accommodate four 10,000-ton vessels and one petroleum tanker at the same time. There are storage facilities, transit sheds, and general cargo-handling equipment. Along the southern waterfront there are numerous small piers.

Supplies.—Gasoline, diesel fuel, fuel oil, water, ice, provisions, and ship chandlery are available.

Repairs.—There are marine ways and plants equipped to handle hull and topside repairs to vessels of up to 120 feet in length and 250 tons in weight.

Communications.—Morehead City is served by highways and railroads.

Beaufort, on the eastern side of Morehead City Harbor, is reached from Beaufort Inlet through Bulkhead Channel, and from the Intracoastal Waterway through Gallant Channel. The Taylor Creek Channel has been described previously.

Federal project depth through **Bulkhead** and **Gallant**

Channels to and inside the Beaufort waterfront is 12 feet. In 1958 the controlling depth in Gallant Channel was 7 feet, and in Bulkhead Channel, 10 feet.

Beaufort is connected by rail and highway bridges across Gallant Channel to **Radio Island,** and thence to Morehead City by bridges over the main route of the Intracoastal Waterway. Minimum clearances of the bridges with bascule spans over Gallant Channel are horizontal 60 feet, and vertical 4½ feet. An overhead power cable about 80 yards north of the highway bridge has a permit clearance of 85 feet. The bridges over the Intracoastal Waterway are described in Chapter 12.

Gasoline, diesel fuel, water, ice, provisions, and some ship chandlery may be obtained at Beaufort. A small boatyard, on Gallant Channel between the railroad and highway bridges, has a marine railway that can haul out vessels up to 65 feet in length, 40 tons in weight, and 6 feet in draft; hull repairs can be made at the yard.

Chart 1234.—Bogue Sound extends 22 miles westward along the coast from Beaufort Inlet to Bogue Inlet. It is shallow, and separated from the ocean by Bogue Banks, a wooded beach 0.1 to 0.7 mile wide. The sound is about 2 miles wide midway of its length but narrow at each end; at the western end there are numerous marshy islets. The Intracoastal Waterway route is through the north side of the sound. The mean range of tide in Bogue Sound is about 2½ feet near the inlets, and about a foot where the tides meet near the middle. Strong south or southwest winds may raise the tide a foot or more, and north to northwest winds lower it the same amount.

Bogue Inlet, 22 miles west of Beaufort Inlet, is the seaward approach to the town of Swansboro, which can be seen from outside. The entrance is used almost exclusively by local fishermen. The inlet is between a high wooded ridge on the west and a long low spit on the east. On the inside of the spit, about a mile eastward of the inlet, is a Coast Guard station. The entrance is obstructed by a shifting bar extending about 0.5 mile seaward, through which the channel depth is less than 3 feet. The mean range of tide is about 2½ feet on the bar; high water occurs 2 hours earlier than at the head of the marshes inside.

The channel into Bogue Inlet is continually changing and the buoys are shifted frequently. Strangers should wait for a rising tide and never attempt to enter when the bar is breaking. If fishermen happen to be coming in, it is advisable to follow them. The channels inside the inlet also are subject to considerable change, particularly during southeast and southwest storms.

Swansboro, a small town on the west bank of White Oak River 3 miles north of Bogue Inlet, is reached by the shifting channel from the inlet, and from Bogue Sound and Cape Fear River through the Intracoastal Waterway. Numerous fishermen base at Swansboro. The fixed highway bridge over White Oak River at the town has a horizontal clearance of 30 feet and a vertical clearance of 12 feet. The fixed bridge over the easterly channel, about 0.3 mile southeastward, has a horizontal clearance of 16 feet and a vertical clearance of 7 feet. Swansboro is more particularly described in connection with the Intracoastal Waterway, Chapter 12.

For 4 miles above Swansboro, **White Oak River** has a width of 1 mile or more through which there is a narrow tortuous channel between the flats and oyster rocks. Farther up, the river is narrow and deep, and leads between marshes. The head of navigation is the fixed bridge at **Stella,** about 8 miles above Swansboro.

Bear Inlet, 3 miles westward of Bogue Inlet, is used only by local boats. The entrance is about 0.3 mile wide between high sand dunes. The buoys marking the entrance are shifted to conform to the changing channel. The depth over the bar to the Intracoastal Waterway is only about 2 feet. Strangers should not attempt to enter the inlet. **Browns Inlet,** 3 miles northwestward of Bear Inlet is rarely used, and strangers are advised not to attempt passage.

The **danger zones** of firing ranges are in the ocean between Bear Inlet and New River Inlet; limits and regulations are given in **§ 204.55** and **§ 204.56,** Chapter 2.

Chart 777.—New River Inlet, 35 miles westward of Beaufort Inlet, is considered dangerous by local pilots, and entrance should not be attempted except under the most favorable conditions. There is a strong ebb current from the inlet which causes a break on the bar when there is a sea outside. The break is especially bad when the ebb sets against a south or southeast wind. Current predictions may be obtained from the Tidal Current Tables. The mean range of tide at the inlet is 3 feet. At the head of the marshes, 2 miles above the entrance, the range is about 1 foot.

A Federal project provides for an entrance channel 6 feet deep and 90 feet wide at New River Inlet, with a connecting channel of the same dimensions to the Intracoastal Waterway. The controlling depth in the channel was 6 feet in January 1957. Lights and buoys mark the channel through the marshes.

New River has a width of 1 to 2 miles from the head of the marshes above the inlet to within 2 miles of Jacksonville, above which it is a narrow stream. There is practically no periodic tide in the river.

A Federal project provides for a channel 10 feet deep and 90 feet wide in New River from the Intracoastal Waterway at the head of the marshes to the Atlantic Coast Line Railroad bridge at Jacksonville. The channel is well marked by lights and daybeasons; the controlling depth was 10 feet in February 1959.

A highway bridge over New River, 3 miles above the Intracoastal Waterway, has a swing span with a horizontal clearance of 50 feet and a vertical clearance of 9 feet.

Jacksonville is on the east bank of New River, about 17 miles above the Intracoastal Waterway. Gasoline, diesel fuel, and ice are obtainable at the town. Hotel accommodations are available and there is a county hospital. Fish are moved by rail and truck to the interior, and pulpwood is shipped by barge down the Intracoastal Waterway.

About a mile south of Jacksonville, an overhead power

cable with a permit clearance of 60 feet crosses the river near **Jacks Point.** The Atlantic Coast Line Railroad bridge over New River at Jacksonville has a swing span with a horizontal clearance of 48 feet and a vertical clearance of 3½ feet. An overhead cable at the bridge has a permit clearance of 50 feet. The fixed highway bridge 0.5 mile above the railroad bridge has a horizontal clearance of 28 feet and a vertical clearance of 13 feet. About 200 yards above this bridge is another fixed bridge with a horizontal clearance of 33 feet and vertical clearance of 14 feet.

Chart 1235.—New Topsail Inlet, 19 miles southwestward of New River Inlet, has an unmarked channel which is obstructed by a shifting bar. The inlet is rarely used, and should not be entered by strangers.

Old Topsail Inlet, about 1.5 miles southwestward of New Topsail Inlet, is constantly changing. The depth in the entrance is about 3 feet. Small boats can enter the inlet at low water, and at high water they can pass through the inside channels to the Intracoastal Waterway and the mainland. Strangers should not use this inlet. The shore on both sides is a low sand beach without distinguishing marks. **Rich Inlet,** 5 miles southwestward of New Topsail Inlet, has a reported depth of about 2 feet over the bar. Local fishermen sometimes use it, but strangers should not. **Mason Inlet** has a depth over the bar of less than 2 feet. Strangers should not attempt it. **Moore Inlet,** 10 miles southwest of New Topsail Inlet, has closed.

Wrightsville Beach is a summer resort between Moore Inlet and Masonboro Inlet. A tank and buildings are prominent from seaward. The municipal dock, just southward of the highway bridge, is 120 feet long with a depth of 5 feet alongside; water and electricity are available. Charter fishing boats use the wharf. There is bus service between Wrightsville Beach, Wrightsville, and Wilmington.

Masonboro Inlet is 2.5 miles southward of Moore Inlet and 22 miles northward of Cape Fear Light. The entrance is buoyed, but the buoys are frequently shifted to conform to the changing depths. Entrance should not be attempted except with thorough knowledge and under the most favorable conditions. In northeasterly weather the bar is rough. Strong tide rips form on the ebb current. The mean range of tide on the bar is about 4 feet. See Appendix for **storm warning** display.

A Federal project provides for a channel 14 feet deep across the ocean bar to a 15-foot deep turning basin at Wrightsville Beach inside and northward of the inlet, thence a channel 12 feet deep northward through Wrightsville Channel to a junction with the Intracoastal Waterway at Wrightsville. The ocean bar channel has never been dredged. In June 1958 the controlling depth in the turning basin was 5½ feet, and in June 1959 the controlling depth in the channel from the turning basin to the Intracoastal Waterway was 10 feet.

About midway between Wrightsville and Wrightsville Beach there is a pier where gasoline, diesel fuel, water, ice, meals, and rooms are available. A marine railway can haul out craft up to 42 feet in length, 5 feet in draft, and 20 tons in weight, for hull and engine repairs.

About 7 miles south of Masonboro Inlet is **Carolina Beach Inlet** which cuts through the beach and provides a channel to the Intracoastal Waterway. In 1953, a depth of 3 feet was reported over the bar and 2½ feet in the channel. Only those with local knowledge should use this channel.

Carolina Beach is a resort 12 miles northward of Cape Fear Light. A yacht basin at the town connects with Myrtle Sound and the Intracoastal Waterway by a small channel 1.5 miles long. In the basin the bulkhead is 175 feet long with a depth of 6 feet alongside. Minor hull and engine repairs can be made. Diesel fuel, gasoline, fresh water, provisions, and limited wet storage are available. The controlling depth in the channel leading from the Intracoastal Waterway to Carolina Beach is about 8 feet. See Appendix for **storm warning** display.

A military tower, about 2.1 miles north-northwest of the Carolina Beach pier, is 641 feet high.

Corncake Inlet, 4 miles north of Cape Fear Light, connects with Cape Fear River through shallow sloughs north of Smith Island. Depths over the bar are 1 to 2 feet, but the channel is shifting and treacherous. Strangers should not attempt it.

Chart 1236.—Cape Fear is a low, sharp, sandy point 85 miles southwestward of Cape Lookout at the southern extremity of **Smith Island.** This island, on the eastern side of the entrance to Cape Fear River, is mostly low and marshy, but on the western side has a thick growth of trees and a 99-foot high octagonal tower of an abandoned light.

Frying Pan Shoals, extending south-southeastward from Cape Fear, are bare in spots near the shore and have general depths of 2 to 12 feet in an unbroken line to a point 10 miles from the cape; for 6 miles farther the shoals are broken, with depths ranging from 10 to 20 feet. Broken ground with depths of 5 to 7 fathoms extends from the shoals proper almost to the lightship. Lighted buoys are at critical points along the shoals.

Frying Pan Shoals Lightship (33°28.0′ N., 77°33.8′ W.) is in 60 feet of water about 30.5 miles southeast of Cape Fear. The lightship has a red hull with the word FRYINGPAN on each side, and two masts with a circular gallery and lantern at each masthead. The light is 63 feet above the water and visible 13 miles. The fog signal and radiobeacon are synchronized for distance finding. The code flag signal and radio call is NNBM. **Storm warnings** are displayed daytime only.

A sunken wreck, covered by about 6 feet, lies on Frying Pan Shoals about midway between Cape Fear and the lightship. A reported obstruction, covered by about 19 feet, lies in 75 feet of water 5.3 miles east-northeast of the lightship.

Oak Island is on the western side of the entrance to Cape Fear River. **Oak Island Light (33°53.6′ N., 78°02.1′ W.),** 169 feet above the water and visible 19

miles, is shown from a cylindrical concrete tower that has the top painted black, middle white, and bottom not painted. A radiobeacon is at the light.

Chart 426.—Cape Fear River, about 370 miles in length and the approach to the city of Wilmington, empties into the sea immediately westward of Cape Fear.

Wilmington, 25 miles above the mouth on the east bank of Cape Fear River, is the leading port of North Carolina. Its extensive shipping industry moves quantities of gasoline, fuel oil, lumber, cotton, tobacco, and fertilizer materials, and barges haul large quantities of cargo between Wilmington, Fayetteville, Edenton, Greenville, and other ports on the Intracoastal Waterway.

Prominent features.—The abandoned lighthouse tower locally referred to as **"Old Baldy"** on the west side of Smith Island, and the Oak Island Light and Coast Guard station buildings westward of Fort Caswell, are the most conspicuous landmarks from seaward.

Channels.—A Federal project provides for a channel 35 feet deep over the ocean bar and thence 34 feet deep for 25 miles to Wilmington and 34 feet deep in the anchorage basin off the southerly part of the city; thence 30 feet deep to and including a turning basin just above the mouth of Northeast Cape Fear River opposite the Seaboard Terminals, thence 30 feet deep to Hilton Bridge about 1.3 miles above the mouth of Northeast Cape Fear River, and thence 25 feet deep to and including a turning basin about a mile above that bridge. The channels are maintained at or near project depth. The controlling depths are published from time to time in the Notice to Mariners.

Western Bar Channel, close to **Fort Caswell** on the western side of the entrance to Cape Fear River, is used considerably by small craft bound westward along the coast. The channel is good for about 6 feet but is not buoyed. The best water lies from 100 to 200 yards offshore south of Fort Caswell, and from there the channel through the shoals trends about 256°. Abreast of the Coast Guard station the shore should not be approached closer than 0.3 mile. A dredged channel from Cape Fear River to the Coast Guard wharf has a reported depth of 7 feet. The channel is marked by daybeacons.

Anchorages.—An anchorage basin is available at Wilmington. Good anchorage is available in the Cape Fear River abreast the town of Southport. The holding ground is good but because of strong tidal currents vessels should anchor with a good scope of chain. This anchorage is sometimes used as a harbor of refuge in the winter by coasting vessels.

Dangers.—A **restricted area** of the Sunny Point Army Terminal is 9 miles above the mouth of the Cape Fear River; limits and regulations are given in **§ 207.164a,** Chapter 2. A **restricted area** for a reserve fleet of the Maritime Administration is in Brunswick River 21 miles above the mouth; regulations are given in **§ 207.900,** Chapter 2.

Routes.—On the approach to the Cape Fear River from northward, the safer course, and the one generally used by deep-draft vessels, is outside of Frying Pan Shoals Lightship.

From southward, deep-draft vessels should set a course to pass outside the broken ground extending offshore between Cape Romain and Winyah Bay. When clear of this broken ground, the course can be shaped for Cape Fear River Entrance lighted whistle buoy 2CF. When approaching from southward, overrun of as much as ½ knot may be expected except during northeasterly winds.

Tides.—For tides at Wilmington refer to the Tide Tables. Proceeding toward the mouth of the river, the tides are earlier than at Wilmington. The mean range at the entrance is about 4½ feet and at Wilmington, about 3 feet.

Currents.—The tidal currents on the bar run with considerable velocity, and as a rule set nearly in the direction of the channels, but on the last of the flood and first of the ebb they tend more or less across the shoals. In the river their set is generally in the direction of the channel. The relative velocities of flood and ebb depend upon the stage of the river. During freshets the flood at times is completely overcome by the river current and the ebb is greatly increased. At low-river stages, a strong flood is felt for a considerable distance above Wilmington, where it runs 5¼ hours to nearly 7 hours of ebb; downriver from Wilmington, the periods of flood and ebb become more nearly equal. Current predictions for a number of locations in Cape Fear River may be obtained from the Tidal Current Tables.

See Appendix for **storm warning** display.

Pilotage from the sea to Southport is compulsory for vessels engaged in the foreign trade and for vessels in the domestic trade, except those under 60 tons lawfully engaged in the coastwise trade and coastwise vessels with a pilot aboard licensed by the Federal Government. Pilotage between Southport and Wilmington is not compulsory. Pilots board vessels at the sea buoy. The pilot boat is white, flies the code flag **P,** and has a white letter **P** painted on the black stack; the boat has ship-to-shore radio.

Towage.—Vessels seldom find it necessary to employ tugs between the sea buoy and the anchorage basin at Wilmington, but tugs are generally used to assist in docking and movement within the port or to upriver facilities. Inbound vessels are usually met by tugs near the anchorage grounds just below the city.

Quarantine.—Vessels subject to quarantine are boarded by quarantine officers for inspection upon arrival at the dock. U.S. Public Health Service outpatient offices are at Southport and Wilmington.

Customs.—Wilmington is a port of entry and marine documents are issued.

Immigration officials are stationed at Wilmington.

Terminal facilities consist of many municipal and private wharves. The port terminal wharf is about 1,500 feet long and 200 feet wide, with depths of 34 feet alongside, and can berth three large ships at the same time. Two railroad tracks and two 45-ton gantry cranes are on the concrete dock, and transit sheds are adjacent to the

berths. A storage warehouse of about 85,000 square feet and two transit sheds with about 80,000 square feet are available. There is a bonded warehouse. A 1,000-foot extension to the port terminal wharf and a large transit shed were under construction in 1958. An elevated water tank provides fire protection at the terminal. The belt line railroad that parallels the waterfront has connections to the larger piers.

Supplies of all kinds and in any quantity are obtainable at Wilmington. Fresh water is available at all wharves and for ships in the stream by tugboats.

Repair facilities consist of two shipyards on the west bank of the river at Wilmington with several marine ways that can haul out vessels up to 750 tons in weight, 135 feet in length, a draft of 12 feet, and beam of 40 feet. Major hull and engine repairs can be made.

Communications.—Railroad connections to the interior and coastal cities are offered by two railroads. Three commercial airlines connect Wilmington with most other cities in the United States. Steamship service is irregular. There are complete telephone, telegraph, and radio facilities, including two-way radio between ships, Southport pilot station, and the city.

Southport is on the west bank of Cape Fear River, 3 miles above the mouth. There is deep water at the wharves. Gasoline, diesel fuel, water, ice, and provisions are available. A marine railway just off the Intracoastal Waterway can handle a length of 45 feet and a draft of 5 feet. Minor repairs to hulls and engines can be made. Fuel oil is available at the oil company wharves. Pilots for the bar and river maintain a conspicuous 90-foot lookout tower on the south end of town.

About 11 miles above the mouth of Cape Fear River, a channel 100 feet wide has been dredged eastward and southeastward from the main ship channel to a chemical company dock on the east side of the river. The controlling depth is about 7 feet.

The Intracoastal Waterway northward leaves the main ship channel about 11.5 miles above the mouth of the river. The distance from the intersection of the two channels to the western end of the land cut of the waterway is 2 miles. A Federal project provides for a channel 12 feet deep and 100 feet wide from near the end of the land cut to a connection with the main ship channel about 15 miles above the mouth of the river. In April 1958 the centerline controlling depth was 6½ feet.

The Federal project for Cape Fear River above Wilmington provides for a channel 25 feet deep for 3.5 miles to and including a turning basin at **Navassa,** thence 8 feet deep to **Fayetteville,** the head of navigation, 100 miles above Wilmington, and the construction of three locks and dams in the latter section. In 1958 controlling depths were 25 feet to Navassa and thence 5½ feet to Fayetteville. The locks between Navassa and Fayetteville have a usable length of 200 feet, a width of 40 feet, and a depth over miter sills of 9 feet.

The highway bridge over Cape Fear River opposite Wilmington has a bascule span with a horizontal clearance of 120 feet and a vertical clearance of 26 feet. Just above the highway bridge is an overhead power cable with a permit clearance of 158 feet. The railroad bridge at Navassa has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 6 feet.

Black River flows into Cape Fear River about 12 miles above Wilmington. It has been reported that drafts of not more than 3 feet can be taken to **Still Bluff,** about 10.4 miles above the mouth.

Northeast Cape Fear River empties into Cape Fear River from northward at Wilmington. Above the turning basin 1 mile above the Hilton bridge, it is reported that natural depths of 6 feet can be taken for 42 miles, and thence 3 feet for 7 miles to Crooms Bridge.

A highway bridge over Northeast Cape Fear River a mile above its mouth has a bascule span with a horizontal clearance of 150 feet and a vertical clearance of 26 feet. The Hilton railroad bridge 1.3 miles above the mouth has a bascule span with a horizontal clearance of 95 feet and a vertical clearance of 5 feet.

Smith Creek empties into Northeast Cape Fear River from eastward 2 miles above the river mouth. The reported controlling depth over the bar was 10½ feet in 1950.

Freshets.—Low-water stages prevail in the rivers above Wilmington from 2 to 4 months during the summer, and freshets usually occur as often as once a month during the remainder of the year, but with no regularity.

6. CAPE FEAR TO CHARLESTON HARBOR

Chart 1110.—From Cape Fear the coast curves gradually westward and southward for 80 miles to Winyah Bay Entrance. It is a sand beach, with numerous sand hills, separated from the heavily wooded mainland by small streams and marshes. From offshore, the woods appear to extend to the outer beach. The coast is clear, and a depth of 3 fathoms can be taken to within a mile of the beach, except at Murrells Inlet where, about 2 miles offshore, there is a 16-foot spot. The 10-fathom curve is from 18 to 21 miles offshore, and inside it the water shoals gradually as the shore is approached.

Chart 1236.—Lockwoods Folly Inlet is 11 miles westward of Cape Fear River. There are aids for entering, but strangers should not attempt it as the inlet is closed by breakers at virtually all stages of tide and wind. The controlling depth over the bar is 2 feet. Two wrecks, one showing at low water, are at the mouth. A high sand dune is east of the inlet.

Lockwoods Folly River is navigable from the ocean to the Intracoastal Waterway, at the head of the marshes inside the inlet, and thence to **Supply** (P.O.), which is at the practical head of navigation 16 miles above the waterway. The channel is narrow and bordered on both sides by oyster bars which are covered at high water. The mean range of tide is about 4 feet at the inlet and about 2 feet at Supply In July 1958 the controlling depth from the waterway to Supply was reported to be 3 feet.

Shallotte Inlet, 19 miles westward of Cape Fear River, has a shifting bar and a winding entrance; it is used only by local fishermen. **Shallotte River** is navigable from the sea to the Intracoastal Waterway, and thence to the town of **Shallotte,** about 8 miles above the inlet. The mean range of tide is about 4½ feet near the inlet and 3 feet at Shallotte. In July 1958 the reported controlling depth was 2 feet to Shallotte.

Tubbs Inlet, 6 miles westward of Shallotte Inlet, is seldom used.

Chart 1237.—Little River Inlet, 28 miles westward of Cape Fear River, is entered between **Waiter Island** on the west and **Bird Island** on the east. The bar channel is subject to change and the buoys marking it are shifted frequently. Daybeacons mark the channel from the inlet for about 2 miles to the junction with the Intracoastal Waterway. The controlling depth over the bar was reported to be 3 feet in June 1958. The mean range of tide at the inlet is about 4½ feet.

Between **Cherry Grove Inlet,** 4.5 miles westward of Little River Inlet, and Murrells Inlet, there are many piers which extend out some 400 to 1,000 feet into the ocean. See Appendix for **storm warning** displays.

Myrtle Beach, a summer resort, is on the outer beach nearly 20 miles southwestward of Little River Inlet and 32 miles north-northeastward from Georgetown Light. See Appendix for **storm warning** display. At **Ocean Forest,** 3.5 miles northeast of Myrtle Beach, there is a large white hotel whose tall central superstructure is the most prominent landmark between Beaufort and Winyah Bay. An aviation light is on the hotel cupola. Several tanks in the area are conspicuous.

Murrells Inlet, 12 miles southwest of Myrtle Beach, connects with **Main** and **Oak Creeks,** which drain a considerable area of marsh between the mainland and the outer beach. The entrance bar is shifting and the channel is subject to change. Inside the inlet, where the channel turns sharply to northward into Main Creek, the tide rips are strong at full ebb or flood. There is good water up this channel for about 1.8 miles to a launch landing. Buoys and daybeacons mark the channel; in June 1958 it was reported that only small outboard-powered boats were using the inlet. See Appendix for **storm warning** display.

North Inlet, about 6 miles northward of Georgetown Light, connects with Winyah Bay by way of both **Town Creek** and **Jones Creek.** Jones Creek, the southerly of the two, is easier to follow. There is little water on the Winyah Bay side, and navigation is restricted to shallow drafts. Some fishermen use North Inlet, but strangers should not. It was reported in 1958 that the controlling depth over the bar was about 5 feet.

Chart 787.—Winyah Bay is the first harbor southward of Cape Fear River, a distance of 70 miles, that is navigable for vessels of medium draft. It is entered between **North Island** and **South Island**; the entrance is protected on each side by jetties. **Georgetown Light (33°13.4′ N., 79°11.1′ W.),** 85 feet above the water and visible 15 miles, is shown from a white cylindrical tower and dwelling near the south end of North Island; a radiobeacon is at the light.

The jettied entrance is not safe for small craft except in favorable weather. Heavy tide rips prevail near the ends of the jetties, and heavy seas run in moderate to heavy weather. The south jetty is visible only at low tide. Vessels drawing 5 feet or less can enter close to the outer end of the north jetty.

Federal project depth is 27 feet from the sea to a turning basin in Sampit River. The project also provides for a turning basin in the cutoff portion of that river at the city waterfront, and for maintaining a depth of 18 feet in the bypassed portion of the river, opposite the city. The channel is well marked and is maintained at or near project depths; controlling depths are published from time to time in the Notice to Mariners.

The entrance to Sampit River, 10 miles above George-

town Light, is protected on the east side by a timber-and-brush training wall 2,000 feet long; a light is at its outer end. The principal landing above Georgetown is **Sampit,** 10 miles from the river mouth. The fixed highway bridge over Sampit River, just above Georgetown, has a horizontal clearance of 100 feet and a vertical clearance of 35 feet. The overhead power cable about 0.9 mile above the bridge has a permit clearance of 61 feet.

Georgetown, on the north bank of Sampit River just inside the mouth, has considerable trade in lumber and pulp paper, and is the terminus of a branch railroad line. Depths at the wharves are adequate for drafts able to enter the bypassed portion; convenient sheltered berths for small craft are available. Gasoline, diesel fuel, ice, water, provisions, marine supplies, and hotel accommodations can be obtained. A boatyard has two marine railways that can handle craft up to 55 feet in length and 6 feet in draft for hull and engine repairs; a machine shop is on the premises.

Georgetown is a customs port of entry and marine documents are issued. The nearest marine hospital is at Savannah, Georgia. See Appendix for **storm warning** display.

Tides.—The mean rise and fall at Georgetown is about 3½ feet. The tide at Georgetown Light occurs about 15 minutes later than at Charleston, while at Georgetown it occurs about 1 hour and 55 minutes later than at Charleston.

Currents.—Tidal currents in Winyah Bay are affected by variations in the flow of its tributary rivers. The velocity is greatest between the jetties where, at strength, it is 2 to 3 knots. The set is diagonally across the south jetty. During freshets in the rivers, also with westerly winds, the buoys between the jetties are nearly towed under at times on the ebb. In the channel in Winyah Bay from the entrance to Georgetown the average velocity at strength is about 2 knots except south of Frazier Point where the mean ebb velocity at strength is about 1 knot. At times of freshets the flood current is somewhat weaker and the ebb stronger, particularly near the entrance. Near the mouth of Sampit River, mean velocities at strength are about 1 knot, with somewhat stronger ebb velocities at times of freshets. Current predictions for a number of places in Winyah Bay and the entrance to Sampit River may be obtained from the Tidal Current Tables.

Waccamaw River rises at Lake Waccamaw, N.C., and flows southwestward some 120 miles into Winyah Bay just above Georgetown. The river is little used, except for that section which is a part of the route of the Intracoastal Waterway described in Chapter 12.

The controlling depth to **Conway,** 36 miles above the mouth, is about 11 feet; above this point the river is obstructed by logs, snags, and sandbars. The mean range of tide in the river is about 3½ feet at the mouth and 1½ feet at Conway. The head of the tidal reach is at Bellamys Landing, 80 miles above the mouth. The flood range at Conway is about 13½ feet. About a mile below Conway a fixed highway bridge over Waccamaw River has a horizontal clearance of 60 feet and a vertical clearance of 35 feet. At Conway the river is crossed by three bridges. The first is a fixed highway span with a horizontal clearance of 60 feet and a vertical clearance of 48 feet. The second is a railroad swing bridge with a horizontal clearance of 60 feet and a vertical clearance of 10 feet. The third, also a railroad swing bridge, has a horizontal clearance of 80 feet and a vertical clearance of 5 feet; an overhead cable near this bridge has permit clearance of 50 feet. Above Conway the bridges have fixed spans with minimum horizontal clearance of 15 feet and minimum vertical clearance of 4½ feet.

Pee Dee River rises in the North Carolina mountains and flows generally southeastward 375 miles into Winyah Bay just westward of Waccamaw River. Above the Uharie River, 200 miles from the mouth, it is called the Yadkin. The highway bridge over Pee Dee River just above the mouth has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 12½ feet; operating regulations are given in **§ 203.245,** Chapter 2. At **Yawhannah,** 28 miles above the mouth, the river is crossed by a fixed highway bridge with a horizontal clearance of 165 feet and a vertical clearance of 25 feet.

The Seaboard Air Line Railway bridge near Poston is the head of commercial navigation.

Black River empties into Pee Dee River from northward about 3 miles above the mouth of the latter, and is navigable for a distance of 44 miles. The limiting clearances of bridges over this river are 60 feet horizontal and 9 feet vertical; operating regulations are given in **§ 203.245,** Chapter 2. The mean range of tide in Pee Dee River is about 3½ feet at the mouth and ¼ foot at the mouth of Little Pee Dee River, 33 miles above. **Mingo Creek** flows into Black River about 22 miles above the mouth of the latter. When last ascertained, the controlling depth in this creek was 8 feet. The mean range of tide is 2 feet, and the freshet range is 4½ feet.

Chart 1238.—Between Winyah Bay and Charleston Harbor there are several rivers and inlets which are changeable in character, and local knowledge is essential to enter even under favorable conditions. Depths range between 1 and 6 feet. Suitable anchorages can be found inside these inlets or in their tributary waters. At most entrances, the channels trend in northerly directions, and shoals and breakers generally mark the channel edges inside the bars. Entrances to North Santee River and Bull Bay are less difficult of navigation than the other entrances in this locality.

East Bank, covered by 10 feet, is about 2 miles south of the Winyah Bay south jetty. Between East Bank and Cape Romain there are other shoal spots, one with a depth of 14 feet about 6 miles offshore. Broken ground, with depths of 5 fathoms or less, extend as much as 11 miles offshore. The wreck of the HECTOR lies on the outer edge of the shoals 12 miles southward of the outer end of Winyah Bay south jetty and 13 miles eastward of Cape Romain. The wreck, with a depth of 11 feet over it, is marked by a lighted bell buoy. Deep-draft vessels should stay outside this buoy.

Santee River, formed by the confluence of **Congaree**

River and **Wateree River,** flows generally southeast for 124 miles and enters the ocean between Winyah Bay and Cape Romain. Its two mouths, known as **North Santee River** and **South Santee River,** are both obstructed by shifting bars with little depth. In the tidal reach are several privately owned landings which are used infrequently. The river is closed to navigation at Wilson Landing, 75 miles above the mouth, by the Santee Dam.

Vessels bound for Santee River are advised to enter by way of Winyah Bay and the Intracoastal Waterway. Navigation between the coast and points on Santee River above the dam is possible by way of Cooper River and the Santee-Cooper project. The Route 17 fixed highway bridges over North and South Santee Rivers, about 12 miles above the mouths, have a horizontal clearance of 100 feet at the main central spans. Vertical clearances are 30 feet over North Santee River and 15 feet over South Santee River.

Cape Romain Shoal, with depths of 6 to 15 feet over it, extends 4 miles southeastward from Cape Romain. A depth of 7 feet at the outer end of the shoal is marked by a buoy. An abandoned lighthouse 161 feet high stands on the east end of Lighthouse Island.

Cape Romain Harbor, an unimportant cove with depths of 1 to 2 feet, is used only by small local fishing craft. **Casino Creek,** good for about 3 feet, joins the Intracoastal Waterway. A narrow, crooked channel, unmarked, leads from the sea around the north end of **Cape Island** into **Horsehead Creek;** its controlling depth is 5 feet. The mean range of tide in this area is about 5 feet. The inlet leading to Cape Romain Harbor from the south is practically closed at low water.

Five Fathom Creek, off Sandy Point at the western end of Raccoon Key, has a controlling depth of about 6 feet from the sea to the Intracoastal Waterway. Narrow and crooked at its upper end, the creek has deeper water throughout from its entrance to within a mile of the waterway; buoys mark the approach channel. The outer bar is subject to change, and strangers should not attempt it.

Bull Bay, southwest of Raccoon Key, is broad and shallow, and has numerous shoals, many of which bare at high water. The narrow channel into **Bull Creek,** at the southwest side of the bay, has a controlling depth of about 9 feet over the bar; it is used occassionally as an anchorage. **Bull Breakers** extend 4 miles southward from **Bull Island,** on the southwest side of the entrance to Bull Bay, and are marked at their outer end by a buoy.

Chart 1239.—Price Inlet, between Bull Island and **Capers Island,** has a depth of about 6 feet over the bar. The channel is unmarked. The inlet, the best between Bull Bay and Charleston, is used by local fishermen. With average weather conditions, there are heavy breakers on the shoal on the eastern side of the channel and small breakers on the west side. Good anchorage is available in **Price Creek,** which connects with the Intracoastal Waterway.

Capers Inlet is between Capers Island and **Dewees Island;** the depth over the bar is about 3 feet. The channel is narrow and unmarked, and is seldom used. Because of the shoal that extends eastward on the south side of the inlet and breaks the southwesterly seas, the channel can be entered when the wind is southwest. A shoal bare at about half tide extends southward along the eastern side of the inlet. There are numerous stumps and snags outside the high waterline in **Capers Creek. Dewees Inlet,** between Dewees Island and **Isle of Palms,** is little used; the depth over the bar is about 4 feet. The channel is narrow and unmarked. Under average conditions, seas break entirely across the inlet. A standpipe at the pleasure resort near the southwest end of Isle of Palms is a prominent landmark; a 1,000-foot T-shaped pier projects seaward from the beach colony.

Breach Inlet is between Isle of Palms and Sullivans Island. There is very little water over the bar, and breakers extend entirely across the entrance under almost all weather conditions. Currents are extremely strong in this inlet. A fixed highway bridge over the inlet has a horizontal clearance of 70 feet and a vertical clearance of 5½ feet.

Rattlesnake Shoal, 3 miles offshore and the same distance east-northeastward of the north jetty at the entrance to Charleston Harbor, is about 2 miles long east and west; its least depth is about 9 feet. A buoy is east of the outer end of the shoal.

Charts 491, 470.—Charleston Harbor, 264 miles southwestward of Cape Hatteras and 65 miles northeastward of Savannah River, is the approach to the city of Charleston and to Cooper and Ashley Rivers. The harbor is easy of access day or night in clear weather, and is one of the best harbors of refuge on the South Atlantic coast.

Charleston, the largest city and port in South Carolina, is at the confluence of Cooper and Ashley Rivers, at the head of the largest natural deepwater harbor on the Atlantic coast south of Hampton Roads. The distance from the ends of the jetties to the city wharves is 7 miles. The city is in the center of a rich agricultural district for which it is the distributing point. Numerous manufacturing plants are in and near the city. The principal wharves are along the west bank of Cooper River. Coal, cotton, lumber, fertilizer, and petroleum products are shipped.

Prominent features.—The entrance to Charleston Harbor is between converging jetties which extend nearly 3 miles seaward. Prominent to the northward of the entrance are several tanks on Sullivans Island, and the standpipe on Isle of Palms. **Fort Moultrie** and the town of **Sullivans Island** are on the north side of the entrance, and **Fort Sumter** is on the southwest side of the channel just inside the entrance.

The prominent fixed red lights marking the top of the central span piers of the Cooper River bridge are seen from the channel between the jetties and are useful in connection with Mount Pleasant Range. When Mount Pleasant range line is extended northwestward to the bridge, it intersects the bridge just west of the midpoint between the two bridge lights. Prominent fixed red lights

also mark the top of the central span piers of the bridge where it crosses Town Creek, west of Drum Island.

Charleston Light (32°41.7′ N., 79°53.0′ W.), 155 feet above the water and visible 19 miles, is shown from a black-and-white horizontally banded conical tower, black top, 3.5 miles south of Fort Sumter, off the end of Morris Island. The radiobeacon is at the Coast Guard station on Sullivans Island, 4.3 miles northeastward of the light.

Boundary lines of Inland Waters.—The line established for Charleston Harbor is described in § **82.35,** Chapter 2.

Channels.—A Federal project provides for a channel 35 feet deep over the bar and through the entrance into the major reaches of Cooper River and Town Creek to Goose Creek, 13.6 miles above the mouth; and a connecting channel into Shipyard Creek 30 feet deep. The channels are maintained at or near project depths. The controlling depths are reported from time to time in Notice to Mariners. The channels are well marked by lighted ranges and other aids to navigation.

Anchorages.—The anchorage grounds and regulations are given in § **202.173,** Chapter 2.

Dangers.—The courses between the lightship and the sea buoys are comparatively close inshore from Charleston to Jacksonville. Vessels using this route must guard against an inshore set which may amount to a knot or more due to indraft of current into various inlets. In this section, preceding a northeasterly or following a southerly gale, an atmospheric condition known as **southern haze** may be encountered, resulting in low visibility of lights even in fine weather when it is clear overhead. During the periods when this condition prevails it is reported that excessive inshore sets have been experienced.

Bridges.—A fixed cantilever bridge spans Town Creek, Drum Island, and Cooper River on the east side of Charleston, 5.7 miles above the mouth. Clearances are: over Town Creek, 600 feet horizontal and 135 feet vertical; over Cooper River, 150 feet vertical for a width of 300 feet and 135 feet for a width of 1,000 feet.

Routes.—From northward, the safer approach to Charleston Harbor, and the one generally used by deep-draft vessels, is outside Frying Pan Shoals Lightship. The course should be shaped west-southwesterly to pick up Cape Romain lighted whistle buoy 2CR, and then the Charleston sea buoy. From southward, a northeast course, from a point 2 miles southeastward of Savannah Lightship, will lead to the Charleston sea buoy.

Tides.—The mean range of tide at Charleston and Fort Sumter is about 5 feet. At Fort Sumter the tides occur about 10 minutes earlier than at Charleston. Daily tide predictions for Charleston are given in the Tide Tables.

Currents.—Off the entrance to Charleston Harbor the tidal currents are rotary. Near the entrance to the jetties the current sets fair with the channel at strengths of flood and ebb and can be expected to set across the channel with a velocity of about ¼ knot about 3 hours after strength of flood and ebb, setting northeastward and southwestward, respectively.

In the channel between the west end of the south jetty and the submerged jetty, the average velocities of the current at strengths of flood and ebb are about 1½ knots and 2 knots, respectively.

Daily current predictions for Charleston Harbor, off Fort Sumter, are contained in the Tidal Current Tables, and predictions for a number of other locations in the harbor and tributaries can be obtained through the use of Table 2 of the Tidal Current Tables.

Weather.—The climate is equable, and the port is comparatively free of fog and high winds. See Appendix for **storm warning** display.

Pilotage is compulsory for foreign and coastwise vessels of over 100 gross tons, except coastwise vessels with a pilot aboard licensed by the Federal Government.

Pilots can be found cruising in the vicinity of the sea buoy. Vessels desiring a pilot but unable to find one can anchor about a mile south of the buoy. Pilots for inland passage may be obtained at Charleston. It is customary to request a pilot 24 hours in advance of arrival through agents or direct to the Pilots Association.

Towage.—Vessels usually proceed from the ocean to the city without assistance. Towboats can be had by making a signal while outside the bar or at the wharves, or may be ordered from the towboat office in the city.

Quarantine.—Vessels subject to quarantine will be boarded by an officer of the U.S. Public Health Service upon arrival at the dock. An outpatient clinic is maintained by the Public Health Service. The nearest Public Health Service hospital is at Savannah.

Customs.—Charleston is a customs port of entry and marine documents are issued.

Immigration officials are stationed at Charleston.

Harbor regulations.—The South Carolina State Ports Authority and a local Board of Harbor Commissioners comprise the administrative bodies exercising jurisdiction over the port of Charleston. A harbormaster enforces the regulations of the port.

Terminal facilities include the State-owned general cargo wharves and a fully mechanized banana wharf 0.5 mile above the Battery on the west side of the Cooper River, and Columbus Terminals 1 mile above the Battery. Several of the terminals are owned by railroads and steamship companies.

The **Charleston Naval Shipyard** is on the west bank of the Cooper River 6 miles above the Battery. Just north of the shipyard is **North Charleston,** the site of several oil wharves, a cotton compress, and several bulk commodity piers. The terminals of the **South Carolina State Ports Authority** are 9 miles above the Battery on the west side of the Cooper River. Depths of 30 feet or more are available at the principal terminals.

The Coast Guard depot wharves are on the east side of Ashley River 0.8 mile above the Battery.

Supplies.—Bunker oil can be had at most of the principal piers on Cooper River or Shipyard Creek. Coal can be obtained by barge. Water is available on the principal piers and can be delivered by barge.

Repairs.—Charleston Harbor has adequate facilities for drydocking and hauling out. The largest floating drydock has a capacity of 6,500 tons and can accommodate vessels up to 420 feet in length. The drydock plant is

equipped to make general hull and engine repairs. Several repair yards in the area provide facilities for small boats and yachts.

Wrecking and salvage gear is available for normal operations and special equipment can be brought from New York.

Communications.—The port of Charleston is served by three trunkline railroads connecting with the beltline serving the riverfront terminals. A number of steamship lines connect the port with principal United States and foreign ports. Frequent sailings are maintained by most of the lines. The municipal airport is 9.5 miles northwestward of the Battery.

Chart 470.—Ashley River empties into Charleston Harbor from northwestward on the southwest side of the city. There are no towns or villages of importance above Charleston. The principal landings are at numerous phosphate works, all of which have wharves extending to the channel. In May 1957 the centerline depths in the river were 19 feet from the entrance for 2.6 miles to the highway bridge, and thence 14 feet for about 3.5 miles to the head of the improved channel.

A municipal yacht basin is on the northeast side of Ashley River, 1.3 miles above the Battery. Gasoline, diesel fuel, fresh water, and some supplies are available; there are dockage facilities. In May 1957 the controlling depth into the basin was 5 feet.

On the opposite side of the river is the entrance to **Wappoo Creek,** which is the route of the Intracoastal Waterway southward.

A highway bridge over Ashley River 2 miles above the Battery has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 14 feet. In 1958 a highway bridge was under construction about 0.1 mile below this bridge. A railroad bridge 3 miles above the Battery has a swing span with a horizontal clearance of 100 feet and a vertical clearance of 10 feet. The fixed highway bridge about 6.2 miles above the Battery has a horizontal clearance of 100 feet and a vertical clearance of 50 feet. The railroad bridge 10 miles above the Battery has a bascule span with a horizontal clearance of 60 feet and vertical clearance of 3 feet. The overhead power cable nearby has a permit clearance of 74 feet.

There is a controlling depth of about 5 feet from the upper limit of the project channel for about 8 miles above the fourth bridge, thence a depth of 3 feet for about 1.5 miles to **Greggs Landing.**

Hog Island Channel and **Shem Creek** lead to **Mount Pleasant** on the lower east side of Charleston Harbor. A Federal project provides for a channel 10 feet deep to a terminal basin at Mount Pleasant. In June 1958 the project depth was obtained. A shipyard on Shem Creek at the foot of Wharf Street makes hull and engine repairs and has a machine shop. Two marine railways can haul out craft up to 150 tons in weight, 104 feet in length, and 8 feet in draft. Several small wharves are above the shipyard on both sides of the creek. A fixed bridge 0.4 mile above the mouth of the creek has a horizontal clearance of 36 feet and a vertical clearance of 12 feet. An overhead power cable with a permit clearance of 40 feet crosses the creek about 0.2 mile above the bridge.

Cooper River enters Charleston Harbor from northward on the eastern side of Charleston; the main channel of the harbor extends several miles up this river. **Drum Island** is 2 miles above the mouth of the river. The channel on the westerly side of this island is known as **Town Creek.**

A Naval degaussing range crosses the channel between Hog Island and the southeastern extremity of Drum Island. It is marked by buoys and piling.

Shipyard Creek joins Cooper River from the west about 1 mile above the north end of Drum Island. There is considerable traffic in oil, phosphates, and lumber on this waterway.

Chart 680.—Depths of 20 feet or more are available in Cooper River from Charleston to **The Tee,** 18 miles above the Port Terminal, where the river divides into East and West Branches. This section of the river is bordered by marshland, with occasional bluffs 15 to 20 feet high.

In **East Branch** the controlling depth is about 9 feet to **Pompion Hill Chapel,** 6 miles above The Tee. The channel is narrow and follows the ebb-tide bends. In **West Branch** the controlling depth is about 14 feet to the Seaboard Air Line Railroad bridge 4 miles above The Tee. The first bend west of The Tee is a bad spot; deep water is on the inner side of the bend. The railroad bridge has a horizontal clearance of 33 feet and a vertical clearance of 6½ feet. The nearby overhead cable has permit clearance of 85 feet. Operating regulations for the bridge are given in § **203.245,** Chapter 2. Extreme caution is necessary at the bridge; the current is strong, and about 40 minutes is needed to open the draw. The mean range of tide at the bridge is about 4 feet.

About 12 miles above The Tee, a tailrace canal enters West Branch from **Pinopolis Reservoir.** The distance along the canal from West Branch to the reservoir is about 4 miles. Two bridges cross the canal; minimum clearances are 100 feet horizontal and 50 feet vertical. A marginal wharf 200 feet long is on the west side of the canal about a mile above the junction with West Branch.

A depth of about 11 feet is available from the Seaboard Air Line Railroad bridge over West Branch to the tailrace canal and thence to the dam. The lock in the dam has a length of 180 feet, a width of 60 feet, and a depth over the miter sills of 12 feet; the vertical lift is 75 feet. A draft of 14½ feet has been taken to the reservoir with favoring tides. Light-draft vessels can navigate to Columbia, S.C., by way of Pinopolis Reservoir, Santee Reservoir, and the Congaree River. The last 18 miles are treacherous because of the twisting channel and varying water levels caused by a dam above Columbia. The reservoirs are fouled by submerged trees. Navigation should not be attempted by strangers.

Chart 470.—Wando River empties from the northeast into Cooper River eastward of Drum Island. Buoys mark the channel entrance. Westward of the entrance,

and opposite the mouth of **Hobcaw Creek,** mooring dolphins extend about 900 yards in depths of 30 to 36 feet.

Chart 681.—Cainhoy (Wando) (P.O.) is a village on Wando River about 9 miles above Drum Island. A depth of about 12 feet can be taken to the town wharf, which has a depth of 6 feet alongside; provisions and gasoline are available. Just westward of the town there is a shipyard with a machine shop which makes repairs to steel hulls of boats and barges, and to engines. A marine railway can haul out boats up to 750 tons in weight, 120 feet in length, and a draft of 9 feet. A bridge and cable cross the river about 0.4 mile above Cainhoy; the highway bridge has a swing span with a horizontal clearance of 62 feet and a vertical clearance of 6 feet, and the overhead power cable has a permit clearance of 45 feet. Operating regulations for the bridge are given in **§ 203.245,** Chapter 2.

Wando River continues for about 7 miles to **Wards Bridge** at the head of navigation. **Guerin Creek** flows into Wando River from the northeast about 2 miles above Cainhoy. **Guerin Bridge,** a fixed structure at the head of navigation, is some 3 miles above the mouth of the creek.

7. CHARLESTON HARBOR TO SAVANNAH RIVER

Charts 1239, 1240.—From Charleston Harbor to Savannah River the coast trends in a southwesterly direction for 65 miles. The coast is low and timbered, and is broken by St. Helena, Port Royal, and Calibogue Sounds, and by numerous inlets from which there is access to the interior by way of the rivers emptying into them. Shoal water extends 3 to 8 miles offshore.

Chart 792.—Lighthouse Inlet, between Charleston Light and **Folly Island,** has no channel across the bar; entrance should be attempted only with local knowledge, and with a rising tide on a smooth day. Entrance is not possible for boats drawing more than 3 feet; the inlet is used only by local fishermen. Small craft pass into Charleston Harbor by way of **Lighthouse Creek** and also into the numerous sloughs north of Folly Island. **Folly Beach,** an amusement park on Folly Island, is connected by highway with Charleston. The buildings and lights are prominent from seaward.

Stono Inlet, between Folly Island and **Kiawah Island,** is 7 miles southwestward of Charleston Light. A shifting bar obstructing the entrance to the inlet is marked by several buoys which may be moved from time to time to mark the best water. A draft of about 4 feet can be taken into Stono River with local knowledge. The entrance is used by local fishermen.

Stono River, which joins the inlet from northward, is of little commercial importance except in its upper reach above **Elliott Cut** where it forms part of the Intracoastal Waterway. Vessels enter the river by way of the waterway from Charleston. In the summertime numerous pleasure craft use Stono River and Folly River to reach Folly Beach. A highway bridge about a mile below Elliott Cut has a swing span with a horizontal clearance of 55 feet in the west draw and a vertical clearance of 8 feet.

Folly River flows into Stono Inlet from the northeast and **Kiawah River** from the west. Both are relatively unimportant. Folly River is used by pleasure craft and local fishermen desiring to reach Folly Beach. About 1.8 miles above the entrance, a marine railway can haul out vessels up to 55 feet in length, 5½ feet in draft, and 25 tons in weight, for general repairs. Gasoline, diesel fuel, ice, and provisions are available nearby. A fixed highway bridge about 2 miles above the entrance has a horizontal clearance of 58 feet and a vertical clearance of 10 feet. **Folly Creek** enters Folly River from the north about 1.6 miles above the mouth. A fixed highway bridge about 2.6 miles above the creek mouth has a horizontal clearance of 58 feet and a vertical clearance of 10 feet. An overhead cable about 0.4 mile above the bridge has a permit clearance of 48 feet.

North Edisto River, 17 miles southwestward of Charleston Light, is of little commercial importance, and rarely used. From its entrance shoals extend offshore as much as 3 miles forming a shifting bar over which there is a depth of about 10 feet. The channel is marked by a range and by buoys which are moved, when practicable, to indicate the best water. It is well defined by breakers.

Two tributaries of North Edisto River, **Wadmalaw River** from eastward, and **Dawho River** from westward, comprise part of the Intracoastal Waterway. **Bohicket Creek** entrance is about 2.5 miles above the entrance to North Edisto River. **Rockville,** a village about 1.1 miles above the mouth of Bohicket Creek, has several piers and docks at which fresh water can be obtained. A depth of 14 feet can be carried up the creek to Rockville. **Steamboat Creek** entrance is marked by a daybeacon.

The mean range of tide in North Edisto River entrance is about 6 feet. On the bar the direction of the current is generally across the channel. The flood current sets about westward, and the ebb eastward; both have considerable velocity. Inside the bar, in the channel between the breakers, the ebb current is to be guarded against, especially when it sets across the north breakers. Predicted currents for the North Edisto River entrance may be obtained from the Tidal Current Tables.

Chart 793.—The entrance to **St. Helena Sound** is 7 miles wide between **Bay Point** on the northeast and **Hunting Island** on the southwest. An abandoned lighthouse, 128 feet high, about 1.2 miles from the north end of the island, makes a good landmark. There are several channels through the shoals which extend about 6 miles seaward from the sound entrance. The principal channel has depths of 13 to 16 feet over the bar, and is marked by buoys which are shifted to indicate the best water. The mean range of tide on the bar and in the entrance to the sound is about 6 feet.

Most important of the several navigable rivers emptying into the sound are South Edisto, Ashepoo, Coosaw, Morgan, and Harbor Rivers; the first three are links in the route of the Intracoastal Waterway.

South Edisto River, which empties into St. Helena Sound immediately westward of Bay Point, is of little commercial importance. Above its junction with Dawho River, the South Edisto is known as **Edisto River.** An unmarked channel into South Edisto River has depths of 12 to 16 feet over the ocean bar. The river is usually entered from the Intracoastal Waterway; the entrance from the ocean is rarely used. The mean range of tide is about 6 feet in the lower part of the river. Currents at the entrance have a velocity of about 2 knots; current

predictions may be obtained from the Tidal Current Tables. See Appendix for **storm warning** display.

The railroad bridge over Edisto River 20 miles above the mouth has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 3½ feet; operating regulations are given in § **203.245,** Chapter 2. The rails have been laid across the swing span in such manner that extensive dismantling is necessary to open the bridge. A draft of about 3 feet can be taken about 8 miles above this bridge to a fixed bridge at **Jacksonboro.**

Ashepoo River flows into St. Helena Sound from northward on the west side of **Otter Islands.** A highway bridge over the river 13 miles above the mouth has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 7 feet; operating regulations are given in § **203.245,** Chapter 2. An overhead power cable across Ashepoo River, just westward of the highway bridge, has a clearance of 63 feet. The railroad bridge 4 miles above the highway bridge has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 4½ feet. An overhead cable at this bridge has clearance of 84 feet. This bridge requires extensive dismantling to open; operating regulations are given in § **203.245,** Chapter 2. The river has a controlling depth of about 9 feet to the second bridge.

Coosaw River, which enters the head of St. Helena Sound from westward, is important only as a link in the Intracoastal Waterway. The river channel is irregular in depth, partly because of the phosphate dredges which once operated here.

Chart 794.—Combahee River, 3 miles above the mouth of Coosaw River, is navigable for drafts up to about 5 feet to a highway bridge 20 miles above the entrance. A railroad bridge 12 miles above the mouth of Combahee River has a swing span with a horizontal clearance of 42 feet and a vertical clearance of 6 feet. The highway bridge 8 miles above the railroad bridge has a swing span with a horizontal clearance of 100 feet and a vertical clearance of 8½ feet. Operating regulations for these bridges are given in § **203.245,** Chapter 2. The tides have a range of about 6 feet at the mouth of the river and 4½ feet at the highway bridge.

New Chehaw River, on the north side of the entrance to Combahee River, is unimportant and has no traffic. **Old Chehaw River** enters the Combahee River from northward about 2 miles above New Chehaw River. The village of **Wiggins** is about a mile above the junction of Old and New Chehaw Rivers.

Bull River is 5 miles above the mouth of the Coosaw River. It divides into **Williman Creek** and **Wimbee Creek** 2 miles above the mouth, passes north and south of **Williman Islands,** and rejoins as Wimbee Creek 4.5 miles above the lower junction.

Chisolm is a small village on the south bank of Wimbee Creek about 1.5 miles above the lower junction; the controlling depth to Chisolm is about 8 feet. A railroad swing bridge over Wimbee Creek 1 mile above the upper junction with Williman Creek has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 5½ feet; operating regulations are given in § **203.245,** Chapter 2. The nearby overhead cable has a clearance of 80 feet. The controlling depth to the bridge by way of Bull River and Williman Creek is about 10 feet; between Chisolm and the upper junction, Wimbee Creek is nearly dry in places at low water.

Parrot Creek, which enters Coosaw River on the south side directly opposite Bull River, is a 2-mile link between Coosaw and Morgan Rivers. The controlling depth through the creek is about 13 feet.

Lucy Point Creek, about 2 miles westward of Parrot Creek, also connects Coosaw and Morgan Rivers; the controlling depth through the creek is about 6 feet. A wharf and a shrimp-packing plant are just inside the Coosaw River entrance to the creek. An overhead power cable across the creek, just inside the entrance from Coosaw River, has permit clearance of 75 feet.

Chart 793.—Morgan River flows into St. Helena Sound from westward. The river is about 8 miles long, and at its head connects with Chowan Creek, a tributary of Beaufort River; at the divide, this passage is nearly dry at low water. The mean range of tide near the head of Morgan River is about 7 feet. **Coffin Creek,** on the south side of Morgan River near the mouth, has a shrimp-packing plant about half a mile above the creek mouth where gasoline, diesel fuel, and emergency supplies can be obtained. On **Village Creek,** about 0.8 mile above Coffin Creek, there are two shrimp-packing plants where some fuel and supplies may be obtained in an emergency. On **Edding Creek,** about 1.5 miles west of Village Creek, is **Edding Point Camp,** where gasoline, some provisions, fresh water, and motel and restaurant accommodations are available.

Fripps Inlet, between Hunting Island and **Fripps Island,** is obstructed at its mouth by shoals over which no more than 2 to 4 feet can be taken in the smoothest weather. **Harbor River,** at the head of the inlet, connects with St. Helena Sound to the eastward, and **Story River** connects the inlet with Trenchards Inlet and Station Creek to the westward. **Wards Creek,** on the north side of Harbor River about 0.25 mile above the highway bridge, has a shrimp-packing plant about 0.5 mile above the mouth where gasoline, diesel fuel, and emergency supplies may be obtained. A depth of about 4 feet can be taken from St. Helena Sound to Port Royal Sound by way of Harbor River, Story River, and Station Creek. A highway bridge over Harbor River 0.5 mile above the mouth has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 15 feet; operating regulations are given in § **203.245,** Chapter 2.

Skull Inlet, 3 miles southwest of Fripps Inlet, is a narrow passage with little water over the bar.

Chart 571.—Pritchards Inlet, 5 miles northeast of Port Royal Sound, is a narrow passage from the ocean to **Moon Creek** which connects with the upper part of Trenchards Inlet; there is very little water over the bar. **Trenchards Inlet,** just northeast of Port Royal Sound, has a bar which extends about 2 miles from shore; the narrow unmarked

channel over the bar has a controlling depth of about 4 feet. This inlet is connected at its head by Station Creek which joins Port Royal Sound to the westward.

Port Royal Sound, one of the largest harbors on the South Carolina coast, has an entrance about 2 miles wide between **Bay Point** on the northeast and **Hilton Head** on the southwest.

A Federal project provides for a channel 27 feet deep through the ocean bar to Beaufort River, thence 24 feet deep to the turning basin 27 feet deep at Port Royal on the north side of the entrance to Battery Creek. In May 1958 the controlling depth was 20 feet. The channel is marked by lights, and lighted and unlighted buoys.

South Channel, a natural channel just westward of the marked entrance, has least depths of about 12 feet over the shoals.

Beaufort River, which flows into Port Royal Sound from northward just inside Bay Point, is the approach to the U.S. Marine Corps Recruit Depot on Parris Island, Port Royal, and Beaufort. The river is a link in the Intracoastal Waterway; above the improved portion depths of 12 feet or more can be taken to the city of Beaufort.

Station Creek joins Beaufort River from eastward 1 mile above Bay Point. A depth of about 4 feet can be taken from Port Royal Sound to St. Helena Sound by way of Station Creek, Story River, and Harbor River.

Chowan Creek, which empties into Beaufort River from northeastward about 5 miles above Bay Point, connects at its head with Morgan River. Passage to Morgan River is restricted about 5 miles above the mouth of Chowan Creek by a fixed highway bridge with 4 feet vertical clearance, and by the shoals in that vicinity.

Parris Island, on the west side of the entrance to Beaufort River, is the site of a U.S. Marine Corps Recruit Depot. The dock on Parris Island opposite the mouth of Chowan Creek has a depth of about 15 feet at the face.

Battery Creek empties into Beaufort River from northwestward 7 miles above Bay Point. Above the turning basin at Port Royal the creek has natural depths of 17 feet or more for a mile to the highway bridge, and thence about 5 feet in a narrow winding channel to a point back of Beaufort Station. The bridge has a swing span with a horizontal clearance of 99 feet and a vertical clearance of 12 feet. Operating regulations are given in **§ 203.245,** Chapter 2. About 4.4 miles above the bridge are overhead cables with a minimum permit clearance of 12 feet.

Archers Creek, a narrow passage leading westward from the mouth of Battery Creek to Broad River, is shoal at its eastern end, and about midway of its length a fixed highway bridge has a horizontal clearance of 34 feet and a vertical clearance of 20 feet. The creek is included in a **danger zone** of a rifle range; limits and regulations are given in **§ 204.80,** Chapter 2.

Port Royal, on the north bank of the entrance to Battery Creek, has a 500-foot dock and warehouse. It is a terminus of the Charleston and Western Carolina Railway. Shrimp and fish are trucked inland from the port. Supplies for Parris Island are handled at the port. See Appendix for **storm warning** display.

Beaufort, on the point of land jutting eastward into Beaufort River 11 miles above Bay Point, has good highway connections with Charleston, Savannah, and other points, and is served by the Charleston and Western Carolina Railway. Principal cargo handled includes fish, shrimp, and truck farming. The yacht club wharf is about 0.2 mile westward of the highway bridge to **Ladies Island.** Fresh water, electricity, showers, and rest rooms are available. The municipal wharf just eastward of the yacht club pier is over 450 feet long, with depths of 12 to 14 feet alongside. A marine service wharf just westward of the highway bridge is 80 feet long, with a depth of 15 feet alongside. There is fair anchorage in the stream off the wharves. Bridge clearances are given in the discussion of the Intracoastal Waterway, Chapter 12.

Hotel accommodations, gasoline, diesel fuel, water, ice, and provisions are available at Beaufort. Across the river from the town above the bridge, there is a ship repair yard with marine railways able to haul out craft up to 75 feet in length, 7 feet in draft, and 90 tons in weight, for general repairs. A machine shop is on the premises; gasoline, diesel fuel, water, and ice are available.

Anchorage.—The usual and best anchorage is in the mouth of Beaufort River abreast of Station Creek; the holding ground south of Bay Point is poor. There is good anchorage, with a depth of about 24 feet, in Beaufort River within 0.3 mile of the Parris Island wharf. Port Royal Sound is sometimes used as a harbor of refuge in winter.

Tides and currents.—The mean range of tide is about 6½ feet at the ocean bar and 7½ feet at Beaufort. The currents on the ocean bar have an estimated velocity of 1½ knots and set fair with the channel. The currents in the sound have a velocity of 2 or more knots at times, and the tide rips on Fishing Rip and Middle Shoal sometimes have the appearance of breakers. Current predictions for a number of places in Port Royal Sound and vicinity can be obtained from the Tidal Current Tables.

Broad River, which enters Port Royal Sound on the west side of Parris Island, extends northwestward about 16 miles. The river is not difficult to navigate as far as Whale Branch. About 3 miles above the mouth of Archers Creek the river is crossed by a highway swing bridge with a horizontal clearance of 120 feet in the east draw and 110 feet in the west draw, and a vertical clearance of 12 feet.

Chart 794.—A railroad bridge over Broad River 2 miles above Whale Branch has a swing span with a horizontal clearance of 55 feet and a vertical clearance of 7 feet; operating regulations are given in **§ 203.245,** Chapter 2. **Pocotaligo River, Tulifiny River,** and **Coosawhatchie River** are shallow streams which empty into the head of Broad River.

Whale Beach, which connects Broad River with Coosaw River to the eastward, has a controlling depth of about 7 feet. Overhead cables crossing the branch about

3.5 miles above the mouth have a minimum permit clearance of 54 feet. The railroad bridge over the branch 4 miles from Broad River has a swing span with a horizontal clearance of 51 feet and a vertical clearance of 5½ feet. The highway bridge 1.5 miles above the railroad bridge has a swing span with a horizontal clearance of 34 feet and a vertical clearance of 5 feet. Operating regulations for these bridges are given in **§ 203.245,** Chapter 2.

Brickyard Creek, 5 miles eastward of the highway bridge over Whale Branch, connects Coosaw River with Beaufort River to the southward and is a link in the Intracoastal Waterway. The mean range of tide is about 7 feet at the mouth of the creek.

Chart 571.—Chechessee River empties into Port Royal Sound from westward. The fixed highway bridge crossing the river 10 miles above the mouth has a horizontal clearance of 66 feet and a vertical clearance of 20 feet. A least depth of 19 feet is available from the mouth of the Chechessee River to just above Copp Landing on the **Colleton River,** 5 miles above the mouth. These rivers are of no commercial importance.

Mackay Creek joins Chechessee River from westward about 1 mile above its mouth. An unlighted route from Port Royal Sound to Calibogue Sound is through Mackay Creek past the north side of Pinckney Island, parallel with Skull Creek. This passage is more difficult than the route through Skull Creek, but equally deep water can be found by those having local knowledge. A fixed highway bridge over Mackay Creek from Buckingham Landing to Last End Point has a permit horizontal clearance of 60 feet and a vertical clearance of 25 feet.

Skull Creek, a link in the Intracoastal Waterway, enters Port Royal Sound from southwestward about 4 miles above Hilton Head and is described in Chapter 12.

Chart 440.—Calibogue Sound is entered between Hilton Head Island and **Daufuskie Island,** about 5 miles northward of Tybee Light. The entrance is obstructed by shifting shoals through which are several crooked channels. One of the best of these extends from Tybee Roads northward just eastward of the lighted range; this is good for depths of 10 feet or more. Inside the bar depths are ample.

Cooper River, of importance only as a section of the Intracoastal Waterway, empties into Calibogue Sound from westward about 3 miles above the entrance to the sound.

Chart 571.—May River, which empties into Calibogue Sound from westward about 6 miles above the entrance, is the approach to the village of **Bluffton,** 7 miles above the mouth. The controlling depth in the river to Bluffton is about 13 feet. The power cable over the river near Buck Point has permit clearance of 35 feet over the narrow northern channel and 68 feet over the southern channel. The permit clearances for the power cable west of Bluffton (Chart 1240) are 53 feet over the northern channel and 48 feet over the southern. Passage is sometimes made from May River to Cooper River by way of **Bull Creek.** An overhead cable with a permit clearance of 46 feet crosses Bull Creek between Bull and Savage Islands. The tides meet in Bull Creek, forming flats over which there is a depth of 2 feet at low water.

Broad Creek flows into Calibogue Sound from eastward, about 1.2 miles above the entrance to the sound, and extends 6 miles into Hilton Head Island. The creek is of no importance, but has a depth of 12 feet or more for several miles.

Chart 440.—Savannah River, the boundary between the states of South Carolina and Georgia, is 65 miles southwestward of Charleston Harbor and 105 miles northward of the entrance to the St. Johns River. It is navigable for deep-draft vessels to the upper end of Savannah Harbor, 19 miles above the outer ends of the entrance jetties, and for shallow-draft vessels to the city of Augusta, 172 miles above Savannah. Deep-draft vessels approach the entrance from outside the lightship.

Savannah, on the south bank of Savannah River about 15 miles above the outer end of the jetties, is the second largest city and chief port of the state of Georgia. It is a leading southern port, and is the main distributing point for the surrounding country. The city has considerable coastwise and foreign trade, and is connected with coastal cities to the north and south by the Intracoastal Waterway which crosses Savannah River several miles below the waterfront terminals. There are excellent hotel accommodations. The climate is equable, and high-velocity winds are infrequent. The water-borne commerce is of a widely varied nature, principally petroleum and petroleum products, sugar, lumber, cotton and cotton goods, naval stores, fertilizers, bagging, paper and paper goods, clay and fuller's earth, sodium sulfate, iron and steel articles, and scrap iron and steel.

Prominent features.—Savannah Lightship (31°56.6′ N., 80°39.8′ W.), is in 48 feet of water 12 miles southeastward of the entrance to Savannah River. The lightship has a red hull with the word SAVANNAH on each side, and two masts with a circular gallery and lantern at each masthead. The light is 66 feet above the water and visible 14 miles. The fog signal is synchronized with the radiobeacon for distance finding. The code flag signal and radio call is NNCX. **Storm warnings** are displayed daytime only.

Tybee Light (32°01.3′ N., 80°50.8′ W.), 144 feet above the water and visible 18 miles, is shown from an octagonal brick tower, lower 50 feet painted black, middle part white, and upper part black, on the northeast end of Tybee Island.

The flashing red lights atop the three WSAV radio towers at Whitemarsh Island are prominent from seaward in clear weather.

Boundary lines of Inland Waters.—The line established for Savannah River is described in **§ 82.40,** Chapter 2.

Channels.—Federal project depths are 36 feet for 8.5 miles across the bar through Tybee Roads to Cockspur Island, thence 34 feet for 16.4 miles in the main channel

to Kings Island, and thence 30 feet for 2 miles to the head of the project about 1,500 feet below the U.S. Highway 17 Bridge; the project also provides for suitable turning basins above the city waterfront terminals. The channels are well marked and are generally maintained; controlling depths are published at frequent intervals in the Notice to Mariners.

Anchorages.—Most vessels usually anchor northwestward of the sea buoy where depths range from 19 to 45 feet with good holding ground.

Bridges.—A fixed highway bridge near the western edge of the city waterfront, 13 miles above the mouth, has a horizontal clearance of 600 feet and vertical clearance of 135 feet over a center span width of 400 feet. The highway served by this bridge also crosses Back River, just northward, over a fixed bridge with a horizontal clearance of 34 feet and a vertical clearance of 10 feet. The only other bridge crossing the improved deepwater channel is the Seaboard Air Line Railroad lift bridge, about 2 miles above the city. Its horizontal clearance is 200 feet and the vertical clearances are 9½ feet down and 135 feet up.

Tides.—Tide predictions for both Savannah River entrance and Savannah are given in the Tide Tables. At the bar, high and low waters occur about 30 minutes earlier than at the river entrance. The mean range of tide is about 7 feet at Tybee Light and 7½ feet at Savannah.

Currents.—The mean velocity of the strength of ebb current from the entrance jetties to Savannah is from 2½ to 3 knots. The flood current has a velocity at strength of from 1½ to 2 knots. The current is considerably influenced by winds and freshets. The predicted times of slack water and the times and velocities of strength of flood and ebb at the entrance to Savannah River are given in the Tidal Current Tables. Similar predictions for a number of other places in Savannah River may be obtained from data in the tables.

Currents set in the direction of the channel except at the entrance near Tybee Light, where the flood sets northwestward across the channel. Between the jetties the flood sets 260°. Freshets occasionally occur in the spring, but do not endanger shipping at the wharves.

Detailed results of current observations, including a set of hourly tidal current charts for Savannah River referred to times of high and low waters at Tybee Light, are contained in Coast and Geodetic Survey Special Publication No. 211, Currents in St. Johns River, Savannah River, and Intervening Waterways.

Pilotage is compulsory at the bar for vessels engaged in the foreign trade and for vessels in the domestic trade, except domestic vessels drawing under 12 feet or domestic vessels with a pilot aboard licensed by the Federal Government.

The pilot boat is stationed at **Cockspur Island,** at the mouth of the river, but vessels are boarded off the sea buoy. The boat is equipped with a radiotelephone, and also has direct telephone communication with Savannah Radio Station WSV.

Towage.—Vessels usually proceed from the bar to Savannah without assistance. Towboats are available at Savannah upon call to assist in docking, undocking, and shifting berth.

Quarantine.—Vessels are boarded by officers of the U.S. Public Health Service upon arrival at berth. A Public Health Service marine hospital is in the city.

Customs.—Savannah is a port of entry and marine documents are issued.

Immigration officials are stationed at Savannah.

Harbor regulations.—The Savannah District Authority regulates Savannah Harbor and the port. The Georgia Ports Authority owns and operates the State docks and warehouses.

Terminal facilities.—There are many wharves of all types at Savannah with depths alongside ranging up to 34 feet. Several are opposite the city on **Hutchinson Island,** but most are on the south bank of the river. A passenger ferry operates daily between the municipal wharf at the foot of Bull Street and Hutchinson Island. The State docks about 4 miles above the city consist of a concrete marginal wharf more than 2,000 feet long with depths of about 32 feet alongside. There are warehouses, transit sheds, rail connections, and adequate facilities for handling all cargo; fresh water and fuel oil are piped to the fourth berths. The terminal is served by all the rail and truck lines that operate to Savannah; the terminal maintains its own fire department. About a half of the other wharves have direct rail connections. There are ample stowage and cargo-handling facilities for the existing commerce.

Supplies of all kinds are available in the city. Coal can be procured, and diesel and bunker oils can be obtained at the fuel wharves or at the piers from lighters.

Repair facilities include a graving dock 540 feet long, 73 feet wide, and 24 feet deep over the keel blocks at high water. There are two well-equipped machine shops, and a 50-ton portable electric crane. A floating drydock and several marine railways are available; the largest railway can haul out craft up to 200 feet in length and 900 tons in weight.

Communications.—Savannah has rail, water, highway, and air transportation facilities linking up with all parts of the country. Five railroads operate out of the city, and regular steamship service connects Atlantic and Gulf ports, and there is considerable shipping to all foreign ports. Three major airlines serve Savannah.

Above Savannah, the river is generally navigable for drafts of about 6 feet to the city of **Augusta,** a distance of 172 miles. The revised Federal project depth is 9 feet over a width of 90 feet.

The freshet variation above the normal pool level of the **New Savannah Bluff** lock and dam, about 155 miles above Savannah, is about 13 feet ordinarily, with an extreme of 34 feet. The lock is 360 feet long, 56 feet wide, and has a depth over the lower miter sill of 10 feet. The depth over the upper miter sill at normal pool level is 13½ feet; the vertical lift is 15 feet. There is no navigable connection between the pool of the navigation dam and the pool of the Augusta city dam.

Between Savannah Harbor and the lock and dam, the limiting clearances of the drawbridges are 67 feet horizontally and minus 3 feet vertically at extreme high water and 13 feet at low water. Between the lock and dam and the Augusta city dam, the head of navigation, the limiting drawbridge clearances are 75 feet horizontally, and minus 9 feet vertically at flood stages and 26 feet at normal pool level. Operating regulations governing the Charleston and Western Carolina Railway Co. bridge near Augusta are given in **§ 203.245,** Chapter 2.

There are numerous landings between Savannah and Augusta without wharves or rail connections. A city wharf and warehouse are at Augusta.

8. SAVANNAH RIVER TO ST. JOHNS RIVER

Charts 1241, 1242, 1243.—The coast from Savannah River to St. Johns River extends in a south-southwesterly direction for about 100 miles. Islands separated by numerous sounds and rivers constitute the entire coast. In general these islands are heavily wooded with marshy areas bordering them on their western sides. The 5-fathom curve extends about 7 miles offshore except in the vicinity of St. Simons Sound where 5 fathoms can be found as much as 12 miles offshore.

Caution must be observed along this section of the coast due to the inshore sets caused by the numerous rivers and sounds. Detailed results of current observations taken at a number of locations in the navigable entrances and passages of this area are contained in Coast and Geodetic Survey Special Publication No. 211, Currents in St. Johns River, Savannah River, and Intervening Waterways. Included are a set of hourly tidal current charts referring to times of high and low waters at Tybee Light.

Boundary lines of Inland Waters.—The line established for St. Simons Sound, St. Andrew Sound, and Cumberland Sound is described in **§ 82.45,** Chapter 2.

Danger areas for air-to-air and air-to-water gunnery and bombing ranges are off the Georgia coast; limits and regulations are given in **§ 204.81,** Chapter 2.

Chart 440.—From Savannah River to Wassaw Sound, a distance of about 7 miles, the coast is formed by the shores of **Tybee Island** which lies in a southwesterly direction. Dangerous shoals extend from the shore of the island for a distance of 4.5 miles.

On the north side of Tybee Island, the **South Channel** of the Savannah River extends from the main channel at the east end of Cockspur Island to the southwest end of Elba Island where it again joins the main channel. **McQueens Island** is west of Tybee Island along the south side of South Channel. **Fort Pulaski National Monument** includes Cockspur and McQueens Islands. **Fort Pulaski** on Cockspur Island was built during the period 1829–1847. The Intracoastal Waterway crosses the South Channel through Elba Island Cut. The fixed highway bridge crossing the channel between Cockspur and McQueens Islands has a horizontal clearance of 36 feet and a vertical clearance of 10 feet.

Savannah Beach, a summer resort at the northern end of Tybee Island, is conspicuous from seaward. An inside approach to the beach is made through **Lazaretto** and **Tybee Creeks.** In 1959 a new bridge was under construction just inside the entrance to Lazaretto Creek. The highway bridge about 0.3 mile above its mouth has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 6 feet. Operating regulations are given in **§ 203.404,** Chapter 2. There are small-boat piers on each side of the bridge. Gasoline is available.

The remaining portion of Tybee Island is generally low and marshy, although it has many wooded hummocks with numerous creeks winding among them. Several creeks flow into the sea, but they are of little importance as their mouths are obstructed by shoals with crooked channels of 2 to 3 feet in depth.

The southwest part of Tybee Island, separated from the main body by a stretch of marsh, is **Petit Chou Island.** It is distinguishable by a large and heavily wooded hummock which marks the northern point of the entrance to Wassaw Sound.

The entrance to **Wassaw Sound** is about 9.5 miles southwestward of Tybee Light. Shoals extend offshore a distance of 4 to 4.5 miles from the entrance, forming a shifting bar through which is a channel with a depth of about 14 feet. The entrance is used only by small boats. Pilots will not take a ship into the sound.

After crossing the bar at the entrance to Wassaw Sound, a channel with depths of 19 to 50 feet leads through the southern part of the sound and up the Wilmington River for 6 miles to the Intracoastal Waterway.

The tidal currents in Wassaw Sound have considerable velocity. Current predictions for a number of places in the sound and vicinity may be obtained from the Tidal Current Tables. The mean range of tide varies from about 7 feet in the sound to 8 feet up the rivers.

Tybee River (also known in the upper reaches as **Bull River**) flows into Wassaw Sound from northward. It is connected with the South Channel of the Savannah River 5 miles below the city of Savannah by St. Augustine Creek and the upper part of Wilmington River. The mouth of the river is obstructed by shoals. The highway bridge, 5.7 miles above the mouth, has a swing span with a horizontal clearance of 95 feet and a vertical clearance of 6 feet; operating regulations are given in **§ 203.404,** Chapter 2.

Wilmington River flows into Wassaw Sound from northwestward. The upper end of the river from the junction with Skidaway River is part of the Intracoastal Waterway. **Turners Creek,** which connects the Wilmington and Tybee Rivers, has a controlling depth of about 7 feet. The highway bridge over the creek, 1.7 miles above the mouth, has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 6 feet; operating regulations are given in **§ 203.404,** Chapter 2. A boatyard, 1.6 miles southward of the bridge, makes hull and gasoline engine repairs, and has a marine railway that can haul out boats up to 45 feet in length and 5 feet in

draft. Gasoline and water can be obtained at several piers along the creek.

The coast between Wassaw and Ossabaw Sounds is formed by **Wassaw Island,** which is triangular in shape and has a length of about 4.5 miles and a width of about 3.5 miles in its widest part. In general, the island is low and marshy, the strip of firm land forming the coastline being only 0.3 to 0.8 mile wide. The firm land is heavily wooded and has a broad sand beach backed by sand hills. From this shore dangerous shoals extend to a distance of 3 to 4 miles. The marshy portion of the island is cut by numerous creeks winding among the heavily wooded hummocks. Romerly Marsh Creek and **Odingsell River** separate the island from the islands to the westward.

Chart 573.—Ossabaw Sound is a broad opening in the coast about 15 miles southwestward of Tybee Light. Most of the sound is shallow, and shifting shoals extend seaward about 4 miles. Two channels lead through the shoals into the sound. Small local fishing craft are the principal traffic seaward from the sound. Pilots are not available and strangers are advised not to enter. Vernon River, Ogeechee River, and numerous smaller rivers and creeks enter the sound.

Chart 440.—Vernon River enters Ossabaw Sound from the northwestward. The Intracoastal Waterway traverses a portion of this river. The **Burnside** and **Little Ogeechee Rivers** and several creeks enter the Vernon River. **Montgomery,** a village on Vernon River 5 miles above the mouth, has highway connections with Savannah.

Charts 573, 1241.—Ogeechee River flows into the western part of Ossabaw Sound. The river drains an extensive area and is subject to flood conditions which continually change the channel. Pilots are not available. Navigation to the Seaboard Air Line Railroad bridge, about 27 miles above the sound, is possible with local knowledge. This fixed bridge has a horizontal clearance of 40 feet and a vertical clearance of 7½ feet. The adjacent Atlantic Coast Line Railroad bridge has a lift span with a horizontal clearance of 60 feet and a vertical clearance of 0 feet down and 34 feet up. Operating regulations are given in § **203.245,** Chapter 2.

The currents in the Ogeechee River and Ossabaw Sound have considerable velocity, particularly the ebb setting out of the river. Current predictions for several locations in Ossabaw Sound and vicinity can be obtained from the Tidal Current Tables. The mean range of tide is about 7 feet, decreasing to about 1 foot at the highway bridge.

Chart 573.—The coastline between Ossabaw Sound and St. Catherines Sound is formed by the eastern shore of **Ossabaw Island,** which lies in a southwesterly direction and has a length of 8 miles and a width of 6 miles. The eastern half of the island is heavily wooded. The north end forms the south shore of Ossabaw Sound.

The seaward side of the island appears unbroken by streams, and shows as a white sand beach backed by heavy woods. Dangerous shoals extend offshore nearly 5 miles.

The southwestern point of the island borders on St. Catherines Sound and is thickly wooded. The western half is almost entirely marshy and is cut up by numerous creeks which provide access to the higher ground to the eastward. On the west the island is separated from the marshes of the mainland by **Bear River** and **Florida Passage,** connecting streams which afford an inside passage from one sound to the other.

St. Catherines Sound is about 22 miles southwestward of Tybee Light. The entrance is over a shifting bar which extends 5 miles offshore. The entrance buoy is 6.5 miles offshore. With the aid of a chart it should not be difficult for boats drawing 11 feet to enter by closely following the buoyed channel. The points on its northern and southern sides are wooded.

There are no towns on the sound and strangers seldom enter. Except for light-draft fishing craft, little traffic crosses St. Catherines Bar. Pilots are not available. Channels with depths of 13 to 38 feet lead from inside the bar into the entrances of its tributaries. The main body of the sound is exposed and becomes quite rough in moderately bad weather. Protected anchorage is in **Walburg Creek** on the south side of the entrance to the sound.

The mean range of tide in the sound is about 7 feet, increasing to about 8 feet at Belfast and **Kilkenny Club.** Tidal currents have considerable velocity at the entrance and in the tributary rivers. The Tidal Current Tables should be consulted for current predictions.

The Intracoastal Waterway crosses St. Catherines Sound just inside the entrance, and affords passage northward through Bear River to Ossabaw Sound, and southward through North Newport River and Johnson Creek to Sapelo Sound.

Three main rivers enter the sound. **Bear River** and **North Newport River,** which form a portion of the Intracoastal Waterway, flow into the sound from the northwestward and southwestward, respectively. **Medway River** enters the sound from the westward. A draft of 12 feet can be carried to **Sunbury,** a small settlement on the western shore 7 miles above the mouth of the river. Water can be obtained at the wharf which serves an oyster plant.

By way of the Medway River and **Belfast River** a draft of 7 feet can be carried to **Belfast.** A pile of rocks bare about 3 feet at low water, stands in the mid-channel with surrounding depths of 12 feet off the bluff at Belfast.

St. Catherines Island forms the coast from St. Catherines Sound to Sapelo Sound, lies in a nearly north and south line, and has a length of 9 miles and a width at its widest part of about 3 miles. The island is flat and much of it is marshy with the higher part heavily wooded.

When viewed from a distance seaward, only dense woods in level silhouette are to be seen on St. Catherines Island. Closer inspection reveals a white sand beach, with sand hills 20 feet high near the center of the island which show up from some directions. A prominent sand dune 3 miles

south of the north end of the island and about 1 mile north of McQueen Inlet, is reported to show well from seaward. **McQueen Inlet,** the only break in the shoreline visible from seaward, is unimportant, as it is blocked by shoals at low water. Dangerous shoals extend offshore to a distance of 5 miles.

The island is separated from the marshes lying between it and the mainland by Walburg Creek, Johnson Creek, and South Newport River. The entrance to Sapelo Sound is between the south point of this island and the north point of Blackbeard Island.

Chart 574.—Sapelo Sound is about 32 miles southwestward of Tybee Light. A lighted buoy is 15 miles off the entrance. About 8 miles from the entrance the break in the shore can be seen on a clear day. The tower of the abandoned lighthouse 10 miles southwestward of the sound can also be seen from off the bar and is a good landmark. Vessels should stay in a depth of over 5 fathoms until the entrance buoys are seen because of the shoals extending about 5 miles offshore.

With the aid of the chart, and on a rising tide and a smooth sea, vessels up to a 15-foot draft should have no difficulty in entering during daylight hours by following the buoys. A comparison of the surveys made since 1859 shows virtually no change in the bar except in the vicinity of the shoalest part of **Experiment Shoal,** which has moved more than 0.25 mile southward. The slough between the shoal and St. Catherines Island also has deepened and extended, and now shows up as a swash channel with a least depth of 9 feet. Another unmarked channel south of the main channel has a reported depth of 8 feet and is used by fishing boats.

Pilots are not available for Sapelo Sound. No towns or villages of any importance are on the sound or tributaries. In northeasterly weather anchorage can be made in the lower part of South Newport River with fair protection.

The mean range of tide is about 7 feet. In the entrance to the sound the average velocities at strengths of flood and ebb are about 2 and 2½ knots, respectively. The Tidal Current Tables should be consulted for current predictions.

The Intracoastal Waterway enters Sapelo Sound from the northward through South Newport River and continues southward to Doboy Sound through Sapelo River, Front River, Creighton Narrows, and Old Teakettle Creek.

South Newport River flows into the sound from northward just inside the entrance, and has a channel depth of 11 feet for a distance of 11 miles to its junction with North Newport River. **Sapelo River,** entering the sound from westward, is used only by small fishing boats, except for the lower part below **Front River** which forms a part of the Intracoastal Waterway.

A draft of 13 feet can be carried from the deeper waters of Sapelo River into the mouth of Front River, at the head of which a dredged channel through **Creighton Narrows** offers passage to Old Teakettle Creek and thence to Doboy Sound. The Intracoastal Waterway follows this route.

Mud River, flowing into the head of Sapelo Sound from southward, is a broad shallow body of water.

The coastline from Sapelo Sound to Doboy Sound is formed by the shores of **Blackbeard** and **Sapelo Islands.** These are separated by **Blackbeard Creek,** which empties into **Cabretta Inlet.** From all points of view, they appear as a single island and are described as such. Taken together they have a length of 10 miles in a south-southwesterly direction and a width of 4 miles. Large portions of both islands are heavily wooded. These islands present no well-marked distinguishing features, except the usual sand beach backed by dense woods in level outline and the abandoned lighthouse tower near the south point of Sapelo Island. The western part of Sapelo Island consists almost entirely of broad marshes with numerous creeks. Most important of these is Duplin River, which has deep water for several miles and affords means of communication to the island. Sapelo Island is separated from the marshes lying between it and the mainland by Mud River and New Teakettle Creek.

Blackbeard Island is a game refuge under the control of the U.S. Fish and Wildlife Service.

Doboy Sound is 45 miles southwestward of Tybee Light and 16 miles northeastward of St. Simons Light. The entrance, between Sapelo Island and Wolf Island, is about 1 mile wide and obstructed by shifting shoals extending about 4.5 miles offshore. When approaching the sound vessels should stay in a depth of 5 fathoms or more until the entrance buoys are sighted. If there is too much sea to cross the bar, vessels are advised to enter via St. Simons Sound and the Intracoastal Waterway.

The marked channel over the bar at the entrance to Doboy Sound is not considered safe for strangers with draft of more than 8 feet and only then under the safest condition of a rising tide and a smooth sea. The bar has been changing over the past years. An unmarked swash channel with a least depth of 7 feet makes into the sound close under the south point of Sapelo Island. The channels are used by local shrimp boats. Pilots are not available.

Doboy Sound extends northwestward about 5 miles from the bar with a width of about 0.8 mile. The mean range of tide is about 7 feet in the sound and about 7½ feet at Darien. Tidal currents in the sound have an average velocity of about 1½ to 2 knots. Predicted currents may be obtained from the Tidal Current Tables. Good anchorage is found anywhere in the channel of the sound upstream from **Commodore Island** except in the cable area.

The Intracoastal Waterway enters Doboy Sound through Old Teakettle Creek and passes southward through North River, Darien River, Rockdedundy River, and Little Mud River to Altamaha Sound.

Duplin River, entering Doboy Sound from northward, is a small stream about 5 miles long and good for a re-

ported depth of 10 feet until near its head. A large private dock is on the eastern bank of the river approximately 0.3 mile upstream from the entrance.

Sapelo, a village with a post office on the southerly end of Sapelo Island, is reached by boat going up South End Creek on high tide only. In an emergency some services and supplies can be obtained here.

Old Teakettle Creek enters the sound from northward about 1 mile northwestward of Duplin River. It forms a part of the Intracoastal Waterway. A depth of 7 feet can be carried up **Shellbluff Creek** to the small packing plant at **Valona.** The docks are privately owned by a shrimp-boatbuilding yard with a small marine railway for hauling them out.

Atwood and **Hudson Creeks** are small streams emptying into the head of Doboy Sound from the northwestward. About 10 feet can be taken up Atwood Creek for a distance of 2 miles. Hudson Creek has a depth of 9 feet to the mouth of the small creek leading to a small shrimp-packing plant at **Meridian Landing.**

Carnigan River enters the head of the sound from southwestward, and is connected with North River by a branch known as **Buzzard Roost Creek. North River** enters Doboy Sound west of Doboy Island. It extends westward 6 miles to the village of **Ridgeville** where it joins **May Hall Creek,** which, running southward, connects with Darien River 5 miles above its mouth. **Doboy Island** is wooded and has several buildings on its southwest end. A small private landing is on the west side of the island.

Back River, on the southern side of Doboy and Commodore Islands, forms another, and little used, entrance from the sound to North and Darien Rivers.

South River, also little used, empties into Doboy Sound from southwestward about 0.8 mile inside the entrance. It extends in a general westerly direction for 3 miles, where it joins **Little Mud River,** a part of the Intracoastal Waterway.

Darien River runs southwestward for a distance of 11.5 miles, where it joins the Altamaha River. The controlling depth from Doboy Sound to Darien through the Intracoastal Waterway and Darien River is reported to be 8½ feet. Care is necessary when navigating this river due to the shoals and numerous floating snags. Water is fresh in the river at Darien after the ebb has been running for about 3 hours. The best route from Doboy Sound to the Darien River is via the Intracoastal Waterway.

Darien is 8.5 miles above Doboy Island on the north bank of the Darien River. It is of little commercial importance. Fishing and pulpwood are the main industries. Some shrimp and shad fishermen base here. It has telephone communication, and a good highway passes through the town from Savannah to Brunswick, 18 miles away. Gasoline, diesel fuel, ice, fresh water, and supplies are procurable. Two marine railways, owned by a packing company, are capable of hauling out fishing boats up to 55 feet in length and 21 tons in weight. The depth of water alongside the wharves is 7 to 14 feet. The fixed highway bridge crossing the river at the town has a horizontal clearance of 109 feet and a vertical clearance of 31 feet. The overhead cable about 100 yards west of the bridge has a clearance of 54 feet.

Chart 575.—Between Doboy Sound and Altamaha Sound is Wolf Island, which is about 2.5 miles long in a north-south direction. The island is almost entirely marsh, cut by numerous creeks.

Altamaha Sound is 48 miles southwestward of Tybee Light and 12 miles northeastward of St. Simons Light. The entrance and the sound are obstructed by shoals which are dangerous to navigation. An unmarked shifting channel through the shoals extends 4 miles from the entrance. It is advisable to enter Altamaha Sound via the Intracoastal Waterway. The mean range of tide in the entrance is about 6½ feet.

Altamaha River is formed by the confluence of the Oconee and Ocmulgee Rivers, 110 miles above the town of Darien and 119 miles above its mouth, and flows in a general southeasterly direction, entering the western end of Altamaha Sound. The river is subject to freshets and depths change radically.

In 1958 the controlling depth was 3 feet during 9 months of the year to Milledgeville, a city on the Oconee River 126 miles above the junction with the Altamaha River, and to Macon, a city on the Ocmulgee River 178 miles above the junction. The depths are ½ to 1½ feet less during the summer low-water period.

The fixed highway bridge over South Altamaha River, 2.5 miles south of Darien, has a horizontal clearance of 80 feet and a vertical clearance of 43 feet. Operating regulations for the bridges crossing the Altamaha, Oconee and Ocmulgee Rivers are given in **§ 203.245,** Chapter 2.

Little Mud River enters Altamaha Sound from northward about 2.5 miles inside the entrance. The Intracoastal Waterway passes through it. **Buttermilk Sound,** which enters Altamaha Sound from the southwestward, has an average width of 0.5 mile. At its head the sound connects with Frederica River and Mackay River, the latter connecting with Back River. These three rivers enter the western end of St. Simons Sound from northward, and Mackay River with Buttermilk Sound forms part of the Intracoastal Waterway.

The coast between Altamaha and St. Simons Sounds is formed by the shores of **Little St. Simons Island, Sea Island,** and St. Simons Island. These islands are separated only by stretches of marsh traversed by small streams, and from seaward appear as one body of land although from certain points the marshes, alternating with patches of trees, give the land an unusually broken appearance.

St. Simons Island is the main body of land between the two sounds, and in general description the other two islands may be considered as parts of it. The three taken together are 11 miles long and 6 miles wide at the northern end, diminishing gradually to 2.5 miles near the southern end. Immediately along the coast and in the central parts it is heavily wooded. Between the two wooded portions is a stretch of marsh from 1 to 1.5 miles wide extending nearly the whole length of the island, and to the westward it is separated from the mainland by extensive marshes,

through which flow the Frederica and Mackay Rivers, joining Altamaha and St. Simons Sounds.

The northern portion is marshy and traversed by **Hampton River,** a sizable stream flowing in an easterly and southeasterly direction, which separates St. Simons and Little St. Simons Islands and enters the sea 5 miles below Altamaha Sound. There is a depth of about 6 feet over the bar. The dangerous shoals on both sides of the channel are unmarked. Inside the bar 8 feet can be carried through to Buttermilk Sound.

Village Creek flows into Hampton River from the southward, about 1.5 miles above its mouth. It goes through a stretch of marsh separating Sea Island and St. Simons Island. At low water the channel of Village Creek is practically dry about 4.5 miles above the mouth. After a crooked course of several miles, it joins the **Blackbank River** (Chart 447), a narrow and twisting stream flowing to the southward between the two islands and entering the sea 4 miles south of Hampton River. The fixed highway bridge crossing Blackbank River has a horizontal clearance of 14 feet and a vertical clearance of 5 feet; overhead cables about 200 feet below the bridge have a clearance of 16 feet.

Chart 447.—St. Simons Sound, an inlet 0.8 mile wide, lies 61 miles southwestward of Tybee Light and 27 miles northward of Amelia Island Light. The sound forms a good harbor and is the approach to the city of Brunswick. The entrance is obstructed by dangerous shifting shoals forming a bar which extends for a distance of 5.5 miles offshore.

Brunswick is on the eastern bank of Oglethorpe Bay and Academy Creek opposite Andrews Island, 7.5 miles above St. Simons Light. It is 4.5 miles west of the Intracoastal Waterway route which connects it with ports to the north and south. The city is the second largest port of commercial importance in Georgia. It is about 70 miles south of the Savannah River entrance and about 80 miles north of the St. Johns River entrance to Jacksonville. The principal shipments from the port are naval stores, lumber, and wood pulp. The principal receipts are salt, gypsum, and petroleum products. The principal industries are wood creosoting, seafood packing, and manufacture of rosin, turpentine, wood containers, paper, and plywood.

Brunswick Harbor comprises the improved channel across the bar, St. Simons Sound, Brunswick River, and Turtle River.

Prominent features.—St. Simons Light (31°08.0′ N., 81°23.6 W.), 104 feet above the water and visible 16 miles, is shown from a white conical tower attached to a brick dwelling on the north side of the entrance to the sound. A Coast Guard station is 1.2 miles northeastward of the light. The abandoned lighthouse on the north end of Little Cumberland Island at the entrance to St. Andrew Sound can be seen to the southward. Near the beach eastward and northeastward of St. Simons Light are many palatial homes and summer residences extending to the vicinity of Hampton River. The water tank on St. Simons Island about 0.4 mile north of the light and the tall stacks of the Hercules Powder Company in Brunswick are prominent.

Channels.—A Federal project provides for a channel 32 feet deep through the bar, thence 30 feet deep in Brunswick River and Oglethorpe Bay to the foot of Fifth Street, and thence 27 feet to Academy Creek; 30 feet deep in Turtle River to the abandoned wharf of the Atlantic Refining Company; 24 feet deep in Academy Creek; 10 feet deep in Terry Creek; and 20 feet deep in Back River for a distance of 1.1 miles above the fixed bridge. In 1958 the controlling depths were: 31 feet through the bar channel, 28 feet to the Brunswick Lift Bridge, 25 feet in Turtle River to head of the improved project, 18 feet in Oglethorpe Bay, 5½ feet in Academy Creek, 6½ feet in Terry Creek, and 10 feet in Back River.

A lighted buoy is 15 miles off the entrance to St. Simons Sound. The channel through the bar is marked with lighted and unlighted buoys, and the channels inside the sound are marked with lighted ranges, and lighted and unlighted buoys.

There is a shoal area with a least charted depth of 26 feet on the north side of the approach from the outer buoy to the mid-channel buoy at the entrance to the bar channel which should be avoided in heavy weather.

Anchorages.—There is good anchorage anywhere along the sides of the channel off the range lines in St. Simons Sound or Brunswick River. Depths of 22 to 79 feet may be found in the sound between Jekyll Island and St. Simons Island, and depths of 17 to 30 feet in the Brunswick River directly westward of Jekyll Island. In the area westward of the Brunswick Harbor Range, across the channel from Brunswick, anchorage is only for small craft. Small vessels can also anchor in the East River near the mouth of Academy Creek.

Bridges.—The only bridge crossing the main channel is the highway bridge at Brunswick, 5.4 miles above the mouth, which has a lift span with a horizontal clearance of 250 feet and a vertical clearance of 24 feet down and 139 feet up.

Tides and currents.—The mean range of tide is about 6½ feet on the bar and 7½ feet at Brunswick. Tidal currents normally follow the general direction of the dredged channel across the bar and have an estimated velocity of 1 to 2 knots. They set diagonally across the Plantation Creek Range with an average velocity at strength of about 2 knots. Current predictions for a number of locations in the vicinity of St. Simons Sound may be obtained from the Tidal Current Tables.

See Appendix for **storm warning** display.

Pilotage is compulsory except for vessels with less than 10-foot draft and coastwise vessels having on board a pilot licensed by the Federal Government. Pilots are obtained by wire or telephone to the Brunswick Bar Pilots Association, St. Simons Island.

Towage.—Limited towage is available upon request.

Quarantine.—Vessels subject to quarantine are inspected by an officer of the U.S. Public Health Service upon arrival at berth. An outpatient office of the Public Health Service is maintained. The Brunswick City Hospital maintains a ward for seamen.

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Customs.—Brunswick is a port of entry and marine documents are issued.

Immigration.—There is no immigration office at Brunswick. Inspectors are sent from Savannah when such services are required.

Terminal facilities.—Most of the piers and wharves are along the west side of Brunswick. The port has berthing facilities for three deep-draft cargo vessels with a depth of 25 feet alongside. Two warehouses and transit sheds adjacent to the berths have a total capacity of 428,000 square feet of storage space. Facilities for loading and discharging cargo are limited but improvement of the harbor is planned.

Supplies.—Diesel fuel, gasoline, fresh water, ice and ship chandlery are available.

Repairs.—Good facilities for repair are available. Several marine railways are available, the largest is capable of hauling out vessels of 300 tons, 140 feet in length, and 5 feet in draft forward and 10 feet aft. Complete machine, boiler, steel, and wooded fabrication facilities are available. One wharf is equipped with a derrick capable of handling a 50-ton lift.

There are no special facilities at the port for use in wrecking or salvage operations. When such equipment is needed, it is obtained from Savannah or Jacksonville.

Communications.—The port is served by the Southern Railway and the Atlantic Coast Line Railroad. Two major airlines provide air connections to cities on the Atlantic coast and make western connections.

St. Simons Island (town) is a summer resort with a concrete fishing pier at the south end of St. Simons Island. The pier, 107 feet long on the outside face and 25 feet wide, has a depth of 19 feet alongside.

Frederica River joins St. Simons Sound from the northward about 1 mile inside the entrance and for several miles, to the junction with Mackay River, is the main route of the Intracoastal Waterway.

Mackay River enters the sound from northward but is obstructed by a fixed highway bridge, about 1.5 miles above the mouth, which has a horizontal clearance of 34 feet and a vertical clearance of 7 feet. To the northward of **Lanier Island,** the river is joined by Frederica River and becomes the route of the Intracoastal Waterway.

Little River is west of Mackay River and flows into Back River. A fixed highway bridge about 0.7 mile above the mouth has a horizontal clearance of 34 feet and a vertical clearance of 7 feet.

Back River, an alternate route of the Intracoastal Waterway, enters St. Simons Sound from northward. The highway bridge, 1.5 miles above the mouth, has a lift span with a horizontal clearance of 100 feet and a vertical clearance of 9 feet down and 85 feet up. Above the bridge the channel to the head of the improvement is marked by daybeacons and an unlighted range.

Terry Creek flows into Back River 0.3 mile above the highway bridge and leads westward 1.5 miles to the city of Brunswick. The entrance is marked by an unlighted range. About 1.3 miles above the mouth the creek is crossed by a fixed bridge with a horizontal clearance of 35 feet and a vertical clearance of 7½ feet. A yacht basin on the creek, within the city limits of Brunswick, offers good protection from storms and has 450 feet of dock space and a float with 10 feet of water alongside. Gasoline, ice, and fresh water are available, and provisions and diesel fuel may be delivered from the city.

Plantation Creek and **Clubbs Creek** offer a protected short cut between Back River and Brunswick River, and can be used safely by small craft on a rising tide.

Brunswick River enters the sound from southwestward just inside the entrance and provides access for ocean-going vessels to the city of Brunswick. For a distance of 2.8 miles above its mouth the river has an average width of 1.3 miles, but the deepwater channel averages only 0.3 mile in width. Above **Brunswick Point** the river has an average width of 0.7 mile to **Andrews Island,** which divides it into two branches. The southern branch is known as **Turtle River** and the northern branch, on which the city of Brunswick is situated, is known as **Oglethorpe Bay** to the mouth of **Academy Creek** and thence as **East River** to its junction with Turtle River. All of the channels, except East River and Academy Creek are marked by lighted ranges, lights, and lighted and unlighted buoys.

The highway bridge crossing Turtle River, just above the head of the improvement, has a swing span with a horizontal clearance of 87 feet and a vertical clearance of 5½ feet. Just above the bridge is an overhead power cable with a permit clearance of 55 feet. There is little traffic above the bridge.

South Brunswick River enters Turtle River from westward opposite Andrews Island. The fixed highway bridge 3 miles above the mouth, has a horizontal clearance of 36 feet and a vertical clearance of 12 feet.

Fancy Bluff Creek enters South Brunswick River from the southwest, 1.3 miles above the mouth. The fixed highway bridge 2.3 miles above the entrance, has a horizontal clearance of 49 feet and a vertical clearance of 17 feet. The overhead power cable just southwest of the bridge has a permit clearance of 44 feet.

Cedar Creek enters Brunswick River from the south, about 1.2 miles from Brunswick Point. The fixed highway bridge, 1 mile above the entrance, has a horizontal clearance of 30 feet and a vertical clearance of 10 feet.

Jekyll Creek enters Brunswick River from southward about 2.5 miles above its mouth. With Jekyll and St. Andrews Sounds, it forms part of the Intracoastal Waterway to Fernandina. The entrance is marked by a lighted range and protected by a jetty on its west side, the outer end of which is marked by a light. Jekyll Island Range Front Light is about 25 yards to the westward of this light. The jetty covers at high tide but is marked by daybeacons. To enter be guided by the range, lights, and daybeacons marking the route of the Intracoastal Waterway. Jekyll Island is a State Park; several large buildings, formerly private homes, are on the west side of the island.

Chart 448.—From St. Simons Sound to St. Andrew Sound the coast is formed by the shores of **Jekyll Island** which extends nearly north and south for a distance of 6.5 miles and has a width of 2 miles. The island is

wooded all along its eastern shore and dark woods which are quite level in silhouette stand out in the background. Shoals extend to a distance of 3 to 5 miles offshore.

The western portion of Jekyll Island is marshy, bordered by the Brunswick River, Jekyll Creek, and Jekyll Sound. A settlement on the western side is reached through Jekyll Creek.

St. Andrew Sound, between Jekyll Island and Little Cumberland Island, is about 7 miles southward of St. Simons Sound and 17 miles northward of St. Marys Entrance.

The entrance to the sound is over a shifting bar which extends about 5 miles offshore. Vessels should stay in 5 fathoms or more until the outer buoy is sighted. The channel into the sound is marked by buoys. An abandoned lighthouse is on the north end of Little Cumberland Island. Vessels with a draft of about 10 feet should have little difficulty entering the sound. There is a licensed pilot at Brunswick. The entrance is used only by local shrimp boats.

In the sound are extensive shoals, between which channels lead to the principal tributaries: Jekyll Sound on the north, Satilla River on the west, and Cumberland River on the south. The mean range of tide is 6½ feet. Currents in the entrance are strong, averaging about 2 knots at strength of flood and ebb. Current predictions are given in the Tidal Current Tables.

The best anchorage in the sound is in the channel on the western side of Little Cumberland Island in depths of 21 to 27 feet. good holding ground. Good anchorage is also found in the entrance to Jekyll Sound westward of Jekyll Point.

The Intracoastal Waterway, which crosses the sound, enters from the northward through Jekyll Creek and Jekyll Sound and passes southward through Cumberland River to Cumberland Sound and St. Marys Entrance.

Jekyll Sound, which enters St. Andrew Sound from northward just inside the entrance, has many shoals. Three channels lead to its three principal tributaries. **Jekyll Creek** enters the sound from northward, forming a part of the Intracoastal Waterway. Its northern part connects with Brunswick River. **Jointer Creek** enters Jekyll Sound from northwestward. It is crooked and has several narrow branches, all of which, except Cedar Creek, are blocked by the Jekyll Island Highway. A small boat can navigate from Brunswick River to Jekyll Sound by way of Cedar and Jointer Creeks.

Little Satilla River enters Jekyll Sound from westward. It has a controlling depth of 13 feet at its entrance and for several miles above its mouth. Small craft going to landings on the river enter from South Brunswick River through Fancy Bluff Creek, which is navigable only at high tide as the creek dries at low water.

Satilla River enters St. Andrew Sound from the westward through a narrow channel in the shoals. The controlling depth is about 9 feet from the mouth to the bridge at **Woodbine,** a distance of 22 miles. The fixed highway bridge at Woodbine has a horizontal clearance of 80 feet and a vertical clearance of 40 feet. The railroad bridge to the westward has a swing span with a horizontal clearance of 50 feet in the south draw and 48 feet in the north draw, and a vertical clearance of 5½ feet. Operating regulations are given in § **203.245,** Chapter 2. Traffic in this area consists mostly of pulpwood tows. The controlling depth is about 6 feet from Woodbine to **Burnt Fort,** 45 miles above the mouth of the river.

The mean tidal range is 6½ feet at the mouth of the river and 3¼ feet at Burnt Fort. The freshet variation at Waycross, 142 miles above the mouth, is about 12 feet.

Cumberland River enters St. Andrew Sound from southward just inside Little Cumberland Island. Its general direction is southerly for a distance of 11 miles, where it joins Cumberland Sound. The Intracoastal Waterway follows this route which is well marked by ranges in the more difficult sections.

Brickhill River branches from Cumberland River about 5 miles above the mouth and rejoins it at **Cumberland Dividings. Floyd Creek** enters Cumberland River from westward about 4.5 miles above the north end of Little Cumberland Island, and joins with Satilla River through a cut to form an alternate passage to the Intracoastal Waterway.

Between St. Andrew Sound and Cumberland Sound the coastline, extending in a southerly direction for about 16 miles, is formed by the shores of Little Cumberland and Cumberland Islands. These two islands are separated only by a stretch of marsh and **Christmas Creek,** and appear as one island from seaward. The coastline shows a broad white sand beach backed by an almost continuous range of sand hills with dense woods backing them.

The north end of **Little Cumberland Island,** heavily wooded, has a prominent buff colored bluff and is marked by an abandoned lighthouse.

Cumberland Island is almost entirely covered by woods, though somewhat marshy to the westward. The island is separated from the mainland by extensive marshes through which flow the Cumberland and Brickhill Rivers. The extreme southern point of the island, which forms the north side of the entrance to Cumberland Sound, has several conspicuous sand hills.

For about 9 miles from the entrance to St. Andrew Sound, the coast is bordered by dangerous shoals extending 3 to 5 miles offshore. For the remaining distance to Cumberland Sound there is a depth of 3 fathoms to within 1 mile of the beach.

Chart 453.—St. Marys Entrance and **Cumberland Sound** are 16 miles southward of St. Andrew Sound and 19 miles northward of St. Johns River. The sound is the approach to the city of Fernandina Beach, the town of St. Marys, the docks at Kings Bay, and an inland passage to St. Andrew Sound through its connection with the Cumberland River.

Fernandina Beach, the principal city on Cumberland Sound, is on the east bank of Amelia River, 2 miles south of the entrance. It is a shipping port for woodpulp. Fuel oil, seafood, chemicals, and food products are re-

ceived. A moderate amount of coastwise and foreign shipping serves the port.

Prominent features.—Amelia Island Light (30°40.4′ N., 81°26.6′ W.), 107 feet above the water and visible 16 miles, is shown from a white conical tower 2 miles southward of the entrance to Cumberland Sound. The watertank at Dungeness, 2 miles north of the entrance, and the watertank 1.6 miles south of the entrance, are also prominent from seaward.

Channels.—A Federal project provides for a channel 32 feet deep through the bar to the turning basin in Amelia River below Fernandina Beach. In September 1958 the controlling depth was 22 feet. In September 1958 the channel to the port facilities in Kings Bay at the north end of Cumberland Sound had a controlling depth of 33 feet to the lower turning basin, thence 30 feet to the upper turning basin.

The entrance to the sound is marked by two stone jetties. The jetties are awash at halftide, making them a menace to navigation when visibility is limited. Currents are strong off the ends of the jetties. The natural channel between the jetties is subject to frequent change. The currents scour out the channel during spring tides, but the shoals build up again during neap tides.

A lighted buoy is 5 miles off St. Marys Entrance. The channel through the bar and the channels inside the sound are marked with lighted ranges, lights, and lighted and unlighted buoys.

Fishing vessels going northward out of the sound use the natural channel off the end of the north jetty. The channel is not marked and strangers are warned against using it as there is danger of being set into the end of the jetty. A shoal with a least depth of 6 feet extends more than a mile southeastward from the outer end of the south jetty.

Anchorages.—There is good anchorage along the sides of the channels in Cumberland Sound and in the Amelia River according to the draft of the vessel.

See Appendix for **storm warning** display.

Tides and currents.—The mean range of tide at the entrance and at Fernandina Beach is about 6 feet. The tidal currents at the entrance have considerable velocity and are dangerous at times, especially on the flood current. Freshets in the St. Marys River may cause the ebb to run 7 or 8 hours. Current predictions for Cumberland Sound vicinity may be obtained from the Tidal Current Tables.

Pilotage.—Pilots for Fernandina Beach and St. Marys are stationed at Fernandina Beach. A request for their services may be made by radio through the pilot station at Jacksonville, Florida. Pilotage is compulsory for certain vessels.

Towage.—Towboats can be obtained only from Jacksonville or Savannah.

Quarantine.—Vessels subject to quarantine are inspected by an officer of the U.S. Public Health Service upon arrival at berth. The nearest Public Health Service hospital is at Savannah. A county hospital is at Fernandina Beach.

Customs.—Fernandina Beach is a port of entry and marine documents are issued.

Harbor regulations.—Local rules and regulations are enforced by the harbormaster.

Terminal facilities.—Deep-draft vessels use two wharves which have 29 feet of water alongside. Numerous smaller wharves with lesser depths operate for the shrimp-fishing fleet. The municipal wharf is at the foot of Main Street.

Supplies.—Fresh water, gasoline, diesel fuel, provisions, and marine supplies are obtainable.

Repairs.—Facilities are not available for large vessels. Jacksonville is the nearest place for repairs and haul-out services. A marine railway can haul out vessels up to 68 feet in length and 6 feet in draft; hull repairs can be made.

No special facilities are available for wrecking or salvage operations When such equipment is needed it is obtained from Jacksonville.

Communications.—Fernandina Beach is served by a bus which makes connections with the Seaboard Air Line Railroad at Yulee. An improved highway and bus line connects with the mainland.

The Intracoastal Waterway enters Cumberland Sound from the Cumberland River and continues through the Amelia River on the south.

Beach Creek extends northward into Cumberland Island from a point just inside the entrance to Cumberland Sound. The controlling depth to the landing at Dungeness is reported to be 3 feet.

Kings Bay, in the northern part of Cumberland Sound, has a large wharf and two turning basins for deep-draft vessels.

St. Marys River, the principal tributary of Cumberland Sound, enters from the westward and is a portion of the boundary between Georgia and Florida. It is used primarily by shrimp fishermen and tugs towing pulpwood and sand as far as St. Marys, and above that point by pulpwood tows. The controlling depth in the channel to St. Marys is about 14 feet. Above St. Marys a vessel with a draft of 10 feet or less should have little difficulty going as far as Kings Ferry, 32 miles above the mouth, on a rising tide. The river is very crooked and some of the turns are sharp. The mean range of tide is about 6 feet at the entrance, 5 feet at Crandall, 11 miles above the mouth, 3 feet at Kings Ferry, and 1½ feet at the Atlantic Coast Line Railroad bridge, 48 miles above the mouth. The water is fresh above the Seaboard Air Line bridge, 20 miles above the mouth. Pilots for the river are available at Fernandina Beach.

The highway bridge at Wilds Landing, 20 miles above the mouth of the St. Marys River, has a swing span with a horizontal clearance of 88 feet in the south draw and 86 feet in the north draw, and a vertical clearance of 5 feet. The railroad bridge just upstream has a swing span with a horizontal clearance of 57 feet and a vertical clearance of 5 feet. Operating regulations are given in **§ 203.245,** Chapter 2. The overhead power cable about

250 yards above the railroad bridge has a permit clearance of 71 feet.

The town of **St. Marys** is situated on the north bank of St. Marys River, 4 miles above the mouth. The larger wharves here have 15 feet of water alongside. The larger of the two marine railways is capable of hauling out boats up to 65 feet in length and 7 feet in draft. Gasoline, fuel oil, and water can be obtained at the waterfront. Rail, bus, telegraph, and telephone connections, and ordinary provisions are available.

A good haven for small vessels, particularly in northeasterly weather, can be found at St. Marys. Launches also can obtain refuge in bad weather by anchoring near the pulp mill 1 mile up North River or near the bridges 16 miles above St. Marys on the St. Marys River.

North River branches from St. Marys River about 2 miles above its mouth. A draft of 8 feet can be carried to the docks up the river.

Bells River branches from St. Marys River about 1.5 miles above the town of St. Marys. It flows in an easterly direction to its junction with the Amelia River at Fernandina Beach. The controlling depth is about 5 feet. **Chester,** a village on the river, has a number of small docks. Two of the docks are in fair condition and have a depth of about 5 feet alongside.

Jolly River branches eastward from Bells River about 6 miles above its mouth, and empties into Cumberland Sound at the mouth of St. Marys River. The controlling depth is about 5 feet.

Lanceford Creek branches from Amelia River west of Fernandina Beach. There is a reported depth of less than 4 feet to the docks at **Black Rock.** The creek widens at the docks into tidal flats which bare at low tide. Small boats cross from the creek to Amelia River at high tide through **Soap Creek,** which passes through numerous mud flats and oyster beds that bare at low tide.

Chart 1243.—From Cumberland Sound to St. Johns River the coast is formed by the shores of Amelia, Talbot, Little Talbot, and Fort George Islands. **Amelia Island** is nearly north and south, with a length of about 12 miles and a width varying from 1 to 2.5 miles. The island is low and gently undulating with heavy woods along the shore.

From seaward no prominent natural features distinguish Amelia Island from other land in the vicinity. It shows a long line of dark woods, irregular in outline, with numerous tall trees rising conspicuously above the general level. In front of these woods a range of sand hills, partly covered with course grass and scrub, back the broad stretch of white sand beach. About 2 miles from its northern end, the white tower of Amelia Island Light rising from a grove of large trees is a conspicuous landmark. About 3 miles south-southeast of Amelia Island Light is a pier extending 800 feet into the ocean.

The western portion of Amelia Island is marshy. Separating the island from the mainland is a broad stretch of marsh through which flow the Amelia and South Amelia Rivers connecting Cumberland Sound and Nassau Sound.

Chart 577.—**Nassau Sound** is 10 miles southward of Amelia Island Light and 6 miles northward of St. Johns River. The entrance is obstructed by shifting shoals which extend about 1.5 miles seaward and form a shallow bar. Breakers form across the entire entrance. Small craft are advised not to attempt passage through the shoals without local information. The mean range of tide in Nassau Sound is about 5½ feet. A highway toll bridge 1 mile above the entrance has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 15 feet. Operating regulations are given in § **203.245,** Chapter 2.

South Amelia River and Nassau River are the principal tributaries of Nassau Sound. **South Amelia River** enters from the northward and is a portion of the Intracoastal Waterway.

Nassau River enters Nassau Sound from the northwestward. A draft of 8 feet can be carried to Christopher Creek, 8 miles above the entrance to the sound. Occasional sunken logs and numerous shoals are a menace to navigation. **Nassauville** is a small settlement on the north bank of the river, 7 miles above the entrance to the sound, with private piers adjoining private homes and a fishing camp.

Alligator Creek connects South Amelia River and Nassau River. Its twisting channel leads through tidal flats and between oyster bars.

Sawpit Creek enters the sound from the westward. The fixed bridge crossing the creek about 0.3 mile above the mouth has a horizontal clearance of 38½ feet and a vertical clearance of 14 feet. A portion of this creek forms a part of the Intracoastal Waterway.

Talbot Island, about 4 miles in length and 1.5 miles in width, is partly wooded and partly marshy. Along the marshy eastern shore flow several creeks which separate Talbot and Little Talbot Islands.

Little Talbot Island, a strip of low flat land about 4 miles in length and averaging about 0.8 mile in width, lies in a north-south direction. The island is wooded along its outer coast. From seaward it shows a strip of dark woods with many conspicuous sand hills near the beach. Its south end runs off in a low point of bare sand bordering on Fort George Inlet.

Fort George Inlet is a narrow body of water separating Little Talbot and Fort George Islands. The inlet changes rapidly, due to shifting sands at its entrance, and should never be used without local knowledge. The fixed bridge near the entrance to the inlet has a horizontal clearance of 38½ feet and a vertical clearance at the center of 17 feet.

Fort George Island is immediately southward of Fort George Inlet. Its eastern shore, forming the coastline, shows a broad strip of white sand beach backed by a range of high hills. The island is separated from the mainland by Sisters Creek.

9. ST. JOHNS RIVER

Chart 577.—St. Johns River, the largest river of eastern Florida, is about 212 miles in length. It rises in the swamps near the Atlantic coast in about latitude 28°10′ N., flows in a northerly direction, and empties into the sea north of the St. Johns River Light Station in latitude 30°24′ N. The river is the approach to the city of Jacksonville and a number of towns and villages near its shores. Some of these places are winter resorts while others are centers of farming districts and citrus groves. Sanford is the present head of commercial navigation, although small boats have navigated the river as far as Lake Washington, 188 miles above Jacksonville.

Jacksonville is on the west side of the St. Johns River as it turns southward, 21 miles above the entrance. The harbor is the largest deep-water port on the east coast of Florida. Because of its geographic location, it has become a major southeastern bulk storage warehousing, distribution, and railroad center. The principal exports are lumber, paper, tobacco, naval stores, and citrus fruits. The principal imports are crude oil, gasoline, feritlizer materials, coffee, sugar, and bananas.

Prominent features.—St. Johns Light (30°23.1′ N., 81°23.9′ W), 83 feet above the water and visible 15 miles, is shown from a white square tower on shore 0.9 mile south of the entrance to the St. Johns River. A fog signal is at the outer end and a radiobeacon is at the inshore end of the south jetty. **Mount Cornelia,** about 2 miles north of the entrance, is 63 feet high and thickly wooded. A silver water tank about 0.3 mile southward of this hill is conspicious. Prominent to the south of the entrance are the tanks at the Atlantic, Neptune, and Jacksonville beaches. The tank at Neptune Beach is distinctive because of its oblate form. The abandoned lighthouse on the south side of the entrance at Mayport is a conical tower painted with red and white horizontal stripes. An obstruction light is on top.

Boundary lines of Inland Waters.—The line established for the entrance to the St. Johns River is described in § **82.50,** Chapter 2.

Channels.—A Federal project provides for a channel 34 feet deep from the ocean to Commodore Point via Terminal Channel, thence 30 feet deep to the Florida East Coast Railway bridge at Jacksonville, and a channel 30 feet deep through Arlington Cut east of the Terminal Channel. The main channel is maintained at or near project depth. In September 1958 the channel through Arlington Cut had a reported controlling depth of 23 feet.

A lighted buoy is 3 miles off the entrance to the river. The entrance channel, between two converging rubblestone jetties, and the channels in the river are marked by lighted and unlighted buoys, lights, and lighted ranges.

Anchorages.—Anchorage areas have been established in the St. Johns River in the vicinity of Jacksonville; limits and regulations are given in § **202.183,** Chapter 2. Vessels waiting outside the entrance can anchor in depths of 36 to 50 feet north-northeastward of the jetties if wind and sea permit. The usual anchorage inside the jetties is on the west side of the channel abreast of Mayport; however, strong currents may cause vessels to drag in this area.

Dangers.—The principal danger in the northern approach to the St. Johns River is the bar at the entrance to Nassau Sound on which a number of vessels have been lost. In each case the vessel was standing in for the coast on a southwesterly course, obtained a sounding of over 9 fathoms (high water) in the deep hole a short distance outside the bar, and stranded before obtaining another sounding. A contributary cause for the disasters is the prevailing northerly current, which is felt until well inside the 10-fathom curve, except with northeasterly or northerly winds.

In the southern approach, broken ground with least depths of 5 to 6 fathoms lies from 4 to 6 miles from the coast for a distance of 15 miles northward of St. Augustine Light.

Bridges.—Five bridges cross the St. Johns River between the entrance and Jacksonville. The fixed highway bridge 0.5 mile north of Commodore Point has a horizontal clearance of 702 feet and a vertical clearance of 148 feet across Terminal Channel, and a horizontal clearance of 364 feet and a vertical clearance of 87 feet across Arlington Cut. The first of four bridges at Hendricks Point is a highway bridge with a lift span having a horizontal clearance of 350 feet and a vertical clearance of 38 feet down and 135 feet up. The second, 0.3 mile upstream, is a highway bridge with a lift span having a horizontal clearance of 174 feet and a vertical clearance of 56 feet down and 164 feet up. The third, a railroad bridge adjacent to the highway bridge, has a bascule span with a horizontal clearance of 195 feet and a vertical clearance of 5 feet. The fourth, 0.6 mile upstream, is a highway bridge with a bascule span having a horizontal clearance of 173 feet and a vertical clearance of 44 feet at the center. Operating regulations are given in § **203.430,** Chapter 2.

Routes.—Along the coast from Charleston to Jacksonville the course between the sea buoys and the lightship is close inshore. Vessels must, therefore, guard against an inshore set which may amount to a knot or more due to the current in the inlets. Approaching from the southward, the 15-fathom curve about 15 miles off Cape Canaveral Light is a good guide, thence to the entrance buoy off the St. Johns River. A set of ½ to ¾ knot in a

northerly direction parallel with the coast may be expected in this area due to the prevailing current, except with northerly or northeasterly winds. Southbound lightdraft vessels can avoid the northerly set due to the prevailing current by following the coast at a distance of about 3 miles to abreast Ponce de Leon Inlet Light, and then shaping the course to pass outside of Hetzel Shoal lighted whistle buoy 8.

Tides.—For tides at Mayport refer to the Tide Tables. At the entrance between the jetties of St. Johns River the time of high and low water occurs about 20 minutes earlier than at Mayport. Proceeding up St. Johns River, the tide is later than at Mayport, the differences being approximately as follows: Fulton, 35 minutes; Dame Point, 50 minutes; Phoenix Park, 1 hour 10 minutes; and Jacksonville (Hogan Street), 2 hours.

The approximate mean range of tide is as follows: Entrance between jetties, 5 feet; Mayport, 4½ feet; Fulton, 3½ feet; Dame Point, 3 feet; Phoenix Park, 2 feet; and Jacksonville (Hogan Street), 1½ feet.

From Jacksonville to Palatka the mean range of tide is about 1 foot while at the mouth of Dunns Creek and Oklawaha River it is about 1 foot and ½ foot, respectively, and diminishes in passing up these streams. At low-water stages tidal action is felt to Lake George.

Currents.—The tidal currents are strong in St. Johns River as far as Jacksonville. The currents at the entrance between the jetties require special attention. With northerly winds there is a strong southerly set on the flood at the end of the north jetty, and the conditions here are often dangerous, especially in heavy weather. The mean velocities in the channel at the strength of the current are about as follows: Mayport, 2½ knots; St. Johns Bluff, 2 knots; Drummond Point, 1½ knots; and Jacksonville (off Washington Street), 2 knots. The velocity of the flood is increased by northeasterly and easterly winds, and the ebb by southwesterly and westerly winds.

Daily predictions of the times of slack water and the times and velocities of strength of flood and ebb in the St. Johns River entrance are included in the Tidal Current Tables.

The tidal currents above Jacksonville average less than a knot. The winds have considerable effect on the water level and velocity of the currents. Strong northerly and northeasterly winds raise the water level about 2 feet at Jacksonville, about 1 foot at Palatka, and about 1½ feet at the mouth of Dunns Creek. Strong southerly and southwesterly winds lower the water level about 1 to 1½ feet, increase the velocity of the ebb, and decrease or may interrupt the flood. The currents in Deep Creek are weak, being due primarily to the winds and tide. There is a moderate drainage current in the Oklawaha River. The wind has no appreciable effect on the water level at the head of Dunns Creek and in Lake Crescent.

The flood stages in the river usually occur during the fall months and are about 1 foot above ordinary low-water level at Jacksonville, 2 feet at Palatka, 3 feet at Lake George, 5 feet at Sanford, and 6½ feet at Lake Harney.

The river water may be fresh at Jacksonville at low water with westerly winds, while with northeasterly winds the water may be brackish to Doctors Lake.

Weather.—Fog is negligible. Winters are mild and free from extreme cold, and summers are tempered by sea breezes from the Atlantic Ocean.

Pilotage is compulsory for all foreign vessels and for United States vessels, except those whose masters are licensed pilots of the Federal Government. Incoming vessels are boarded by pilots at the ocean entrance and outgoing vessels are boarded at the pier or wharf. Pilots will come out to a vessel making a signal. The pilot boat is equipped with radiotelephone. The bar pilots keep a lookout from the pilot station for approaching vessels on the south side of the St. Johns River just inside the jetties. Upriver pilots can be obtained at Jacksonville.

Towage.—Towboats are available at Jacksonville.

Quarantine.—Anchorage E, 2.8 miles north of Commodore Point, is used by vessels awaiting quarantine inspection. Vessels are boarded abreast the municipal docks at Jacksonville, 2 miles north of Commodore Point. An outpatient clinic is maintained by the U.S. Public Health Service.

Customs.—Jacksonville is a port of entry and marine documents are issued.

Immigration officials are stationed at Jacksonville.

Harbor regulations.—The Board of Pilot Commissioners acts as port wardens and has control of shipping in the port of Jacksonville.

Terminal facilities.—The facilities consist of an extensive system of wharves, both municipal and private, some of which are equipped with the most modern facilities for handling all kinds of cargo. Three piers are owned and operated by the city. The piers of the Commodore Point Terminal Company are the largest of the privately owned piers, having a 3,000-foot berthing space parallel to the channel. The railway owned by the city has direct connections with all trunk lines serving Jacksonville and handles freight to the docks.

The depth of water at the principal piers ranges from 18 to 30 feet. Good rail and highway connections are available along the entire waterfront. The municipal terminals are supplemented by a cotton warehouse and compress, and are equipped with mechanical freight-handling devices.

About two blocks upstream from the railroad bridge a yacht storage and repair yard has 3 wharves, the largest of which is 400 feet long, with depths of 5 to 18 feet alongside. Dry storage is available for boats up to 60 feet in length.

Supplies of all kinds and in any quantity can be obtained in Jacksonville.

Repairs to all kinds of hulls and machinery can be made. Jacksonville is well-equipped to handle any type of ship from the largest oceangoing vessel to the smallest pleasure craft. The largest of the numerous drydocks and railways can handle ships up to 20,000 tons in weight and 30 feet in draft, with a length along the bottom of the dock of 622 feet. All types of shipyard equipment, in-

cluding 2 floating derricks of 65-ton capacity are available.

Salvage and wrecking gear, including diving equipment, are available.

Two vertical-lifts at the yacht basin two blocks upstream from the railroad bridge can handle boats up to 110 feet in length, 22 feet in beam, 8 feet in draft, and 125 tons in weight.

Communications.—The port is reached by four railroad lines and is also served by three terminal companies. Numerous steamship lines connect with all the principal ports on the Atlantic, Gulf, and Pacific coasts, as well as with the principal foreign ports. Jacksonville has traffic also with upriver points and along the Intracoastal Waterway. Bus and truck systems operate over the excellent highways which reach the city. Air transportation facilities and telephone, telegraph, and radio communications are available.

Chart 569.—Mayport Basin (Ribault Bay) is on the south side of the St. Johns River just inside the entrance jetties and westward of **St. Johns Point.** A deep channel leads along the inshore end of the south jetty to the basin. It is marked with lights, and lighted and unlighted buoys. The waters of the turning basin are a part of the U.S. Naval Air Base Reservation and are within a **prohibited area** where public vessels are prohibited from entering except in cases of extreme emergency; limits and regulations are given in § **207.165,** Chapter 2.

Mayport is a village on the south bank of the St. Johns River, 3 miles inside the entrance jetties. It has a ferry connection with the village of **Pilot Town** across the river. The wharves are private and used by fishing vessels. Diesel fuel, gasoline, provisions, and water can be obtained. The Corps of Engineers maintains a small wharf with 12 feet at the end where water may be obtained. Mooring is not permitted without permission.

Chart 577.—The Intracoastal Waterway crosses the St. Johns River 5.3 miles from the entrance through Sisters Creek on the north and Pablo Creek on the south.

Broward River, on the north side and 13 miles from the entrance to the St. Johns River, has depths of 3 to 4 feet to Cedar Heights. The highway bridge at the mouth has a bascule span with a horizontal clearance of 40 feet and a vertical clearance of 13 feet. Operating regulations are given in § **203.245,** Chapter 2. An overhead power cable at the bridge has a permit clearance of 40 feet. The railroad bridge 0.4 mile upstream has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 8 feet.

Trout River, north of Jacksonville, has depths of 10 feet to the mouth of the **Ribault River** and 6 feet to the highway bridge 4.5 miles above the mouth. The railroad bridge, 0.5 mile above the entrance, has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 1 foot. The span is normally kept open, but is closed for the passage of trains. The fixed highway bridge 0.6 mile upstream has a horizontal clearance of 52 feet and a vertical clearance of 29 feet. The adjacent old bridge, except the channel span, remains and is used as a fishing pier. The overhead power cable at the bridge has a permit clearance of 60 feet. The railroad bridge just upstream has a swing span with a horizontal clearance of 46 feet and a vertical clearance of 2½ feet. A small-boat opening under the bridge has a horizontal clearance of 11½ feet and a vertical clearance of 6 feet. Operating regulations are given in § **203.245,** Chapter 2. The fixed highway bridge 2 miles above the mouth has a horizontal clearance of 51 feet and a vertical clearance of 29 feet. The fixed highway bridge 4.5 miles above the mouth has a horizontal clearance of 40 feet and a vertical clearance of 18 feet.

Groups of piles, sunken wrecks, and barges are near the shores of Trout River. When outboard motorboat races are held in the river near the mouth of **Moncrief Creek,** several barrel buoys temporarily mark the course.

Chart 685.—St. Johns River south of Jacksonville. The route from Jacksonville to Sanford, a distance of 123 miles, is well marked by lights and daybeacons, and is comparatively easy to navigate with the aid of the charts. However, if a local pilot is desired, fishermen from Jacksonville, Palatka, Welaka, or Sanford will serve. The river is partly obstructed by hyacinths at certain times of the year and floating snags are a continual menace to navigation. The snags and overhanging trees are periodically removed by the snag boats of the Corps of Engineers. The unimproved creeks tributary to the St. Johns River may be obstructed by logs and hyacinths.

Fish traps, pilings, and remains of old wharves are generally found close inshore or on the bars in midstream. Fish traps are usually constructed of small poles and are frequently destroyed and rebuilt. In some cases, they extend several feet above high water and can be avoided in daylight hours, but in some places they have been broken off below low water and are a serious menace to small boats. In some areas where the water is 2 feet or less, a fine stem grass grows nearly to the surface of the water. This grass fouls the propellers of small boats and makes navigation difficult.

Channels.—A Federal project provides for a channel 13 feet deep from Jacksonville to Palatka, a distance of 48 miles, thence 12 feet to Sanford, an additional 75 miles. In September 1958 the reported controlling depth was 12 feet.

A **measured nautical mile** on course **38°56′** is near the northwest shore of the St. Johns River between **Winter Point** and the Ortega River. The target at each end of the course has two pile structures 8 feet apart and perpendicular to the course with a steel rod at the top of each pile. The piles are connected by an observer's platform.

Ortega River is 3 miles above Jacksonville on the west side of the St. Johns River. A draft of 4 feet can be taken across the bar above the bridges into the narrowest part of the river. The highway bridge at the entrance to the river connecting **Ortega** and **St. Johns Park** has a bascule span with a horizontal clearance of 53 feet and a vertical clearance of 9 feet. The highway bridge 0.7 mile upstream has dual single-leaf bascule spans about 20 feet

apart, each with a horizontal clearance of 40 feet and a vertical clearance of 6 feet. Operating regulations are given in **§ 203.431**, Chapter 2. The overhead power cable at the bridge has a permit clearance of 65 feet. The railroad bridge adjacent to this bridge has a bascule span with a horizontal clearance of 40 feet and a vertical clearance of 2 feet.

Three yacht basins are near the mouth of the Ortega River. The largest yard, between the highway bridges, has 2 marine railways and a hoist capable of hauling out boats up to 30 tons in weight, 55 feet in length, and 6 feet in draft. Two wharves, each 500 feet long, have covered storage for over 50 boats up to 85 feet long with a depth of 8 feet alongside. General hull and engine repairs can be made. Gasoline, diesel fuel, water, ice, and marine supplies are available. The second yacht basin is adjacent to and upstream of the railroad bridge. This marina has a protected basin 300 feet by 250 feet with a 40-foot wide entrance and a number of finger piers for berthing yachts in a depth of 8 feet. Excellent facilities are available for complete yacht repairs to vessels up to 75 feet in length, 7 feet in draft, and 40 tons in weight. Gasoline, diesel fuel, marine supplies, ice, and provisions are available. The third yacht basin is about 0.3 mile upstream from the railroad bridge. A wide pier extending out from the plant has depths of 7 feet alongside and 9 feet along the face; it has slips for boats up to 85 feet in length. Boats up to 65 feet in length, 5 feet in draft, and 30 tons in weight can be hauled out for general hull and engine repairs. Gasoline, diesel fuel, water, ice, and marine supplies are available.

Caution—Seadrome area.—The water area in the St. Johns River bounded on the north by a line joining the Florida Yacht Club and Christopher Point and on the south by a line joining Black Point and Beauclerc Bluff is a takeoff and landing area for seaplanes of the Naval Air Station. Surface windline lights are laid in the area for night seaplane operations. Landings and takeoffs of seaplanes and land planes are conducted in or over this area both day and night. Mariners are cautioned to keep a sharp lookout for planes when in or near the area.

Orange Park, 10 miles above Jacksonville on the west bank of the St. Johns River, is a winter resort.

Doctors Lake, 11 miles above Jacksonville, has a depth of 7 to 8 feet in the entrance. It is an excellent fishing ground for sportsmen and a haven for small boats in stormy weather. A highway bridge at the mouth has a swing span with a horizontal clearance of 62 feet and a vertical clearance of 9 feet. A sunken barge, awash at low water, is 460 feet southward of the center pier of the bridge on the upstream side. Gasoline may be obtained at a small boat basin on the south side of the entrance.

Julington Creek, 13 miles above Jacksonville, has a least depth of 5 feet to the bridge about a mile inside the entrance. The fixed highway bridge has a horizontal clearance of 44 feet and a vertical clearance of 15 feet. Gasoline is available just upstream of the north end of the bridge.

Black Creek, 18 miles above Jacksonville, is navigable for vessels of 8-foot draft for about 15 miles to the village of Middleburg. The creek is used by small boats as a refuge during hurricanes. The trees along the bank form an excellent windbreak. Just inside the entrance is a highway bridge with a swing span having a horizontal clearance of 62 feet and a vertical clearance of 9 feet. A railroad bridge 5 miles above the mouth has a swing span with a horizontal clearance of 50 feet and a vertical clearance of 6 feet. An overhead power cable with a permit clearance of 49 feet crosses the creek just above Rideout Ferry, 8.5 miles above the mouth. A fixed bridge at Middleburg has a horizontal clearance of 30½ feet and a vertical clearance of 15 feet. Gasoline may be obtained at a small-boat landing on the south side of the entrance.

Green Cove Springs, a village on the west bank of the St. Johns River 20 miles above Jacksonville, is a winter resort. The municipal dock is in poor condition and is used only as a fishing pier. Gasoline may be obtained at a marina on the west side of the entrance to **Governors Creek** north of the village.

The waters in the vicinity of the piers at the U.S. Naval Station southeastward of Green Cove Springs are included in a **naval restricted area**; limits and regulations are given in **§ 207.166**, Chapter 2. The highway bridge across the St. Johns River, 22 miles above Jacksonville at **Red Bay Point,** has a bascule span with a horizontal clearance of 99 feet and a vertical clearance of 11 feet. There are submerged obstructions in the river from **Magnolia Point,** 3.4 miles below the bridge to **Smith Point,** 1 mile above the bridge. The areas are outlined on the chart and should be avoided.

Trout Creek and **Sixmile Creek** have a common entrance 24 miles above Jacksonville. These creeks are navigable for about 3 or 4 miles upstream for boats of 6-foot or less draft. The fixed highway bridge, 0.5 mile above the entrance of Trout Creek, has a horizontal clearance of 40 feet and a vertical clearance of 14 feet.

Chart 686.—Rice Creek, 44 miles above Jacksonville, has been dredged to a depth of 12 feet for about 2.9 miles above the mouth. In September 1958 the reported controlling depth was 11 feet. The channel is marked by a lighted range, lights, and daybeacons. A railroad bridge, 0.6 mile above the mouth, has a swing span with a horizontal clearance of 30 feet and a vertical clearance of 2 feet. A highway bridge, 0.8 mile above the mouth, has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 1 foot. The overhead power cable at the bridge has a permit clearance of 60 feet. The creek is used only by fuel barges going to the paper plant about 0.3 mile up **Little Rice Creek (South Fork).** All of the paper is shipped by rail.

Palatka is an important city and railroad center on the St. Johns River, 48 miles above Jacksonville. There are several large sawmills here. A yacht storage house and basin about 0.2 mile southwestward of the highway bridge has a vertical-lift capable of hauling out boats up to 30 tons in weight, 45 feet in length, and 6-foot draft. A 400-foot wharf with depths of 6 to 11 feet alongside

provides covered storage for boats up to 30 feet in length. A dry-storage loft with a 2-ton overhead crane can handle boats up to 20 feet in length. A well-equipped machine shop is on the premises. Fresh water, gasoline, diesel fuel, and marine supplies are obtainable.

The highway bridge across the St. Johns River at Palatka has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 21 feet. The depths at the commercial wharves south of the bridge are 10 to 16 feet and a channel with a controlling depth of 8 feet leads to them. The city dock, just eastward of the yacht basin, has a depth of 9 feet alongside the outer end. Fresh water and electricity are available at the wharf.

Wilson Cove, 0.7 mile south of Palatka, is very shallow and fouled by hulks, piling, and concrete-ballast blocks.

An overhead power cable with a permit clearance of 159 feet crosses the St. Johns River 2.5 miles above the highway bridge.

Along the southern shore of the St. Johns River, about 4.5 miles above Palatka between **San Mateo** and **Edgewater,** submerged piling of old piers are a menace to inshore navigation. Keep at least 150 yards off this shore.

Dunns Creek, 6.5 miles above Palatka, is navigable for small fishing and pleasure boats. A depth of 5 feet can be taken to Crescent Lake, a distance of 7.5 miles. Some of the bends in the creek are sharp. Northeast storms raise the height of water in the creek. The highway bridge across the creek, 0.8 mile above the mouth, has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 11 feet. The span is hand operated and moves slowly. Pass through either opening; the southwest side has a deeper channel. An overhead cable at the bridge has a permit clearance of 70 feet. Boats may land on either bank at the bridge. An overhead telephone cable with a permit clearance of 70 feet crosses 3.8 miles above the mouth. From St. Johns River the creek should be entered from a point northeast of its mouth, passing about 50 yards off the fish traps on the east side of the entrance. The eastern entrance of Polly Creek lies just to the west of the mouth of Dunns Creek and care should be taken not to confuse the two.

Cross Creek crosses Dunns Creek 0.5 mile inside the entrance. The easterly section of the creek is obstructed by a row of piling in Dunns Creek.

Crescent Lake is about 11 miles long and has a maximum width of about 2 miles. The general depth is between 8 and 13 feet, gradually shoaling toward shore. There are no periodic tides in the lake, the range in Dunns Creek becoming zero near its end. Sudden squalls in the lake cause a chop dangerous to small boats. In the center of the lake, the bottom is soft mud. Near the shore, the bottom changes to hard sand. Large patches of hyacinth drift about the lake with the changing wind. The lake appears to be free of sunken logs but when navigating near the shore a close watch should be maintained for broken-off piling and sunken logs. On the west side of the lake between Dunns Creek and Crescent City are several fishing camps where gasoline can be obtained.

Crescent City is on the west side of the lake about 6.5 miles from the north end. There is a small municipal pier, a fishhouse, and several private piers at the town. The mole and small slip across the lake at **Shell Bluff Landing** are in ruins and not used.

A depth of 5 feet can be taken into **Haw Creek** at the head of Crescent Lake. About 3 miles above the mouth is the hulk of a gunboat sunk during the Civil War which completely blocks navigation.

Dead Lake is about 1 mile long and 0.5 mile wide at the head of Crescent Lake, and has a depth in the center of about 8 feet. **St. Johns Park** and the ruins of a dock are on the northeast shore. Considerable hyacinths are found at times in the lake.

Chart 687.—At **Buffalo Bluff,** 9.8 miles above Palatka, the St. Johns River is crossed by a railroad bridge having a swing span with horizontal clearances of 89 feet in the south opening and 95 feet in the north opening, and a vertical clearance of 6½ feet.

At the settlement of **Saratoga,** 3.5 miles below Welaka, is a small wharf with clock faces on the cupola of the shelter roof.

Welaka is a village on the east side of the St. Johns River, 18 miles above Palatka and 66 miles above Jacksonville. There are several landings where gasoline, diesel fuel, water, ice, and some marine supplies can be obtained. A marine railway is capable of hauling out boats up to 35 feet in length and 15 tons in weight. A pilot for Silver Springs and Lake Harney is here. The village has telephone, telegraph, and good highway connections, and a hotel. Provisions are available.

Oklawaha River has its source in the system of large lakes in the central part of the peninsula of Florida and flows in a general northerly direction, then eastward, emptying into the St. Johns River 19 miles above Palatka. Do not confuse the entrance of **Bear Creek** to the southward with the mouth of the river. The river is extremely tortuous and obstructed by shoals; snage are liable to be encountered by boats. The downstream current is about 1 knot.

The controlling depth in Oklawaha River is reported to be 4 feet to **Silver Springs Run,** 46 miles above the mouth, thence 3½ feet to **Moss Bluff Lock,** 57 miles above the mouth, thence 5½ feet to **Leesburg,** 75 miles above the mouth. The lock at Moss Bluff has a width of 30 feet, length of 125 feet, and depth of 7 feet over the sill. Information about the pool level of the dam is given in **§ 207.170,** Chapter 2. The minimum clearances for the bridges with swing spans that cross the river are: horizontal, 34 feet; vertical, ½ foot at high water and 4 feet at mean low water stage. Pilots for the river can be obtained at Palatka and Welaka.

A ferry consisting of a tug and barge crosses the St. Johns River 4.2 miles above Welaka just below Mt. Royal. A hotel and a good wharf are at **Fort Gates,** 5.3 miles

above Welaka. Gasoline can be obtained at several fishing camps along the river.

Georgetown (P.O.) is a small village on the east bank of the St. Johns River at the north end of Lake George, 8 miles above Welaka. A ferry consisting of a tug and barge crosses the river between the village and **Drayton Island.**

Lake George, the first of the larger lakes on the St. Johns River 75 miles above Jacksonville, is about 10 miles long and 5.5 miles wide. The bottom is fairly uniform with depths of 8 to 12 feet in the center, shoaling rather abruptly near the shores. The improved channel marked by lights and daybeacons cuts through the middle of the lake. In strong northerly or southerly winds the water becomes very rough. Small patches of hyacinth drift about the lake with the changing winds. Numerous old piling are found near the lake shore in 2 to 8 feet of water. The creeks emptying into the lake are shoal. A **naval bombing area** is in the eastern part of the lake; limits and regulations are given in § **204.81a,** Chapter 2.

Astor (P.O.) is a small village 4.5 miles above the south end of Lake George. The highway bridge across the St. Johns River here has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 4 feet. Gasoline can be obtained at the piers just below the bridge.

Chart 688.—The main channel of the St. Johns River flows through the northwest portion of **Lake Dexter,** 92 miles above Jacksonville. This very shallow lake is 3.7 miles long and about 0.9 mile in its widest part.

A draft of 3 feet can be carried eastward through Lake Dexter, **Tick Island Creek, Lake Woodruff, Spring Garden Creek,** and the northern portion of **Spring Garden Lake** to **De Leon Springs.** The channel and aids to navigation are privately maintained. De Leon Springs is one of the larger fresh-water springs in Florida. At the end of the channel is a hotel and a recreation park. Gasoline can be obtained at a boathouse at the park.

On the St. Johns River 14.6 miles above **Dexter Point** at **Crows Bluff,** the river is crossed by a highway bridge with a bascule span that has a horizontal clearance of 90 feet and vertical clearance of 10 feet at the center. An overhead power cable with a permit clearance of 82 feet crosses the river 0.3 mile below the bridge. Just below the bridge is a small park with a boat basin, small piers, and a launching ramp. Water can be obtained at the park. Gasoline may be obtained at a landing just above the bridge.

Lake Beresford is a small lake, 2.2 miles long north and south and 0.5 mile wide, on the east side of the St. Johns River, 107 miles above Jacksonville. On the west side of the lake is a yacht club and several boat landings. Gasoline is available at these landings. There is a boat works where a marine railway can haul out boats up to 35 feet in length and 4 feet in draft for hull and engine repairs. Marine supplies are available at the boat works. **Beresford** is a small village and landing at the north end of the lake. A draft of 4 feet can be taken to the dock.

Wekiva River, 115 miles above Jacksonville, is reported to be navigable for boats of 7-foot draft for a distance of about 2 miles above its mouth, and of 2-foot draft to Wekiva Springs, a winter resort 15 miles above the mouth. The river is little used. Three fixed bridges cross the river at Tufts, 4.3 miles above the mouth. The minimum clearances are: horizontal, 21 feet; vertical, 10 feet.

The improved channel of the St. Johns River enters **Lake Monroe** 120 miles above Jacksonville. The railroad bridge here has a hand-operated swing span with a horizontal clearance of 91 feet in the south opening and a vertical clearance of 7 feet. The highway bridge just upstream has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 13 feet. The center piers of these two bridges form a continuous structure. Vessels should always use the south opening. The overhead power cables below and above these bridges have a minimum permit clearance of 49 feet. On the north side of the river just east of the highway bridge is a dredged slip and boat landing where gasoline can be obtained. A new bridge is under construction 0.3 mile above the highway bridge.

Enterprise is a town on the north shore of Lake Monroe. A channel with a reported depth of 12 feet and marked by lights and daybeacons leads to the wharf of the powerplant west of the town.

Sanford, 123 miles above Jacksonville, is an important city and railroad center on the south side of Lake Monroe in the heart of the celery district. Inbound water traffic consists of petroleum products. The municipal yacht pier, conspicuous by a bandstand, has a reported depth of 12 feet at the outer end. There are two fuel receiving piers along the waterfront. Provisions and ice are obtainable. Fresh water is piped to the municipal wharves.

Yachts intending to remain any length of time at Sanford usually go to the boat works on the south bank of the St. Johns River about 3 miles east of the city. Fresh water, gasoline, diesel fuel, ice, and electricity are available here. Boats 75 feet in length can use the docks and moorings. The marine railway is capable of hauling out boats 55 feet in length, 5 feet in draft, and 50 tons in weight. Hull and engine repairs can be made. A wharf 200 feet long provides covered storage for over 50 boats up to 60 feet in length.

St. Johns River above Sanford.—The route from Lake Monroe to Lake Harney, a distance of 15 miles, is marked by numerous markers. Navigation is not difficult except during periods of high water when the banks are flooded, at which times a local pilot should be taken. A Federal project provides for a channel 5 feet deep between the two lakes. In September 1958 the reported controlling depth was 3½ feet.

The highway bridge crossing the St. Johns River, 3 miles east of Sanford, has a hand-operated swing span with a horizontal clearance of 65 feet and a vertical clearance of 4½ feet.

At the entrance to **Lake Jessup,** 6 miles east of Sanford,

a fixed highway bridge crosses the channel entering the lake with a horizontal clearance of 47 feet and a vertical clearance of 14 feet. A section of the old bridge just downstream extends 45 feet from the west shore and is used as a fishing pier. Lake Jessup is about 8.5 miles long with a greatest width of 2.2 miles. It is very shallow at the entrance and is little used.

The St. Johns River flows from **Lake Harney**, 140 miles above Jacksonville. The lake is about 3.6 miles long with a greatest width of 2.2 miles. It is uniformly 6 to 7 feet deep except along the shores where it shoals. Boats do not generally go above the lake.

Above Lake Harney the St. Johns River continues generally southward through Lakes Poinsett, Winder, Washington, Sawgrass, and Hellen Blazes, then into the swamps.

10. ST. JOHNS RIVER TO MIAMI

Chart 1111.—The coast from St. Johns River to Cape Canaveral trends south-southeastward for 125 miles. Three inlets, St. Augustine, Matanzas, and Ponce de Leon indent the coast. From St. Johns River to Ponce de Leon Inlet the coast is bold in appearance, with an almost continuous range of sand hills backed by woods. The section southward of Ponce de Leon Inlet for 25 miles is formed by a very narrow strip of lowland lying between the sea, and Hillsborough River and Mosquito Lagoon. From seaward this coast shows a low line of sand hills partially covered by grass and scrub trees with distant woods showing over them. The only natural object distinctive in appearance is Turtle Mound, a green hillock about 10 miles south of Ponce de Leon Inlet. When seen from northward and eastward, it is quite conspicuous but is less marked when viewed from other directions. The woods in the vicinity of Cape Canaveral are farther back from the beach and are less distinct when seen from seaward. Many landmarks are available along this stretch of the coast that may be used by southbound vessels proceeding close inshore to avoid the Gulf stream.

The depths from St. Johns River to Cape Canaveral are irregular. Depths of 5 to 7 fathoms are 1 mile offshore while a depth of 3 fathoms is within 0.4 mile of the shore except off the entrances to St. Johns River, St. Augustine Inlet, Ponce de Leon Inlet, and from about 7 miles north of False Cape to Cape Canaveral.

Shoal spots with depths of 33 to 38 feet over them are from 4 to 6 miles offshore and from 12 to 16 miles north-northeastward of St. Augustine Light. These shoals are about 8 miles long in a southeasterly direction and about 2.5 miles wide. A swash channel with a depth of 40 to 50 feet is inside these shoals and about 2 miles from the beach.

Off Ponce de Leon Inlet 10 fathoms will be found within 2 miles of the beach. Two shoal spots, with depths of 37 to 39 feet, are about 7 miles north-northeast of Ponce de Leon Inlet and about 5.5 miles off the beach. Going southward the 10-fathom curve gradually works offshore to a distance of 10 miles off False Cape. From about 7 miles north of False Cape to Cape Canaveral are dangerous off-lying shoals.

Chart 1112.—From Cape Canaveral to Fort Pierce Inlet the coast trends generally south-southeastward for 62 miles and is broken only by Sebastian Inlet. The inlet is a narrow dredged channel, not distinguishable from any distance offshore except by the sand spoil bank on the north side which is bare and a little higher than other sand dunes in the vicinity. This section of the coast is formed almost entirely by a low, narrow strip of sand, covered with vegetation, which lies at a distance of 1 to 2 miles from the mainland, from which it is separated by the shallow waters of Banana and Indian Rivers, a part of the Intracoastal Waterway. From seaward the coast shows a line of sand hills partly covered with grass and scrub palmetto. At several places buildings show prominently from seaward. In the background the heavy woods on the mainland may be seen. Shoals extend 10 miles offshore with a least depth of 29 feet at Bethel Shoal, 28.5 miles southward of Cape Canaveral Light.

From Fort Pierce Inlet to Lake Worth Inlet, the coast trends generally south-southeastward for 43 miles and is broken by St. Lucie and Jupiter Inlets. This section of the coast is formed by a low, narrow strip of sand, covered with vegetation, and separated from the mainland by the shallow waters of Indian River and by the Intracoastal Waterway connection between the Indian River and Lake Worth. From seaward the coast shows a line of sand hills partly covered with grass and scrub palmetto. In the background the heavy woods on the mainland may be seen. Buildings show prominently from seaward.

From Lake Worth Inlet the general trend of the coast is south for 60 miles to the Miami Harbor entrance. The coastline is broken by Port Everglades, several unimportant inlets, and the entrance to Miami Harbor. It is formed almost entirely by a low sand beach covered with grass and scrub palmetto, back of which it is wooded. Conspicuous from seaward are the buildings and pier at Palm Beach, Hillsboro Inlet Light, and the large buildings and tanks at Fort Lauderdale, Hollywood, Miami Beach, and Miami.

This section of the coast is also fairly bold, and the 20-fathom curve runs parallel to the beach at a distance of about 2 miles until in the vicinity of the Miami Harbor entrance where the curve of the shore becomes south-southwestward and the 20-fathom curve is about 4 miles offshore. Between Port Everglades and the Miami Harbor entrance shoaling is rapid, depths of 6 to 8 fathoms being found in places 1.5 miles from the beach.

Chart 1243.—The coast between St. Johns River and St. Augustine Inlet is straight with the 5-fathom curve about 0.5 mile offshore except at the entrances. A series of shoals with depths of 33 to 40 feet are about 5 miles offshore and 14 to 20 miles south-southeast of St. Johns River entrance. A swash channel with depths of 41 to 60 feet is shoreward of the shoals.

The first 9 miles south of St. Johns River are marked by the water tanks of **Atlantic, Neptune, Jacksonville,**

and **Ponte Vedra Beaches.** The radio tower at Jacksonville Beach, about 6 miles south of the river entrance, is very prominent. Otherwise the coast is unmarked except for St. Johns Light and St. Augustine Light.

St. Augustine Inlet is 30 miles south of the St. Johns River entrance. **St. Augustine,** the oldest city in the United States and a popular winter resort with several fine hotels, is located 2 miles inside the entrance.

Prominent features.—St. Augustine Light (29°53.1′ N., 81°17.3′ W.), 161 feet above the water and visible 19 miles, is shown from a conical tower with a black and white spirally-banded shaft on the north end of Anastasia Island, 1.5 miles south of the entrance to St. Augustine Inlet.

Other prominent features are an elevated water tank about 250 yards southeast of the light, a cupola on the south end of a large building and a standpipe in the city, and a radio tower in the northern part of the city. **Castillo de San Marcos** may be seen after entering the inlet.

Channels.—In September 1958 the centerline depth was 11 feet through the entrance channel marked by buoys, thence 12 feet deep along the Intracoastal Waterway in the Matanzas River to the San Sebastian River entrance, 1.4 miles south of St. Augustine. The entrance channel is subject to frequent change in depth and direction due to current and storm action. Dangerous and shifting shoals extend 1.5 miles seaward. The entrance buoys are moved with changing conditions.

Anchorages.—There is good anchorage in the Matanzas River at St. Augustine both below and above the bridge. This anchorage, however, is not used as a harbor of refuge because during strong northeasterly and northwesterly winds the sea makes the bar impassable even for small vessels.

Directions.—The shore should be given a berth of at least 2 miles when approaching St. Augustine Inlet in order to stay outside of the outer sea buoy. No strangers should attempt to enter without a pilot as the channel shifts frequently.

Tides.—The mean range of tide is about 4¼ feet, and high water occurs about one-half hour later than at Mayport.

Pilots.—All vessels including yachts not having local knowledge of the channel are advised to take a local licensed pilot both entering and leaving the inlet. Licensed pilots are available at St. Augustine. The usual procedure to obtain a pilot is to notify the harbormaster in advance the expected time of arrival so that a pilot may be available outside the bar.

Harbor regulations.—The office of the harbormaster is at the pier just north of the Bridge of Lions on the west side of the Matanzas River. The dockmaster is at the municipal pier.

Terminal facilities.—A number of small private landings are on the east side of the city, north and south of the bridge. The municipal pier is about 100 yards south of the Bridge of Lions which crosses the Matanzas River opposite the center of the city. It affords good berths for yachts. Depths of 6 to 20 feet are in the various slips, and from 15 to 22 feet at the face of the pier.

Supplies.—Gasoline, diesel fuel, and water are obtainable at the municipal pier. Provisions are available at the many stores in the city.

Repairs.—The repair yards are on the San Sebastian River.

The Intracoastal Waterway enters the St. Augustine Inlet from the north through Tolomato River and continues southward through Matanzas River. Clearances of the Bridge of Lions crossing the Matanzas River at St. Augustine are given in Chapter 12.

San Sebastian River flows past the west side of the city of St. Augustine and empties into the Matanzas River 1.4 miles south of the Bridge of Lions. A Federal project provides for a channel 10 feet deep from the entrance to King Street Bridge, 2.3 miles above the mouth. In September 1958 the centerline controlling depth was reported to be 9 feet. The channel is marked by daybeacons to the wharves. In stormy southeasterly weather small boats may find a good haven in the river. The overhead power cable crossing the river about 300 yards south of the King Street Bridge has a permit clearance of 76 feet.

An extensive shrimp industry is conducted along the wharves in the upper part of the river, being supplied by seagoing shrimp boats during the shrimp season. Several small shipyards and shrimp boatbuilding yards are located along the river. Shrimp boats up to 75 feet in length can be hauled out for general repairs. Supplies and fuel may be obtained at the wharves.

Chart 1244.—From St. Augustine Inlet to Ponce de Leon Inlet the coast continues straight, broken only by Matanzas Inlet. The 5-fathom curve is within 0.5 mile of the shore except off St. Augustine Inlet and Matanzas Inlet.

An **oceanic spring** is about 8.2 miles southeast of St. Augustine Light and 2.4 miles east of **Crescent Beach.** The location of the spring can easily be detected by the appearance of the water; noticeable swirls, similar to those in a swiftly running stream, can be seen at a distance of about a mile. At times, especially in rough weather, there is a marked disturbance of the water and a yellowish color trails off to the northeastward. In choppy weather, a slick is the most noticeable feature. In fact, it has all the appearance of a shoal or reef.

A closer view shows a slick swirl with a slight overfall, the center of the swirl moving about 100 feet, first to the eastward and then to the westward, and a noticeable streak of current to the northeastward. The swirls and overfalls vary rapidly in intensity, as though large bubbles or intermittent volumes of water were being emitted. A boat will be thrown out of the swirl so that it is difficult to hold it in position.

A strong odor, quite similar to the smell of water from the various sulphur springs of Florida, is noticeable, and under favorable circumstances can easily be detected 2 miles away.

Matanzas Inlet is 11 miles southward of St. Augustine

Light. It affords an outlet for Matanzas River, which extends northward to St. Augustine and southward, following the coast for a distance of 8 or 10 miles to **Graham Swamp.** The inlet is obstructed by a shifting bar and is no longer used by boats of any type. Small water tanks are prominent on the north side of the entrance near **Fort Matanzas National Monument** and on the south side of the entrance at **Summer Haven.** The Intracoastal Waterway passes through a land cut of the Matanzas River just inside the entrance.

At Marineland, 13.6 miles southward of St. Augustine Light, is a conspicuous building housing an oceanarium.

Flagler Beach is 26.5 miles southward of St. Augustine Light. The hotel and ocean pier are good landmarks. The T-shaped pier extending offshore is 650 feet long and 20 feet wide.

Daytona Beach is a popular winter resort about 42 miles southward of St. Augustine Light. The buildings, water tanks, and radio towers are visible from seaward. The large recreation pier on the oceanfront is a prominent landmark for passing vessels.

Chart 1245.—From Ponce de Leon Inlet to False Cape the coast is straight. The 5-fathom curve is about 0.5 mile offshore for a distance of 24 miles. Beyond this distance dangerous shoals will be found up to 15 miles offshore.

Ponce de Leon Inlet is 53 miles southward of St. Augustine Light and 41 miles northwestward of Cape Canaveral Light. It is used by fishing parties, shrimp and commercial fishermen bound for New Smyrna Beach or Daytona Beach, and an occasional stranger entering for an anchorage.

Ponce de Leon Inlet Light (29°04.8′ N., 80°55.7′ W.), 159 feet above the water and visible 19 miles, is shown from a red brick conical tower just north of the entrance to the inlet.

The entrance to the inlet is obstructed by shifting shoals which form a bar extending about 0.7 mile seaward. In October 1958 the reported depth in the entrance channel was 3½ feet. With a continued west wind there is sometimes very little water anywhere on the bar. Local knowledge is necessary for entering and a stranger should attempt it only in an emergency or when the sea is smooth. The entrance channel moves with the season; it leads north in the winter and south in the summer. The current is very strong. The mean range of tide is about 2½ feet; high water occurs about the same time as at Mayport. The entrance channel is marked by buoys which are frequently shifted in position with changing conditions.

A Coast Guard station is on the south side of the entrance to Ponce de Leon Inlet. See Appendix for **storm warning** display. Supply and repair facilities inside the inlet are described in Chapter 12.

The Intracoastal Waterway is just inside the entrance to Ponce de Leon Inlet, passing through Halifax River from the north and Hillsborough River from the south.

About 10 miles southward of Ponce de Leon Inlet is **Turtle Mound.** This prominent hill is 50 feet high. It is under the protection of the Florida State Historical Society. The original Indian name was **Mount of Surruque.** It was charted on Florida maps in 1564. Spanish galleons stopped here for repairs, wood, and water.

Eldora is a fishing camp 11.5 miles southward of Ponce de Leon Inlet.

Danger zones for naval bombing and strafing extend about 1 mile offshore 18 miles southward of Ponce de Leon Inlet; limits and regulations are given in § **204.81b,** Chapter 2.

False Cape is the name given to a small part of the coast which it resembles when seen from seaward, about 7.5 miles northward of Cape Canaveral Light.

Cape Canaveral, where the coast makes a sharp bend westward, is low and sandy. The shore in the vicinity of the cape is constantly moving eastward. **Cape Canaveral Light (28°27.6′ N., 80°32.6′ W.),** 137 feet above the water and visible 18 miles, is shown from a white and black horizontally banded conical tower 1 mile inshore from the cape. A radiobeacon is at the light.

Broken ground and shoals extend 13 miles north and northeastward from Cape Canaveral. The outer shoals consisting of **Hetzel Shoal, Ohio Shoal,** and **The Bull** have a least depth of 11 feet. The inner shoals consisting of **Chester Shoal** and **Southeast Shoal** have depths of 2 to 18 feet. A lighted buoy is 2.5 miles northeastward of Hetzel Shoal and two lighted buoys are off the southern end of Southeast Shoal. In a heavy sea the shoals are marked by breakers, but with a smooth sea there is nothing to indicate them except their relative positions to Cape Canaveral Light and the lighted buoys. Only small light-draft vessels should pass inside the outer shoals.

Several wrecks are eastward of Cape Canaveral within 13 miles of the shore. They have been cleared by a wire drag to a least depth of 46 feet.

The effect of the Gulf Stream may be expected well in on the shoals, and this should be kept in mind in approaching the cape from southward, as a vessel will generally overrun her log. In approaching the cape stay in at least 15 fathoms from southward and at least 13 fathoms from northward to avoid the shoals. Vessels are advised to use great care when navigating in the vicinity of the shoals off Cape Canaveral.

A **danger zone** for a missile testing area extends 3 miles offshore from False Cape to the entrance to Port Canaveral southwestward of Cape Canaveral; limits and regulations are given in § **204.82a,** Chapter 2. **Canaveral Bight,** on the south side of the cape, is in the danger zone.

Chart 456.—Canaveral Harbor is 4 miles southwest of Cape Canaveral Light and 150 miles south of the entrance to the St. Johns River. **Port Canaveral** is on the south side of the channel 1 mile inside the entrance. The principal receipts into the harbor are petroleum products, while the shipments consist primarily of coal-tar products. Several fishing vessels operate in and out of the harbor.

Channels.—A Federal project provides for an entrance channel 36 feet deep and an inner channel leading to the turning basin 34 feet deep. The channel is maintained at or near project depths. The entrance to the

harbor is protected by jetties. Lighted ranges, and lighted and unlighted buoys mark the channel.

Pilotage is compulsory for foreign vessels and for United States vessels, except those whose masters are licensed pilots of the Federal Government. The pilot will board vessels about 3 miles southeast of the jetties. If possible an advance notice of 24 hours should be given.

Quarantine.—A quarantine officer will board vessels at the Canaveral Harbor wharf. The harbor is not a customs port of entry, but marine documents can be issued at West Palm Beach.

Terminal facilities.—A 400-foot marginal wharf for unloading bulk cargo is on the south side of the turning basin in the harbor. The wharves and piers on the north side of the harbor are the property of the Federal Government and are not used by private vessels.

Supplies.—Gasoline, diesel fuel, water, and ice are available.

Communications.—Good highways connect with the town of Cocoa and the mainland.

Chart 1246.—From southward of the shoals at Cape Canaveral to Bethel Shoal, a distance of about 43 miles, the shore is straight. The 5-fathom curve is from 0.3 to 1 mile offshore along this section of the coast.

Two large water tanks are prominent about 4.5 miles southward of **Cocoa Beach,** and 13 miles southward of Cape Canaveral Light. **Eau Gallie Beach** is marked by a water tank and a casino with a small fishing pier. **Indialantic** is marked by a prominent white casino and a large water tank.

Sebastian Inlet is 36.5 miles southward of Cape Canaveral Light. In October 1958 there was a reported depth of 3 feet over the bar and through the inside channel leading to the Indian River. The entrance is protected by a north jetty extending 600 feet from shore and a south jetty extending 500 feet from shore. A steel bulkhead leads in a west-northwest direction for about 1,500 yards from the south side of the inlet into Indian River. A strong current runs through the inlet. Passage should not be attempted without local knowledge.

Thomas Shoal, with a least depth of 26 feet over it, is 7 miles eastward of Sebastian Inlet. **Bethel Shoal,** with depths of 29 to 30 feet over it, is 17 miles southeastward of the inlet and 11 miles offshore. A lighted buoy is northeast of the shoal area.

Chart 1247.—From Bethel Shoal to Jupiter Inlet, a distance of about 50 miles, shoal areas and wrecks are over 10 miles offshore.

The elevated water tank at **Riomar,** 11.5 miles northward of Fort Pierce Inlet, is prominent. Two wrecks which are visible at high water are just offshore at Riomar. The northern wreck shows as an old boiler and the southern one as a mast.

Indian River Shoal, with depths of 10 to 30 feet over it, is about 8 miles northward of Fort Pierce Inlet and extends for about 3 miles offshore. Sunken wrecks visible at high water are just offshore about 2.5 miles northward of Fort Pierce Inlet.

Chart 582.—**Fort Pierce Inlet** is 62 miles southward of Cape Canaveral Light and 33 miles northward of Jupiter Inlet Light. Care must be exercised in entering due to the strong currents. In southeasterly weather with an ebb tide the entrance is rough.

Fort Pierce, on the west shore of the Indian River inside Fort Pierce Inlet, is the St. Lucie County seat. Chartered deep-draft vessels use the terminal facilities here during the citrus shipping season. Oil barges dock at the municipal pier. The principal receipts into the harbor are petroleum products and limestone, while the shipments consist of citrus fruits and vegetables. Several fishing vessels operate in and out of the harbor. It is the distributing point for supplies to the surrounding country. The Intracoastal Waterway passes through the Indian River east of the city.

Prominent features.—The fixed red light on top of the water tank 0.5 mile southwestward of the town is visible well to seaward and is a good mark in clear weather. Another water tank is to the north of the city. A large white house on the beach marks the inner end of the south jetty. Adjoining it is the lookout tower of the Coast Guard station. See Appendix for **storm warning** display. The tower of the radio station 0.7 mile south of the turning basin looms up, and at night the light on top of it should not be confused with the lighted whistle buoy at the entrance to the inlet.

Channels.—A Federal project provides for an entrance channel 27 feet deep, and an inner channel and turning basin 25 feet deep. The channel is maintained at or near project depths. Two rubblestone jetties with revetment extensions protect the entrance. The channel is marked with lighted ranges, and lighted and unlighted buoys.

Tides.—The mean range of tide at the jetties is about 2½ feet, and at the city dock about ¾ foot.

Currents.—The tidal currents in the inlet have a velocity at strength of about 3 knots. Current predictions may be obtained from the Tidal Current Tables. It has been reported that a strong current, about 5 knots, runs through the cut parallel with the channel, but at the turn in the channel, extreme caution should be used as the current sets across the channel, flood to the south and ebb to the north. Across Indian River the currents run parallel with the channel, which parallels the causeway fill. At the western end of this fill, cross currents are sometimes encountered, especially where the channel crosses the Intracoastal Waterway. The northwestern corner of this intersection is marked by a buoy. Currents in this section are influenced by the winds.

Pilotage is compulsory for foreign vessels and for United States vessels, except those whose masters are licensed pilots of the Federal Government. The pilot who is also the harbormaster will meet vessels off the bar on advance notice.

Quarantine.—Vessels subject to inspection will be boarded upon arrival at the dock by a quarantine officer from West Palm Beach.

Customs.—Fort Pierce is not a port of entry, but marine documents are issued by the customs officer at West Palm Beach.

Harbor regulations.—There is a harbormaster at Fort Pierce. Due to tricky currents in the turning basin, running of lines is compulsory for all vessels. The pilot boat will render this service. All vessels moving from one wharf to another shall have the harbormaster aboard. The pilot boat will assist in this movement.

Terminal facilities.—The terminal facilities consist of a turning basin and slips which provide berthing space of about 1,500 feet. Depths of 24 feet are in the slip on the north side of the pier of the Indian River Refrigeration Terminal Company. The two piers are 330 feet and 425 feet in length. The southern, or municipal pier, is in poor condition but is used by fishermen. The northern pier is open on both the north and south sides. Vessels also dock across the end of this pier, which is 178 feet in width. No vessel of greater length, however, may lie there.

Supplies of all kinds can be obtained in Fort Pierce.

Repairs.—There is a marine railway for hull repairs only about 0.2 mile northward of the terminals. Vessels of 7-foot draft, 100 feet in length, and about 75 tons in weight, can be hauled out. Local knowledge is required to carry the best water to the marine railway.

Communications.—Fort Pierce is served by the Florida East Coast Railway. Good highways connect with the other towns in the area, and an airport is 3 miles northwest of the town.

A yacht basin is 1 mile inside the entrance to Fort Pierce Inlet on the south side of the channel at Faber Point. It has four wharves, the largest of which is L-shaped with a depth of 6 feet alongside. Open wet storage is available. Gasoline, diesel fuel, and fresh water are piped to the large wharf.

A yacht storage and repair yard on the northwestern end of Causeway Island has a wharf 150 feet long with a depth of 7½ feet alongside. A marine railway can haul out boats up to 65 feet in length for general repairs on hulls and engines. Fresh water, electricity, and marine supplies are available.

The clearances for the bridges crossing the Intracoastal Waterway north and south of the entrance channel are given in Chapter 12.

A yacht basin is just south of **Moore Creek,** with an approach channel from the Intracoastal Waterway. The entrance channel to the yacht basin is immediately south of the bridge and parallel to it, thence along the waterfront to the basin. The overhead cable has a clearance of only about 50 feet where it crosses the entrance channel. In 1958 the controlling depth was reported to be 5 feet in the channel and turning basin. The wharf is 150 feet in length with approximately 700 feet of transient dockage. An elevator capable of hauling out boats up to 50 tons in weight, 55 feet in length, and 5 feet in draft is available. General hull and engine repairs can be made. Fresh water, gasoline, and diesel fuel are obtainable. There is a nominal charge for overnight mooring.

Chart 1247.—For a distance of 13 miles southward of Fort Pierce Inlet, broken ground with 18 to 28 feet over it extends from 2.5 to 6 miles offshore.

Capron Shoal has a depth of 18 feet over it about 3.6 miles southeastward of Fort Pierce Inlet. A buoy is 300 yards northeastward of the 18-foot spot.

St. Lucie Shoal, with 16 to 24 feet over it, lies from 3 to 6 miles offshore, and 22 to 26 miles northward of Jupiter Inlet Light. It is the principal danger in this area. The northern end of the shoal is marked by a lighted buoy and an unlighted buoy is southeast of a 15-foot spot at the southern end.

Several wrecks are eastward of the broken ground within 10 miles of the shore. The wreck about 5 miles northeastward of St. Lucie Shoal has been cleared by a wire drag to a depth of 42 feet. It is marked by a lighted buoy. The dangerous wreck about 3.5 miles eastward of St. Lucie Shoal has a reported depth of 24 feet over it.

Gilbert Shoal, with 19 to 26 feet over it, is 1 to 1.5 miles offshore about 3 miles north of St. Lucie Inlet. A shoal with a least found depth of 36 feet lies 3 miles offshore at the entrance to St. Lucie Inlet and 13 miles northward of Jupiter Inlet Light.

St. Lucie Inlet, forming the mouth of the St. Lucie River and the south end of the Indian River, lies 20 miles south of Fort Pierce Inlet and 13.5 miles north of Jupiter Inlet Light. A jetty extends 0.3 mile offshore on the north side of the inlet. A rock ledge lies across the inlet and extends southward from the east end of the jetty for a distance of a little over 1 mile. A channel 10 feet deep over a width of 200 feet and a length of 1,300 feet has been dredged through the ledge. In October 1958 the reported depth through the ledge was 6 feet.

Local knowledge is required to enter the inlet as the frequently changing sandbars obstruct the channel leading to the Intracoastal Waterway. In October 1958 the reported controlling depth was 3 feet. The mean range of tide at the jetty is about 2½ feet.

St. Lucie River enters the sea through St. Lucie Inlet and connects with the Gulf coast via the Okeechobee Waterway. A highway bridge crosses the river 3 miles above the junction with the Intracoastal Waterway having a bascule span with a horizontal clearance of 89 feet and a vertical clearance of 21 feet at the center. There is an overhead cable crossing at the bridge at Stuart with a permit clearance of 92 feet. The Florida East Coast Railway bridge at Stuart has a bascule span with a horizontal clearance of 50 feet and a vertical clearance of 7½ feet. The highway bridge immediately above the railway bridge has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 14 feet.

The confluence of the St. Lucie River and the Intracoastal Waterway at Sewall Point develops a hazardous condition in making the short turn between the river and the waterway as cross currents will cause barges in tow to swing out of the channel and either go aground or destroy the aids to navigation at this point. All vessels are advised to keep 100 yards southward of the line between buoy 4 and daybeacon 6 to avoid hitting the hard ledge on the north side of the channel.

The St. Lucie River also has several branches of some

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commercial importance. These, with the main river, form an important center for yachting and fishing in winter months.

Manatee Pocket is a protected body of water approximately 1 mile in length and ¼ mile in width. It had a controlling depth of 5 feet in November 1958. The entrance is 0.6 mile west of the intersection of the St. Lucie River and the Intracoastal Waterway. The channel at the entrance is marked by daybeacons. Gasoline, diesel fuel, and fresh water can be obtained at any of several marine service stations. Small boats can obtain protection from tropical storms in Manatee Pocket. The holding bottom is good. Yachts can anchor anywhere for overnight stops.

Salerno, a small town located at the head of Manatee Pocket, has a vegetable-packing plant, an asphalt plant, a shark factory, and is headquarters for a fishing fleet. Sharks are processed to obtain vitamin ingredients and numerous byproducts. There are several boatyards; the largest has 3 marine railways capable of hauling out vessels up to 75 tons in weight, 70 feet in length, and 6 feet in draft for engine and general repairs. Gasoline, diesel fuel, water, and overnight dockage or seasonal storage can be obtained. Groceries can be obtained from nearby stores.

Pilots for the St. Lucie Inlet can be obtained at Manatee Pocket.

At **Port Sewall,** 1.2 miles above the junction of the St. Lucie River and the Intracoastal Waterway there is a boatyard which has 2 marine railways and can haul out boats up to 48 feet in length, 3½ feet in draft, and 20 tons in weight. Hull and engine repairs can be made; there is a machine shop on the premises. Dockage, gasoline, water, ice, and marine supplies are available.

In the St. Lucie River west of Light 14 is a private dock of the Sunrise Inn. The dock is 50 feet wide with 6 feet of water at its front. Passing yachts can stop for fresh water and obtain permission to stop overnight alongside the dock.

Rio is a small real estate development on the north bank of the St. Lucie River 3.5 miles above Sewall Point. A dredged channel with a reported depth of 5½ feet in November 1958 leads to a yacht basin and repair yard. Dockage, water, ice, electricity, gasoline, and diesel fuel are available. Repair facilities include a 10-ton hoist for boats up to 41 feet in length. Hull and engine repairs can be made.

Stuart is a progressive city on the St. Lucie River 5 miles above Sewall Point. It is the county seat of Martin County and is located on the Florida East Coast Railway, U.S. Highway No. 1, and the Okeechobee Waterway. The city is the distributing center to the surrounding area which is noted for its winter vegetables, citrus, and tropical fruits, poultry raising, ranching, commercial fishing, and flowers.

Gasoline, diesel fuel, fresh water, ice, marine supplies, and provisions are available. The municipal dock on the south side of the river east of the bridges has only about 3 feet of water at its end and is unfit for use as a landing. The city dock, on the eastern bank of the river just above the bridges, is in good condition but affords only limited dockage space for one craft on each side and one at the end. A small fee is charged for the space. In October 1958 there was a depth of 10 feet at the end.

General repairs, yacht storage, water, and marine supplies can be obtained at the shipyard on the north side of the river just east of the bridges. In October 1958 there was a depth of 7 feet up to the dock. The shipyard has a machine shop and a marine railway that can haul out vessels up to 76 feet in length, 6 feet in draft, and 60 tons in weight.

The oil dock just eastward of the boatyard has a depth of 6½ feet at its face. Gasoline and diesel fuel can be obtained.

Although there is no large yacht basin, yachts can obtain dockage at a number of places. The small basin in Frazier Creek is well protected. See Appendix for **storm warning** display.

Pilots for the St. Lucie Inlet and connecting waterways can be obtained through the Stuart Chamber of Commerce.

West of Stuart the St. Lucie River forks. The **North Fork** extends several miles in a north-northwest direction. It is approximately 0.75 mile in width with an even bottom of 10 to 12 feet in depth. The South Fork is described as part of the Okeechobee Waterway, Chapter 12.

From St. Lucie Inlet to Jupiter Inlet, a distance of 14 miles, several shoals and wrecks are within about 3 miles of the shore. A depth of 37 feet has been found on the shoal 2.6 miles offshore and 4.3 miles northeastward of Jupiter Inlet Light. A wreck cleared by the wire drag to a depth of 31 feet is 0.3 mile south of this spot. It is marked by a lighted buoy. A wreck dangerous to small vessels is reported 4.3 miles north of Jupiter Inlet Light and about 0.5 mile offshore. It is the bow of a tanker; the anchor winch shows at extreme low water. The shoals and wrecks should be avoided by deep-draft vessels. The 15-fathom curve is a safe guide.

Jupiter Inlet Light (26°56.9′ N., 80°04.9′ W.), 146 feet above the water and visible 18 miles, is shown from a red brick tower on the north side of the inlet, 94 miles south of Cape Canaveral Light. A radiobeacon is at the light.

Jupiter Inlet, an opening in the beach just south of Jupiter Inlet Light, is 14 miles south of St. Lucie Inlet. It leads to Jupiter Sound on the north, Loxahatchee River on the west, and Lake Worth Creek on the south. A short stone jetty is on the north side of the entrance to the inlet, and a concrete apron is halfway across the entrance from the south side. The entrance is blocked by a shifting bar with a reported depth over it of about 2 feet. Small boats of the fishing fleet use the inlet. It is never used by strangers. The Intracoastal Waterway is 0.5 mile inside the entrance to the inlet.

Chart 1248.—Between Jupiter Inlet and Lake Worth Inlet, a distance of about 10.5 miles, the coast is clear of shoals with the 10-fathom curve about 1 mile offshore.

Chart 291.—Lake Worth Inlet is an opening cut through the beach 11 miles south of Jupiter Inlet Light and 31 miles north of Hillsboro Inlet Light.

A Coast Guard station is on the south side of **Peanut Island,** 0.8 mile inside the entrance.

Port of Palm Beach, a marine terminal development, is 1 mile inside of Lake Worth Inlet on the west side of Lake Worth. It embraces the communities of **Palm Beach** which occupies about 7 miles of the barrier beach of the inlet channel; **Palm Beach Shores** just northward of the inlet; the city of **West Palm Beach** on the west shore of the lake, and about 7.5 miles south of the port; the towns of **Riviera Beach** and **Lake Park** just north of West Palm Beach and the town of **Lake Worth** just south of it.

In addition to the regular car ferry services to Cuba, the Port of Palm Beach is a foreign port of call. Coastwise and inland shipping consists chiefly of petroleum products, shell, and concrete aggregates.

Prominent features.—The ocean pier at Palm Beach, 4.3 miles south of the entrance, shows up well, and hotels and buildings at Palm Beach also are conspicuous from seaward. The red occulting lights on several radio towers in the area show prominently at night.

Channels.—A Federal project provides for a channel 25 feet deep from the ocean to the turning basin at Port of Palm Beach. The channel is maintained at or near project depth. It is marked by lighted ranges, lights, and lighted and unlighted buoys. The entrance is protected by jetties.

Dangers.—A reef in the form of a ridge with scattered boulders extends for about 300 yards eastward of Peanut Island about 25 feet north of the improved channel. The reef, with a least depth of about 3 feet over it, is extremely dangerous. All vessels should keep south of buoy 4 as the ebb current sets across the reef in a northeasterly direction at times with sufficient velocity to tow this buoy under the surface.

See Appendix for **storm warning** displays.

Tides and currents.—The mean range of tide is about 3 feet at the inlet and 2 feet at the Port of Palm Beach. The currents in the inlet are strong and must be carefully guarded against. The average velocity at strength of flood is about 2½ knots and of ebb about 3½ knots. Current predictions may be obtained from the Tidal Current Tables.

Pilotage is compulsory for foreign vessels and for United States vessels, except those with a pilot aboard licensed by the Federal Government. Arrangements for pilots are usually made through the shipping agents.

Towage.—Tug service is available, and can be obtained through the Port of Palm Beach district offices located just north of the slips.

Quarantine.—Vessels subject to inspection are boarded by an officer of the United States Public Health Service upon arrival at berth.

Customs.—The Port of Palm Beach is a port of entry and marine documents are issued.

Immigration.—Inspectors are available at all times at the port.

Harbor regulations.—The Board of Commissioners of the Port of Palm Beach District is the principal administrative authority in the port. One of the members of the board serves as port director.

Port regulations state it shall be unlawful for any vessel, boat, barge, or other watercraft of any kind to anchor in the channel or turning basin, except in cases of actual emergency.

Terminal facilities.—The Port of Palm Beach has two slips with more than 3,000 feet of berthing space and depths of 25 to 30 feet alongside. There are over 56,000 square feet of warehouse space and 200,000 square feet of open storage. Fresh water and bunker C fuel are available at all berths. A spur railroad, operated by the West Palm Beach Terminal Company, connects the port area with the Seaboard Air Line and Florida East Coast Railways to points north and south. There are no cargo handling facilities at the port. General cargo is usually handled to and from vessels by ship's tackle. Adequate pipelines for the discharge of bulk petroleum cargoes are available in Slip 2. Most of the oil is brought in by tanker to the Florida Power & Light Company wharf adjacent to the port.

Supplies.—Fresh water and fuel oil are piped to all berths. Diesel fuel, electricity, provisions, and marine supplies can be obtained.

Repairs.—Only minor hull and engine repairs to large ships can be made at the port. The nearest drydock is at Jacksonville, 280 miles northward of the Port of Palm Beach.

Communications.—West Palm Beach and the Port of Palm Beach are served by two railroads, three commercial airlines, and passenger and freight ferry service to Cuba.

The Intracoastal Waterway passes through Lake Worth just eastward of Port of Palm Beach. Facilities in the area for yachts and small craft are given in Chapter 12.

Chart 1248.—From Lake Worth Inlet the general trend of the coastline is south for 41 miles to Port Everglades. It is broken by several inlets of little importance. The coast is formed almost entirely by a low sand beach, with more or less conspicuous hills partly covered by grass and scrub palmetto, and woods in the background. Numerous towns, tanks, radio towers, and scattered buildings are visible from seaward. Conspicuous from offshore are the buildings and pier at Palm Beach, Hillsboro Inlet Light, and the large buildings and tanks at Fort Lauderdale.

The coast between Lake Worth Inlet and Port Everglades is fairly bold. The 20-fathom curve runs parallel to the beach and for a greater part of the distance is less than 2 miles from it.

Palm Beach, a resort on the narrow island between Lake Worth and the sea, is connected to West Palm Beach by highway bridges. The ocean pier here is used only for amusement purposes. Several other towns and cities are built along the shores of Lake Worth.

South Lake Worth Inlet, at the south end of Lake Worth, is a small dredged cut through the outside beach, about 200 feet wide and 5 feet deep. It is crossed by a

fixed bridge with a charted horizontal clearance of 100 feet and a vertical clearance of 18 feet. Only small boats with local knowledge use this cut, and then only at or near slack water. Currents through it have great velocity, and with an easterly wind it is impassable on account of breakers at the entrance.

Boca Raton Inlet is a narrow dredged cut through the beach 5 miles northward of Hillsboro Inlet Light. It is used mostly by party fishermen. The hotel at **Boca Raton** is a prominent landmark. The mouth of the inlet is protected by short jetties. In November 1958 the controlling depth was 4 feet on the bar outside the jetties, but the channel shifts with the winds. The controlling depth from inside the bar to the junction with the Intracoastal Waterway is about 5½ feet. The highway bridge crossing the inlet has a bascule span with a horizontal clearance of 24 feet and a vertical clearance of 8 feet. There is shoal water southeastward of the bridge.

Hillsboro Inlet Light (26°15.6′ N., 80°04.9′ W.), 136 feet above the water and visible 18 miles, is shown from an octagonal pyramidal skeleton tower with central stair cylinder, lower third of structure white, upper two-thirds black, on the beach on the north side of the inlet. A radiobeacon is at the light.

Hillsboro Inlet, 31 miles southward of Lake Worth Inlet, connects with Hillsboro River and the Intracoastal Waterway. It has considerable importance as a base for party fishermen who run out into the Gulf Stream. In November 1958 the controlling depth was 6 feet over the bar with 4½ feet inside the entrance off the Hillsboro Club and deeper water to the Intracoastal Waterway. The highway bridge crossing the inlet has a swing span with a horizontal clearance of 49 feet and a vertical clearance of 4 feet. Operating regulations are given in **§ 203.442,** Chapter 2. An overhead power cable at the bridge has a permit clearance of 64 feet. Yacht landings are on the south shore on either side of the bridge. A depth of 5 feet is at the landings. Gasoline and fresh water can be obtained.

Southward of Hillsboro Inlet shoaling is rapid, depths of 6 to 8 fathoms having been found 1.5 miles offshore. A wreck 3 miles south of Hillsboro Inlet Light and 0.5 mile offshore has a depth of about 10 feet over it. Two small rock islets on each side of a stranded vessel were formed by the jettisoning of a cargo of cement about 5 miles south of Hillsboro Inlet Light and 0.4 mile offshore. They were blasted away during World War II, but until the depth over them has been determined, the area should be avoided by light-draft vessels.

Chart 546.—Port Everglades is a deepwater port, 10 miles south of Hillsboro Inlet Light and 20 miles north of Miami, at the adjoining city limits of Fort Lauderdale and Hollywood.

Because of adverse current conditions, it is not advisable for vessels larger than small yachts to navigate the channel at night without a pilot. Vessels arriving at the entrance during darkness anchor just west of the sea buoy and 0.3 mile south of it in 60 feet. The holding ground is good.

A **naval restricted area** extends from the south side of the entrance to Port Everglades southward for about 2.5 miles; limits and regulations are given in **§ 207.171b,** Chapter 2.

Channels.—A Federal project provides for an entrance channel 35 feet deep leading to a turning basin of the same depth. The channel and basin are maintained at or near project depth. A lighted range, lights, and lighted and unlighted buoys mark the channel.

Two converging angular stone jetties, 240 yards apart at the seaward end, protect the harbor entrance. Two lines of submerged mats of rock for proposed breakwaters extend about 0.8 mile from shore on both sides of the entrance channel. The general depth over them is about 10 feet and they are about 380 yards apart at their seaward ends, which are unmarked.

Prominent features.—A large hotel and four elevated tanks, painted silver with lights on top, are prominent immediately northward of Port Everglades.

Tides and currents.—The mean range of tide in the Port Everglades entrance is about 2½ feet. The tidal current in the entrance has a velocity of about 1 knot at strength. Current predictions may be obtained from the Tidal Current Tables.

Current swirls of varying characteristics exist in the turning basin and make handling of ships difficult. Prevailing winds from the southeast and east coupled with a rising tide are the most hazardous times. Caution should be exercised in maneuvering vessels to avoid striking the piers or the rocky sides of the turning basin.

See Appendix for **storm warning** display.

Pilotage is compulsory for all vessels engaged in foreign trade. Coastwise vessels in domestic trade are not required to take pilots, but such vessels are required to have a pilot aboard licensed by the Federal Government. Arrangements for pilots, available day and night, are usually made in advance through the shipping agents. The pilot boat is a gray motorboat flying the code flag **P.** Vessels are boarded at the sea buoy.

Towboats.—Tugboats for docking and undocking are available in the harbor.

Quarantine.—Vessels subject to quarantine are inspected by an officer of the United States Public Health Service upon arrival at the berth.

Customs.—Port Everglades is a port of entry. Marine documents are not issued.

Immigration.—Inspectors are available at the port.

Harbor regulations.—Port Everglades is under the jurisdiction and control of Broward County Port Authority. The administration, operation, and maintenance of the port is under the direction and supervision of a Port Manager, appointed by the Port Authority. The Port Manager has an office in the Administration Building just above Slip 1.

Terminal facilities.—Slip 1, directly in line with the entrance channel, is 1,200 feet long and 300 feet wide. Slip 2, north of Slip 1, is 700 feet long and 300 feet wide. Slip 3, south of Slip 1, is 1,200 feet long and 300 feet wide. All three slips have been dredged to 35 feet. The dock facilities provide a total of 6,500 linear feet of berthing

space, adequate for several large vessels. A steel and concrete warehouse with unlimited bearing capacity is adjacent to the berths. The transit warehouses have over 250,000 square feet of floor space.

A precooling and cold storage plant is on pier 1. A beltline railroad serves all the facilities and industries at Port Everglades, connecting them with the Seaboard Airline and Florida East Coast Railroads. Facilities are available at most berths for furnishing fuel oil and fresh water. Tank storage capacity available for molasses products and petroleum exceeds 3,250,000 barrels. Pier 4 has a large open-storage area for handling lumber and other bulk materials. A concrete warehouse is used for bulk cement storage. The turning basin adjacent to the slips has steep rock sides extending almost to the low-water level.

Supplies.—Fresh water, bunker C fuel oil, electricity, and a limited quantity of ship chandlery can be obtained.

Repairs.—A small machine shop with ship repair equipment is available.

Communications.—There is irregular steamship service to the Gulf, South American and European ports. Port Everglades is the oil storage and distribution center for southern Florida.

The Intracoastal Waterway passes through the Stranahan River and Lake Mabel just eastward of Port Everglades. Facilities at Fort Lauderdale and other places along the Intracoastal Waterway are given in Chapter 12.

Chart 1248.—Between Port Everglades and the Miami Harbor entrance, 20 miles to the southward, the general trend of the coastline is south, and it is formed almost entirely by a low sand beach. The large buildings and tanks in Hollywood, Miami Beach, and Miami are particularly conspicuous from seaward.

This section of the coast is also fairly bold, and the 20-fathom curve runs parallel to the beach at a distance of about 2 miles until in the vicinity of the Miami Harbor entrance where the curve of the shore becomes south-southwestward and the 20-fathom curve lies about 4 miles offshore. Inside this curve shoaling is rapid, and northward of the Miami Harbor entrance 6 to 8 fathoms are found in places 1.5 miles from the beach.

Hollywood is a popular resort 5 miles south of Port Everglades and about 1 mile west of the Intracoastal Waterway. The Hollywood Hotel, a very prominent structure, is situated on the ocean beach east of the city. A lighted buoy is 10 miles south of Port Everglades and 1.5 miles offshore. Ships wishing to stay beyond the 10-fathom curve should stay 0.6 mile seaward of the buoy.

Bakers Haulover Cut has been dredged through the barrier beach at the north end of Biscayne Bay, 11.6 miles south of Port Everglades, to provide circulation of water in the bay. The channel is 12 feet deep. A fixed highway bridge over the cut has a horizontal clearance of 125 feet and a vertical clearance of 32 feet; an overhead power cable just east of the bridge has a permit clearance of 49 feet. Current velocities of about 2½ knots on the flood and 3½ knots on the ebb have been recorded in the cut. See the Tidal Current Tables for predicted times and velocities of the current.

Many charter-boat fishermen use the cut in good weather. The tower on the north side resembles a conical lighthouse. A light, visible about 5 miles, is shown from the tower until about 3 a.m. Several prominent hotels are south of the cut. The Intracoastal Waterway is 0.4 mile inside the entrance.

Chart 547.—Miami Harbor is near the southern extremity of Florida, 300 mies south of the entrance to the St. Johns River and 150 miles northeasterly of Key West. The harbor comprises Biscayne Bay, the Miami River, and a number of channels, slips, and basins which have been dredged along the bay frontage of Miami and Miami Beach and from the basins to the ocean.

Biscayne Bay and the small-boat channels in it, are described in Chapter 12.

Miami, 3.5 miles inside the entrance to the harbor and westward of Miami Beach, is the principal city on Biscayne Bay and covers virtually the entire west side of the bay north of Key Biscayne. It is internationally famous as a winter resort and has some commercial importance. The city is a popular yachting center, particularly in winter, and a large number of small boats that fish and cruise along the Florida Keys operate out of this port.

Miami, Miami Beach, and the adjoining cities form the "Greater Miami" area, a commercial center of increasing importance. Winter tourist trade accounts for the greatest part of the business of the port.

Miami Beach is the colorful play spot occupying the peninsula that separates the ocean from the upper part of Biscayne Bay. Several bridges cross the bay forming good highway connections with the city of Miami. Miami Beach is residential except for shops and recreational establishments. On its southwest end, south of MacArthur Causeway and just inside the jettied entrance of the main channel, are located the only commercial wharves. The municipal wharf is located at this point. Numerous small wharves are along the west side of the city which are used entirely by pleasure craft. The east side of the city fronts directly on the ocean. An amusement pier extends out into the sea about 0.3 mile north of the jetties. Several structures are prominent from seaward.

Prominent features.—The group of skyscrapers in Miami and the large hotels at Miami Beach form a landmark visible for miles in all directions. Among those most easily distinguished are the courthouse dome, the Daily News tower, and the Everglades Hotel in Miami. The most prominent structure in Miami Beach is the green and black building of the Miami Beach Federal Savings and Loan, which has four red lights on top. Just under the red lights is an illuminated sign which alternately flashes the time and temperature from 7 a.m. to midnight. This flashing light can be seen over 16 miles offshore. From the south, the most prominent landmark is the stack and elevated tank on Virginia Key. Cape Florida unused lighthouse, a red tower on the south point of Key Biscayne, is easily seen. An aviation light northwest of

Miami, and several radio towers with red occulting lights on top show prominently at night. Numerous other tanks and towers shown on the chart need no description.

Boundary lines of Inland Waters.—The line established along the Florida Reefs and Keys from Miami to Marquesas Keys is described in § **82.55**, Chapter 2.

Channels.—A Federal project provides for a channel 30 feet deep from the ocean to a turning basin of the same depth at Miami; a channel 15 feet deep from the turning basin at Miami to the mouth of the Miami River: and a channel in Miami River 15 feet deep under flood conditions to just below the 36th Street bridge, 4.8 miles above the mouth.

The **Main Channel** is a dredged cut from the 30-foot contour through the jettied entrance south of Miami Beach, and thence across the flats in Biscayne Bay, parallel and close to the MacArthur Causeway, to the municipal piers on the Miami waterfront. The channel is maintained at or near the project depth of 30 feet. The entrance is protected by jetties. A lighted range, lights, and lighted and unlighted buoys mark the channel. A shoal marginal strip about 100 feet wide is between the northern edge of the channel and MacArthur Causeway along its entire length. Lights marking the southerly side of this channel are established about 25 feet back from the edge of the channel. Vessels are advised to favor the south side of the channel during southerly winds, as a pronounced northerly set of current may then be experienced.

Meloy Channel (Miami Beach Channel) branches from the Main Channel at the inside end of the jetties and extends northwestward along the west shore of Miami Beach as far as the causeway bridge. The controlling depth in the channel and at the wharves on the east side of the channel is 19 feet.

A channel branches from the Main Channel just inside the jetties and extends westward for about 1,200 yards along the north side of **Fisher Island** to the Belcher Oil Company property. It is maintained by the company at a depth of about 23 feet. The channel westward of this point and on the west side of the island was dredged by private interests but no maintenance dredging has been done. In November 1958 the depth on the range shoaled to 7 feet at the western point of the island.

A small crossover channel extends in a southerly direction from the Main Channel just eastward of **Lummus Island** to the channel along the northern side of Fisher Island. In November 1958 the reported controlling depth was 8 feet. A private lighted range marks the channel.

Other channels in Biscayne Bay are described in Chapter 12.

Anchorages.—The anchorage area is just north of the entrance to Miami Harbor; limits and regulations are given in § **202.188**, Chapter 2. There is no available anchorage for oceangoing vessels inside the harbor. Yachts and small craft usually lay alongside the various wharves, but in winter such accommodations are crowded and a large number of these boats anchor between the two causeways in the vicinity of Star Island or lie to moorings off the city yacht basin.

Tides.—The mean range of tide is about 2½ feet at the entrance to Miami Harbor and about 2 feet in the bay. Daily tide predictions for Miami Harbor Entrance (Miami Beach) are given in the Tide Tables. High and low waters at Miami occur about 1 hour, 40 minutes, later than at Miami Harbor Entrance.

Currents.—Strong tidal currents run in the Main Channel entrance, the average strength of current being about 2 knots. Daily predictions of times of slack water and times and velocities of strength of flood and ebb for Miami Harbor entrance are given in the Tidal Current Tables. A north wind causes considerable southerly current across the ends of the jetties. Between the entrance cut and Causeway Terminal the current sets north with the flood and south with the ebb.

See Appendix for **storm warning** displays.

Pilotage is compulsory for foreign vessels and for coastwise vessels except those which have a pilot licensed by the Federal Government. The pilot station is within the government reservation on Miami Beach close to the inner end of the north jetty. The pilot boat will come out to meet any vessel making a signal for a pilot, Code flag **G**. Arrangements may be made in advance for a pilot by radio to the shipping agents at Miami giving the expected time of arrival off the entrance. Code flag **H** flies from the pilot boat, which is black with buff deck and housing. Vessels are boarded near the outer sea buoy, 2.5 miles offshore.

Towage.—A number of towing companies provide towage service.

Quarantine.—The quarantine station is on Fisher Island on the south side of the main channel just inside the jetties. Vessels are boarded by officers of the United States Public Health Service off the station. Large vessels unable to pass quarantine anchor in an anchorage area outside the jetties. Smaller vessels anchor in the channel north of Fisher Island. An outpatient clinic of the Public Health Service is at Miami. The nearest Public Health Service hospital is at Savannah.

Customs.—Miami is a port of entry and marine documents are issued.

Immigration.—Inspectors usually board vessels with aliens at the berth.

Other Federal Offices.—Local offices of the following Federal agencies are also located in Miami, see Appendix for addresses: Coast Guard, Federal Communications Commission, and Weather Bureau.

Harbor regulations.—The Port Director assigns berths to ships and enforces the regulations of the port of Miami.

It is unlawful for vessels or other craft to proceed at a **speed** which will endanger other vessels or structures. Official signs are posted indicating limited speeds through critical portions of the waterways.

Terminal facilities.—The facilities consist of many wharves, both municipal and private, some of which are equipped with cargo handling equipment for general cargo, heavy lifts, and petroleum products. Three municipal wharves and a privately maintained wharf just west of the turning basin comprise the deepwater terminal area at the port of Miami. Depths of 25 to 30 feet are alongside the wharves. The facilities include warehouses,

transit sheds, and a cold storage plant. Tankers bring bunker C fuel oil, diesel fuel, and road asphalt products to the port which are distributed by barge and truck to Key West and the Okeechobee area including Fort Myers.

A belt line serving the port terminal connects with the Florida East Coast and the Seaboard Air Line railroads.

Numerous smaller landing facilities in and around Miami, including the Miami River and Miami Beach, are used by recreational craft.

Supplies of all kinds are obtainable in Miami. Gasoline, diesel fuel, bunker C fuel oil, and fresh water may be obtained at the wharves. Deliveries can also be made by barge.

Repairs.—General hull and engine repairs can be made at Miami. Two floating drydocks, just southward of Pier 3 can handle vessels up to 1,700 tons in weight, 280 feet in length, and 17 feet in draft. One of the drydocks has 2- and 3-ton cranes. A 65-ton crane and two 25-ton mobile cranes are also available. The shipyard has a machine shop and marine supplies can be procured.

The largest repair yard on the Miami River has a marine railway that can haul out vessels up to 173 feet in length, 8 feet in draft forward and 12 feet in draft aft, and 800 tons in weight; and a marine lift 160 feet in length, 16 feet in draft, and 500 tons in weight. A machine shop is on the premises. Other smaller shipyards are situated along the river. Heavy repairs may be made at Jacksonville or Charleston.

In Biscayne Bay there are several boatyards just northward of the eastern end of Venetian Causeway. Diesel fuel, gasoline, water, supplies, and boat storage are available. The most northerly yard has a vertical-lift dock which will accommodate a vessel 110 feet in length, 18 feet in beam, and 6 feet in draft.

Communications.—Miami is on the main line of the Florida East Coast Railway and is the southern terminus of the Seaboard Air Line Railroad. In addition to shipping connections with the North Atlantic, Gulf, the West Indies, and Pacific Coast ports, it has regular steamship service to European ports and several on the east coast of South America. Bus and truck systems operate over the excellent highways which reach the city. Air transportation facilities and telephone, telegraph, and radio communications are available.

The Intracoastal Waterway passes through Biscayne Bay just eastward of Miami. Clearances of bridges over the waterway are given in Chapter 12.

Just southward of the turning basin at Miami is the Florida East Coast Railway Terminal Basin. It has a reported controlling depth of 13 feet. The City Yacht Basin at the northeast end of **Bay Front Park** has a reported controlling depth of 16 feet. In November 1958 the channel leading to it from the Main Channel and marked by daybeacons had a reported controlling depth of 7 feet.

The channel east of Bay Front Park between the turning basin at Miami and the mouth of the Miami River had a reported controlling depth of 13 feet in November 1958. A mooring buoy for a marine fuel vessel is about opposite the center of Bay Front Park and 125 yards offshore. It is unlighted and hazardous at night when not in use. Vessels should proceed with caution in the area until the buoy is sighted.

The approach channel to Miami River from the southward, and west of **Burlingame Island,** had a reported controlling depth of 7 feet in November 1958. Miami South Channel is part of the Intracoastal Waterway.

Miami River trends westward through the southern part of the city of Miami to the Everglades. The river is an important part of the Miami waterfront for both commercial and pleasure craft. The principal wharves can accommodate any boat able to enter the river. The largest repair yards and numerous yacht basins are along the river banks.

In November 1958 the reported controlling depths were 13 feet to the Northwest 27th Avenue Highway Bridge, thence 8 feet to the Seaboard Air Line Railroad bridge, and thence 7 feet to the Northwest 36th Avenue Bridge which is 400 yards above the head of the project and is the head of navigation. Currents are strong on the ebb and cause whirls at the bends.

The minimum clearances of the bridges from the mouth of the river to the head of navigation are: horizontal 50 feet, and vertical 6 feet. The highway bridge, 0.1 mile above the mouth has a bascule span with a horizontal clearance of 97 feet and a vertical clearance of 21 feet. The highway bridge, 0.2 mile above the mouth, has a bascule span with a horizontal clearance of 108 feet and a vertical clearance of 11 feet. The railroad bridge, 0.4 mile above the mouth has a swing span with a horizontal clearance of 50 feet and a vertical clearance of 6 feet. The highway bridge, 0.5 mile above the mouth, has a bascule span with a horizontal clearance of 112 feet and a vertical clearance of 13 feet. Operating regulations are given in § **203.448,** Chapter 2.

11. MIAMI TO KEY WEST

Chart 1112.—The **Florida Keys** consist of a remarkable chain of low islands, beginning with Virginia Key and extending in a circular sweep to Loggerhead Key, a distance of about 192 miles. For some 100 miles of that distance they skirt the southeast coast of the Florida Peninsula, from which they are separated by shallow bodies of water known as Biscayne Bay, Card Sound, Barnes Sound, Blackwater Sound, and Florida Bay. Biscayne Bay has a depth of 9 to 10 feet for most of its length, and the other bodies of water are shallow, containing small keys and shoals, and of no commercial importance except as a cruising ground for small boats. Westward of Florida Bay the Florida Keys separate the **Straits of Florida** from the Gulf of Mexico.

The keys are mostly of coral formation, low, and generally covered with dense mangrove growth, though some are wooded with pine, and on a few are groves of coconut trees. Most of the keys that are connected by U.S. Highway 1 to Key West are inhabited. Key West is the most important of the keys.

The openings under the viaduct and bridges are indicated on the charts. Drawbridges are over the Indian Key Channel, Channel Five east of Jewfish Key, and Moser Channel. Small craft with local knowledge use these channels to go from the Straits of Florida to Florida Bay and the Gulf of Mexico. Strangers should not attempt passage without a pilot.

The tidal currents are strong through the openings between the keys. Wind effects may at times be expected to modify the velocities shown in the tidal current tables.

The Florida Keys are skirted on the side next to the straits throughout their extent by the **Florida Reefs,** a chain of dangerous reefs and shoals lying at an average distance of about 5 miles from the line of keys. The reefs are hazardous because they are not marked by breakers in smooth weather and only a few show above water. On the outer edge of and between the reefs the water shoals abruptly.

In approaching the reefs from seaward, warning of their proximity usually will be given by the difference in color of the water, from deep blue to light green, or by the **Bank Blink,** described in Chapter 3. Too much reliance in these warnings, however, may lead to trouble. In clear weather the lights and daybeacons make navigation along the reefs easy, but in thick weather soundings should be relied upon for safety. Fifty-fathom soundings indicate a distance of 2 to 3 miles from the reefs, and great caution should be used in approaching them closer. Fogs are not frequent in this locality.

The water always becomes milky following windy weather. The usual color of the water on the reefs is bluish green and the shoal patches show dark, shading through brown to yellow as they approach the surfaces. The shoal sand patches show as a bright green. At depths of 10 to 15 feet grass patches on the bottom show quite similar to rocks. When piloting in this area a time should be chosen so that the sun will be astern, conning the vessel from aloft or from an elevated position forward, for then the line of demarcation between deep water and edges of the shoal will be indicated with surprising clarity.

Prominent features.—The outer part of the Florida Reefs is marked by lights from Miami to Key West. Several lights marking the Hawk Channel are also visible from seaward. In addition, several lighted radio towers along the keys and the aviation light on Boca Chica Key near Key West are prominent.

Boundary lines of Inland Waters.—The line established along the Florida Reefs and Keys from Miami to Marquesas Keys is described in **§ 82.55,** Chapter 2.

Dangers.—Vessels proceeding through the channels inside the Florida Reefs should exercise extreme caution because of the numerous dangerous rocks, shoals, wrecks, and pile structures which exist. The chart should be examined carefully to determine the position of these dangerous obstructions so they may be avoided.

Hawk Channel is the navigable passage inside Florida Reefs and outside the keys from Cape Florida to Key West, a distance of about 127 miles. It varies in depth from 9 to 34 feet, and is 0.25 mile wide at its narrowest part. Light-draft vessels, bound southward and westward, may use this channel with great advantage, avoiding entirely the adverse current of the Gulf Stream and finding comparatively smooth water in all winds, except when passing the large openings between the reefs in southerly winds. These openings are principally between Alligator Reef Light and American Shoal Light. Steamers or sailing vessels with a leading wind may run the courses through this channel without difficulty. Sailing vessels drawing more than 7 feet are advised not to try to beat through without a pilot.

Reports indicate that the current in Hawk Channel usually sets fair with the channel, except alongside the open area between Hawk Channel and Biscayne Bay where a fairly strong cross current exists, particularly on an ebb tide. Possible cross currents should be guarded against, especially in the vicinity of the openings between the keys.

Pilots are generally available at Miami or Key West. The channel is marked with lights, daybeacons, and buoys, but there are not sufficient lights in all portions of

the waterway for safe passage of vessels at night without local knowledge. Vessels may anchor at night where the bottom is soft. Anchorages are discussed in a later section. The holding ground is poor where the bottom is hard. It is reported that tugs using the channel time their departure so as to run in the lighted portion at night; otherwise they anchor.

The **Intracoastal Waterway** between Miami and Key West is described in Chapter 12. This waterway on the western and northern side of the keys passes southward through Biscayne Bay, Card, Barnes, and Blackwater Sounds and connecting waterways in Florida Bay to Moser Channel. From there it is necessary to pass either through Moser Channel and proceed to Key West via Hawk Channel, a distance of 40 miles, or to remain on the northern side of the keys and proceed to Key West via Big Spanish Channel and the Gulf of Mexico, a distance of 54 miles. The waterway route is through smooth waters except in Hawk Channel and the Gulf of Mexico.

Florida Bay, northward of the Florida Keys and southward of the mainland of Florida, is a triangular-shaped body of water extending in a general east and west direction from Barnes Sound to Cape Sable. The depths are shallow and irregular, and the bottom is mostly coral with a thin covering of silt in the eastern part. From April to October the waters of the bay are clear and the shoals plainly discernible, but during the winter months the water is frequently milky and the shoals indistinguishable.

In the eastern part of the bay are numerous ridges and reefs which show bare or nearly bare. Numerous small wooded keys dot the area. Only small craft can navigate this part of the bay which is frequented by small motor yachts, spongers, fishing craft, and the flat-bottomed shoal-draft boats of the inhabitants of the keys. The western part of the bay is comparatively clear, with depths ranging from 7 to 13 feet. The bottom is covered with loggerhead sponges and small coral heads.

Chart 1248.—Norris Cut is a shallow inlet just south of the Main Channel to Miami Harbor between Fisher Island and Virginia Key.

Key Biscayne is connected to the mainland by a causeway which crosses Bear Cut, Virginia Key, and Biscayne Bay. The red tower of an abandoned lighthouse is on **Cape Florida** on the south end of Key Biscayne.

Biscayne Channel leads through the shoals south of Cape Florida into Biscayne Bay. It is partially dredged but the channel has shoaled. In November 1958 the reported controlling depth was 5 feet. The channel is marked by lights, lighted buoys, and daybeacons. Craft whose draft is close to the limiting depth of the channel should exercise extreme caution in navigating it. Several channels leading through the shoals between Biscayne Channel and Key Biscayne are used by local boats.

Cape Florida Anchorage, with depths of 12 to 20 feet, is about 300 yards westward of the south end of Cape Florida with the abandoned lighthouse tower bearing northward of 069°

Miami South Channel is a dredged cut leading from Biscayne Bay, northward of Key Biscayne, to the Miami waterfront. One branch of it leads into the Miami River and the other leads directly into the turning basin off the city park. The Intracoastal Waterway southward to Key West passes through Miami South Channel. Clearances of the Rickenbacker Causeway bridge are given in Chapter 12.

Fowey Rocks Light (25°35.4′ N., 80°05.8′ W.), 110 feet above the water and visible 16 miles, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation enclosing a white dwelling and stair cylinder. A radiobeacon is at the light. See Appendix for **storm warning** display.

Fowey Rocks Anchorage, 1.3 miles westward of Fowey Rocks Light, is fairly well sheltered, and can be used by vessels with a 14-foot draft or less.

Chart 1249.—Bowles Bank Anchorage, 6.5 miles southwestward of Fowey Rocks Light, is good in all winds. It has depths of 14 to 16 feet, soft bottom in places, and lies about 0.5 mile north of the light on Bache Shoal and eastward of the north end of **Elliott Key.**

Legare Anchorage, 7 miles southwestward of Fowey Rocks Light, lies between the reefs westward of **Triumph Reef.** The bottom is mostly hard, but there are some soft spots on which vessels may anchor and ride out a gale. The entrances are not marked and the anchorage is not generally used.

Caesar Creek Bank Anchorage, 12 miles southwestward of Fowey Rocks Light, is good in all winds. It lies on the west side of Hawk Channel between **Margot Fish Shoal** and **Caesar Creek Bank,** with depths of 10 to 12 feet, soft bottom.

Excellent anchorage for small craft will be found in **Caesar Creek,** just north of Caesar Creek Bank. The entrance is marked by a lighted buoy and privately maintained stakes mark the channel. There is a depth of about 6 feet on the bar.

There is also a secure anchorage between **Adams Key, Meigs Key,** and Elliott Key. A draft of about 5½ feet can be carried into Biscayne Bay through a privately marked channel. This channel leads along the northwest side of Adams Key. It is reported, however, that this passage is seldom used.

A light marks **Pacific Reef,** 13.4 miles southward of Fowey Rocks Light. A channel marked by daybeacons leads from the ocean north of the light to Caesar Creek; it has ample depths for vessels that use Hawk Channel.

Angelfish Creek, 17.5 miles southwestward of Fowey Rocks Light, is used by vessels proceeding to Card Sound. A draft of 5 feet can be carried into Card Sound. The channel is marked by lights and daybeacons. The outer end of the creek offers good protection, but the bottom is rock ledge and the anchor should be buoyed. Gasoline, diesel fuel, water, and ice may be obtained at the dock just inside the east entrance.

Ocean Reef (Key Largo) Harbor is on the east side of Key Largo, 19.5 miles southwestward of Fowey Rocks Light. In 1958 the reported depth in the 70-foot wide

dredged channel leading to the harbor was 5 feet. A light is off the end of the entrance channel which is marked by privately maintained stakes. The harbor has good anchorage and wharf facilities. Good hotel accommodations, gasoline, diesel fuel, water, electricity, and limited supplies are available.

Key Largo Anchorage, 20 miles southwestward of Fowey Rocks Light, is good in all winds. It has a depth of 14 feet, soft bottom, 4.5 miles northwestward of Carysfort Reef Light.

Turtle Harbor, a well-sheltered anchorage between the reefs lying northwestward of Carysfort Reef Light, is entered from the Straits of Florida by a marked passage 5 miles northeastward of the light. Vessels of 15-foot draft can use this passage in smooth water. Depths in the approach range from 27 to 38 feet, and at the anchorage from 25 to 28 feet. A buoy, 2.5 miles northwestward of Carysfort Reef Light, marks the center of the anchorage area. Vessels can enter Hawk Channel from this harbor by proceeding about 0.4 mile south of the anchorage buoy and then taking a westerly course.

Carysfort Reef Light (25°13.3′ N., 80°12.7′ W.), 100 feet above the water and visible 16 miles, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation, enclosing a conical dwelling and stair cylinder. See Appendix for **storm warning** display.

The Elbow is a reef, 5.3 miles southwestward of Carysfort Reef Light, on which several wrecks have occurred. It is marked on its seaward edge by a light.

Molasses Reef, 15.5 miles southwestward of Carysfort Reef Light, is marked by a light. The entrance to Molasses Reef Channel, which has a controlling depth of about 8 feet, is just south of the light. The shoalest part of the channel is marked by a buoy and daybeacons.

Tavernier, 20 miles southwestward of Carysfort Reef Light, is one of the larger settlements on the keys. Gasoline, supplies, motels, and chartered party fishing are available.

Tavernier Key Anchorage is 2 miles eastward of Tavernier. Anchor according to depth from northward to eastward of Tavernier Key, soft bottom.

See Appendix for **storm warning** displays.

Chart 1250.—Alligator Reef Light (24°51.1′ N., 80°37.1′ W.), 136 feet above the water and visible 18 miles, is shown from a white, octagonal, pyramidal skeleton tower on pile foundation, enclosing a white dwelling and a stair cylinder. See Appendix for **storm warning** display.

Indian Key Channel, northwestward of Alligator Reef Light, is about 200 yards wide and has a controlling depth of 5 feet from the Straits of Florida to Florida Bay. It is well defined, but marked only by private temporary stakes. The highway viaduct across the channel has a bascule span with a horizontal clearance of 40 feet and a vertical clearance of 8 feet.

See Appendix for **storm warning** display.

Channel Five, 8.4 miles westward of Alligator Reef Light, is a natural channel with a controlling depth of 7 feet on the ocean side and 9 feet on the bay side. However, a draft of 9 feet may be taken from the ocean with local knowledge. At times a strong current sets through the channel. The highway viaduct across the channel has a bascule span with a horizontal clearance of 50 feet and a vertical clearance of 8½ feet. Vessels with drafts up to 6 feet can follow the marked route leading westward and northwestward in Florida Bay to Cape Sable and the village of **Flamingo.**

Tennessee Reef, 9 miles southwestward of Alligator Reef Light, is marked by a daybeacon on its eastern side and by a light on the southwestern end.

Long Key Anchorage, 3 miles north-northwestward of Tennessee Reef Light, has soft bottom in depths of 15 to 18 feet, but it is exposed to southerly winds.

Turtle Shoal Anchorage, 20 miles southwestward of Alligator Reef Light and 1 mile west of East Turtle Shoal Light has soft bottom in a depth of 27 feet. It is a fair anchorage in fine weather. Another anchorage area is 1 mile west of West Turtle Shoal in depths of 24 to 36 feet.

There is a marina in a protected harbor westward of **Fat Deer Key,** 24 miles southwestward of Alligator Reef Light. In November 1958 the privately marked entrance channel had a controlling depth of 9 feet. Gasoline, diesel fuel, water, electricity, and berthing facilities are available. See Appendix for **storm warning** display.

Sister Creek, 4 miles northeastward of Sombrero Key Light, is a narrow passage between **Boot Key** and **Vaca Key.** It has several arms which provide secure refuge during a tropical hurricane. Vessels tie to the mangroves. The entrance to the creek between **West Sister** and **East Sister Rocks** is marked by a light and daybeacons. A channel 4 feet deep connects the creek with the eastern end of Boot Key Harbor.

Knight Key Anchorage, northward of Sombrero Key Light, is good but is exposed to southwesterly winds. To make this anchorage, bring Sombrero Key Light astern on a **343°** course and anchor in 18 to 30 feet about 0.8 mile southwestward of Knight Key, sticky bottom. The westerly edge of a red sector of Sombrero Key Light leads to the anchorage. The west side of Knight Key should be given a berth of about 0.5 mile.

Boot Key Harbor is 4.5 miles northward of Sombrero Key Light. The entrance to the harbor is south of Knight Key and is marked by a light and daybeacons. A narrow channel with a least depth of 6 feet has been dredged into the harbor and affords a secure refuge for launches and small craft. In 1959 a bridge was under construction across the channel. The color of the banks is a good guide in the narrow channel. A repair yard inside the harbor has a marine lift with a 100-ton capacity for boats up to 115 feet in length and 6 feet in draft. Hull and engine repairs can be made. A machine shop is on the premises. Gasoline and fresh water are obtainable. Diesel fuel can be obtained at a fish wharf westward of the repair yard.

Chart 1251.—Sombrero Key Light (24°37.6′ N., 81°06.6′ W.), 142 feet above the water and visible 18 miles, is shown from a brown, octagonal, pyramidal

skeleton tower on pile foundation, enclosing a square dwelling and stair cylinder. See Appendix for **storm warning** display.

Moser Channel is northwestward of Sombrero Key Light and 95 miles southwestward of Miami. It affords a passage for vessels of 7 to 8 feet in draft between the Florida Keys from the Straits of Florida to Florida Bay. The highway bridge across the channel has a swing span with a horizontal clearance of 107 feet and a vertical clearance of 24 feet.

The tidal current at the bridge has an average velocity at strength of about 1½ knots. Wind effects modify the current velocities considerably at times; easterly winds tend to increase the northward flow and westerly winds the southward flow. Overfalls that may swamp a small boat are said to occur near the bridge at times of large tides.

Route.—A route with a least depth of 9 feet from the Straits of Florida via the Moser Channel to the Gulf of Mexico is as follows: From a point 0.5 mile 156° from the center of the bridge, pass 200 yards west of the daybeacon at Red Bay Bank, thence 0.4 mile east of the light on Bullard Bank, thence to a position 3 miles west of Northwest Cape of Cape Sable, thence to destination.

Bahia Honda, 10 miles northwestward of Sombrero Key, is the deepest channel between the Straits of Florida and Florida Bay. The center span of the fixed highway bridge across the passage has a horizontal clearance of 232 feet and a vertical clearance of 20 feet. The direction of the current should be carefully watched when turning northwestward after passing under the bridge in order to avoid being grounded on the banks on either side of the channel. These banks are usually visible. Currents through the bridge have a velocity of about 2 knots. For current predictions at the bridge see the Tidal Current Tables. From Bahia Honda vessels may proceed via Big Spanish Channel to the Gulf of Mexico as described in Chapter 12.

Newfound Harbor Keys Anchorage, 16 miles westward of Sombrero Key Light, is in depths of 19 to 22 feet in the channel northeastward of the daybeacon at the west end of the keys. **Newfound Harbor Channel** to the northward is clearly defined by the appearance of the water. A strong current sets fair with the channel.

Niles Channel, 18 miles westward of Sombrero Key Light, is the best channel from the Straits of Florida to the Gulf of Mexico between Bahia Honda and Key West. It has a controlling depth of about 4 feet and is marked at its narrowest sections by private stakes. The fixed highway bridge across the channel has a horizontal clearance of 25 feet and a vertical clearance of 8 feet. Caution should be exercised to avoid the piling on the north side of the bridge.

Loggerhead Key Anchorage, 19 miles westward of Sombrero Key Light, is in a depth of 15 feet, soft bottom, about 0.8 mile eastward of Loggerhead Key. This is a fair anchorage in all but easterly to southerly winds. When going to the anchorage pass at least 0.3 mile eastward of the buoy 1 mile southeastward of the key.

Sugarloaf Channel, northward of American Shoal Light, is marked by daybeacons from Hawk Channel to the highway bridge. The fixed highway bridge across the channel has a horizontal clearance of 20 feet and a vertical clearance of 6 feet. An overhead power cable about 700 yards south of the bridge has a permit clearance of 31 feet. Currents are strong and set fair with the channel; north with the flood and south with the ebb. The channel is not recommended for a draft of over 2 feet without a pilot. Controlling depths are reported to be 4 feet from Hawk Channel to the highway bridge, thence 2 feet to the Gulf of Mexico. **Cudjoe Bay,** eastward of the channel offers fair holding ground for fishing boats.

American Shoal Light (24°31.5′ N., 81°31.2′ W.) 109 feet above the water and visible 16 miles, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation, enclosing a brown dwelling and white stair cylinder. See Appendix for **storm warning** display.

West Washerwoman Anchorage, 4.3 miles northwestward of American Shoal Light, has a depth of 23 feet, soft bottom. Another anchorage in a depth of 24 feet, soft bottom, is 5 miles westward of the light on Ninefoot Shoal.

Saddlebunch Harbor, 10.5 miles eastward of Key West, is a good hurricane anchorage for small craft. The northwest end of the harbor is obstructed by the ruins of a bridge.

Boca Chica Key, 5 miles eastward of Key West, is the site of a Naval Air Station. **Boca Chica Channel,** with a reported controlling depth of 12 feet in November 1958, leads from Hawk Channel to a basin on the west side of the key. It is marked by lighted and unlighted buoys, and daybeacons. An overhead power cable has a permit clearance of 60 feet across the channel. The basin provides a good hurricane anchorage for small vessels.

Safe Harbor, 4 miles eastward of Key West, is a deepwater harbor on the south side of **Stock Island.** The channel leading to it has a controlling depth of about 20 feet and is marked by buoys and daybeacons. There are shrimp-packing facilities in the harbor. Diesel fuel, gasoline, fresh water, ice, general supplies, and transfer-and storage facilities are available. An auto and passenger ferry operates to Habana where connection is made with the Palm Beach-Habana ferry. The same pilotage, customs, and other services available for Key West Harbor are available here.

Charts 576, 584.—Key West Harbor is 145 miles southwestward of Miami Harbor. The harbor proper lies in front of the city of Key West, protected on the eastern side by the island and on the other sides by submerged reefs and sand flats. The harbor is entered through breaks in the reef by five principal channels with depths of 13 to 30 feet, and several minor channels.

Key West, on the island of the same name near the western end of the Florida Keys, is a winter resort and the site of a large Navy Base. Commercial fishing is one of the leading industries, but commerce is mostly in crude and refined oils.

Prominent features.—Easy to identify when standing along the keys at a distance of about 6 miles are the three 300-foot radio towers north of Fort Taylor, the

hotel cupola, and the Naval Hospital cupola. Numerous tanks, lookout towers, and masts are prominent but difficult to identify.

Key West Light (24°33.0′ N., 81°48.1′ W.), 91 feet above the water and visible 15 miles, is shown from a buff conical tower with a green lantern near the western end of the island. The light structure is not conspicuous.

Sand Key Light (24°27.2′ N., 81°52.7′ W.), 109 feet above the water and visible 16 miles, is shown from a brown square pyramidal skeleton tower on pile foundation, enclosing a stair cylinder and square dwelling.

Boundary lines of Inland Waters.—The line established along the Florida Reefs and Keys from Miami to Marquesas Keys is described in § **82.55**, Chapter 2.

Channels.—**Southeast Channel** is marked by buoys and by the easterly edge of a red sector in Key West Light. Depths over the coral heads in the channel are 14 to 18 feet. It is not recommended for drafts greater than 13 feet.

Main Ship Channel, the only deep-draft approach to Key West, leads from a southerly direction to the harbor. A Federal project provides for a channel 30 feet deep from the Straits of Florida to and including the turning basin at the Naval Operating Base. In November 1958 the reported controlling depth was 30 feet.

Northwest Channel is a medium-draft passage between Key West Harbor and the Gulf of Mexico. In November 1958 the reported controlling depth along the centerline of the channel was 20 feet. Vessels drawing up to 15 feet can pass directly across the reefs from the Gulf to the Straits of Florida by way of Northwest Channel and Main Ship Channel.

The jetties on either side of the Gulf entrance to Northwest Channel are 0.3 to 0.5 mile from the centerline of the channel, and only the outer part of the east jetty shows above low water. The channel is marked by lighted ranges, and lighted and unlighted buoys. The inner range is hard to identify until within about a mile of the front light. A good landmark for the Gulf entrance is the abandoned gray two-story lighthouse standing on piles 0.3 mile southwest of the west jetty.

Other channels approaching Key West are described in United States Coast Pilot 5, Gulf Coast, Puerto Rico, and Virgin Islands.

Anchorages.—The best anchorage is north of the city in **Man of War Harbor** where depths are 19 to 26 feet. This, the usual quarantine anchorage, is protected against heavy seas by the coral banks on the west and **Fleming Key** on the east. Small craft usually anchor in **Key West Bight** or **Garrison Bight** on the north side of the city.

Vessels can anchor west of the city in depths of 20 to 30 feet, taking care, however, to avoid the reefs which rise abruptly in some places along the edges of the channels. The outer anchorage, southwest of **Fort Taylor**, is somewhat exposed, but has depths of 22 to 36 feet and is safe for vessels with good ground tackle. The anchorage area at Key West is one of the best for large vessels south of Chesapeake Bay.

A **naval restricted area** is about 0.6 mile south of Key West Light; limits and regulations are given in § **207.173**, Chapter 2.

Tides.—The mean range of tide is 1¼ feet in the Main Ship Channel and at Key West. Daily predictions of times and heights of high and low water at Key West are given in the Tide Tables.

Currents.—In Key West Harbor the current sets northward on the flood and southward on the ebb with average velocities at strength of about 1 knot and 1½ knots, respectively. Daily current predictions for Key West are contained in the Tidal Current Tables.

See Appendix for **storm warning** displays.

Pilotage is compulsory for vessels in foreign trade, and also for vessels in coastwise trade except those drawing less than 6 feet or having on board a pilot licensed by the Federal Government. Pilots are available day or night and may be obtained by radio to the Coast Guard or Navy at Key West. Pilots for Hawk Channel are local fishermen available at Key West.

Vessels frequently find it convenient to make use of a special service performed by the pilot boat at Key West. If requested by radio or telegraph, the pilot boat will meet vessels at the outer buoy at the entrance to the Main Ship Channel to deliver orders or provisions; there is a charge for this service.

Towboats.—There is no commercial towboat service. Key West is the regular station for a large salvage tug. General equipment is available for heavy salvage work.

Quarantine.—Vessels subject to quarantine inspection are boarded off Fort Taylor, and no vessel is permitted to dock before obtaining pratique. The quarantine anchorage is in Man of War Harbor if size and draft of vessel permits. Larger vessels anchor in the outer harbor.

The United States Public Health Service maintains an outpatient office at Key West. In addition to the municipal and Navy hospitals, one private hospital is available.

Customs.—Key West is a port of entry and marine documents are issued.

Immigration officials are stationed at Key West for the inspection of passengers and crews of vessels in the foreign trade.

Harbor regulations.—The harbormaster has direct supervision of the port, of anchoring and mooring all vessels, and collection of port dues. A speed limit of 6 miles per hour is enforced in the Main Ship Channel between lighted buoy 10 and the inner harbor.

Terminal facilities.—There are nine wharves, three of which are government owned, with 2,000 feet of berthing space; three of six privately owned docks are in poor condition. Several warehouses and two transit sheds for petroleum products are near the wharves.

Supplies.—Diesel fuel, gasoline, fresh water, ship chandlery, marine supplies, and good hotel accommodations can be obtained. Since Key West is less than an hour's run off the main route for ships passing the southern end of Florida, it is a convenient port of call for fuel and provisions. Local arrangements can be made for de-

livery of supplies and provisions to vessels in the Gulf Stream.

Repairs.—Three repair yards are located in Key West Bight. The largest can handle general repairs on boats up to 600 tons in weight, 120 feet in length, and 10 feet in draft. General hull and engine repairs can be made.

Salvage and wrecking gear consist of a salvage tug and general equipment for heavy salvage work.

Communications.—There are no rail connections at Key West. Movement of freight in and out of the port is by vessel or truck. The Overseas Highway connects the city with Miami and points north, and there is air service to Miami and Cuba. A barge line maintains weekly freight service between Key West and Miami. An auto and passenger ferry operates between Key West and Habana.

Information about the Florida Reefs west of Key West and the Gulf of Mexico is contained in United States Coast Pilot 5, Gulf Coast, Puerto Rico, and Virgin Islands.

12. ATLANTIC INTRACOASTAL WATERWAY

The **Atlantic Intracoastal Waterway** is a toll-free inside protected coastal route that parallels the Atlantic Coast from Norfolk, Virginia, to Key West, Florida, a distance of about 1,080 nautical miles. The Federal project for this waterway provides for a channel 12 feet deep from Norfolk, Virginia, Mile 0.0, to Miami, Florida, Mile 946.3, and thence 7 feet to Key West, Florida, Mile 1080.7. Controlling depths are not given in this volume but are published each week in Notice to Mariners.

The controlling overhead clearance of bridges and cables along the Atlantic Intracoastal Waterway is 80 feet from Norfolk to the 36th Street Causeway, Mile 944.7, at Miami; this causeway has a fixed span over the waterway with a vertical clearance of 55 feet.

The waterway is used by commercial light-draft vessels and tows unable to navigate long stretches in the open ocean, and by pleasure craft. Small-boat and recreation facilities are found along the waterway.

Charts.—A special 1:40,000 scale series of nautical charts for easy navigation of the Atlantic Intracoastal Waterway are published by the Coast and Geodetic Survey. The route is indicated by a red line on the charts.

Navigational aids.—Along the Intracoastal Waterway, aids to navigation have characteristic yellow marking to distinguish them from aids marking other waters. This system of marking is described in the List of Lights and Other Marine Aids, Atlantic Coast, published by the U.S. Coast Guard and sold by the Superintendent of Documents, Government Printing Office, Washington 25, D.C., and his sales agents. It is also illustrated in color on Chart No. 1, the pamphlet of nautical chart symbols and abbreviations published and sold by the Coast and Geodetic Survey, U.S. Department of Commerce, Washington 25, D.C., and their sales agents.

Knowledge of the system and constant reference to the charts are essential to insure that the Intracoastal Waterway route is being followed, particularly at junctions with other waterways having a different system of numbering and coloring.

Navigation regulations.—Federal regulations governing **bridges** over the Intracoastal Waterway are given in **§ 203.240, § 203.241,** and **§ 207.160,** Chapter 2. Regulations governing **locks** and the handling of **tows** are given in **§ 207.160,** Chapter 2.

Tides.—Under ordinary conditions the mean range of tide in the waterway is from nontidal to about 7 feet. In many sections the tide is largely dependent on the force and direction of the wind. Severe hurricanes have raised the water surface 10 feet or more above low water in some localities.

Distances shown in the text as **Mile 41.1, 732.9,** etc., are the nautical miles along the Intracoastal Waterway route southward from the City Wharf at the foot of West Main Street in Norfolk, Virginia. Mileage given in **boldface** following chart numbers and titles at the beginning of paragraphs refer to mileages at the match lines of those charts and not necessarily the mileage between places named. These distances should not be confused with statute-mile distances shown on markers placed along some portions of the waterway by the Corps of Engineers. Tables for converting statute miles to nautical miles, and vice versa, are at the end of this volume.

Chart 829.—Norfolk to Albemarle Sound via Dismal Swamp Canal.—Mile 0.0 to Mile 59.5.—Norfolk, on the east bank of the Elizabeth River in Norfolk Harbor 26 miles inside the entrance to Chesapeake Bay, is one of the major ports of the United States. Supply and repair facilities are available at the marinas and yacht basins located in Norfolk Harbor. A detailed description of the port is contained in **United States Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.**

From the City Wharf at the foot of West Main Street in Norfolk, **Mile 0.0,** the waterway follows the Southern Branch of Elizabeth River to the alternate route through Deep Creek. The mean range of tide in Southern Branch and Deep Creek is about 2½ to 3 feet. **Naval restricted areas** are on both sides of the river; limits and regulations are given in **§ 207.153,** Chapter 2.

The **speed limit** is 6 knots from Eastern Branch to the Norfolk and Portsmouth Belt Line Railroad bridge, **Mile 2.2.** This bridge has a lift span with a horizontal clearance of 300 feet and a vertical clearance of 6½ feet down and 142 feet up. At **Mile 2.5,** a highway bridge has a lift span with a horizontal clearance of 220 feet and a vertical clearance of 15 feet down and 145 feet up. The Virginian Railway bridge at **Mile 3.2** has a swing span with a horizontal clearance of 110 feet and a vertical clearance of 9 feet. The highway bridge and the Norfolk and Western Railway bridge at **Mile 5.5** have bascule spans with a horizontal clearance of 125 feet and a vertical clearance 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 permit clearance of 145 feet.

Deep Creek, Mile 6.6, leads westward from the Southern Branch to **Dismal Swamp Canal,** the alternate route,

which has a project depth of 9 feet and is about 2 miles longer than the main route. Vessels that proceed with care and follow the chart can navigate this route without difficulty. Extra caution is required in Deep Creek, Turners Cut, and the numerous sharp bends in the upper reaches of the Pasquotank River. Winds sometimes cause a variation of 1 to 2 feet in water level. The canal is a nontidal summit-level section about 19 miles long, controlled by a lock at each of the terminals, and at 3-mile intervals has turn-outs where vessels may pass. The locks are 300 feet long and 52 feet wide; depth over the miter sills is 12 feet and the vertical lift is 12 feet.

The established **speed limit** between the locks is 5 knots. At times, due to low water, navigation may be restricted or the canal closed. During restricted operations at Deep Creek lock, boats up to 20 feet in length can be moved from one level to the other by a marine railway. Locks and bridges are operated only between the hours of 6:00 a.m. and 10:00 p.m. daily.

At Deep Creek lock, **Mile 9.2,** vessels are required to list their registry, tonnage, and passengers. A dock about 100 feet long is at the lock. The town of Deep Creek is at **Mile 9.6,** and the highway bridge across the canal has a bascule span with a horizontal clearance of 60 feet and a vertical clearance of 4½ feet.

A ferry crosses the canal at **Mile 18.2.**

At **Mile 18.7,** a 30-foot wide feeder ditch runs in a straight line westward from the Dismal Swamp Canal for about 3 miles to **Lake Drummond;** the ditch has a controlling depth of 4 to 5 feet and the lake has depths of 3 to 5 feet. Lake Drummond is about 2.2 miles in diameter and its water level is about 6 feet higher than the canal. Flow of water from the lake is regulated by a series of gates or wickets in the feeder ditch at the Corps of Engineers reservation 0.5 mile from the lake. Boats up to 18 feet in length are moved overland past the gates by a small railway. All persons entering or leaving Lake Drummond through the feeder ditch are required at the gates to register their name, address, and purpose of visit. Visitors are warned of the dangers of being lost in the swamps and the prevalence of poisonous snakes, and are cautioned to take precautions to prevent forest fires.

Gasoline is available at a small wharf on the east side of the canal near **Mile 27.0.** Supplies are available at **South Mills, Mile 28.1.**

U.S. Highway 341 bridge across the canal at **Mile 28.1** has a bascule span with a horizontal clearance of 60 feet and a vertical clearance of 4½ feet. The South Mills lock of the Dismal Swamp Canal is at **Mile 28.5.**

Turners Cut is a canal which extends in nearly a straight line from the south end of Dismal Swamp Canal to the Pasquotank River at **Mile 32.1.**

Pasquotank River has a length of 12 miles from the south end of Turners Cut to Elizabeth City, and thence 15 miles to Wade Point Light at the entrance from Albemarle Sound. The narrow upper part of the river has been improved by dredging, where necessary, to attain the project depth of the waterway. From Elizabeth City to the mouth, the river varies in width from 0.5 to 3 miles, has general depths of 9 to 12 feet, and is well marked by lights.

The Norfolk Southern Railway bridge across Pasquotank River at **Mile 41.1** has a hand-operated swing span with a horizontal clearance of 42½ feet and a vertical clearance of 3 feet; operating regulations are given in § **203.245,** Chapter 2.

Knobb Creek is a nontidal fresh water stream on the north side of Elizabeth City and enters Pasquotank River at **Mile 43.2.** A highway bridge about 0.1 mile above the mouth of the creek has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 4 feet.

The Federal project for the improvement of Knobb Creek provides for a channel 10 feet deep from that depth in Pasquotank River to the Norfolk Southern Railway bridge at the head of navigation about 1 mile above the mouth of the creek. In June 1959 the controlling depth to the head of navigation was 5½ feet.

Elizabeth City, Mile 43.7, on the west bank of Pasquotank River, is one of the most important towns on the inland waters of North Carolina, and has rail, airline, and highway connections with Norfolk. Waterfront bulkheads have good depths alongside, and a vessel can usually find a berth. Anchorage can be had in depths of 7 to 12 feet on the north side of the channel just below the city. North Carolina Highway 170 Bridge across the river at **Mile 43.7** has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 12 feet.

Complete supply and repair facilities, and hotel accommodations are available at Elizabeth City. The larger of two shipyards, about 0.5 mile below the highway bridge, can accommodate any size yacht or commercial vessel navigating these waters. Repair facilities include two marine railways capable of hauling out vessels up to 450 tons in weight, 200 feet in length, and 12 feet in draft; and a machine shop. Finger piers have about 3,600 feet of dockage and covered storage space for eight 50-foot boats. The river water is practically fresh.

Elizabeth City is a customs port of entry, issues marine documents, and has an outpatient office of the U.S. Public Health Service. See Appendix for **storm warning** display.

About 1.5 miles below Elizabeth City highway bridge is the beginning of a **restricted area** extending for about 3.5 miles southward; limits and regulations are given in § **207.162,** Chapter 2.

Newbegun Creek enters Pasquotank River about 7.5 miles below Elizabeth City. **Weeksville,** the principal town on the creek, is 3 miles from the mouth. A Federal project for the improvement of the creek provides for a depth of 5 feet across the bar at the mouth of the stream. The controlling depth over the bar and in the main part of the creek is about 4 feet.

Directions.—South of Elizabeth City the route is through the open waters of Pasquotank River and Albemarle Sound. From a mid-channel position 0.5 mile below the highway bridge at Elizabeth City, steer **115°** for 3.5 miles, passing about 100 yards northward of the light off Cobb Point, to a position 0.6 mile off **Brickhouse Point;** then steer **136°** for 7.6 miles to a position with the

light off Poquoson Point on the port beam; then steer **110°** for 4.4 miles, passing 0.4 mile northeast of **Wade Point Light** at **Mile 59.1**, to a position 1.4 miles past the light; then steer **188°** for 11 miles across Albemarle Sound to the lighted bell buoy at the entrance to Alligator River.

Chart 830.—Norfolk to North River.—Mile 0.0 to Mile 52.0.—From **Mile 6.6** at the entrance to Deep Creek, the main route continuing through Southern Branch to North River is well marked and easily followed in daylight; strangers are advised against running at night.

At **Mile 7.3** the Norfolk and Portsmouth Belt Line Railroad bridge across Southern Branch has a hand-operated swing span with a horizontal clearance of 80 feet and a vertical clearance of 7 feet. Virginia Highway 166 Bridge at **Mile 8.0** has a hand-operated swing span with a horizontal clearance of 80 feet and a vertical clearance of 6 feet. The swing spans of these bridges are usually kept in the open position.

Great Bridge Lock, at the beginning of **Virginia Cut** at **Mile 10.4,** is a tidal guard-lock 600 feet long and 75 feet wide with depths of 16 feet over the miter sills and a vertical lift of 2½ feet. There is no periodic tide southward of the lock, the water level depending on the force and direction of the winds. All vessels passing through the lock are required to list their registry, tonnage, and passengers. There is an established **speed limit** of 8 knots from the lock to North Landing bridge, a distance of about 7 miles.

Great Bridge, a village on the south side of Virginia Cut at **Mile 10.9,** has telephone and bus connections with Norfolk. The bridge across the cut at the town has a double swing span with a horizontal clearance of 80 feet and a vertical clearance of 6½ feet.

On the south side of the cut a short distance eastward of Great Bridge, a privately owned marine basin is available for mooring, docking, covered storage, and general hull and engine repairs. The larger of two marine railways can haul out vessels up to 400 tons in weight and 110 feet in length. Other repair facilities consist of a 40-ton crane, two 10-ton mobile cranes, and a well-equipped machine shop. Covered wet storage space can accommodate 150 pleasure craft. Gasoline, diesel fuel, water, ice, provisions, and marine supplies are available.

From Great Bridge, Virginia Cut continues almost in a straight line eastward for a distance of about 6 miles. The Norfolk Southern Railway bridge at **Mile 12.3** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 7½ feet. Virginia Highway 604 Bridge at **Mile 13.5** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 4 feet.

North Landing, Mile 17.4, is a small village at the junction of Virginia Cut and North Landing River. Virginia Highway 165 Bridge over North Landing River at **Mile 17.5** has a double swing span with a horizontal clearance of 80 feet and a vertical clearance of 6½ feet.

North Landing River is narrow and crooked for a distance of about 9 miles below Virginia Cut. The worst bends have been bypassed by dredging through the marshy points; the remaining bends are usually easy. At **Pungo Ferry, Mile 24.3,** a highway bridge across the river has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 8 feet.

From **Mile 26.0,** the route is through a dredged cut in the open waters of North Landing River and **Currituck Sound,** thence into **Coinjock Bay** and through North Carolina Cut to the head of North River. **Munden** is a village and rail terminal on the east side of North Landing River at **Mile 27.8**; the wharf here is in ruins. **Currituck** is a village on the west side of the mouth of North Landing River opposite **Mile 35.0.**

Coinjock, Mile 43.4, is a village on the Norfolk-Hatteras Highway, midway along **North Carolina Cut.** A highway swing bridge across the cut here has a horizontal clearance of 80 feet and a vertical clearance of 4 feet. Gasoline, diesel fuel, water, and some supplies may be obtained at the wharf just westward of the bridge. See Appendix for **storm warning** display.

A canal 22 feet wide and 1 foot deep branches northeastward from North Carolina Cut about 1 mile northward of the Coinjock Bridge, and connects with Currituck Sound through Parker Creek. The canal is crossed by a fixed bridge with a horizontal clearance of 16 feet and a vertical clearance of 6 feet.

Chart 831.—North River to Alligator River-Pungo River Canal.—Mile 52.0 to Mile 107.4.—North River is about 12 miles long from North Carolina Cut to the entrance from Albemarle Sound, and has a general depth of about 9 feet outside the dredged cut of the Intracoastal Waterway. The channel is well marked by lights and buoys, and a lighted range marks the section through the bar at the mouth of the river. On the east side of the river, near the mouth, is the village of **Jarvisburg** (P.O.), **Mile 55.9**; the dock is in ruins.

From the vicinity of the lighted buoy at the entrance to North River, the 10.5-mile run across **Albermarle Sound** to the lighted buoy at the entrance to Alligator River is made on a **202°** course. The alternate Dismal Swamp Canal route rejoins the main route at this buoy. In heavy weather the passage is uncomfortable and even dangerous for open boats. The rise and fall of the water level in Albemarle Sound depends on the wind.

Alligator River flows in a southerly direction for about 18 miles, then turns west and narrows. The channel of the Intracoastal Waterway has been dredged the entire length of the wider part of the river and for about 4 miles through its western reach to the land cut connecting with the Pungo River. The channel is well marked by lights and buoys.

Alligator River and Little Alligator River are discussed in more detail in Chapter 4. **Whipping Creek** empties into Alligator River from eastward near the south end of the wide reach. A small-boat passage is reported to lead from the creek for 14 miles to Long Shoal River and Pamlico Sound.

The route of the waterway passes from Alligator River to the **Alligator River-Pungo River Canal** at **Mile 91.2,** a land cut extending about 19 miles in a westerly direction.

At **Mile 98.9** a highway bridge over the canal has a swing span with a horizontal clearance of 80 feet in the south draw and a vertical clearance of 7 feet. Just east of the bridge the **Fairfield Canal,** privately owned, makes off from the main canal in a southerly direction through the town of **Fairfield** to the north shore of **Lake Mattamuskeet.** All vessels are advised to exercise caution when passing through this land cut. Continuous bank erosion, caused by passing boats, floats, snags, and debris. An overhead power cable just west of the bridge has a permit clearance of 100 feet.

Chart 832.—Alligator River-Pungo River Canal to Neuse River.—Mile 107.4 to Mile 158.3.—At **Mile 109.4** a highway bridge over the Alligator River-Pungo River Canal has a swing span with a horizontal clearance of 80 feet in the south draw and a vertical clearance of 8 feet. An overhead power cable just east of the bridge has a permit clearance of 100 feet. The canal enters **Wilkerson Creek** at the bridge. The route is then through the dredged cut in the creek to **Pungo River,** southwestward and westward to abeam of Belhaven, then southward in Pungo River to Pamlico River.

Belhaven, Mile 119.9, is on the northeastern side of the entrance to **Pantego Creek.** The harbor is protected by breakwaters at the creek entrance and is excellent for small craft. Fuel, supplies, repair facilities, and guest rooms are available at Belhaven. The town and the channel into the harbor are discussed in Chapter 4.

From abeam of the light off Grassy Point at **Mile 123.7** in the lower part of Pungo River, a course of **167°** for 3.7 miles leads to the lighted bell buoy off the mouth of the river; then steer **233°** across Pamlico River for 2.9 miles to the light at the entrance to Goose Creek.

Pamlico River, discussed at length in Chapter 4, is the approach to the important town of Washington.

The route of the Intracoastal Waterway follows the dredged channel through **Goose Creek** and its tributary, **Upper Spring Creek,** to the land cut which connects with **Gale Creek** and Bay River.

The Hobucken highway bridge, crossing the land cut at **Mile 136.6,** has a swing span with a horizontal clearance of 79 feet and a vertical clearance of 6 feet. A small marine railway near the bridge can handle vessels of 2 feet draft and 30 feet in length; there is also a small machine shop. Gasoline, provisions, and miscellaneous small-boat supplies can be obtained at the pier which has a depth of about 9 feet alongside. A Coast Guard buoy depot is just north of the bridge.

The village of **Hobucken** (P.O.) is about 1 mile east of the bridge and has a landing on **Jones Bay,** which is discussed in Chapter 4.

From Gale Creek, the route of the Intracoastal Waterway is down **Bay River,** then up the **Neuse River.** Bay River is the approach to Bayboro and other small towns; Neuse River is the approach to the important city of New Bern. Both rivers are discussed in Chapter 4.

From the light at **Mile 139.8,** off the entrance to Gale Creek, a course of **125°** for 5 miles leads down Bay River to a lighted bell buoy at the junction of Bay and Neuse Rivers; then steer **206°** for 4.5 miles up Neuse River to another lighted bell buoy; then steer **238°** for 7.5 miles to abeam of the lighted bell buoy off Garbacon Shoal; then steer **214°** for 2.6 miles to the lighted bell buoy off the entrance to Adams Creek.

The town of **Oriental** (P.O.) is west of **Mile 157.5** on the north side of Neuse River opposite Garbacon Shoal. Fuel, supplies, repair facilities, and guest rooms are available here. The town and its waterfront is discussed in Chapter 4.

Chart 833.—Neuse River to New River Inlet.—Mile 158.3 to Mile 212.2.—The Intracoastal Waterway leaves Neuse River about 13 miles above the mouth and follows a dredged channel through Adams Creek to **Adams Creek Canal,** a land cut about 5 miles long which connects with the head of **Core Creek.** The highway bridge over Adams Creek Canal at **Mile 170.1** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 16 feet. Overhead power cables on both sides of the bridge have a permit clearance of 97 feet.

From Core Creek the route of the Intracoastal Waterway is through **Newport River** to Morehead City. At **Mile 175.6, Gallant Channel** branches off from the through route of the waterway and leads to Beaufort, which is described in Chapter 5.

At **Mile 177.0,** a channel leads westward along the north side of Morehead City to a yacht basin about 0.5 mile from the waterway; the approaching depth to the basin was 6½ feet in May 1958.

At **Mile 177.1,** adjacent railroad and highway bridges cross the channel. The bascule spans have horizontal clearances of 80 feet and a minimum vertical clearance of 3 feet; an overhead power cable close southward of the highway bridge has a permit clearance of 25 feet except at the draw, where it is submerged. Caution is advised when running with a fair current or approaching the bridges in windy weather. See the Tidal Current Tables for times and velocities of current.

Fuel, supplies, repair facilities, and hotel accommodations are available at **Morehead City, Mile 177.5.** The city and its waterfront are discussed at greater length in Chapter 5.

From Morehead City the waterway follows a dredged channel through **Bogue Sound.** The highway bridge over Bogue Sound at **Mile 179.6** has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 13 feet. A power cable 20 yards west of the bridge has a permit clearance of 28 feet along the causeway but is submerged where it crosses the channel. Caution is advised when running with a fair tide or approaching the bridge in windy weather. At **Mile 181.8,** a dredged channel with a depth of 6 feet leads northward from the waterway to **Peltier Creek.** The channel is marked by daybeacons. A shipyard at the head of the creek has berthage, gasoline, diesel fuel, water, ice, electricity, and some ship chandlery. The larger of two marine railways can haul out vessels up to 85 feet in length, 6½ feet in draft, and 50 tons in weight. Major repairs can be made to hulls and engines.

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At **Bogue Inlet,** the waterway passes around the head of the marshes to **Swansboro, Mile 199.8.** A shipyard in a small cut near the east end of the highway bridge has several marine railways capable of hauling out boats up to 50 feet in length, 6 feet in draft, and 20 tons in weight. Major hull and engine repairs can be made. About 0.5 mile southwestward of the Swansboro end of the highway bridge there is a T-shaped yacht basin about 400 feet long where gasoline, diesel fuel, water, ice, electricity, bottled gas, provisions, and some ship chandlery are available. A travel-lift can haul out vessels up to 55 feet in length, 7 feet in draft, and 25 tons in weight. Minor repairs to hulls and engines can be made.

From Swansboro, the route of the waterway follows cuts through the marshes to New River. The highway bridge at **Mile 209.8** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 12 feet; the northwest draw only is used.

Chart 834.—New River Inlet to Southport.—Mile 212.2 to Mile 267.0.—At **Mile 213.0,** a channel 12 feet deep leads to a turning basin of the same depth at the U.S. Marine Corps facility at the head of **Mile Hammock Bay.**

At **New River Inlet** the waterway passes around the head of the marshes in New River to the land cuts southward. **New River** is the approach to the town of **Jacksonville,** described in Chapter 5. Except at slack water, dangerous cross currents may be encountered in crossing the inlet.

The route continues through **Alligator Bay** and **Stump Sound.** The highway bridge at **Mile 226.7** has a swing span with a horizontal clearance of 92 feet and a vertical clearance of 12 feet. The overhead power cable at the bridge has a permit clearance of 105 feet.

From Stump Sound the channel is through **Topsail Sound** and **Middle Sound. Page Creek,** on the north side of the waterway at **Mile 242.1,** has a yacht basin with an L-head wharf about 250 feet long that has a depth of about 7 feet alongside. Berthage, gasoline, water, and electricity are available. A marine railway can haul out boats up to 40 feet in length and 5 feet in draft. Minor repairs to hull and gasoline engines can be made. Opposite **Mile 243.0,** on the north side of the waterway, there is a yacht basin where berthage is available, and a marine railway that can haul out vessels up to 50 feet in length and 6 feet in draft.

A highway bridge over the waterway at **Wrightsville, Mile 246.0,** has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 20 feet. An overhead power cable at the bridge has a permit clearance of 80 feet. Gasoline, diesel fuel, water, ice, and provisions are available on the piers at Wrightsville. A shipyard just southward of the highway bridge has a marine railway that can haul out vessels up to 60 feet in length, 6 feet in draft, and 40 tons in weight. A sling-hoist can haul out boats up to 35 feet in length and 7 tons in weight. See Appendix for **storm warning** display. **Wrightsville Beach,** on the outer coast, is discussed in Chapter 5.

From Wrightsville the waterway continues south through **Masonboro Sound** and **Myrtle Sound** to Snows Cut. The shallow channel from the waterway to Carolina Beach, at the south end of Myrtle Sound, is discussed in Chapter 5.

Snows Cut connects Myrtle Sound with Cape Fear River. The highway bridge over Snows Cut at **Mile 256.9** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 13 feet. An overhead power cable at the bridge has a clearance of 85 feet. Extreme caution is advised when running through the bridge with a fair current. The ebb current is 1.5 knots and the flood current is 1.8 knots.

The northerly of two dredged channels at the western end of Snows Cut leads northerly about 11.5 miles via **Cape Fear River** to the city of **Wilmington.** The Intracoastal Waterway follows the southerly channel to the main channel of Cape Fear River and thence southward to **Southport** where fuel, supplies, repair facilities, and guest rooms are available. Wilmington and Southport are discussed in Chapter 5.

Chart 835.—Southport to Socastee Creek.—Mile 267.0 to Mile 320.8.—At Southport, **Mile 268.1,** the route of the Intracoastal Waterway leaves Cape Fear River and proceeds westward through land cuts to Lockwoods Folly River. A highway bridge over the waterway at **Mile 270.9** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 9 feet.

In **Lockwoods Folly River,** the waterway passes around the head of the marshes just inside Lockwoods Folly Inlet. A highway bridge over the waterway at **Holden Beach, Mile 281.3,** has a swing span with a horizontal clearance of 87 feet and a vertical clearance of 13 feet.

The waterway passes around the head of the marshes inside **Shallotte Inlet** and proceeds westward by way of cuts through the marshes and sloughs. **Shallotte River, Mile 286.5,** causes strong crosscurrents in the waterway.

A shipyard at **Bowen Point, Mile 286.7,** has a marine railway that can haul out boats up to 74 feet in length, 20 feet in width, and 100 tons in weight; hull and engine repairs can be made. Gasoline and diesel fuel are available. **Old Brick Landing Ferry** crosses the waterway at **Mile 287.6;** the clearance is 236 feet. At **Gause Landing, Mile 290.2,** is a small public wharf; some provisions are available. The highway bridge across the waterway about 0.5 mile east of the landing has a swing span with a horizontal clearance of 80 feet in the south draw and a vertical clearance of 13 feet. At **Mile 293.7,** a pontoon bridge across the waterway has a horizontal clearance of 126 feet.

The waterway joins **Little River** at **Mile 297.2. Calabash Creek** extends northeastward from Little River just north of the waterway cutoff and has a depth of about 3 feet to the village of **Calabash,** North Carolina, 0.6 mile above the entrance. A marine railway at Calabash has a capacity of 15 tons and can handle a length of 40 feet and a draft of 4 feet.

There is considerable dock space at the town of **Little**

River, South Carolina, **Mile 299.2**; fuel and groceries are available. The mean ranage of tide at Little River is about 5 feet.

A yacht basin at **Mile 300.6** has a travel-lift that handles boats up to 65 feet in length, 6½ feet in draft, and 40 tons in weight. Repairs can be made to hulls and engines. Gasoline, diesel fuel, water, and ice are available.

A highway bridge over the waterway at **Mile 301.8** has a swing span with a horizontal clearance of 79 feet, north draw, and a vertical clearance of 7½ feet. An overhead cable at the bridge has a clearance of 84 feet.

From Little River, the waterway follows a long land cut southwestward to Socastee Creek and Waccamaw River. Near **Windy Hill, Mile 307.6,** is a yacht basin where gasoline, diesel fuel, water, ice, provisions, and marine supplies are available. Minor hull and engine repairs can be made. The basin is about 10 miles northeastward of Myrtle Beach proper.

At **Mile 317.5,** a combination highway and railroad bridge over the waterway leads to **Myrtle Beach.** The bridge has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 16 feet. Overhead cables at the bridge and for about 0.25 mile southward have a minimum clearance of 80 feet.

Chart 836.—Socastee Creek to McClellanville.—Mile 320.8 to Mile 372.8.—A highway bridge over the waterway at **Socastee, Mile 322.4,** has a swing span with a horizontal clearance of 79 feet in the southeast draw and a vertical clearance of 11 feet. Overhead power cables above and at the bridge have a minimum clearance of 94 feet. A county-owned yacht basin without wharves is on the north side of the waterway just west of the bridge. Some supplies can be obtained at Socastee.

The route of the waterway enters **Waccamaw River** at **Enterprise Landing, Mile 325.4,** and follows the river to Winyah Bay. The direction of flow of the current in the waterway changes at Enterprise Landing. The mean range of tide at the landing is about 2 feet.

Bucksport, on the west side of Waccamaw River at **Mile 327.6,** has a yacht basin where gasoline, diesel fuel, water, ice, and provisions are available. There is plenty of dock space. The marine railway can haul out vessels up to 70 feet in length for general repairs. The highway bridge over Waccamaw River at **Mile 349.2** has a swing span with a horizontal clearance of 120 feet and a vertical clearance of 12 feet.

Georgetown, Mile 350.8, at the head of Winyah Bay and just inside the mouth of **Sampit River,** is about a mile northwestward of the waterway. Supplies, hotel accommodations, and repair facilities are available at Georgetown. The mean range of tide is about 3½ feet. The town is discussed at greater length in Chapter 6.

The Intracoastal Waterway leaves Winyah Bay by way of Western Channel at **Mile 354.0,** and proceeds southward through the **Estherville-Minim Creek Canal.** A cable ferry crosses the canal at **Mile 357.6.** An overhead power cable over the canal at **Mile 359.4** has a clearance of 97 feet. Southwest of the canal, the waterway crosses **North** and **South Santee Rivers** and proceeds by way of cuts through the marsh to McClellanville.

Chart 837.—McClellanville to Wadmalaw River.—Mile 372.8 to Mile 429.6.—McClellanville is on **Jeremy Creek** 1 mile north of the waterway. Boats lie alongside the bulkhead on the east side of the dredged channel from the waterway. A marine railway of the National Wildlife Refuge, available for do-it-yourself repairs, is on the east side of Jeremy Creek just north of the waterway. The mean range of tide at McClellanville is about 5 feet. Gasoline, diesel fuel, water, and provisions are available, and there is telephone and mail service.

From McClellanville the waterway follows land cuts and sloughs through the marshes back of **Bull Bay**; thence through shoal **Sewee Bay** and along **Price Creek**; through the marshes and along **Capers Creek**; behind **Dewees Island** and across **Dewees Creek** to the land cuts behind **Isle of Palms** and Sullivans Island. The several outlets to the ocean along this stretch are described in Chapter 6.

The highway bridge to **Sullivans Island** over the waterway at **Mile 401.6** has a swing span with a horizontal clearance of 93 feet and a vertical clearance of 32 feet. The bridge which formerly crossed the waterway at **Mile 402.7** has been abandoned and the channel spans have been removed.

The route of the waterway enters the lower east side of **Charleston Harbor** between Sullivans Island and the town of **Mount Pleasant,** which is about 1 mile north of the waterway and is reached through a well-marked channel that branches off from the waterway at **Mile 403.2.**

Complete supply and repair facilities are available at **Charleston, Mile 406.2.** The city is described at length in Chapter 6. The route of the waterway leaves the waterfront of Charleston in **Ashley River** and proceeds westward and southward through Wappoo Creek. The mean range of tide at Charleston is about 5 feet.

The route of the waterway leaves Charleston Harbor at **Mile 407.9** by way of **Wappoo Creek.** A highway bridge over Wappoo Creek at **Mile 409.1** has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 33 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from the old creek are encountered on the ebb in the west approach, and are noticeable on the flood in the east approach due to the bends in the channel. A boatyard is off the bend in the creek west of the bridge.

From Wappoo Creek, the route of the waterway is through **Elliott Cut** and **Stono River** to Wadmalaw River. At **Mile 410.1** is an overhead power cable with permit clearance of 100 feet. The Seaboard Air Line Railroad bridge over Stono River at **Mile 414.5** has a swing span with a horizontal clearance of 66 feet and a vertical clearance of 6 feet. Extreme caution is advised when running through the bridge with a current. Cross currents are noticeable on the flood in the south approach. The mean range of tide at the bridge is about 5½ feet.

The John F. Limehouse Highway Bridge over Stono River at **Mile 416.5** has a swing span with a horizontal

clearance of 90 feet through the south span and a vertical clearance of 13 feet. The overhead power cable at the bridge has a clearance of 92 feet. Caution is advised when running through the bridge with a current. A slight cross current is noticeable on the flood and ebb at both approaches.

At **Mile 417.3, Rantowles Creek** enters from the north. A railroad bridge 0.6 mile above the mouth has a lift span with a horizontal clearance of 41 feet and a vertical clearance of 4 feet down, 28 feet up; operating regulations are given in § **203.245,** Chapter 2. About 1.3 miles above the mouth there is a fixed highway bridge with a horizontal clearance of 37½ feet and a vertical clearance of 9½ feet. **Wallace Creek** enters Rantowles Creek from the west 0.1 mile above the railroad bridge. A fixed highway bridge 0.7 mile above the mouth of Wallace Creek has a horizontal clearance of 38½ feet and a vertical clearance of 9½ feet. Overhead cables between the mouth and the bridge have a least clearance of 8 feet.

The Seaboard Air Line Railroad bridge over Stono River at **Mile 419.4** has a swing span with a horizontal clearance of 67 feet in the east draw and 71 feet in the west draw, and a vertical clearance of 6 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from the old channel are encountered on the ebb in the south approach. The tides meet in the vicinity of this bridge.

The route of the waterway enters **Wadmalaw River** at **Mile 423.0.** Some supplies are available at the village of **Yonges Island, Mile 426.1.** Two marine railways, owned by the Stevens Lines and used to overhaul its own vessels, can handle lengths up to 90 feet and drafts up to 6 feet.

Chart 838.—Wadmalaw River to Port Royal Sound.—Mile 429.6 to **Mile 476.8.**—From Wadmalaw River, the route of the waterway follows **Dawho River, North Creek,** and **Watts Cut** to South Edisto River. The highway bridge over Dawho River at **Mile 435.6** has a swing span with a horizontal clearance of 90 feet and a vertical clearance of 8 feet. An overhead power cable just west of the bridge has a permit clearance of 100 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from Dawho River are encountered on the ebb in the west approach and are noticeable on the flood in the east approach.

Careful steering is required in the Dawho River between **White Point** and the entrance to the cutoff. The channel is well marked but strong currents are experienced. Strong currents are also found at the crossings of the cutoff with the river. The mean range of tide in Dawho River is about 6 feet.

The waterway follows **South Edisto River** from Watts Cut to **Fenwick Cut,** thence along the **Ashepoo River** for a short distance to **Ashepoo-Coosaw Cutoff,** thence along the **Coosaw River** to Brickyard Creek.

The entrance to **Brickyard Creek** is between marshy shores, but the marsh on the south side is narrow and terminates just inside the creek in a red, eroded bank leading up to somewhat higher ground; this bank is visible for some distance along the Coosaw River. The mean range of tide at the entrance to Brickyard Creek is about 7 feet.

The waterway continues along Brickyard Creek and into **Beaufort River.** On the west side of the waterway at **Mile 465.8** is the town of **Beaufort,** where fuel, supplies, repair facilities, and hotel accommodations are available. The town is described at length in Chapter 7. The Ladies Island highway bridge over Beaufort River at Beaufort has a hand-operated swing span with a horizontal clearance of 82 feet and a vertical clearance of 20 feet. Just eastward of the highway bridge, a new bridge was under construction in 1959. Extreme caution is advised when running through the bridges with a current. Cross currents are encountered in both approaches on flood and ebb.

The waterway follows Beaufort River past **Port Royal,** at **Mile 470.0,** and into **Port Royal Sound,** which is described at length in Chapter 7.

Chart 839.—Port Royal Sound to Johnson Creek.—Mile 476.8 to Mile 545.1.—After crossing Port Royal Sound, the route of the waterway follows **Skull Creek** to **Calibogue Sound,** thence down the sound to the mouth of Cooper River. **Seabrook Landing,** on the south side of Skull Creek, is at **Mile 480.9.** At **Hilton Head Harbor (formerly Seabrook Landing), Mile 483.8,** a yacht facility on the south side of Skull Creek has a depth of 13 feet alongside; gasoline, diesel fuel, water, some marine supplies, and motels are available. At **Mile 484.5** the highway bridge crossing the waterway has a swing span with a horizontal clearance of 97 feet and a vertical clearance of 30 feet.

The route follows **Cooper River** to Ramshorn Creek at **Mile 493.6.** An overhead power cable with a permit clearance of 55 feet crosses Cooper River 1.6 miles above its junction with Ramshorn Creek. At **Mile 494.1** an overhead power cable crossing **Ramshorn Creek** has a permit clearance of 105 feet. The tides meet in Ramshorn Creek. Between the creek and Walls Cut the route follows **New River.** Care is required as cross currents may be encountered in New River.

The mean range of tide in **Walls Cut** is about 7 feet. The route is through the cut and along **Wright River** for a short distance, thence through Fields Cut and into Savannah River at **Mile 500.0.** The river ebbs through the cut and strong cross currents may be experienced at the ends of it; these currents cause a shoal to build up and encroach from westward at the north end of the cut.

Savannah River is the approach to the important city of **Savannah,** about 8 miles upstream from the Intracoastal Waterway crossing. Savannah has complete supply and repair facilities and is described at length in Chapter 7. The municipal wharf at the foot of Bull Street is used by the Coast Guard and the Corps of Engineers, and when space is available, is suitable for berthing large yachts; there is no charge for berthage. Wharves in Savannah Harbor are not as suitable for small craft as those at Thunderbolt and Isle of Hope. Berthage of small craft in Savannah Harbor exposes them to pounding against

the wharves by the surge of vessels plying Savannah River.

Daily predictions of currents in Savannah River are published in the Tidal Current Tables.

The Intracoastal Waterway leaves the Savannah River at **Mile 500.6** and enters **Elba Island Cut**, which leads into **St. Augustine Creek.** At the junction of St. Augustine Creek and **Wilmington River, Mile 502.6,** the abandoned route from the south channel of the Savannah River joins the waterway.

A highway bridge over Wilmington River at **Mile 506.4** has a bascule span with a horizontal clearance of 100 feet and a vertical clearance of 22 feet.

No cross currents are experienced during either flood or ebb; the currents follow the direction of the channel. Ebb currents are very strong. Mooring dolphins for tieing-up or breaking-up tows are on both sides of the bridge. When proceeding against the current, a tow may be taken through without breaking up. When proceeding with the current, a tow should be secured to the dolphin and await a favorable current or be broken up and taken through singly.

Thunderbolt, Mile 506.7, is a small town and pleasure resort on the west bank of Wilmington River. Small boats and yachts prefer Thunderbolt to Savannah for berthing to avoid pounding against the wharves. Bus, telephone, telegraph, and post office services are available. Gasoline, diesel fuel, water, electricity, and some provisions are available at the wharves which have 4 to 28 feet of water alongside. There are boat-building and repair shops, and several marine railways, the largest having a capacity to haul out boats 137 feet in length, 18 feet in draft, and 200 tons in weight. A machine shop is on the premises; hull and engine repairs can be made.

An **anchorage area** is in Wilmington River near Thunderbolt; limits and regulations are given in § **202.178,** Chapter 2.

At **Mile 509.1** the route leaves Wilmington River and enters **Skidaway River.** In Wilmington River about half a mile eastward from the Intracoastal Waterway and the Wilmington River-Skidaway River junction, there are hotel accommodations, yacht club privileges, and good anchorage.

Isle of Hope, Mile 512.4, is a pleasure resort on the north bank of Skidaway River with small wharves having depths up to 10 feet alongside. Gasoline, diesel fuel, water, and some provisions are available. The largest marine railway can haul out boats up to 50 feet in length and 20 tons in weight; hull and engine repairs can be made. A small machine shop is available. There is also an **anchorage area** for small craft; limits and regulations are given in § **202.179,** Chapter 2.

Skidaway Narrows, between Skidaway River and Burnside River, is easily navigated by small craft, and by larger vessels when speed is reduced sufficiently to accommodate the sharp turns. The average velocity at strength of current in the narrows is about 1 knot. Current predictions are published in the Tidal Current Tables.

Vernon View, Mile 518.3, on the north shore of Burnside River, has several small privately owned docks where gasoline may be obtained in an emergency.

At **Mile 519.1,** the Intracoastal Waterway enters **Vernon River,** proceeding thence to **Hell Gate** and **Ogeechee River.** The ebb currents setting out of the Ogeechee River are particularly strong.

The waterway enters **Florida Passage** at **Mile 526.3** and joins **Bear River** at **Mile 528.5.** The current is swift in the lower part of Bear River.

St. Catherines Sound, Mile 536.7, becomes quite rough in moderately bad weather, especially with strong east and northeast winds. Strong cross currents may be encountered during periods when flood waters are being discharged from **Medway River.**

The waterway leaves St. Catherines Sound through **North Newport River** and at **Mile 541.7** joins **Johnson Creek.** An alternate route leaving the waterway at **Mile 536.7** proceeds through **Walburg Creek** and joins the main route at **Mile 541.1.** This alternate route is not marked and is seldom used. Good anchorage can be found in Walburg Creek.

Chart 840.—Johnson Creek to Brunswick River.—Mile 545.1 to Mile 593.0.—The Intracoastal Waterway leaves Johnson Creek and enters **South Newport River** at **Mile 546.4,** and follows the river to Sapelo Sound at **Mile 549.0. Sapelo Sound** is somewhat rough when there are strong east or northeast winds. The sound is described in Chapter 8.

The route leaves Sapelo Sound through **Sapelo River** and enters **Front River** at **Mile 554.7.** About a 7-foot draft can be carried 6 miles up the Sapelo River above this junction to the landing at **Pine Harbor (Fairhope).**

Continuing down Front River, the waterway passes through **Creighton Narrows** and joins **Old Teakettle Creek** at **Mile 558.6. Shellbluff Creek** flows into Old Teakettle Creek at **Mile 559.3.** In an emergency, gasoline may be obtained at **Valona,** 0.7 mile up Shellbluff Creek.

At **Mile 562.9,** the route enters **Doboy Sound,** described in Chapter 8. The waterway leaves Doboy Sound via **North River** at **Mile 564.0** and at **Mile 566.1** the route passes **Darien River.**

Little Mud River connects the waterway with **Altamaha Sound** at **Mile 569.5.** The **Altamaha River** enters Altamaha Sound from westward.

The Intracoastal Waterway enters **Buttermilk Sound** at **Mile 573.8** and continues down the **Mackay River.**

Two alternate routes branch off the waterway on the Mackay River. The first, at **Mile 578.8,** proceeds down the **Frederica River** past the ruins of **Fort Frederica (Oglethorpe Barracks),** now a National Monument, and Frederica Yacht Club, and rejoins the waterway at **Mile 585.8.** The controlling depth was reported to be about 9 feet in August 1958.

The second alternate route leaves Mackay River at **Mile 582.9** and enters **Back River** proceeding down through **Plantation Creek** to Brunswick River. This route bypasses St. Simons Sound and is a more sheltered route in

easterly weather. Although the alternate route is the shorter to Brunswick, mariners are advised to use Plantation Creek only on the higher stages of the tide, as the creek mouth at Brunswick River bares at low water. The mean range of tide is about 7 feet. The lift bridge over Black River is described in Chapter 8.

At **Mile 585.7** the main route joins Frederica River and follows it to St. Simons Sound. A highway bridge over the river at **Mile 587.0** has a lift span with a horizontal clearance of 100 feet and a vertical clearance of 9½ feet down and 85 feet up. A strong ebb current sets across the channel. There are mooring dolphins on each side of the bridge.

When proceeding with the tide, tows should stop at the dolphins to await favorable current or be broken up and taken through singly. Caution should be exercised while passing through this bridge, especially with a light tow proceeding south.

Just south of the bridge is the Sea Island Yacht Club. A T-shaped wharf is 205 feet long with depths of 4 to 12 feet alongside. Fresh water, gasoline, diesel fuel, electricity, and telephone service are available. A nominal charge is made for overnight mooring.

Opposite the yacht club on Lanier Island, a storage and repair yard has a dock 420 feet long and 80 feet wide with a depth of 10 feet alongside. Moorings are provided off the dock. Repair facilities consist of two marine railways capable of hauling out boats 65 feet in length, 5 feet in draft, and up to 35 tons in weight; and one 8-ton lift. General hull and engine repairs can be made. Gasoline, diesel fuel, water, ice, electricity, showers, and provisions are available.

From Frederica River, the waterway continues through **St. Simons Sound** and **Brunswick River** to Jekyll Creek. About 4.3 miles up Brunswick River from **Mile 591.0** is the city of **Brunswick,** at which hotel accommodations, fuel, supplies, and repair facilities are available. The city is described at length in Chapter 8.

Chart 841.—Brunswick River to Nassau Sound.—Mile 593.0 to Mile 634.4.—The Intracoastal Waterway follows **Jekyll Creek** southward from Brunswick River to Jekyll Sound. A marina at **Mile 593.9** has a pier 300 feet long with depths of 6 to 12 feet alongside, and a small-boat hoist that can launch or pick up boats up to 4 tons in weight. Gasoline, diesel fuel, water, ice, electricity, groceries, and some marine supplies are available. At **Mile 594.6** the highway bridge crossing the waterway has a lift span with a horizontal clearance of 100 feet and a vertical clearance of 9½ feet down and 85 feet up. From Jekyll Creek the waterway enters **Jekyll Sound** at **Mile 595.9,** and continues across St. Andrew Sound.

St. Andrew Sound has the most hazardous exposure along the waterway south of Port Royal Sound. The sound is very rough during periods of high north, northeast, or east winds. A protected route bypassing St. Andrew Sound leaves the waterway at **Mile 596.1.** This alternate route passes through **Little Satilla River, Umbrella Cut, Umbrella Creek, Dover Cut, Dover Creek, Satilla River, Floyd Creek,** and rejoins the waterway in Cumberland River at **Mile 603.7.**

From St. Andrew Sound the waterway enters **Cumberland River** passing by **Cumberland Wharf** and **Cabin Bluff.** The Cumberland River becomes **Cumberland Dividings** and joins with **Cumberland Sound** at **Mile 611.9.**

The waterway continues down Cumberland Sound past the St. Marys River and into **Amelia River** to **Fernandina Beach, Mile 622.8,** where hotel accommodations, fuel, supplies, and repair facilities are available. Fernandina Beach is described at length in Chapter 8.

At **Mile 625.5** the waterway enters **Kingsley Creek.** Two bridges cross the waterway at **Mile 626.3.** The first is a railroad bridge with a swing span that has a horizontal clearance of 90 feet in the west opening and a vertical clearance of 5 feet. The second, a highway bridge, has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 21 feet; an island is aligned with the center fenders of this bridge. The mean range of tide at the bridge is 6 feet. Flood and ebb currents are normal to the bridge openings and are relatively high; velocities up to 2.2 knots on the flood and 2.6 knots on the ebb may be expected, especially with favoring winds.

At **Mile 627.9** the waterway enters **South Amelia River** and for a distance of about 4 miles the channel is narrow and winds through shoals and marsh islets. Although the channel is well marked by daybeacons and lights, it is the most difficult part of this section of the route. At low water the extensive mud flats and oyster beds on each side of the channel are well defined. **Amelia City** is at **Mile 629.4.** The waterway enters **Nassau Sound** at **Mile 633.5.** The sound is described in Chapter 8.

Chart 842.—Nassau Sound to Matanzas Inlet.—Mile 634.4 to Mile 690.1.—At **Mile 634.0,** the Intracoastal Waterway leaves Nassau Sound through a cut about 0.9 mile long. The route then enters **Sawpit Creek.** In an emergency gasoline may be obtained at a small settlement on the west bank of the creek at **Mile 635.0;** an overhead power cable crossing the route here has permit clearance of 80 feet. The waterway continues along Sawpit Creek and Gunnison Cut to the junction of Sisters Creek with Fort George River at **Mile 638.7.**

Fort George River is marked by daybeacons and trends southward from the waterway to Fort George River Inlet, described in Chapter 8.

The waterway continues down **Sisters Creek.** For predicted times and velocities of the current in the creek see the Tidal Current Tables.

At **Mile 642.3,** near the junction of Sisters Creek and St. Johns River, the highway bridge crossing the waterway has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 24 feet at the center. An overhead power cable about 50 feet west of the bridge has a permit clearance of 80 feet. Caution is advised at the bridge because cross currents are encountered during both flood and ebb.

The **St. Johns River, Mile 642.9,** is the approach to the important city of **Jacksonville,** 16 miles above the junction with the Intracoastal Waterway, where complete supply and repair facilities are available. It is described in Chapter 9.

The Intracoastal Waterway continues south across St. Johns River and into **Pablo Creek.** At **Mile 647.1** the Atlantic Boulevard Highway Bridge across the waterway has a bascule span with a horizontal clearance of 59 feet and a vertical clearance of 7 feet. The mean range of tide at the bridge is 2½ feet. There are strong tidal currents in the immediate vicinity of the bridge. On the flood the current in the channel flows south with an average velocity at strength of about 3½ knots and at right angles to the bridge. On the ebb the current flows northward with an average velocity at strength of about 5 knots and sets about 10° to the right of the axis of the channel. The currents at a distance of 100 yards either side of the bridge are much weaker with practically no turbulence and give no warning of the strong current at the bridge. Predicted times and velocities of current are given in the Tidal Current Tables. An overhead power cable 25 feet north of the bridge has a clearance of 80 feet.

A small landing is on the east bank just northward of the Atlantic Boulevard Bridge. On the west side of the waterway just north of the bridge, a yard can haul out boats up to 150 feet in length, 8 feet in draft, and 250 tons in weight for hull repairs.

A shipyard south of the western approach to the bridge is reached through a dredged cut which leaves the waterway about 200 yards south of the bridge. In September 1958 depths reported in the cut and basin were 11 feet. Gasoline, fuel oil, and fresh water are available. Repairs can be made. Several vertical-lift docks, the largest of which can accommodate boats up to 110 feet in length and 8 feet in draft, are available.

Beach Boulevard Highway Bridge across the waterway at **Mile 649.7** has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 37 feet at the center. An overhead power cable 35 feet north of the bridge has a permit clearance of 80 feet.

Just north of the Beach Boulevard Bridge, on the east side of the waterway, is a yacht basin with a 20-ton lift to haul out boats up to 48 feet in length. There are machine and woodworking shops, and all types of hull and engine repairs can be made. Gasoline, diesel fuel, water, electricity, and marine supplies are available. There are 40 slips for boats up to 110 feet in length and 7 feet in draft, and a protected anchorage off the waterway.

Overnight docking facilities can be had on the eastern shore just southward of the bridge. The yacht basin has a marginal wharf and slips available for yachts up to 50 feet in length. Depths are 12 feet at the wharf and 6 feet at the finger piers. Gasoline, diesel fuel, fresh water, and electricity are available.

Numerous snags and old piling, many covered at high water, are on both sides of the waterway for a distance of about 5 miles from the vicinity of **Oak Landing, Mile 652.0,** to Palm Valley Landing. Particular care should be taken in this section to stay in the center of the channel.

At **Mile 652.4** the waterway leaves Pablo Creek and enters a long cut.

Palm Valley Landing, Mile 656.8, has two locations with docking facilities for yachts. Gasoline, diesel fuel, water, and provisions are available.

The Palm Valley Highway Bridge crossing the waterway at **Mile 659.4** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 10 feet. The mean range of tide at the bridge is 2 feet. Several small landings are on the east bank of the waterway just north and south of the bridge. Fresh water and gasoline are obtainable.

The route continues through the long cut to **Tolomato River** at **Mile 661.1.**

Guano River enters Tolomato River on the east side opposite **Mile 669.3.** A privately marked channel leads up to a dam at **South Ponte Vedra Beach.** The centerline depth was 4 feet in September 1958.

At **Mile 671.1** there is a marine railway that can haul out boats up to 64 feet in length and 4 feet in draft. Emergency gasoline engine repairs can be made.

The **Vilano Beach** Highway Bridge crossing the Tolomato River at **Mile 674.2** has a lift span with a horizontal clearance of 89 feet and a vertical clearance of 5½ feet down and 83 feet up. The mean range of tide at the bridge is 4¼ feet. Tidal currents run at angles to the bridge and caution is imperative when making the passage. Flood currents up to 1 knot and ebb currents up to 1½ knots may be expected during normal weather. An overhead power cable 70 yards south of the bridge has a permit clearance of 100 feet.

The waterway continues on beyond St. Augustine Inlet and enters **Matanzas River;** the river separates Anastasia Island from the mainland. At **Mile 676.0** the **Bridge of Lions,** connecting Anastasia Island with St. Augustine, has a bascule span with a horizontal clearance of 76 feet and a vertical clearance of 25 feet. The range of tide at the bridge is 4¼ feet. Caution is advised because the tidal currents, particularly ebb, run at right angles to the bridge. It is advisable to drift large tows through this opening with favorable currents. Normal flood currents of 1 knot and ebb currents of 1½ knots may be expected.

St. Augustine Inlet and **St. Augustine** are described in Chapter 10.

In the broader sections of the river above St. Augustine, the channel is very narrow and contorted, and is between shoals visible at low water.

San Sebastian River flows into Matanzas River at **Mile 677.4** and is described in Chapter 10.

At **Mile 685.3,** Crescent Beach Bridge over Matanzas River has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 9½ feet at the center.

About a mile northward of Matanzas Inlet, near **Mile 688.5,** the waterway leaves Matanzas River and enters a land cut.

Matanzas River continues eastward and southward about 1.2 miles to Matanzas Inlet. An overhead power

cable with a permit clearance of 80 feet crosses the river 0.6 mile north of the inlet. A fixed highway bridge crossing the inlet has a horizontal clearance of 40 feet and a vertical clearance of 10 feet. The inlet is described in Chapter 10. The overhead power cables over the river southward of the inlet have a least permit clearance of 35 feet.

Chart 843.—Matanzas Inlet to Mosquito Lagoon.—Mile 690.1 to Mile 744.3.—About 2 miles southward of Matanzas Inlet near **Mile 691.2,** the Intracoastal Waterway reenters Matanzas River. At **Mile 691.7** is the oceanarium at **Marineland** where many types of marine life are exhibited; an admission fee is charged. A marine depot has 300 feet of dock space with a depth of 6 feet along its face; gasoline, diesel fuel, water, bus and taxi service are available, and restaurants and a hotel are within walking distance. There is an overhead power cable with a permit clearance of 50 feet across the boatslip at Marineland; this cable does not cross the Intracoastal Waterway.

The highway bridge at **Flagler Beach, Mile 704.3,** has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 14 feet. An overhead power cable 70 feet north of the bridge has a permit clearance of 82 feet.

A highway bridge at **Mile 709.1** has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 15 feet. An overhead power cable 25 feet north of the bridge has a permit clearance of 97 feet.

The waterway enters **Halifax River** at **Mile 711.2** and continues to **Ormond Beach.** A yacht basin at **Mile 714.2** has a marine railway capable of hauling out boats 60 feet in length, 6 feet in draft, and 30 tons in weight. Gasoline, diesel fuel, water, and electricity are available. The Ormond Beach Bridge over the waterway at **Mile 716.8** has a horizontal clearance of 89 feet and a vertical clearance of 21 feet at the center.

Daytona Beach, Mile 721.0, is a large resort with good stores, hotels, adequate dock space, and every needed supply for yachtsmen. Repair facilities are excellent. Four bridges with bascule spans cross Halifax River at Daytona Beach. Seabreeze Bridge at **Mile 720.5** has a horizontal clearance of 89 feet and a vertical clearance of 21 feet at the center. Main Street Bridge at **Mile 721.0** has a horizontal clearance of 60 feet and a vertical clearance of 10 feet; in 1958 a new bridge was under construction at this site. Broadway Bridge at **Mile 721.3** has a horizontal clearance of 90 feet and a vertical clearance of 20 feet; an overhead cable on the south side of the bridge has a clearance of 98 feet. South Bridge at **Mile 721.8** has a horizontal clearance of 89 feet and a vertical clearance of 21 feet at the center.

Just south of the bridge, a channel that had a depth of 6½ feet in October 1958 leads to the city wharf which can accommodate a large number of yachts. At the Yacht Club, reciprocal courtesies are extended to visiting members of other yacht clubs. See Appendix for **storm warning** display.

Yacht storage and repair facilities are available at two shipyards. One is 0.3 mile south of Seabreeze Bridge; boats of 8-foot draft come alongside, and its marine railway can haul out boats 85 feet in length, 6½ feet in draft, and 150 tons in weight. A 20-ton hoist is also on the premises. Gasoline is available. The other yard is 0.5 mile south of the yacht club. A 5½-foot channel leads to an almost land-locked yacht basin with 5,000 feet of dock space. The largest of the three marine railways is capable of hauling out vessels 150 feet in length, 300 tons in weight, and any draft that can enter. Gasoline and diesel fuel are available. Hot showers, groceries, mail and laundry service are available at both yards.

The bridge across the waterway at **Port Orange, Mile 726.0,** has a bascule span with a horizontal clearance of 92 feet and a vertical clearance of 21 feet.

The waterway continues down the Halifax River to **Mile 730.0** where it enters **Ponce de Leon Cut.** Strong cross currents may be felt at times in this cut due to the currents from **Spruce Creek** veering from one side to the other.

Inlet Harbor, 0.5 mile southeast of the waterway at **Mile 729.6,** is a small fishing port. The controlling depth from the waterway to the harbor is about 4 feet. The wharf here has a depth of 14 feet at the end with 6 to 8 feet alongside. Gasoline, diesel fuel, some marine supplies, and water are available. A small marine railway hauls out boats up to 45 feet in length for hull and engine repairs.

At **Ponce Park,** 1 mile below Inlet Harbor inside the north side of Ponce de Leon Inlet, there is a marine railway that can haul out boats up to 50 feet in length and 4 feet in draft for general repairs.

Ponce de Leon Inlet is described in Chapter 10.

The waterway leaves Ponce de Leon Cut and enters **Hillsborough River** at **Mile 732.9,** about a mile southward of Ponce de Leon Inlet, and follows the river southward for about 15.5 miles through the marshes to Mosquito Lagoon. In some places the river is narrow and crooked, requiring careful steering and close attention to the channel daybeacons.

Coronado Beach Highway Bridge at **Mile 734.3** has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 12 feet at the center.

At **New Smyrna Beach, Mile 735.3,** gasoline, fuel oil, water, and food can be obtained. Dock space is available at the city wharf and at a yacht basin operated by the Anglers Club in the protected waters on the west side of the waterway. In October 1958 the depth was reported to be 8 feet in the channel and basin.

New Smyra Beach Highway Bridge at **Mile 735.6** has a swing span with a horizontal clearance of 58 feet and a vertical clearance of 5 feet. During flood (southerly flow) current from Sheephead Cut makes a cross current in a westerly direction north of this bridge. Boats with tows proceeding southward during a flood current are advised to allow for the cross current. An overhead power cable 50 feet south of the bridge has permit clearance of 80 feet.

Chart 844.—Mosquito Lagoon to Eau Gallie.—Mile 744.3 to Mile 794.5—The Intracoastal Waterway through Mosquito Lagoon and Indian River is through open water making the route rough at times, particularly during high winds.

Oak Hill, Mile 745.7, has railroad connections, a post office, and telegraph service.

At **Mile 754.8** the waterway enters **Haulover Canal,** a cut about 1.1 miles long through a strip of land that separates Mosquito Lagoon from Indian River. Jetties extend approximately 0.5 mile out from the mainland at each end of the cut. Storms have washed sand up along the outside of the jetties which are now covered by brush. This gives the channel the appearance of being about 100 feet in width.

Wind tides are quite pronounced at times producing strong currents in the canal. Southerly winds will build up the water level on the Indian River side of the canal and at the same time lower the water level on the Mosquito Lagoon side. Northerly winds will cause the reverse effect. At such times the normal water level varies as much as 2 feet, with currents through the channel up to 1½ knots setting in the direction of the wind.

Near the center of Haulover Canal at **Mile 755.3** is a bridge with a hand-operated swing span having a horizontal clearance of 55 feet and a vertical clearance of 7½ feet; the channel is through the south draw. The overhead power cable 100 feet east of the bridge has a permit clearance of 80 feet. If a vessel must stop before passing through the bridge and a strong current is running, care should be taken to prevent setting against the rocky sides of the canal. Gasoline is available along the canal.

At **Mile 755.8** the waterway enters **Indian River.** It extends southward from Haulover Canal to St. Lucie Inlet, a distance of 103 miles. In general it is a broad lagoon quite shallow in places. The spoil banks alongside the channel have built up in recent years and now appear as small islets on which are mangrove and other trees.

The river is nontidal except in the vicinity of Fort Pierce and for a short distance above the St. Lucie Inlet where the depth may vary as much as 2 feet under the influence of strong northerly and southerly winds.

The principal industries at **Titusville, Mile 763.7,** are fishing, and growing flowers and citrus fruits. The highway bridge across the waterway here has a swing span with a horizontal clearance of 81 feet and a vertical clearance of 9 feet. North of the bridge a well protected municipal yacht basin is connected to the waterway by a dredged channel that had a controlling depth of 3 feet in October 1958. Gasoline, diesel fuel, water, and limited berthage are available at the boat-building yard. The yard can haul out boats up to 40 feet in length for hull and engine repairs. A machine shop is on the premises See Appendix for **storm warning** display.

At **Mile 774.0** a channel with a reported controlling depth of 7 feet in October 1958 leads to a turning basin at **Courtenay,** 1.5 miles east of the waterway.

Canaveral Barge Canal, Mile 776.9, connects the Intracoastal Waterway with a turning basin just west of Cape Canaveral Harbor described in Chapter 10. It is used by commercial traffic going to the lower reaches of Banana River. A Federal project provides for a depth of 8 feet in the canal. In April 1959 there was a controlling depth of 6 feet to the Banana River section, thence 4 feet to the turning basin. Daybeacons mark the cut in the Indian and Banana Rivers. The fixed highway bridge across the western side of the land cut has a horizontal clearance of 45 feet and a vertical clearance of 12 feet.

The highway swing bridge across the Indian River at **Cocoa, Mile 780.2,** has a horizontal clearance of 80 feet and a vertical clearance of 5 feet; operating regulations are given in **§ 203.436,** Chapter 2. An overhead power cable about 0.1 mile below the bridge has a permit clearance of 88 feet.

Gasoline, diesel fuel, water, ice, and yacht supplies are available at Cocoa. Cocoa Municipal Dock, just south of the bridge, has a depth of 6 feet at its face and 4 feet at the finger piers. A channel with a controlling depth of 4 feet between the causeway and the municipal dock leads to the fishhouses.

Northward of and parallel with the causeway on the opposite side of Indian River, a dredged channel, which had a controlling depth of 7 feet in October 1958, leads to a yacht basin and repair yard. This facility has a marine railway capable of hauling out boats up to 50 feet in length, 5 feet in draft, and 30 tons in weight. Gasoline, diesel fuel, water, and dock space with electrical connections are available. General repairs can be made.

At **Mile 783.3,** daybeacons mark a channel leading to Harbor Lights Marina on Merritt Island.

The entrance to **Banana River** is at **Mile 794.5** opposite Eau Gallie and about 0.1 mile north of the highway bridge. The river is used by small boats as a harbor of refuge during hurricanes and storms. A least depth of about 7 feet is available for 9 miles above the entrance.

A highway bridge across Banana River about 0.4 mile above the entrance has a horizontal clearance of 78 feet and a vertical clearance of 3½ feet.

Chart 1246.—Naval and seaplane **restricted areas** are in the Banana River, 7 miles above the entrance; limits and regulations are given in **§ 207.171** and **§ 207.171a,** Chapter 2.

Newfound Harbor is at the southeastern end of Merritt Island, about 10 miles above the entrance to Banana River. The harbor is shoal and is about 4 miles long in a north-south direction; about 3.7 miles above the entrance a fixed highway bridge has a horizontal clearance of 36 feet and vertical clearance of 5 feet.

Across the entrance to **Sykes Creek** at the north end of Newfound Harbor there is a fixed highway bridge that has a horizontal clearance of 11½ feet and a vertical clearance of 8 feet.

A marina and repair yard is on the west side of Banana River about 11.8 miles above the entrance. The yard makes general repairs and has a railway that can haul out boats up to 55 feet in length, 6 feet in draft, and 25 tons in weight. Gasoline, diesel fuel, water, electricity, and marine supplies are available.

Cocoa Beach causeway, crossing Banana River about 13.2 miles above the entrance, has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 5 feet. An overhead power cable on the north side of the bridge has a permit clearance of 82 feet.

Chart 1245.—About 16.3 miles above the entrance, Banana River is crossed by the barge canal that leads to Cape Canaveral Harbor. There are depths of 7 feet in the river for a distance of about 5 miles southward and northward of the canal.

A **prohibited area** for Navy aerial mining operations is in the northern end of Banana River; limits and regulations are given in § **204.82,** Chapter 2.

Banana Creek is a shallow waterway across the north end of Merritt Island, and connects Banana River and Indian River. A fixed bridge about midway of the creek has a horizontal clearance of 23 feet and a vertical clearance of 7 feet.

Chart 845.—Eau Gallie to Walton.—Mile 794.5 to Mile 848.7.—A highway bridge across the Intracoastal Waterway at **Mile 794.6** has a swing span with a horizontal clearance of 85 feet in the east draw and 80 feet in the west draw, and a vertical clearance of 9½ feet; operating regulations are given in § **203.436,** Chapter 2. About 150 yards below the bridge, an overhead power cable crossing the waterway has a permit clearance of 95 feet.

At **Mile 795.1** a channel with a reported controlling depth of 7 feet leads to a yacht basin inside the mouth of **Elbow Creek (Eau Gallie River)** just south of **Eau Gallie.** The basin offers good protection from storms. A city ordinance limits speed to no wake in Elbow Creek. Gasoline, diesel fuel, water, showers, and laundry service are available. Provisions can be obtained in town. A machine shop and two marine railways are in the basin; the larger railway can handle boats up to 85 feet in length and 6 feet in draft. Berthage and storage are available, and general repairs can be made.

Eau Gallie has a harbormaster. See Appendix for **storm warning** display.

About 0.1 mile above the yacht basin and 0.5 mile above the mouth of Elbow Creek there is a fixed highway bridge with a horizontal clearance of 29½ feet and a vertical clearance of 12 feet. About 0.1 mile above the highway bridge is a fixed railroad bridge with a horizontal clearance of 44½ feet and a vertical clearance of 12 feet.

Melbourne is a winter resort at **Mile 797.9.** Gasoline, diesel fuel, water, ice, groceries, marine supplies, and laundry service are available. The highway bridge over the waterway here has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 6 feet; operating regulations are given in § **203.436,** Chapter 2.

About 0.4 mile south of Melbourne bridge, a marked channel that had a controlling depth of 6½ feet in October 1958 leads westward from Indian River to a yacht basin with docking facilities in **Crane Creek.** On the east side of the basin a marine repair and storage plant has a railway capable of hauling out boats up to 50 feet in length and 6 feet in draft for hull and engine repairs. A machine shop is at the yard.

About 0.3 mile above the entrance to Crane Creek is a fixed highway bridge with a horizontal clearance of 40 feet and a vertical clearance of 4½ feet. In October 1958 a new bridge was under construction just eastward of the highway bridge. About 175 yards westward of the existing highway bridge there is a fixed railroad bridge with a horizontal clearance of 40 feet and a vertical clearance of 4½ feet.

Turkey Creek is on the west side of Indian River opposite **Mile 800.7.** About 0.4 mile above the entrance there is a fixed highway bridge with a horizontal clearance of 34 feet and a vertical clearance of 10 feet. About 300 yards above the highway bridge is a fixed railroad bridge with a horizontal clearance of 52 feet and a vertical clearance of 10 feet.

Grant, on the west side of Indian River opposite **Mile 807.5,** has railroad service and a post office.

Sebastian Creek, Mile 812.8, is used by local fishing and kelp-gathering boats going to **Roseland,** 1.1 miles above the mouth. Boats using this creek should avoid the piles of the old highway bridge. The two fixed bridges across the entrance to the creek have a least horizontal clearance of 40 feet and a vertical clearance of 11 feet. About 1 mile above the highway bridge a fixed railroad bridge has a horizontal clearance of 46 feet and a vertical clearance of 12 feet. About 300 yards above the railroad bridge an overhead power cable has permit clearance of 23 feet.

Sebastian is a fishing town at **Mile 815.5.** No docks or marine service are available to passing vessels.

A highway bridge across the waterway at **Mile 819.7** near **Wabasso** has a hand-operated swing span with a horizontal clearance of 60 feet and a vertical clearance of 9½ feet.

The waterway is crooked and subject to strong currents in narrow places from about 1 mile north of the Wabasso Bridge to about 4 miles south of it. Caution must be observed at the bends where vision is limited.

At **Mile 827.0** a marked channel leads eastward for 0.4 mile to a set of piers with 8 feet alongside. Gasoline, diesel fuel, water, electricity, and overnight dockage are available.

A highway bridge at **Mile 827.2** over the waterway at Vero Beach has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 22 feet. Just south of the bridge is a marina where gasoline, diesel fuel, water, ice, and marine supplies are available. There is a restaurant and motel on the premises. There is 7 feet of water at the wharf. **Vero Beach** proper is off the waterfront.

From Vero Beach to the St. Lucie Inlet the Indian River is broad and quite shallow, but the Intracoastal Waterway route is well marked and easy to follow. Spoil banks parallel the channel at a distance of several hundred yards and are mostly covered with mangrove and a few Australian pines.

An overhead power cable at **Mile 828.3** has permit clearance of 80 feet.

The highway bridge north of Fort Pierce at **Mile 838.4** has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 9 feet. A partially submerged wreck lies in the bight northwestward of the bridge.

Fort Pierce, Mile 839.2, has supply and repair facilities. The town and Fort Pierce Inlet are described in Chapter 10.

At **Mile 839.3** the highway bridge across the waterway at Fort Pierce has a swing span with a horizontal clearance of 80 feet and a vertical clearance of 6 feet. A strong cross current exists at this bridge. Vessels proceeding north or south should not approach the bridge until it is fully opened for passage. At all times maintain sufficient headway to avoid being carried against the fender system. An overhead power cable with a permit clearance of 80 feet over the main channel is about 130 yards south of the bridge.

Chart 846.—Walton to St. Lucie Inlet.—Mile 848.7 to Mile 858.4.—Jensen Beach, Mile 852.7, is a winter resort on the west bank of Indian River. Fishing and manufacture of agar-agar from seaweed obtained in Indian River are the principal industries. Dock space is limited to shallow-draft craft. The highway bridge across the waterway here has a swing span with a horizontal clearance of 60 feet and a vertical clearance of 9 feet.

At **Mile 853.9,** a dredged channel leads from the Intracoastal Waterway to a boat harbor and repair yard on the west side of Indian River. A marine railway can haul out vessels up to 50 feet in length and 4 feet in draft for hull and engine repairs. Wet and dry storage are available for small boats. In October 1958 the channel was unmarked and reported to have a depth of 6 feet.

The highway bridge across the waterway at **Mile 855.8** has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 29 feet at the center.

The junction of the Intracoastal Waterway and Okeechobee Waterway is at **St. Lucie Inlet, Mile 858.4.** St. Lucie Inlet and River, Salerno, Port Sewall, and Stuart are described in Chapter 10.

Extreme caution is advised when crossing St. Lucie River. Cross currents will give a vessel an east or west set, depending on the direction and velocity of the current in the river. Vessels should be able to stay in the channel by using the ranges on each side of the intersection. To make a turn from the Intracoastal Waterway into St. Lucie River or vice versa, allowance must be made for the cross currents to prevent swinging too wide or too short.

Chart 1289.—Okeechobee Waterway.—From the junction with the Intracoastal Waterway in St. Lucie Inlet, Okeechobee Waterway follows St. Lucie River westward to South Fork, through South Fork and St. Lucie Canal and enters Okeechobee Lake at Port Mayaca, crosses the southern part of the lake and exits at Moore Haven into Caloosahatchee Canal and thence into Caloosahatchee River, San Carlos Bay and the Gulf of Mexico. The Gulf section of the Intracoastal Waterway follows the Gulf Coast from Apalachee Bay, Florida, to the Mexican border at Brownsville, Texas, and is described in **United States Coast Pilot 5, Gulf Coast, Puerto Rico, and Virgin Islands.**

The Federal project for the Okeechobee Waterway provides for a channel with a depth of 8 feet from the Intracoastal Waterway near Stuart via Okeechobee Lake route 1 and 1B to Fort Myers, and a depth of 6 feet for the alternate route 2 along the south shore of Lake Okeechobee from Port Mayaca westward to Clewiston. Controlling depths are published in Notices to Mariners.

Water levels.—Depths charted in Caloosahatchee River and St. Lucie River are referred to mean low water; in Caloosahatchee Canal, depths are referred to a low-water elevation which is 10 feet above mean sea level; Lake Okeechobee and St. Lucie Canal depths are referred to a low-water elevation which is 12½ feet above mean sea level. Actual navigation depths show on gages displayed at each lock.

Bridges and locks.—General regulations governing bridges and locks and the handling of tows are given in **§ 207.160,** Chapter 2. The navigation locks on the Okeechobee Waterway are normally operated on the following schedule (EST): St. Lucie Lock, 8 a.m. to 12 noon, and 1 p.m. to 5 p.m.; Moore Haven Lock, 6 a.m. to 8 p.m.; and Ortona Lock, 8 a.m. to 12 noon, and 1 p.m. to 5 p.m.

Maintenance of the Okeechobee Waterway and operation of the locks are in charge of the Corps of Engineers area office at Clewiston. Before attempting the passage through any portion of this route, the latest information regarding available depths, operation of the locks, and other existing conditions should be obtained from the office of the Corps of Engineers at Clewiston or at 575 Riverside Avenue, Jacksonville.

Mileage in the Okeechobee Waterway is measured westward from the Intracoastal Waterway junction in St. Lucie Inlet.

St. Lucie Inlet and **St. Lucie River** to **Stuart, Mile 6.5,** are discussed in Chapter 10. **South Fork** of St. Lucie River begins at **Mile 6.7** and trends southward into St. Lucie Canal.

Palm City, Mile 8.2, is a small village on the west bank of South Fork. A small boatyard for hull repairs has a marine railway that can haul out boats up to 30 feet in length. The highway bridge over the waterway here has a bascule span with a horizontal clearance of 60 feet and a vertical clearance of 10 feet at the center. During periods of high water in Lake Okeechobee, shoaling may occur in the vicinity of the bridge.

At **Mile 11.4,** South Fork divides into an east and a west fork. The east fork is the old South Fork of St. Lucie River and is deep and winding, affording good protection for small boats during hurricane weather. About 2 miles up this fork is a fixed highway bridge with a vertical clearance of 4½ feet. Current was observed to be flowing up the river at this bridge. The west fork is **St. Lucie Canal,** the route of the waterway.

St. Lucie Canal is crossed at **Mile 12.6** by a fixed highway bridge with a horizontal clearance of 92 feet and a vertical clearance of 55 feet.

The **St. Lucie Lock, Mile 13.1,** has a width of 50 feet,

length of 250 feet, and a controlling depth of 11 feet over the sill. High water in Lake Okeechobee may cause the lock to be closed to navigation for parts of the day. Caution should be used when approaching the lock when it is being used to discharge water from Lake Okeechobee. Limited tie-up facilities are available at the lock.

An overhead power cable crossing St. Lucie Canal at **Mile 14.8** has permit clearance of 55 feet. A hand-operated swing bridge crosses the canal at **Mile 14.9,** with a horizontal clearance of 52 feet and a vertical clearance of 7 feet.

At **Mile 21.7** an overhead power cable with a permit clearance of 63 feet crosses the waterway.

At **Indian Town,** two hand-operated swing bridges and two overhead cables cross the waterway. The first bridge at **Mile 24.2** has a horizontal clearance of 54 feet and a vertical clearance of 12 feet. The second, the Seaboard Air Line Railroad bridge at **Mile 24.5,** has a horizontal clearance of 51 feet in the south draw, 47½ feet in the north draw, and a vertical clearance of 6½ feet. The two overhead cables at the bridge have a minimum permit clearance of 69 feet.

The minimum permit clearance of the overhead cables at **Miles 31.5** and **32.8** is 71 feet.

Port Mayaca, Mile 33.0, has no gasoline, fresh water or provisions. There are no docks, but one wall of the old lock is still present and can be used to tie up. The Florida East Coast Railway bridge across the waterway here has a lift span with a horizontal clearance of 56 feet and a vertical clearance of 6½ feet down and 48 feet up.

The highway bridge at **Mile 33.7** has a swing span with a horizontal clearance of 53 feet and a vertical clearance of 10 feet. The channel is through the north draw.

The waterway enters **Lake Okeechobee** at **Mile 33.8.** The lake is an approximately circular fresh-water lake in southern Florida, about 26 miles from the Atlantic coast, 50 miles from the Gulf coast, and 90 miles from the south end of the mainland. It varies in width from 22 to 30 miles and is shoal along its west and southwest sides for a distance of 100 to 500 yards off the shore. The center of the lake is comparatively deep. The shoal areas are generally filled with a thick growth of watergrass which makes it necessary to equip boats with weedless propellers if operating in the lake for any length of time.

Taylor Creek empties into Lake Okeechobee at its northernmost extremity. Three miles above the mouth of the creek is the town of **Okeechobee** which has rail and highway connections. A Federal project provides for a channel 6 feet deep and 60 feet wide to Okeechobee. The controlling depth was 5 feet in October 1958.

At the head of navigation in Taylor Creek is the fixed railroad bridge 4 miles above the mouth. The highway bridge 0.2 mile above the mouth of the creek has a bascule span with a horizontal clearance of 40 feet and a vertical clearance of 9½ feet. An overhead power cable north of the bridge has a permit clearance of 40 feet. See Appendix for **storm warning** display.

Kissimmee River flows into the north side of Lake Okeechobee about 5.3 miles southwest of Taylor Creek. The highway bridge about 0.5 mile above the river entrance has a swing span with a horizontal clearance of 40 feet and a vertical clearance of 5 feet. An overhead cable at the bridge has a permit clearance of 47 feet.

North Lake Shoal extends 4 miles off the northwest shore of the lake. **Observation Shoal** is an extensive sand shoal extending as much as 7 miles off the southwest shore of the lake. **Rocky Reef** extends across the south end of the bay between **Observation Island** and **Bacom Point;** depths of 2 to 7 feet are over it in places. A channel through the reef is marked by lights and daybeacons. **Halifax Bank** is a sand shoal toward the south end of **South Bay.**

Shelter may be found in Taylor Creek at the north end of the lake, in **Pelican Bay** at the southeast corner of the lake, and in the canals. Where depths are sufficient in the watergrass off the west and southwest sides of the lake, anchorage in moderate weather can be made, as the holding bottom is good and protection is afforded by the watergrass.

Hurricane gates are in the levee at Taylor Creek, Clewiston Industrial Canal, Miami Drainage Canal, Hillsboro Canal-North New River Drainage Canal, and West Palm Beach Drainage Canal. Pumping stations are at the hurricane gates at Miami Drainage Canal, Hillsboro Canal-North New River Drainage Canal, and West Palm Beach Drainage Canal. The gates are opened or closed only for pumping, and are not opened for boats. Depths of 10 feet may be taken over all sills except at Taylor Creek where the depth over the sill is 7 feet. All gates have a width of 50 feet. These canals are not navigable and have filled with hyacinths and other obstructions.

Route 1 across Lake Okeechobee from Port Mayaca follows a southwesterly course to Rocky Reef, thence a southerly course in the marked channel through the reef, turns westward and branches into Routes 1–A and 1–B. **Route 1–A,** the shortest and shoalest of the routes to Liberty Point, is seldom used although the channel is well marked and relatively free from hyacinths. **Route 1–B** is well marked and branches southward to Clewiston where it is joined by Route 2.

Clewiston, at **Mile 56.4** via Route 1–B, and **Mile 65.7** via Route 2, is an agricultural community on the southwest side of the lake. The area offices and general headquarters of the Corps of Engineers are on the east side of the canal at the east side of town. Gasoline, diesel fuel, some supplies and provisions can be obtained along the west side of the canal. Boats up to 30 feet in length can be hauled out for general repairs. Dock space is available along the bulkhead of the Clewiston Industrial Canal south of the levee. An overhead power cable that has a clearance of 37 feet crosses the canal about 400 yards from the hurricane gate. See Appendix for **storm warning** display.

From Clewiston, combined Routes 1–B and 2 follow the south shore of the lake northwesterly to Liberty Point.

Route 2 leaves St. Lucie Canal and follows the southern perimeter of the lake. It is marked by daybeacons

and is the route most used. It is recommended during periods of rough water and high winds in Lake Okeechobee. Levees are along the southern bank of this route.

Canal Point is at **Mile 41.2** on Route 2. **West Palm Beach Drainage Canal** joins the lake here; at the lock an overhead power cable crossing the canal has a permit clearance of 80 feet. See Appendix for **storm warning** display.

Pahokee, Mile 44.0, is a town on the southeast side of the lake that has a protected boat basin with depths of 7 to 9 feet. Gasoline and water are available at the pier in the basin. See Appendix for **storm warning** display.

At **Mile 52.7** is the only bridge crossing the South Shore Navigation Channel. The bridge connects the mainland at **Chosen** with **Torry** and **Kreamer Islands,** and has a swing span with a horizontal clearance of 50 feet and a vertical clearance of 11 feet. The channel is through the west draw. An overhead cable at the bridge has a permit clearance of 55 feet. Gasoline is available at boat landings on both sides of the bridge. South of the bridge at Torry Island there is a wharf with depths of 4 feet alongside.

About 0.3 mile below the bridge at **Mile 53.0** the **Hillsboro** and **North New River Drainage Canals** join the lake.

The **Miami Drainage Canal** joins the lake at **Lake Harbor, Mile 63.1.**

Route 2 continues northwestward to Clewiston where it joins Route 1–B, and the combined routes continue to Liberty Point.

Routes 1–A, 1–B, and 2 combine into one route on the southwest side of the lake at **Liberty Point, Mile 59.3** via Route 1–A, **Mile 61.1** via Route 1–B, and **Mile 70.4** via Route 2. Mileage westward of Liberty Point is based on use of Route 1–B.

Moore Haven Lock, Mile 67.8, has a width of 50 feet, a length of 250 feet, and a least depth of 11 feet over the sills. Two standby areas have been established for vessels waiting to pass through the lock. The first area is about 275 yards northeast of the lock at the junction of the canals and the second area is 150 yards southwest of it. During periods of discharge through the lock, the currents and turbulence are extremely hazardous to all craft. Under no circumstances shall any craft approach nearer to the lock than the standby areas until discharge has been stopped and the water pool stabilized.

A public address system at the Moore Haven Lock is an aid to navigation and safety feature. Craft coming to the lock should approach the passage only upon receiving instructions from the locktender through the loudspeaker system and enter the lock chamber only after signal from him.

Moore Haven, Mile 67.8, is at the entrance to the canal leading to the Caloosahatchee River and the Gulf of Mexico. It is on a branch of the Atlantic Coast Line Railroad. A hand-operated railroad swing bridge crossing the canal at **Mile 68.0** near Moore Haven requires about 15 minutes for opening. Westbound vessels should signal for opening the bridge while still in the lock chamber at Moore Haven. The swing span has a horizontal clearance of 56 feet in the southeast draw, and a vertical clearance of 5 feet; operating regulations are given in **§ 203.245,** Chapter 2. An overhead cable 150 yards south of the bridge has a clearance of 83 feet. The highway bridge at **Mile 68.1** has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 23 feet at the center.

Fresh water is available at the locks. A government boat basin with four slips for medium-sized boats is just west of the locks. There is a small-boat basin on the west side of the canal between the railroad and highway bridges. An overhead cable with a permit clearance of 18 feet crosses the entrance to the basin. Fresh water and electrical connections are available. Provisions can be obtained in the town. There are other landings along the canal on the south side of the town. Gasoline and diesel fuel may be obtained at two fuel piers at the south edge of town. See Appendix for **storm warning** display.

At **Mile 71.2,** the canal passes through shallow, freshwater **Lake Hicpochee,** about 5 miles long and 2.5 miles wide, soft mud bottom. Most of the surface is covered with hyacinth and saw grass. Spoil banks on both sides of the canal are overgrown to a height of about 12 feet and have only a few open spots where the lake can be seen.

Ortona Lock, Mile 81.2, has a width of 50 feet, a length of 250 feet, and a depth of 11 feet over the sills. During periods of heavy discharge through the spillway with the lock gates closed, the currents sweep toward the spillway. Navigators approaching the lock should exercise extreme caution and maintain maximum possible control at all times.

The waterway now enters **Caloosahatchee River.** Normal current in the river and canal is about 1½ knots; however, velocities in the lower Caloosahatchee Valley are increased considerably during periods of flood.

An overhead power cable about 335 yards westward of Ortona Lock has a clearance of 81 feet.

The river is crossed by a hand-operated swing bridge at **Mile 81.7** with a horizontal clearance of 55 feet and a vertical clearance of 10 feet; the channel is south of the pivot pier. Westbound vessels should signal for opening the bridge while still in the Ortona Lock chamber and anticipate delay awaiting the full opening. Full control should be maintained at all times.

LaBelle, Mile 89.5, has a dock and a turnout basin. Groceries and docking space may be obtained here.

A bridge and a cable cross the river at **Mile 89.5.** The highway bridge has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 31 feet at the center. The overhead power cable at the bridge has a clearance of 80 feet.

At **Denaud, Mile 94.0,** a hand-operated swing highway bridge crosses the channel with a horizontal clearance of 64 feet and a vertical clearance of 8½ feet; the channel is north of the pivot pier. An overhead power cable at the bridge has a permit clearance of 80 feet.

Alva, Mile 100.8, has a small dock where gasoline and oil can be obtained. The highway bridge across the river here has a hand-operated swing span with a horizontal

clearance of 63 feet and a vertical clearance of 7 feet; the channel is north of the pivot pier. The overhead cable at the bridge has a permit clearance of 81 feet.

At **Olga, Mile 106.7**, a hand-operated swing bridge crosses the river with a horizontal clearance of 57 feet in the south draw and 53 feet in the north draw, and a vertical clearance of 4½ feet. An overhead power cable crossing the river on the east side of the bridge has a permit clearance of 80 feet.

At **Mile 108.7, Trout Creek** enters the river. **Owl Creek** branches from Trout Creek 0.7 mile above the entrance. At Owl Creek there is a marina which can haul out boats up to 45 feet in length, 5 feet in draft, and 20 tons in weight for hull work. Boats are put in fresh water storage behind a dam here. Gasoline, water, and electricity are available.

In 1959 a highway bridge with a bascule span was under construction near **Mile 109.0.** The permit clearances are: 90 feet horizontal, and 27 feet vertical.

At **Mile 110.7** the overhead power cable has a permit clearance of 70 feet.

Orange River enters the waterway at **Mile 111.8.** A draft of 5 feet can be carried to the boatyard about 0.5 mile above the mouth. The channel is marked by three private daybeacons. The yard can haul out and repair boats up to 80 feet in length, 5 feet in draft, and 30 tons in weight. Wet storage facilities are available.

Orange River is a hurricane refuge for small yachts. The river is crossed by a highway bridge 0.8 mile above the mouth with a bascule span having a horizontal clearance of 40 feet and a vertical clearance of 9 feet; operating regulations are given in § **203.245,** Chapter 2. Adjacent to the bridge is an overhead power cable with a permit clearance of 47 feet. Two miles above the mouth is an overhead power cable with a permit clearance of 64 feet.

The Caloosahatchee River is crossed at **Mile 112.8** by a hand-operated swing railroad bridge with a horizontal clearance of 49 feet and a vertical clearance of 2½ feet. Overhead cables at **Mile 114.4** and **Mile 115.4** have a least permit clearance of 80 feet.

Edison Memorial Bridge, which crosses Caloosahatchee River at **Fort Myers, Mile 116.9,** has a bascule span with a horizontal clearance of 78 feet and vertical clearances of 10 feet in the center and 6 feet at the fenders.

Fort Myers, on the south bank of Caloosahatchee River 14 miles above the mouth, is the commercial center for this part of the State. The city's hotels, communications, and boating facilities are discussed in **United States Coast Pilot 5, Gulf Coast, Puerto Rico, and Virgin Islands.**

Chart 846.—St. Lucie Inlet to Delray Beach.—Mile 858.4 to Mile 903.2.—The Intracoastal Waterway enters **Great Pocket** at **Mile 859.0,** proceeds to a canal at **Mile 860.5,** and continues through **Peck Lake** and **South Jupiter Narrows** to **Hobe Sound.**

A highway bridge at **Mile 865.4** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 10 feet.

The town of **Hobe Sound** at **Mile 865.9** has a post office and railway connections.

The waterway continues in Hobe Sound to **Conch Bar, Mile 870.1,** and thence through **Jupiter Sound** to Jupiter Inlet. At **Mile 872.5** near the southern end of Jupiter Sound, a highway bridge across the waterway has a swing span with a horizontal clearance of 55 feet and a vertical clearance of 8½ feet; the channel is through the west draw.

The waterway continues into **Loxahatchee River** at **Mile 872.8.** A highway bridge across the waterway at **Mile 873.1** has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 26 feet at the center. Piers of a former bridge extend from shore on both sides of the channel just west of the bridge. About 0.3 mile westward of the bridge the waterway makes a sharp turn just eastward of two other bridges, crosses Loxahatchee River and enters Lake Worth Creek.

Caution is advised when crossing Loxahatchee River. Vessels are to give ONE LONG BLAST on approaching the bend and then proceed at reduced speed on the right-hand side of the channel. Overtaking vessels must never attempt to pass another vessel proceeding in the same direction on bends where visibility ahead is restricted to such an extent that a collision with an unseen approaching vessel may result. See the Rules of the Road published by the Coast Guard.

Care must be taken not to confuse the route of the waterway with the passage through the bascule bridges just westward of the sharp turn across the Loxahatchee River at **Mile 873.3.** The highway bridge has a horizontal clearance of 45 feet and a vertical clearance of 5½ feet, and the overhead power cable at the bridge has permit clearance of 64 feet. The railroad bridge has a horizontal clearance of 40 feet and a vertical clearance of 4½ feet; operating regulations for the railroad bridge are given in § **203.245,** Chapter 2. The overhead power cable at this bridge has a clearance of 64 feet. The river shoals beyond these bridges.

There are four marinas in the Jupiter Inlet area, and two make repairs. Boats up to 40 feet in length and 6 feet in draft can be hauled out. Dockage is available for boats up to 125 feet in length and 8 feet in draft. Gasoline, diesel fuel, water, electricity, and some marine supplies are available.

An overhead power cable with a permit clearance of 83 feet crosses the waterway at **Mile 875.1.** The highway bridge across the waterway at **Mile 877.1** has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 14 feet.

A small shipyard is on the west bank of the waterway at **Mile 879.2.** The marine railway is capable of hauling out vessels up to 50 feet in length, 4½ feet in draft, and 25 tons in weight for general repairs. A small machine shop is here. No fuel, supplies, or dockage are available.

At **Mile 880.9** the waterway is crossed by a bridge with a bascule span having a horizontal clearance of 94 feet and a vertical clearance of 25 feet. The overhead

power cable on the west side of the bridge has a permit clearance of 78 feet.

The Intracoastal Waterway enters **Lake Worth** at **Mile 881.3** and traverses the lake from one end to the other. The lake is a long, narrow, and shallow body of water separated from the ocean by an island varying in width from 0.1 to 0.5 mile. Considerable dredging has been done in Lake Worth for private channels and for real estate development. Local knowledge is necessary to carry the best water outside the limits of the marked channels.

A highway bridge crossing the waterway at **Mile 883.9** just north of **Riviera Beach** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 16 feet. About 0.5 mile south of the bridge there is a repair yard with a marine railway capable of handling vessels up to 112 feet in length, 7 feet in draft, and 250 tons in weight; hull and engine repairs can be made. There is a machine shop at the yard. Dry storage facilities are available.

Lake Worth Inlet, Mile 884.9, and the ship channel leading to the basin at the **Port of Palm Beach** are described in Chapter 10.

Anchorage for yachts up to 14 feet in draft is available in the buoyed channel on the east side of Lake Worth leading southward from Port of Palm Beach main ship channel; the best area is 0.8 mile south of the ship channel.

About 1.1 miles south of the ship channel there are boat storage and repair yards. The first has a marine railway that can haul out boats up to 70 feet in length, 6 feet in draft, and 59 tons in weight. Engine and hull repairs can be made, and machine shop work is done. Dry storage facilities and some overnight wet storage are available. The second repair yard has two 400-foot long wharves with depths of 6 to 12 feet alongside, and open storage is available. Repair facilities include a marine railway that can haul out boats up to 85 feet in length and 7½ feet in draft; a 10-ton crane; and a well-equipped machine shop and carpenter shop. General repairs are made to hulls and engines. Gasoline, diesel fuel, water, and some marine supplies are available.

West Palm Beach, Mile 887.9, is a city of some commercial importance on the west shore of Lake Worth and is about 3 miles south of the Port of Palm Beach. The city has a business district with excellent hotel accommodations, and is a division point on the Florida East Coast and Seaboard Air Line Railways. See Appendix for **storm warning** display.

Palm Beach Yacht Club has a wharf on the west side of Lake Worth at **Mile 887.8,** about 0.1 mile north of the highway bridge. Gasoline, diesel fuel, water, ice, and electricity are available at the docks.

Flagler Memorial Bridge, Mile 887.9, has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 17 feet at the center; operating regulations are given in **§ 203.440,** Chapter 2.

About 0.1 mile south of the bridge, a channel marked by daybeacons leads westward to the city docks. The controlling depth in the channel is 11 feet, and the same depth is along the offshore face and in the northern slips of the yacht basin. There is adequate berthing space; gasoline, diesel fuel, and water are available.

Royal Palm (Royal Park) Bridge, Mile 888.6, has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 14 feet at the center; operating regulations are given in **§ 203.440,** Chapter 2.

Southern Boulevard Bridge, Mile 890.4, has a bascule span with a horizontal clearance of 81 feet and a vertical clearance of 14 feet at the center.

At **Lake Worth, Mile 894.0,** a highway bridge crossing the waterway has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 15 feet at the center.

On the west side of the lake at **Mile 895.5** there is a yacht basin and repair yard that makes general repairs. The largest of four marine railways at the yard can haul out boats up to 100 feet in length, 6 feet in draft, and 200 tons in weight. Gasoline, diesel fuel, water, ice, electricity, marine supplies, overnight dockage, and storage are available.

At **Lantana, Mile 895.9,** a highway bridge crossing the waterway has a bascule span with a horizontal clearance of 90 feet and a vertical clearance of 13 feet at the center.

Easterly winds at South Lake Worth Inlet, **Mile 898.2,** cause strong currents that have great velocity and must be reckoned with when navigating the Intracoastal Waterway.

A highway bridge crossing the waterway at **Boynton Beach, Mile 899.4,** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 10 feet at the center.

Just north of the bridge on the western shore of the lake there is a yacht basin that has several finger piers with depths of 5½ feet at the end. Gasoline, diesel fuel, and water are available. The mouth of the basin is reported to be filling in from the south side.

A bridge over the waterway at **Mile 902.6** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 9½ feet at the center.

Just south of the bridge on the west side of the waterway there is a boatyard that makes general hull and engine repairs. It has a machine shop, and a hoist that can lift out boats up to 58 feet in length, 8 feet in draft, and 25 tons in weight. Gasoline, diesel fuel, water, electricity, and marine supplies are available at the yard; groceries can be delivered to the dock.

Chart 847.—Delray Beach to Miami.—Mile 903.2 to Mile 953.5.—At **Delray Beach, Mile 903.4,** a highway bridge with a bascule span having a horizontal clearance of 90 feet and a vertical clearance of 12 feet at the center crosses the waterway at Atlantic Avenue. A small yacht basin is on the west side of the waterway south of the bridge. There are a number of finger piers for the mooring of yachts; water and electricity are available on the piers.

The highway bridge at **Boca Raton, Mile 910.2,** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 9 feet at the center.

The waterway enters **Lake Boca Raton** at **Mile 910.4. Boca Raton Inlet** leads from the lake to the Atlantic Ocean; it is described in Chapter 10.

The waterway leaves Lake Boca Raton at **Mile 910.8** and enters a long land cut. Crossing the north end of the land cut at **Mile 910.9** is a highway bridge with a bascule span that has a horizontal clearance of 85 feet and a vertical clearance of 10 feet at the center. Care should be exercised at this bridge as strong currents may be encountered; the sides of the canal are rocky.

Just below the bridge, at **Mile 911.0,** a yacht basin on the eastern side of the waterway is used by party fishermen. The landing has about 5 feet of water at its face; gasoline and water are available.

Hillsboro Drainage Canal enters the Intracoastal Waterway from the west at **Mile 912.4** near **Deerfield Beach.** The confluence of the canal and the waterway on the north side of the bridge creates a dangerous condition in the channel. Vessels proceeding southward should not approach the bridge until it is fully opened for passage, and should at all times maintain sufficient headway to avoid being carried toward the east fender system by the flow of water from Hillsboro Canal that generates considerable cross current, especially during periods of flood.

About 0.8 mile up Hillsboro Drainage Canal is a fixed bridge of U.S. Highway No. 1. Just below the bridge there is a marina and repair yard. Half of the finger piers are covered, and there is berthage for boats up to 55 feet in length. Gasoline, water, and electricity are available. The yard has a travel lift that hauls out boats up to 55 feet in length and 30 tons in weight.

Just below the canal, at **Mile 912.4,** the waterway is crossed by a highway bridge that has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 21 feet at the center.

Hillsboro Inlet, at **Mile 915.5,** is described in Chapter 10.

At **Mile 916.3** a marina and repair yard has a machine shop and a vertical lift capable of hauling out boats up to 63 feet in length and 4½ feet in draft; gasoline, water, electricity, and some marine supplies are available.

Near **Pompano Beach, Mile 917.6,** there is a highway bridge with a bascule span having a horizontal clearance of 90 feet and a vertical clearance of 15 feet at the center; operating regulations are given in **§ 203.443,** Chapter 2.

Just north of the bridge a yacht basin has finger piers with depths that vary from 10 feet near the waterway to 4 feet at the inner end of the basin; the piers have water and electricity. Gasoline, diesel fuel, ice, and some provisions are available.

At **Mile 921.5,** a bridge over the waterway near **Oakland Park** has a bascule span with a horizontal clearance of 88 feet and a vertical clearance of 23 feet at the center.

Fort Lauderdale Tenth Street (Sunrise Boulevard) Bridge, Mile 923.4, has a bascule span with a horizontal clearance of 85 feet and a vertical clearance of 16 feet at the center; operating regulations are given in **§ 203.446,** Chapter 2.

Middle River enters the waterway from westward about 0.5 mile below the bridge; the controlling depth is about 4 feet to the fixed bridges about 2.2 miles above the mouth. The fixed highway bridge about 0.9 mile above the mouth has a horizontal clearance of 28 feet and a vertical clearance of 7 feet.

Fort Lauderdale, Mile 924.6, a large and colorful city known as the "Venice of America", is served by the Florida East Coast and the Seaboard Air Line Railways. Navigable waters include the myriad of man-made canals in addition to the natural waterways. The canals between the man-made islands are used by the riparian owners and their guests.

All facilities for yachts are available at Fort Lauderdale, and several thousand yachts base here in the winter season. There are many bathing and recreation facilities, excellent hotels, restaurants, and shopping centers in the city. A monument marks the original site of Fort Lauderdale, built in 1838 during the Seminole War.

At **Mile 924.6, Las Olas Boulevard Bridge** has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 31 feet at the center; operating regulations are given in **§ 203.446,** Chapter 2.

The City Yacht Basin is on the eastern side of the Intracoastal Waterway about 0.4 mile southward of Las Olas Boulevard Bridge, and has an outer wharf with a depth of 10 feet at the face and decreasing depths at the finger piers in the basin. The office of the city dockmaster is in the administration building on the outer wharf. The dockmaster has police powers over all waterways within the city limits and makes all berthing arrangements. Gasoline, diesel fuel, water, electricity, and marine supplies are available at the finger piers. All kinds of supplies are available in the city, and oil companies will make deliveries of gasoline and diesel fuel directly to boats. See Appendix for **storm warning** display.

The boatyard just south of the yacht basin makes minor repairs and has a vertical-lift dock for small boats.

New River, the main navigation channel in this area, enters the waterway from westward at **Mile 925.4.** A Federal project provides for a channel 8 feet deep from the Intracoastal Waterway to **Tarpon Bend,** 0.6 mile above the mouth. In November 1958 a controlling depth of 8 feet was reported. There is deep water in New River above Tarpon Bend.

Above the junction of New River with the Intracoastal Waterway, New River and South Fork are crossed by the following bridges with bascule spans and overhead cable: 1 mile, Southeast 6th Avenue Bridge, horizontal clearance 60 feet, vertical clearance 5½ feet, operating regulations are given in **§ 203.446,** Chapter 2; 1.3 miles, South Andrews Avenue Bridge, horizontal clearance 59 feet, vertical clearance 5½ feet; 1.4 miles, Florida East Coast Railway bridge, horizontal clearance 50 feet, vertical clearance 6 feet; 1.8 miles Southwest 7th Avenue Bridge, horizontal clearance 40 feet, vertical clearance 11 feet, and the overhead power cable at this bridge has permit clearance of 75 feet; 3.0 miles, Seaboard Air Line Railway bridge, horizontal clearance 63 feet, vertical clearance 4 feet; 4.2 miles, State Highway 84 Bridge, permit horizontal clearance 40 feet, vertical clearance 21 feet;

operating regulations are given in § **203.446,** Chapter 2.

The mean range of tide in New River is about 2½ feet. Strong currents may be encountered above Southeast 6th Avenue Bridge; strangers going upriver are advised to obtain information from the city dockmaster.

Speed in New River is limited to no wake.

Both sides of New River between Southeast 6th Avenue Bridge and South Andrews Avenue Bridge are owned by the city. Along the bulkheads, berths with water and electricity are provided for yachts. Arrangements for space are made with the city dockmaster.

A number of large storage yards are on New River about 2.5 miles above the city-owned berthing area. Several repair yards and storage basins are located up the river. The largest shipyard has a marine railway that can haul out vessels up to 140 feet in length and 300 tons in weight. Any hull or engine repair can be made, and machine shops are available. Some yards have cranes of up to 50-ton capacity for rail-water or truck-water transfer.

From New River, the Intracoastal Waterway continues southward. At **Mile 926.2,** Fort Lauderdale Southeast Seventeenth Street Bridge has a bascule span with a horizontal clearance of 98 feet and a vertical clearance of 28 feet at the center.

Port Everglades, Mile 926.6, is described in Chapter 10.

The waterway enters a land cut at **Mile 927.3,** and **Dania Cutoff Canal** enters the cut at **Mile 928.6.** The canal was constructed by the county for drainage purposes, and during floodwater periods may cut through to the ocean. Although not maintained for navigation, in November 1958 the canal had a controlling depth of about 6 feet to the power plant at the intersection with South Fork of New River, a distance of about 5 miles.

About 1 mile along the canal from the waterway, the larger of two marinas and repair yards can haul out boats up to 60 feet in length, 5½ feet in draft, and 50 tons in weight; general repairs can be made. Gasoline, diesel fuel, water, ice, electricity, and marine supplies are available.

A yacht basin is in the canal at **Dania,** 1.7 miles from the waterway. Gasoline and water are obtainable. West of the basin overhead obstructions restrict the vertical clearance to 10 feet.

Dania Beach Highway Bridge, Mile 929.3, has a bascule span with a horizontal clearance of 91 feet and a vertical clearance of 22 feet at the center. The overhead power cable at **Mile 931.2** has a clearance of 79 feet.

Hollywood, Mile 931.7, is about 1 mile west of the waterway. On the ocean side east of the city is the Hollywood Hotel, a very prominent structure. Yacht basins and marine service stations are located on both sides of the waterway. Berthage, gasoline, diesel fuel, water, ice, electricity, and other supplies are available. There are no repair facilities.

Hollywood Beach Bridge, Mile 931.7, has a bascule span with a horizontal clearance of 57 feet and a vertical clearance of 10 feet at the center; operating regulations are given in § **203.446a,** Chapter 2.

At **Hallandale Beach, Mile 933.3,** a highway bridge with a bascule span was under construction in 1958 to replace the swing bridge being removed; a temporary bridge was erected for highway traffic. Operating regulations are given in § **203.446b,** Chapter 2.

At **Mile 935.3,** the waterway enters shallow **Dumfoundling Bay.** Care is required here as spoil banks are close aboard on both sides of the dredged channel. A sharp turn to the east is necessary to enter **Biscayne Creek** at **Mile 936.2.**

At **Mile 936.8** an overhead power cable and a bridge cross the waterway. The cable is about 55 yards north of the bridge and has permit clearance of 80 feet; the bridge has a bascule span with a horizontal clearance of 94 feet and a vertical clearance of 19 feet at the center.

The Intracoastal Waterway enters the northern end of **Biscayne Bay** at **Mile 937.2.** The bay is a shallow body of water extending about 33 miles southward, and is unexcelled as a yachting and small-boating center. The upper part of the bay is very shallow, has a width of about 2 miles, and is separated from the Straits of Florida by a narrow peninsula, Virginia Key, and Key Biscayne. The remainder of the bay has an average width of about 7 miles, general depths of 9 to 10 feet with several places having depths of 13 to 15 feet, and is separated from Hawk Channel by a number of keys and coral banks through which there are several narrow and shallow channels. In the lower part of Biscayne Bay and in the bays and sounds southward, the water is so clear on calm days that the bottom can be seen at considerable depths. On windy days, the water becomes milky and opaque.

On the east side of the waterway at **Mile 938.1** is an entrance to a marina for the use of yachtsmen and party-fishermen. There are depths of 8 to 10 feet in the entrance, at the finger piers, and in the channel leading southward about 0.3 mile to Bakers Haulover Cut. Gasoline, diesel fuel, water, and electricity are available at the finger piers. The dockmaster assigns berths, and a charge is made for docking. See Appendix for **storm warning** display.

Bakers Haulover Cut is described in Chapter 10.

Bal Harbour, a private development, is immediately southward of Bakers Haulover Cut. Several large hotels are conspicuous landmarks.

At **Mile 938.9,** a dredged channel leads south-southeasterly to a yacht basin that has a depth of 14 feet. The channel had a controlling depth of 7 feet in November 1958. The basin is for members only, but other craft may take refuge here during bad storms.

Indian Creek extends southward about 6 miles along the eastern part of the bay from Bal Harbour to Collins Canal in Miami Beach. In November 1958 the controlling depth was reported to be 6 feet in Indian Creek. A fixed highway bridge across the creek from Bal Harbour to **Bal Harbour Island** has a horizontal clearance of 28 feet and a vertical clearance of 12½ feet. About 0.5 mile southward, the fixed bridge at **Surfside** has a horizontal clearance of 40 feet and a vertical clearance of 12 feet. The fixed bridge between **Atlantic Heights** and **Normandy Isle** has a horizontal clearance of 18 feet and a vertical clear-

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ance of 6 feet. On the east side of **Allison Island,** Indian Creek is crossed by a bridge with a bascule span having a horizontal clearance of 50 feet and a vertical clearance of 11 feet; an overhead power cable at the bridge has a permit clearance of 38 feet. Southward of Allison Island, fixed bridges crossing Indian Creek limit the vertical clearance to less than 6 feet.

From the southern end of Indian Creek, **Collins Canal** leads southwesterly along the southeast side of the prolongation of Venetian Causeway. In November 1958 a controlling depth of 4 feet was reported in the canal. Fixed bridges crossing the canal limit the vertical clearance to less than 5 feet.

At **Mile 939.3** a channel on the west side of the Intracoastal Waterway leads northwestward to the west shore, follows the west shore in a northeasterly direction to **Arch Creek,** and follows the creek about 0.8 mile westward to a marina where berthage, gasoline, diesel fuel, storage, and repairs are available. The channel is marked and in April 1959 had a controlling depth of 5½ feet.

At **Mile 939.7** (123d St.) the waterway is crossed by **Broad Causeway** with a bascule span having a horizontal clearance of 80 feet and a vertical clearance of 16 feet at the center.

About 0.5 mile south of Broad Causeway, a natural channel leads southwestward to **Biscayne Point,** thence along the west and south sides of **Normandy Isle,** thence along the east shore of the bay southward to **Venetian Causeway** and Collins Canal in **Miami Beach,** and thence along the west side of Miami Beach southward to **Meloy Channel.** Controlling depths are 6 feet from the waterway southward to Venetian Causeway, thence 8 feet to Meloy Channel. Four bridges cross this channel: At Normandy Isle the easterly bascule span of the 79th Street Causeway has a horizontal clearance of 60 feet and a vertical clearance of 19 feet; the easterly fixed span of the 36th Street Causeway has a permit horizontal clearance of 75 feet and a vertical clearance of 35 feet; Venetian Causeway bascule span between Rivo Alto Island, the most easterly of the Venetian group, and Belle Isle, has a horizontal clearance of 58 feet and a vertical clearance of 9½ feet; operating regulations are given in § **203.447,** Chapter 2; the fixed bridge near the east end of MacArthur Causeway has a horizontal clearance of 75 feet and a vertical clearance of 35 feet. The old bridge to the southward is being removed. Meloy Channel is described in Chapter 10.

At **Mile 941.9** a dredged channel leads southeastward to a private yacht basin in **Island Harbor** just north of the 79th Street Causeway. In November 1958 the reported controlling depth was 11 feet. The channel is marked by an unlighted range.

Seventy-Ninth Street Causeway, Mile 942.5, has a bascule span over the waterway that has a horizontal clearance of 60 feet and a vertical clearance of 18 feet at the center.

Little River flows into the west side of Biscayne Bay at **Mile 942.7.** Yachts tie up along the banks of the river. In November 1958 it was reported that a draft of about 4 feet could be taken to the fixed bridge about 0.6 mile above the mouth; boats that can clear the bridge can continue upstream.

The boatyard on the north shore of Little River makes general repairs and has a marine railway that can haul out boats up to 46 feet in length, 4 feet in draft, and 20 tons in weight. Gasoline, diesel fuel, water, and electricity are available.

Thirty-Sixth Street Causeway, Mile 944.7, has a fixed span over the waterway that has a horizontal clearance of 90 feet and a vertical clearanec of 55 feet.

Venetian Causeway, Mile 946.0, has a bascule span over the waterway with a horizontal clearance of 60 feet and a vertical clearance of 8½ feet at the center. **MacArthur Causeway, Mile 946.1,** has a bascule span over the waterway with a horizontal clearance of 57 feet and a vertical clearance of 7½ feet. Operating regulations for both bridges are given in § **203.447,** Chapter 2.

Miami and **Miami Harbor, Mile 946.5,** are described in Chapter 10. See Appendix for **storm warning** displays.

Fishermans Channel (Railroad Channel) leads southeastward from the waterway at **Mile 947.0,** thence eastward to the deep-water channel at Fisher Island; it is used by yachtsmen and charter-boat fishermen. In November 1958 the controlling depth was 6 feet; the channel is marked by daybeacons. About 1.1 miles westward of Fisher Island, a natural channel leads southward from Fishermans Channel to Rickenbacker Causeway. The channel is little used and marked only at the north end. It had a controlling depth of 7 feet in November 1958.

From Miami the Intracoastal Waterway continues southward along the waterfront, thence through Miami South Channel to **Rickenbacker Causeway** at **Mile 948.6.** The causeway has a bascule span over the waterway with a horizontal clearance of 80 feet and a vertical clearance of 23 feet at the center; operating regulations are given in § **203.447a,** Chapter 2.

Chart 848.—Miami to Elliott Key.—Mile 953.5 to Mile 964.0.—About 0.5 mile south of Rickenbacker Causeway there is a **seaplane operating area** and a **restricted area;** limits and regulations are given in § **207.172,** Chapter 2.

About 2 miles south of Rickenbacker Causeway a privately marked channel leads northeasterly in **Bear Cut** to the Dade County Yacht Basin located in the bight of Northwest Point, Key Biscayne. The basin is used by party-fishing boats. Gasoline, water, and dockage are available.

About 2.3 miles southward of Rickenbacker Causeway are two channels leading westward to the facilities at **Dinner Key** in **Coconut Grove.** Both channels are marked. The north channel had a centerline depth of 6 feet in November 1958.

The yacht storage yards, the Coast Guard Seaplane Base, and the Biscayne Yacht Club are reached through the northern channel. The boatyards have extensive yacht storage; gasoline, diesel fuel, water, electricity,

and repair facilities are available. The largest of several vertical-lift docks and hoists can handle boats up to 55 feet in length and 30 tons in weight.

The southern channel leads to a marina, maintained by the city of Miami, that has piers with depths of 6 to 8 feet alongside. Water and electrical connections are on the piers; a charge is made for berthage assigned by the dockmaster. When construction is completed on the five additional piers started in 1958, the marina will have berthing space for over 500 boats.

Four-way Channel is 3 miles south of Rickenbacker Causeway and leads westward to some private piers and a mooring area; the controlling depth in the channel was 4 feet in November 1958. An unlighted range marks the outer entrance channel.

Entrada Channel, about 0.5 mile southward of Four-way Channel, is privately maintained.

Coral Gables Waterway is 4.2 miles south of Rickenbacker Causeway. It is a deep-water channel dredged through coral, and extends westward about 2 miles inland to the highway bridge on Route 1. The canal is used for drainage purposes and has no docks along the sides; craft tie up on the banks. It is reported that a draft of 4 feet can be taken into the mouth of the canal.

Coral Gables is a picturesque resort that adjoins Miami on the southwest. The tower of the Veterans' Administration Hospital is a conspicuous landmark that shows over the lower part of Biscayne Bay.

The Intracoastal Waterway crosses **Featherbed Bank** at **Mile 962.1** and is marked by daybeacons and lighted buoys. Another channel through Featherbed Bank about 2.5 miles eastward of the waterway is marked by a light and daybeacons; in November 1958 it had a controlling depth of 6 feet. Care must be taken to stay in the center of the channel; the appearance of the water is the best guide, as the shoals on each side are usually visible. The daybeacon northeastward of Featherbed Bank is not easily seen at a distance. A good landmark is the tower resembling a lighthouse located on the key northward of Sands Key.

Chart 849.—Elliott Key to Tarpon Basin.—Mile 964.0 to Mile 990.2.—The **Homestead Bay Front Park Marina** at the entrance to **North Canal,** 5 miles west of **Mile 966.3,** is entered just south of **Convoy Point.** The entrance is marked by a privately maintained light and daybeacons. With local knowledge, boats drawing 3½ feet or less can enter at low water. Slips are available for berthing boats up to 40 feet in length, and there is a 10-ton hoist on the dock. Gasoline, diesel fuel, water, and ice are available at the basin. See Appendix for **storm warning** display.

Caesar Creek, 1.5 miles southeast of **Mile 969.0,** connects Biscayne Bay with Hawk Channel between **Elliott Key** and **Old Rhodes Key.** It had a controlling depth of 5 feet in November 1958. The channel is privately marked across the shoals northwestward of **Adams Key.**

The Intracoastal waterway leaves Biscayne Bay via a straight dredged cut through Cutter Bank at **Mile 970.7** and enters **Card Sound.** The sound is a body of water about 5 miles long and 2.7 miles wide with depths of 7 to 12 feet in the center.

Angelfish Creek, 1.5 miles southeast of **Mile 973.7** between **Palo Alto Key** on the north and **Key Largo** and **Angelfish Key** on the south, connects Card Sound with Hawk Channel. The controlling depth in November 1958 was 6 feet in the Card Sound marked entrance channel, but the eastern end of Angelfish Creek is shoaler.

Good anchorage in depths of 9 feet is available in Card Sound on the south side of **Pumpkin Key,** 1.5 miles southeast of **Mile 974.9.**

Gasoline, diesel fuel, lubricating oil, fresh water, ice, and electricity are available at the Key Largo Anglers Club, 1.8 miles southeast of **Mile 975.3.** A lift is available for hauling out boats up to 35 feet in length.

From Card Sound the waterway follows a dredged cut across **Card Bank, Mile 977.0,** the shoal that separates Card Sound from **Little Card Sound.** Little Card Sound has depths of 7 to 9 feet in the center.

The waterway enters a dredged channel through the shoal that separates Little Card Sound and **Barnes Sound** opposite **Barnes Point, Mile 979.2.** Caution is necessary in the curved portion of the channel west of the point. Barnes Sound is about 6 miles long and 3 miles wide with depths of 7 to 10 feet in the center.

Near the south end of Barnes Sound the waterway enters **Jewfish Creek, Mile 984.6.** The highway bridge crossing the creek at **Cross Key, Mile 985.5,** has a bascule span with a horizontal clearance of 80 feet and a vertical clearance of 12 feet at the center. An overhead power cable about 25 yards northward of the bridge has a permit clearance of 80 feet. On the southwest side of the bridge are two marinas where gasoline, diesel fuel, water, electricity, and restaurant facilities are available. See Appendix for **storm warning** display.

The waterway continues southward into **Blackwater Sound,** a body of water about 3 miles square that has depths of 7 to 8 feet in the center.

The waterway follows **Dusenberry Creek** from Blackwater Sound to **Tarpon Basin.**

Chart 850.—Tarpon Basin to Matecumbe.—Mile 990.2 to Mile 1009.9.—The waterway follows an east-to-west course across Tarpon Basin and on the west side exits through **Grouper Creek** into **Buttonwood Sound;** in the eastern end of the creek, the deepest water is close to the south bank.

From Buttonwood Sound, which has depths of 6 to 8 feet, the Intracoastal Waterway follows **Baker Cut, Mile 993.2,** into **Florida Bay.** The route across the bay crosses many bars and is well marked by aids.

Community Harbor, a bight on the southerly end of Key Largo and 1 mile southeast of **Mile 999.2,** is the bayside waterfront of **Tavernier.** The entrance is marked by daybeacons and stakes. A depth of 4 feet can be carried to the wharf. Gasoline, water, ice, and provisions are available. A marine railway that can haul out boats up to 40 feet in length and 4 feet in draft is available for emergency minor repairs.

Tavernier Creek, just westward of Tavernier, will

carry a 3-foot draft to Hawk Channel and is frequently used by local fishing craft. A fixed bridge near the eastern end of the creek has a horizontal clearance of 24 feet and a vertical clearance of 7 feet. A strong current sets through the bridge; at maximum flood and ebb the difference in height of water on opposite sides of the bridge is about 1 foot.

Cross Bank, Mile 1001.4, is crossed by **Cowpens Cut,** a straight dredged channel marked by lights and daybeacons.

Snake Creek, 1.3 miles south of **Mile 1004.2** between **Plantation Key** and **Windley Key,** is used by local fishing boats as a passage between the bay and the ocean. The fixed bridge across the creek has a horizontal clearance of 10 feet and a vertical clearance of 8 feet. Currents are strong through the creek. Gasoline, water, and ice are available at the wharf at the ocean entrance on Windley Key.

Windley Harbor, 1.7 miles south of **Mile 1005.3,** is a good but little used refuge that is well protected from all directions; the main channel is west of **Wilson Key.** See Appendix for **storm warning** display.

Upper Matecumbe Key is 2 miles southeast of **Mile 1007.5.** The post office is at **Islamorada** on the northeast part of the key and **Matecumbe** is on the southwest part. The **Florida Key Memorial** is in about the middle of the key. See Appendix for **storm warning** display. A yacht basin and marina are about the center of the key on the northwest side. Gasoline, diesel fuel, water, ice, and electricity are available at the yacht basin which has an entrance channel of 6 feet. A lift at the marina can handle boats up to 20 tons in weight for hull and engine repairs. There is a machine shop in the town of Islamorada.

At **Mile 1008.4,** the waterway passes through **Steamboat Channel,** a dredged cut through **Shell Key Bank.**

Chart 851.—Matecumbe to Grassy Key.—Mile 1009.9 to Mile 1027.9. Shell Key Channel and **Race Channel,** just to the northwestward of Upper Matecumbe Key, are used by small sport-fishing craft able to pass under the highway trestle which has a horizontal clearance of 35 feet and a vertical clearance of 10 feet. These channels join to form **Teatable Key Channel** connecting the Intracoastal Waterway and Hawk Channel.

Lignumvitae Channel, 1 mile southeast of **Mile 1011.9** and an unnamed channel north and east of **Lignumvitae Key,** join **Indian Key Channel** to form a passage from the Intracoastal Waterway to Hawk Channel. The controlling depth is about 5 feet. Gasoline and water are available at the northern end of Lower Matecumbe Key. Indian Key Channel is described in Chapter 11.

Peterson Key Bank, Mile 1012.5, is crossed by **Bowlegs Cut.** After passing through the cut traffic may continue southwestward through Channel Five to Hawk Channel.

Matecumbe Harbor is at the southwest end of **Lower Matecumbe Key,** 1 mile southeast of **Mile 1016.0** via Channel Five. The entrance is marked by a light and the remainder of the channel is privately marked. In November 1958 the controlling depth was 5 feet in the entrance and deeper water inside. Gasoline, water, and provisions are obtainable at a yacht basin in the harbor.

Channel Two, just west of Matecumbe Harbor, connects Florida Bay and Hawk Channel, and passes beneath the highway trestle. The controlling depth in the channel is 10 feet, and the trestle has a horizontal clearance of 34 feet and a vertical clearance of 11 feet.

Craig (P.O.) is a small settlement north of the highway bridge between Channel Two and Channel Five. The channel leading to the piers is privately marked. Gasoline, diesel fuel, lubricating oil, water, and provisions are available. See Appendix for **storm warning** display.

Channel Five, Mile 1017.5, one of the main routes by which boats can reach Hawk Channel, is described in Chapter 11.

At the west end of **Long Key,** 2.2 miles south of **Mile 1020.7,** gasoline is available at a small pier. **Conch Keys,** 2.4 miles west of the west end of Long Key, are marked by a watertank. The channel is privately marked. Gasoline and water are obtainable at the wharf.

At **Mile 1024.2,** the waterway goes through **Channel Key Banks** at **Channel Key Pass** which is marked by a light and daybeacons.

See Appendix for **storm warning** display.

Chart 852.—Grassy Key to Bahia Honda Key.—Mile 1027.9 to Mile 1047.7.—Marathon is on the west end of **Vaca Key,** 1.5 miles south of **Mile 1036.1.** It is the second largest town on the Florida Keys. Several fish wharves have 6 feet of water at their faces. Gasoline, diesel fuel, water, ice, and electricity are available at the basin on the north side. The entrance channel and basin have a controlling depth of 7 feet. Provisions are available in the town. See Appendix for **storm warning** display.

Knight Key Channel, just west of Marathon, passes under the highway trestle close westward of **Knight Key.** The controlling depth in the channel is about 8 feet and the trestle has a vertical clearance of 18 feet. **Boot Key Harbor** is described in Chapter 11.

Bethel Bank, Mile 1037.3, is a junction point in the Intracoastal Waterway. Vessels may follow the southern route via Moser Channel or Bahia Honda and Hawk Channel to Key West, or the northern alternate route via Big Spanish Channel and the Gulf of Mexico. The mileage along the northern route is suffixed by the letter "A". The southern route is about 14 miles shorter to Key West.

Paloma (Pigeon) Key, on the east side of Moser Channel, is marked by a group of white houses. The viaduct passes high overhead at the key.

Moser Channel, Mile 1040.2, and **Bahia Honda,** 7 miles to the westward, connect Florida Bay and Hawk Channel. These channels are described in Chapter 11.

Chart 853.—Bahia Honda to Sugarloaf Key.—Mile 1047.7 to Mile 1064.0.—The Intracoastal Waterway

routes through Moser Channel and Bahia Honda join at **Mile 1049.6,** about 2.1 miles south of the bridge over Bahia Honda, and then the route follows the aids in Hawk Channel to Key West. Hawk Channel is described in Chapter 11.

Newfound Harbor Keys Anchorage, Newfound Harbor Channel, Niles Channel, Loggerhead Key Anchorage, Cudjoe Bay, and **Sugarloaf Channel** are discussed in Chapter 11.

Chart 854.—Sugarloaf Key to Key West.—Mile 1064.0 to Mile 1080.7.—The Intracoastal Waterway joins the Main Ship Channel from Hawk Channel at **Mile 1079.2,** 1.1 miles southwestward of Key West Light, and then follows the main channel to **Key West, Mile 1080.7.** The supply and repair facilities at Key West are described in Chapter 11.

Saddlebunch Harbor, Boca Chica Channel, and **Safe Harbor Channel** are discussed in Chapter 11.

Chart 859.—Big Spanish Channel to Johnston Key.—Mile 1044.8A to **Mile 1069.1A.**—The northern alternate route of the Intracoastal Waterway leads northwestward from Bahia Honda through **Big Spanish Channel** to Harbor Key Bank, thence along the north side of the Florida Keys to Northwest Channel, thence to Key West. The controlling depth for this route is about 5 feet.

At **Mile 1048.9A,** about 1.6 miles northeastward of **No Name Key,** an inside route from just south of **Porpoise Key** to Key West is marked by an irregular line of daybeacons between the smaller keys northward of U.S. Highway 1. In November 1958 the controlling depth in the channel was less than 1 foot.

At **Mile 1055.0A** the waterway passes through a crooked channel marked by daybeacons southwest of **Big Spanish Key.** Caution should be exercised in this shoal area. Northward of the key the color of the water is a good indication of the channel location.

At **Harbor Key Bank Light, Mile 1058.7A,** the waterway enters the Gulf of Mexico, turns westward and follows a course of **246°** for about 28 miles to the lighted bell buoy at the entrance to **Northwest Channel, Mile 1087.2A.** A course closer to the Florida Keys should not be attempted because the landmarks are difficult to identify and the bottom inside the 18-foot contour rises abruptly.

Use charts **1251** and **584** westward of Johnston Key to Northwest Channel, thence to **Key West, Mile 1095.2A.** Northwest Channel and Key West are described in Chapter 11.

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, St. Croix River to Cape Cod, 1950.
2, Atlantic Coast, Cape Cod to Sandy Hook, 1950
3, Atlantic Coast, Sandy Hook to Cape Henry, 1953.
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, 1938.

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 (1948).
Tampa Bay (1951).
San Francisco Bay (1947).
Puget Sound, Northern Part (1952).
Puget Sound, Southern Part (1948).

District Offices.—Norfolk District, 102 West Olney Road, Norfolk 10, Va. The Norfolk District includes all of the States of West Virginia, Virginia, North Carolina, and parts of Kentucky and Tennessee east of the Tennessee River.

Tampa District, 19th and Grant Streets, Tampa 5, Fla. The Tampa District includes all of the States of South Carolina, Georgia, and Florida; this office, however, does not sell Coast Pilots, charts, or other publications.

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.

Virginia:

Newport News: * † E. Smola Co., 134 25th Street.
Norfolk: C&GS District Office, * † W. T. Brownley, 121 Randolph Street; * † Henry Eagleton Co., 430 Boush Street; * † E. Smola Co., 316 West Olney Road; Russ Equipment Co., Inc., Port Elco at Hague Marine, 600 Southampton Avenue.
Hampton: Haldeman Marine Sales, 200 East Queen Street.

North Carolina:

Bayboro: Ensley's Radio Co.
Belhaven: River Forest Manor.
Elizabeth City: The Albemarle Sport Center, 406 East Colonial Avenue.
Morehead City: † Dee Gee's Shop, D. G. Bell, Jr.
New Bern: Barbour Boat Works, Inc.; Trent Marine Service.
Raleigh: Raleigh Blue Printers, 107 West Martin Street.
Southport: Tarheel Sport Shop.
Washington: Kugler-Nicholson, Inc.
Wilmington: † O. E. DuRant, Water & Market Streets.
Wrightsville Beach: Wrightsville Marina, Box 269.

South Carolina:

Beaufort: Beaufort Book Shop.
Charleston: * † Capt. Chester Taylor, Nautical Supply & Instrument Co., 141 East Bay Street; † Heyward Supply Co., 167 East Bay Street.
Georgetown: Essomarine Dock.

Georgia:

Brunswick: Georgia Hardware Marine Supply, 205 Monk Street.
Savannah: John D. Robinson Co., 13 West Bay Street; * † Southern Marine Supply Co., Inc., 202 West Bay Street.

Florida:

Dania: DePadro Yacht Basin, P.O. Box 155.
Daytona Beach: John S. Robins Yacht Sales, 306 South Beach Street.
Flamingo: Everglades Park Co., Inc.
Fort Lauderdale: † Vogel's Marine Supply, 601 South Andrews Avenue; * † Herold Boat Co., 1112 East Olas Boulevard; Bahia-Mar Marine Supply Store; Phillips Petroleum Co., P.O. Box 1700, Pier 66; Harbor Beach Tackle & Marine, 2240 Southeast 17th Street.
Fort Myers: Parkers Book Store.
Fort Pierce: Hortons, Inc.

Homestead: Overseas Bait & Tackle Shop, 7295 Krone Avenue; Don's Bait and Tackle, 30711 South Federal Highway.

Jacksonville: The H. & W. B. Drew Co., 22–30 West Bay Street; * † Nautical Supply Co., 213 East Bay Street.

Key West: Capt. Red's, 517 Fleming Street.

Marathon: Ye Ole Feshin' Hole.

Melbourne: Melbourne Marina, Inc., 42 Front Street.

Merritt Island: Banana River Marine Service, Banana River Drive.

Miami: * † Hopkins-Carter Hardware Co., 135–139 South Miami Avenue; † Phillips Hardware Co., 490 Northwest South River Drive; * † Florida Precision Instruments Co., 1221 Biscayne Boulevard; * L. B. Harvey, Marine Instruments, 628 S.W., 2nd Avenue; † Santana Marine Service, Dinner Key.

New Smyrna Beach: Dan's Boathouse, Inc., 4 North Causeway.

Pompano Beach: Lighthouse Marine Center, 2507 North Ocean Boulevard.

Stuart: Anchorage Marina, P.O. Box 1607.

West Palm Beach: * Hopkins Marine Hardware Co., 207 6th Street; D & D Marine Supply Co., 1935 North Dixie.

PUBLICATIONS.—A resumé 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. C&GS Special Publication No. 211, Currents in St. Johns River, Savannah River, and Intervening Waterways; for sale by Superintendent of Documents, Washington 25, D.C., price 60 cents.

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. 205), Radio Weather Aids (H.O. Pub. No. 206), Weather station Index (H.O. Pub. No. 207), and International Code of Signals, Vol. II. Radio (H.O. Pub. No. 88): 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. 87): 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, Districts.—Norfolk District office: Foot of Front Street, Norfolk, Va.

The district comprises a small portion of southeastern West Virginia, central and eastern Virginia, and a portion of northern North Carolina embraced in the west shore drainage basins tributary to the southern part of Chesapeake Bay south of the watershed line between the northerly arm of Winter Harbor and Garden Creek, Va., and the eastern shore drainage basins south of and including Onancock River, Va.; the drainage tributary to the Atlantic Ocean from White Creek and Gargathy Inlet, inclusive, to the Virginia-North Carolina State line; the Roanoke River Basin above Weldon, N.C.; the Meherrin River Basin above Murfreesboro, N.C.; and the Chowan

River Basin above the confluence of the Nottoway and Blackwater Rivers, Va. It also includes the Virginia portion of the Intracoastal Waterway between Norfolk, Va., and Beaufort Inlet, N.C., and the portion of the waterway from Norfolk to the sounds of North Carolina north of Albemarle Sound.

Wilmington District office: 308 Customhouse, Wilmington, N.C.

The district comprises central and eastern North Carolina embraced in the drainage basins tributary to the Atlantic Ocean from the southern boundary of Virginia to Shallotte River, inclusive, with the exception of the Roanoke River Basin above Weldon, N.C.; the Meherrin River Basin above Murfreesboro, N.C.; and the Chowan River Basin above the confluence of the Nottaway and Blackwater Rivers. It includes the portion of the Atlantic Intracoastal Waterway from the northern boundary of North Carolina to Little River, S.C., and the portion of the waterway from Norfolk, Va., to the sounds of North Carolina, south of the north shore of Albemarle Sound.

Charleston District office: 205 King Street, Charleston 1, S.C.

The district comprises all of South Carolina (except the local watersheds draining into the Savannah River), western-central North Carolina, and a very small portion of southwestern Virginia. It embraces the drainage basins tributary to the Atlantic Ocean between Little River and Port Royal Sound, except the watersheds of Mackay and Skull Creeks, and excluding Hilton Head Island. It includes the Atlantic Intracoastal Waterway in the same reach.

Savannah District office: 200 East St. Julian St., Savannah, Ga.

The district comprises the drainage basins tributary to the Atlantic Ocean between Port Royal Sound, S.C., and the harbor at Fernandina, Fla., including the Atlantic Intracoastal Waterway between these points. This area covers the headwaters of the Savannah River in southwestern North Carolina, a considerable portion of western South Carolina, eastern Georgia, and a small portion of northeastern Florida.

Jacksonville District office: 575 Riverside Avenue, Jacksonville 2, Fla.

The district comprises a portion of south-central Georgia and all of peninsular Florida except a small northeastern portion, embracing the watersheds tributary to the Atlantic Ocean and the Gulf of Mexico from, but not including, the harbor at Fernandina, Fla., to and including the Aucilla River. It also includes Puerto Rico, the Virgin Islands of the United States, and other nearby islands.

COAST GUARD.—Commander, Fifth District. The Fifth Coast Guard District, with district office at the U.S. Post Office and Court House, P.O. Box 540, Norfolk 1, Va., shall comprise: Maryland, Virginia, District of Columbia, and North Carolina.

Captain of the Port Office, c/o Coast Guard Group Office, P.O. Box 4557, Berkley 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.

Commander, Seventh District. The Seventh Coast Guard District, with district office at 150 Southeast Third Avenue, Miami 32, Fla., shall comprise: South Carolina and Georgia; Florida, except the part west of the Apalachicola River; Panama Canal Zone; all of the island possessions of the United States pertaining to Puerto Rico and Virgin Islands; and all United States naval reservations in the islands of the West Indies and on the north coast of South America.

Captain of the Port Office, 196 Tradd Street, Charleston, S.C. All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from a point located at 32°57′00″ N., 80°00′00″ W., east to 79°52′00″ W. meridian; thence southeasterly to a point at 32°45′00″ N., 79°45′00″ W.; thence southwesterly to a point at 32°41′00″ N., 79°49′00″ W.; thence northwesterly to a point at 32°45′00″ N., 80°00′00″ W.; thence north to the point of beginning.

Captain of the Port Office, P.O. Box 3201, Station f, Jacksonville, Fla., All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from a point located at 30°45′00″ N., 81°48′00″ W., east to the 81°22′00″ W. meridian; thence south-southeasterly to a point at 29°51′00″ N., 81°15′00″ W., thence west to the 81°48′00″ W. meridian; thence north to the point of beginning.

Captain of the Port Office, Coast Guard Base, Key West, Fla. All navigable waters of the United States and contiguous land areas within the following boundaries: On the east the 81°44′00″ W. meridian; on the south the 24°27′00″ N. parallel; on the west the 81°55′00″ W. meridian; and on the north the 24°39′00″ N. parallel.

Captain of the Port Office, 10 North East Third Avenue, Miami 32, Fla. All navigable waters of the United States and contiguous land areas within the following boundaries: A line extending from a point located at 26°50′00″ N., 80°10′00″ W., east to the 79°54′00″ W. meridian; thence south-southwesterly to a point at 25°30′00″ N., 80°02′00″ W.; thence west to the 80°21′00″ W. meridian; thence north-northeasterly to the point of beginning.

Captain of the Port Office, P.O. Box 194, Savannah 12, Ga. All navigable waters of the United States and contiguous land areas within the following boundaries: a line extending from a point located at 32°08′00″ N., 81°09′00″ W. east to the 80°47′30″ W. meridian; thence south to the 31°59′00″ N. parallel; thence west to the 81°09′00″ W. meridian; thence north to the point of beginning.

Lifeboat Stations.—The lifeboat stations operated by the Coast Guard in the areas covered by this Coast Pilot are:

Virginia Beach, Va. (No. 162), 36°51.2′ N., 75°58.5′ W. On beach front, 5 miles south of Cape Henry Light.

Little Island, Va. (No. 164), 36°41.5′ N., 75°55.3′ W. On beach front abreast of North Bay.

Caffey Inlet, N.C. (No. 170), 36°13.6′ N., 75°46.2′ W. On beach front, 9.8 miles south of Currituck Beach Light.

Kill Devil Hills, N.C. (No. 173), 36°00.7′ N., 75°39.1′ W. On beach front, abreast south end Colington Island.

Oregon Inlet, N.C. (No. 176), 35°46.0′ N., 75°31.5′ W. Northerly end of Pea Island, 0.7 mile south of Oregon Inlet Light.

Cape Hatteras, N.C. (No. 183). 35°14.7′ N., 75°32.0′ W. 0.8 mile southwest of Cape Hatteras Light.

Hatteras Inlet, N.C. (No. 186), 35°12.5′ N., 75°42.4′ W. Southern end of Hatteras Island, 1 mile southwest of town of Hatteras.

Ocracoke, N.C. (No. 187), 35°06.9′ N., 75°59.3′ W. At Ocracoke, about 0.5 mile north of Ocracoke Light.

Cape Lookout, N.C. (No. 190), 34°36.2′ N., 76°32.3′ W. About 1.5 miles south of Cape Lookout Light.

Fort Macon, N.C. (No. 191), 34°41.8′ N., 76°40.8′ W. East end of Bogue Banks near Beaufort Inlet.

Swansboro, N.C. (No. 192), 34°38.8′ N., 77°05.7′ W. About 1 mile east of Bogue Inlet, on west end of Bogue Banks.

Oak Island, N.C. (No. 194), 33°53.7′ N., 78°02.1′ W. On Oak Island, west side Cape Fear River entrance.

Sullivans Island, S.C. (No. 196), 32°45.5′ N., 79°50.6′ W Near shore end of north entrance jetty.

St. Simons Island, Ga. (No. 198), 31°08.7′ N., 81°22.3′ W. Near south end of St. Simons Island.

Ponce de Leon Inlet, Fla. (No. 203), 29°03.9′ N., 80°54.9′ W. About 1.2 miles south-southeast of Ponce de Leon Inlet Light.

Fort Pierce, Fla. (No. 206), 27°28.1′ N., 80°17.8′ W. South side of entrance to Fort Pierce Inlet.

Lake Worth Inlet, Fla. (No. 208), 26°46.3′ N., 80°02.7′ W. South side of Peanut Island, 0.5 mile west of Lake Worth Inlet.

UNITED STATES 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.

Virginia District: The limits are the State of Virginia.

Ports of entry: *Norfolk and Newport News.

North Carolina District: The limits are the State of North Carolina.

Ports of entry: *Wilmington, *Beaufort, Morehead City, *Elizabeth City, Reidsville. Washington is a customs station, but not a port of entry.

South Carolina District: The limits are the State of South Carolina.

Ports of entry: *Charleston, *Georgetown.

Georgia District: The State of Georgia, except the north shore of St. Marys River and the city of St. Marys.

Ports of entry: *Savannah, *Brunswick.

Florida District: The State of Florida, the north bank of St. Marys River, and the city of St. Marys.

Ports of entry: *Tampa, *Fernadina Beach, *Jacksonville, *St. Augustine, *West Palm Beach, Port Everglades, *Miami, *Key West.

PUBLIC HEALTH SERVICE.—Quarantine stations where supervision of quarantine and medical examination of aliens are performed:

Savannah, Ga.; Public Service Hospital, York and Abercorn Streets.

Jacksonville, Fla.; Federal Building, 311 West Monroe Street.

Miami, Fla.: Fisher Island.

Additional ports of entry at which quarantine inspection and/or medical examination of aliens are performed:

Norfolk, Va.; Morehead City, Wilmington, N.C.; Charleston, Georgetown, Port Royal, S.C.; Brunswick, Ga.; Fernandina Beach, St. Augustine, Port Canaveral, Fort Lauderdale (Port Everglades), Fort Pierce, West Palm Beach, and Key West, Fla.

Hospitals:

Norfolk, Va.: 6500 Hampton Boulevard, Larchmont.

Savannah, Ga.: York and Abercorn Streets.

Outpatient Clinics:

Charleston, S.C.: U.S. Customhouse, Market and East Bay Streets.

Jacksonville, Fla.: 403 Federal Building, 311 West Monroe Street.

Miami, Fla.: 365 Federal Building, 300 Northeast First Avenue.

Outpatient Offices:

Elizabeth City, N.C.: 224 Carolina Building.

Edenton, N.C.: 108 East King Street.

Washington, N.C.: 420 North Market Street.

New Bern, N.C.: Elks Temple Building, 81 Pollock Street.

Beaufort, N.C.: 111 Pollock Street.

Morehead City, N.C.: 907 Evans Street.

Southport, N.C.

Wilmington, N.C.: 203 Murchison Building, 209 North Boulevard.

Brunswick, Ga.: Dunwoody Building, 1501 Newcastle Street.

Key West, Fla.: 420 Simonton Street.

IMMIGRATION and NATURALIZATION.—Offices of these services are established in the following ports covered by this Coast Pilot:

Norfolk, Va.: Room 230, U.S. Post Office Building.

Wilmington, N.C.: Room 223, U.S. Post Office Building.

Charleston, S.C.: Room 7, U.S. Customhouse, East Bay and Market Streets.

Savannah, Ga.: Room 8, U.S. Customhouse, 1 Bay Street.

Jacksonville, Fla.: U.S. Courthouse and Post Office Building.

West Palm Beach, Fla.: Customs Immigration Building.

Fort Lauderdale, Fla.: Room 181, U.S. Customhouse, Port Everglades Station.

Miami, Fla.: 3915 Biscayne Boulevard.

Key West, Fla.: Room 103, New Post Office Building, Simonton and Carolina Streets.

In addition, inspection services are provided at the following ports: Morehead City, N.C., Georgetown, Beaufort, S.C.; Brunswick, Ga.; Fernandina Beach, St. Augustine, and Fort Pierce, Fla.

LEGAL HOLIDAYS.—In the areas covered by this Coast Pilot, the following holidays are observed throughout:

January 1, New Year's Day; January 19, Robert E. Lee's Birthday; February 22, Washington's Birthday; July 4, Independence Day; Labor Day; November 11, Veterans Day; Thanksgiving Day; December 25, Christmas Day.

In addition, these holidays are observed as indicated: Arbor Day, third Friday in January, Florida; Easter Monday, North Carolina; April 13, Thomas Jefferson's Birthday, Virginia; April 26, Confederate Memorial Day, Georgia and Florida; May 10, Confederate Memorial Day, North Carolina, South Carolina; May 30, Memorial Day, Florida; June 3, Jefferson Davis' Birthday, Georgia and Florida.

YACHT CLUBS.—Yacht clubs in the area covered by this Coast Pilot include:

Virginia:

Norfolk: Norfolk Yacht and Country Club, Hampton Boulevard; Lafayette Yacht Club, Inc., 4257 Granby Street; Tidewater Boat Club, Inc., 45th Street and Colley Avenue.

Virginia Beach: Cavalier Yacht and Country Club, Bird Neck Point.

Elizabeth City: Pasquotank River Yacht Club, Riverside Avenue.

Morehead City: Morehead City Sailing Club.

New Bern: Eastern Carolina Yacht Club.

Wilmington: Tar Heels Afloat, 112 Princess Street.

Wrightsville Beach: Carolina Yacht Club.

South Carolina:

Beaufort: Beaufort Yacht Club.

Charleston: Carolina Yacht Club, Charleston Harbor; Charleston Yacht Club, west end Calhoun Street; Wappoo Country Club Marina.

Mount Pleasant: Mount Pleasant Yacht Club, Alhambra Park.

Georgia:

St. Simons Island: Frederica Yacht Club; St. Simons Boating and Fishing Club; Sea Island Yacht Club.

Savannah: Savannah Yacht and Country Club, Whitemarsh Island.

Florida:

Boynton Beach: Boynton Beach Boat Club, North Federal and 17th Avenue.

Cocoa: Indian River Yacht Club.

Coral Gables: University Yacht Club, University of Miami.

Daytona Beach: Halifax River Yacht Club, 331 South Beach Street; Daytona Beach Yacht Club, 633 Ballough Road.

Delray Beach: Gulf Stream Yacht Club.

Eau Gallie: Eau Gallie Yacht Club.

Fort George: Jean Rebault Club.

Fort Lauderdale: Bahia-Mar Yacht Club, Seabreeze Avenue; Coral Ridge Yacht Club, 2800 Yacht Club Boulevard; Gulfstream Sailing Club; Lauderdale Yacht Club, 1725 Southeast 12th Street; Lauderdale Isle Yacht Club, Riverland Road.

Fort Myers: Royal Palm Yacht Club.

Fort Pierce: Pelican Yacht Club, P.O. Box 756; Fort Pierce Yacht Club.

Hobe Sound: Hobe Sound Yacht Club.

Hollywood: Hollywood Yacht Club.

Jacksonville: El Verde Yacht Club, on Intracoastal Waterway; Florida Yacht Club, Venetia.

Key Biscayne: Key Biscayne Yacht Club.

Key Largo: Key Largo Anglers Club, north end Key Largo; Caribbean Club.

Key West: Key West Yacht Club, Garrison Bight.

Marathon: Marathon Yacht Club; Valhalla Yacht Club, Crawl Key.

Melbourne: Melbourne Yacht Club, 60 Front Street.

Miami: Bal Harbour Club, 200 Bal Bay Drive; Biscayne Bay Yacht Club, 2450 South Bayshore Drive; Coral Reef Yacht Club, 2484 South Bayshore Drive; Dinner Key Cruising Club, Dinner Key Marina; Flamingo Yacht Club; Gulf Stream Yacht Club, 1710 Purdy Avenue; Kingston Hotel and Yacht Club, 6380 Indian Creek Drive; Indian Creek Yacht Club; Isle de Capri Hotel and Yacht Club, 7900 Harbor Island; Miami Beach Rod and Reel Club, Inc., Hibiscus Id.; Miami Yacht Club, Watson Id., Biscayne Bay; Miami Rod and Reel Club (Fleet Division), 208 Hibiscus Id.; Pelican Harbor Yacht Club, 79th Street Causeway; Pan American Yacht Club, MacArthur Causeway.

New Smyrna Beach: Anglers Yacht Club; Smyrna Yacht Club.

Palm Beach: Sailfish Club of Florida.

Plantation Key: Plantation Yacht Harbor Club.

Rio: Anchorage Yacht Club, Route A1A (St. Lucie River).

St. Augustine: St. Augustine Boating Club, North Beach.

Stuart: St. Lucie Inlet Yacht Club; St. Lucie River Yacht Club, City Pier foot First Street.

Vero Beach: Vero Beach Yacht Club, Municipal Dock.

West Palm Beach: West Palm Beach Fishing Club; Palm Beach Yacht Club, 8th Street and Flagler Drive.

FEDERAL COMMUNICATIONS COMMISSION.—District field offices:

Norfolk: Room 402, Federal Building, Norfolk 10, Va.

Savannah: (subdistrict office) Room 214, Post Office Building, Savannah, Ga.

Miami: Room 312, Federal Building, Miami 1, Fla.

WEATHER BUREAU.—Offices: Barometers may be compared with standards at the following offices:

Norfolk, Va.: 424 Post Office Building.

Charleston, S.C.: Municipal Airport.

Jacksonville, Fla.: Imeson Municipal Airport.

Miami, Fla.: International Airport.

Radiotelephone Broadcasts of Weather Information.—Regular broadcasts of weather forecasts, storm warnings, and other information are made by commercial coastal harbor radiotelephone stations in plain language. Storm warnings are broadcast on receipt and at intervals thereafter while in effect. Regular scheduled times:

WGB, Norfolk, Va., 2538 kc.: 0000, 0600, 1200 and 1800 EST.

WJO, Charleston, S.C., 2566 kc.: 0715 and 1915 EST.

WNJ, Jacksonville, Fla., 2566 kc.: 0700 and 1900 EST.

WDR, Miami, Fla., 2514 kc. daytime only; 2490 kc.: 0715 and 1915 EST.

Radiotelephone broadcasts by Coast Guard.—Important notices to mariners, hydrographic information, storm warnings, advisories, and other urgent marine information are broadcast at scheduled times on indicated frequencies. Emergency broadcasts are made immediately following receipt of the information by the radio station; the information will be repeated on the next scheduled broadcast unless canceled or superseded.

NMN, Norfolk, Va., 2702 kc., warnings at 0020 and 1220 EST; also on receipt on 2182 kc.

NMN37, Fort Macon, N.C., 2702 kc., 1200 EST; warnings on receipt on 2182 kc.

NMB, Charleston, S.C., 2678 kc., warnings at 1120 and 2320 EST; also on receipt on 2182 kc.

NMV, Jacksonville, Fla., 2678 kc., 0120 and 1320 EST; warnings on receipt on 2182 kc.

NMA, Miami, Fla., 2678 kc., warnings at 1150 and 2350 EST; also on receipt on 2182 kc.

Radiotelegraph broadcasts by Coast Guard.—Storm and hurricane warnings, advisories, and other urgent marine information are broadcast by radiotelegraph at the scheduled times and indicated frequencies, preceded by an initial call on 500 kc. Emergency broadcasts are made during the first silent period after receipt.

NMN, 466 kc., Norfolk, Va.: 1120 and 2020 EST.

NMV, 440 kc., Jacksonville, Fla.: 1125 and 2025 EST.

NMA, 440 kc., Miami, Fla.: 1100 and 2000 EST.

Weather Broadcasts by Commercial Radio Stations.—The following commercial radio stations have installed microphones in nearby Weather Bureau offices, from which forecasts and warnings are broadcast on the eastern standard time schedules indicated.

All Virginia stations include forecasts and warnings covering offshore areas from Hatteras, N.C., to Jacksonville, Fla., and Hatteras to Block Island, R.I. All North and South Carolina and Georgia stations include forecasts and warnings covering offshore areas from Hatteras to Jacksonville. The Florida stations include the offshore area from Jacksonville to Key West; the Jacksonville stations also include the area Hatteras to Jacksonville, and the Key West station also includes the eastern part of the Gulf of Mexico.

Hampton, Va., WVEC, 1490 kc., 1230 and 1755 weekdays and Saturdays.

Norfolk, Va., WTAR, 790 kc., 0730 and 1205 weekdays and Saturdays; WCMS, 1050 kc., 0730, 1230, and 1630 weekdays and Saturdays; WNOR, 1230 kc., 0645, 0745, 1205, and 1800 weekdays and Saturdays.

Portsmouth, Va., WLOW, 1400 kc., 0725, 1200, and 1737 weekdays and Saturdays.

New Bern, N.C., WHIT 1450 kc., 0626 and 1210 weekdays and Saturdays.

Wilmington, N.C., WGNI, 1340 kc., 1220 weekdays and Saturdays.

Beaufort, S.C., WBEU., 960 kc., 1205 daily.

Charleston, S.C., WCSC, 1390 kc., 0730 and 1410 weekdays and 0730 Saturdays; WCSC–FM, 96.9 mc., 0730 weekdays and Saturdays; WTMA, 1250 kc. and WTMA–FM, 95.1 mc., 0725, 0830, and 1330 weekdays, 0725 and 0830 Saturdays.

Savannah, Ga., WSAV, 630 kc., 0606, 0655, 0801, 1225, 1735, 1835, 2305, and 2400 weekdays and Saturdays; WTOC, 1290 kc. and WTOC–FM, 97.3 mc., 0005, 0605, 0655 weekdays and Saturdays, 1137 weekdays, and 0005 Sundays.

Coral Gables, Fla., WVCG, 1070 kc. and WVCG–FM, 105.1 mc., 0700, 1300, 1725, 1740, and 2255 weekdays, 0700 and 2255 Saturdays and Sundays.

Daytona Beach, Fla., WMFJ, 1450 kc., 0756, 1206, and 1805 daily; WNDB, 1150 kc. and WNDB–FM, 94.5 mc., 0755 and 1206 daily, 1801 weekdays and Saturdays, 0800 Sundays.

Homestead, Fla., WSDB, 1430 kc., 0635 and 1245 weekdays, 0635 Saturdays, and 0800 Sundays.

Jacksonville, Fla., WJAX, 930 kc. and WJAX–FM, 95.1 mc., 1210 daily; 0635, 1820, and 2305 weekdays and Saturdays.

West Palm Beach, Fla., WEAT, 850 kc., 0815 and 1810 weekdays and Saturdays.

Miami, Fla., WCKR, 610 kc., 0635 weekdays and Saturdays, 1245 weekdays.

Key West, Fla., WKWF, 1600 kc., 0745 and 1230 weekdays and Saturdays, 1530 and 1830 Saturdays and Sundays.

Storm Warning Stations.—Weather Bureau listing of the display stations in the area covered by this Coast Pilot follow. **DN** indicates day and night display; **D** day display only; **W**, no display, posted warning only.

Virginia:

DN Cape Henry; 36°55.8′, 76°00.5′.

North Carolina:

DN Coinjock; 36°20.7′, 75°57.1′.
DN Elizabeth City; 36°17.8′, 76°13.2′.
DN Edenton; 36°03.4′, 76°36.8′.
D Columbia; 35°55.0′, 76°15.2′.
DN Manteo; 35°54.5′, 75°40.0′.
DN Washington; 35°32.2′, 77°02.8′.
D Diamond Shoal Lightship; 35°05.3′, 75°19.4′.
DN Hatteras; 35°13.0′, 75°41.0′.
D Ocracoke Lifeboat Station; 35°06.9′, 75°59.3′.
DN New Bern; 35°05.8′, 77°02.5′.
DN Morehead City; 34°43.2′, 76°42.9′.
W Beaufort; 34°43.0′, 76°39.9′.
D Masonboro Sound; 34°13.0′, 77°48.5′.
D Frying Pan Shoals Lightship; 33°28.0′, 77°33.8′.
DN North Carolina State Docks; 34°12.2′, 77°57.3′.
D Wrightsville Beach; 34°12.1′, 77°48.1′.
D Carolina Beach; 34°01.9′, 77°53.7′.
DN Southport; 33°55.0′, 78°01.1′.

South Carolina:

D Little River; 33°52.1′, 78°36.5′.
D Ocean Drive Beach; 33°49.0′, 78°40.4′.
D Crescent Beach; 33°48.5′, 78°42.6′.
D Briar Cliffe; 33°48.0′, 78°45.0′.
D Myrtle Beach; 33°40.9′, 78°53.4′.
D Garden City Beach; 33°34.5′, 78°59.9′.
D Murrells Inlet; 33°33.0′, 79°02.4′.
DN Georgetown; 33°21.8′, 79°17.0′.
D McClellanville; 33°04.8′, 79°27.6′.
D Charleston Army Depot; 32°54.8′, 79°55.4′.
D Charleston Fleet Landing; 32°46.8′, 79°55.5′.
D Charleston Municipal Yacht Basin; 32°46.8′, 79°56.9′.
DN Charleston USCG Base; 32°46.4′, 79°56.6′.
DN Sullivans Island Lifeboat Station; 32°45.5′, 79°50.6′.
D Edisto Island; 32°29.5′, 80°20.6′.
W Port Royal; 32°22.4′, 80°41.4′.

Georgia:

D Isle of Hope; 31°59.0′, 81°03.3′.
DN Brunswick; 31°08.1′, 81°29.8′.

Florida:

DN Fernandina Beach; 30°40.3′, 81°27.9′.
D Jacksonville Beach, El Verde Yacht Basin; 30°17.2′, 81°25.2′.
D St. Augustine; 29°53.5′, 81°18.6′.
D Daytona Beach Halifax River Yacht Club; 29°12.5′, 81°00.9′.
D Ponce de Leon Inlet Lifeboat Station; 29°04.0′, 80°54.8′.
W Titusville; 28°37.0′, 80°48.0′.
D Eau Gallie; 28°07.5′, 80°37.7′.
5 W Melbourne; 28°04.7′, 80°36.0′.
D Vero Beach; 27°39.2′, 80°22.2′.
D Fort Pierce Inlet Lifeboat Station; 27°28.0′, 80°18.0′.
D Stuart; 27°09.8′, 80°11.0′.
W Okeechobee; 27°14.0′, 80°50.0′.
10 W Canal Point; 26°51.0′, 80°38.0′.
D Moore Haven; 26°50.0′, 81°05.9′.
W Pahokee; 26°49.0′, 80°40.0′.
D Clewiston; 26°45.3′, 80°55.0′.
D Belle Glade; 26°41.1′, 80°40.0′.
15 D Lake Worth Inlet Lifeboat Station; 26°46.3′, 80°02.8′.
D West Palm Beach (Marina); 26°43.0′, 80°03.0′.
D West Palm Beach (Post Times); 26°42.7′, 80°03.2′.
D Port Everglades; 26°05.6′, 80°07.5′.
20 D Fort Lauderdale (Bahia Marina); 26°06.8′, 80°06.5′.
DN Fort Lauderdale (Pier 66); 26°06.1′, 80°07.1′.
D Bakers Haulover; 25°54.2′, 80°07.5′.
D Miami Beach Boat Slip; 25°47.7′, 80°08.7′.
25 D Miami City Yacht Basin; 25°46.7′, 80°11.2′.
D Miami Beach Fisher Island; 25°45.8′, 80°08.3′.
D Miami Dinner Key; 25°43.7′, 80°14.2′.
D Miami Crandon Park; 25°43.4′, 80°09.3′.
D Fowey Rocks Light; 25°35.4′, 80°05.8′.
30 D Homestead Bayfront Park; 25°27.7′, 80°20.4′.
D Carysfort Reef Light; 25°13.3′, 80°12.7′.
D Jewfish Creek Fishing Camp; 25°11.0′, 80°23.3′.
D Tavernier; 25°00.6′, 80°31.0′.
D Windley Key; 24°56.9′, 80°35.7′.
35 D Islamorada; 24°55.0′, 80°37.9′.
D Alligator Reef Light; 24°51.1′, 80°37.1′.
D Craig; 24°50.3′, 80°45.7′.
D Bonefish Harbor (Grassy Key); 24°46.0′, 80°56.7′.
D Marathon, Leonards Store; 24°43.8′, 81°01.8′.
40 D Marathon, Hows Hobby Shop; 24°43.0′, 81°04.5′.
D Marathon; 24°42.2′, 81°06.7′.
D Key Colony Beach; 24°43.0′, 81°05.0′.
D Sombrero Key Light; 24°37.6′, 81°06.7′.
D American Shoals Light; 24°31.5′, 81°31.2′.
45 DN Key West, Lumley & Roberts Co.; 24°33.6′, 81°48.1′.
D Key West, Eisner Yacht Basin; 24°33.5′, 81°47.3′.
D Key West, Navy Station; 24°33.1′, 81°48.4′.

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.

NORFOLK, VA. (Municipal Airport) 36°53' N., 76°12' W. Elevation (ground) 26 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): 7:00 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)				88	88		88	68	71	21	46	9	47	59	68	88	88	88	88	68	74	66
Jan.	50.0	33.0	41.5	80	5	3.17	4.07	2.5	79	61	10.3	SW	54 SW	50	5.9	10	8	13	11	1	*	2
Feb.	50.9	33.1	42.0	82	2	3.06	3.45	2.5	77	56	10.5	N	54 SW	57	5.5	9	8	11	11	1	1	2
Mar.	59.2	38.9	49.1	92	14	3.27	2.78	1.5	77	55	11.1	NE	55 W	60	5.6	10	9	12	12	*	2	1
Apr.	66.2	46.4	56.3	95	23	3.16	5.19	T	74	52	10.5	SW	54 N	63	5.2	11	9	10	10	*	3	1
May	75.4	56.4	65.9	98	36	3.45	3.78	0.0	76	55	9.4	SW	61 W	66	5.2	11	11	9	11	0	5	1
June	84.1	65.2	74.7	103	49	4.16	5.97	0.0	78	57	8.7	SW	70 W	66	5.3	10	12	8	11	0	7	1
July	86.0	68.9	77.5	104	57	6.05	5.00	0.0	81	59	8.3	SW	55 SW	66	5.5	10	12	9	12	0	9	
Aug.	84.6	68.1	76.4	105	56	5.08	6.84	0.0	83	62	8.2	NE	61 NE	66	5.4	10	12	9	12	0	7	1
Sep.	79.9	64.0	72.0	100	40	3.86	4.36	0.0	82	61	8.7	NE	65 NE	63	5.1	11	10	9	8	0	3	1
Oct.	70.0	52.4	61.2	95	31	2.45	6.29	0.0	81	60	9.4	NE	68 S	64	4.7	14	8	9	8	0	1	2
Nov.	60.2	42.5	51.4	87	17	2.67	5.48	0.1	80	56	9.8	SW	46 NW	60	4.9	12	8	10	8	*	*	2
Dec.	51.1	34.4	42.8	78	5	2.88	2.52	2.0	79	59	9.8	SW	54 W	52	5.6	11	8	12	10	1	*	2
Year	68.1	50.3	59.2	105	2	43.26	6.84	8.6	79	59	9.6	SW	70 W	62	5.3	129	115	121	124	3	38	16

CAPE HENRY, VA. (Fort Story) 36°56' N., 76°00' W. Elevation (ground) 16 feet. WB-1952

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): 7:30 a.m. EST	1:30 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)	79	79	79	79	79	79	79	61	31	30	22	79	41	27	42	79	79	79	79	61	61	61
Jan.	48.9	34.3	41.6	79	6	3.18	2.65	2.0	80	69	11.4	SW	63 N	50	6.1	9	9	13	11	1	*	3
Feb.	49.1	34.2	41.7	84	5	3.28	4.23	2.5	78	67	11.9	N	55 N	57	6.6	9	8	11	10	1	1	3
Mar.	55.7	39.7	47.7	90	12	3.83	2.92	1.1	77	64	11.9	SW	51 N	60	5.4	10	10	11	12	*	2	3
Apr.	63.6	47.5	55.6	97	26	3.30	5.01	T	75	63	11.1	SW	52 NE	65	5.2	11	9	10	10	*	3	2
May	72.9	57.4	65.2	98	41	3.46	3.17	0.0	77	64	9.9	SW	57 N	68	5.0	12	10	9	11	0	5	3
June	80.8	66.1	73.5	104	48	3.93	3.97	0.0	80	66	9.0	SW	54 NW	69	5.1	10	12	8	10	0	7	1
July	84.8	70.5	77.7	102	55	5.24	5.76	0.0	82	68	8.3	SW	55 NW	67	5.1	11	12	8	11	0	9	1
Aug.	83.2	70.2	76.7	103	57	4.79	6.04	0.0	82	68	8.8	SW	71 NE	68	4.9	11	12	8	11	0	7	*
Sep.	78.6	66.5	72.6	99	47	3.42	7.18	0.0	81	68	10.6	NE	116 NW	65	5.0	12	10	8	8	0	3	1
Oct.	69.1	56.0	62.6	95	35	3.84	3.76	0.0	80	66	11.4	N	50 N	67	4.6	14	8	9	7	0	1	1
Nov.	58.9	45.3	52.1	86	19	2.66	4.60	T	79	66	11.8	SW	51 N	61	4.9	12	8	10	8	*	1	2
Dec.	50.6	36.7	43.7	78	7	3.23	3.17	1.5	79	69	11.3	SW	53 NW	53	5.8	10	9	12	10	1	3	3
Year	66.4	52.0	59.2	104	5	44.16	7.18	7.1	79	67	10.6	SW	116 NW	63	5.3	131	117	117	119	3	39	23

WILMINGTON, N. C. (New Hanover County Airport) 34°16' N., 77°55' W. Elevation (ground) 30 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): 7:00 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)				88	88		88	88	22	22	27	82	46	65	23	88	88	88	88	88	88	88
Jan.	58.7	36.9	47.8	80	9	3.12	4.56	0.3	83	58	8.3	SW	50 S	57	5.8	10	9	12	9	*	1	2
Feb.	59.8	37.5	48.7	81	5	3.30	3.23	0.7	80	55	9.0	SW	57 SW	60	5.4	10	8	10	10	*	1	1
Mar.	65.9	43.5	54.7	94	20	3.45	5.26	0.1	81	54	9.6	SW	49 SW	64	5.4	11	10	10	10	*	2	1
Apr.	73.4	50.9	62.2	93	28	2.71	3.39	T	80	51	9.6	SW	49 NE	69	4.7	13	10	7	8	*	3	*
May	80.5	59.5	70.0	98	38	3.43	2.90	T	81	54	8.5	SW	43 NW	71	5.1	12	12	7	9	*	5	*
June	87.3	67.9	77.6	104	51	4.49	7.69	0.0	83	59	8.1	SW	47 NW	68	5.3	9	14	7	12	0	8	*
July	89.1	70.9	80.0	103	54	8.16	7.33	0.0	86	63	7.9	SW	36 NW	65	5.6	8	15	8	14	0	11	*
Aug.	88.4	70.2	79.3	101	56	6.40	8.04	0.0	88	63	7.3	SW	63 NE	66	5.4	9	14	8	14	0	9	*
Sep.	84.8	66.0	75.4	100	42	5.95	9.52	0.0	88	62	7.4	NE	76 N	65	5.6	10	11	9	10	0	4	1
Oct.	76.1	54.5	65.3	95	30	2.78	5.31	0.0	88	57	7.5	NE	71 SE	69	4.5	15	9	7	7	0	1	2
Nov.	66.8	44.6	55.7	83	16	2.59	4.42	T	85	54	7.6	NE	36 SW	67	4.6	14	8	8	7	*	1	2
Dec.	59.3	37.7	48.6	80	6	3.46	4.14	0.3	80	55	7.7	W	38 W	57	5.4	12	9	10	10	*	*	2
Year	74.2	53.3	63.8	104	5	49.84	9.52	1.4	84	57	8.2	SW	76 N	65	5.2	133	129	103	120	*	46	11

CAPE HATTERAS, N. C. (Weather Bureau Building) 35°13' N., 75°33' W. Elevation (ground) 7 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): 7:00 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)				84	84		67	66	67	18	54	8	47	13	24	67	67	67	84	28	61	61
Jan.	54.3	41.6	48.0	74	11	4.10	3.44	0.3	84	74	12.4	NW	66 SW	47	6.1	10	8	13	12	*	1	2
Feb.	54.1	41.1	47.6	73	11	4.01	4.34	0.4	82	70	12.7	N	59 S	52	5.9	10	7	11	11	*	1	2
Mar.	59.2	46.2	52.7	82	24	3.89	3.28	T	79	71	12.9	SSW	59 W	55	5.9	11	9	11	11	0	2	2
Apr.	65.9	53.3	59.6	85	31	3.08	4.49	T	78	68	12.1	SSW	46 S	67	5.1	13	9	8	9	0	3	1
May	73.9	62.4	68.2	88	43	3.93	7.44	0.0	79	70	11.0	SSW	52 NW	68	5.3	13	10	8	9	0	5	*
June	80.9	70.2	75.6	97	53	4.37	14.73	0.0	81	73	10.3	SSW	51 W	68	5.4	12	10	8	10	0	6	*
July	83.4	73.5	78.5	95	56	6.48	7.72	0.0	82	74	10.2	SSW	67 NW	68	5.8	11	12	8	11	0	8	*
Aug.	83.3	73.2	78.3	93	60	5.83	5.55	0.0	82	73	9.6	SSW	67 SE	65	5.6	12	11	8	12	0	7	0
Sep.	80.1	70.4	75.3	92	50	6.09	11.99	0.0	82	73	10.4	NNE	96 W	58	5.7	12	10	8	9	0	4	*
Oct.	71.7	60.9	66.3	90	41	4.05	12.46	0.0	81	71	11.0	NNE	49 SE	59	5.1	14	8	9	9	0	1	*
Nov.	63.2	51.4	57.3	79	26	3.85	8.73	T	82	69	11.6	N	56 N	56	5.1	13	8	9	9	0	1	1
Dec.	55.7	43.2	49.5	75	8	5.09	4.06	0.4	83	73	12.3	SW	49 NW	53	5.9	11	8	12	11	*	1	1
Year	68.8	57.3	63.1	97	8	54.77	14.73	1.1	81	72	11.4	SSW	96 W	60	5.6	142	110	113	123	*	40	9

CHARLESTON, S. C. (Custom House) 32°47' N., 79°56' W. Elevation (ground) 9 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): 7:00 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)				88	88		88	68	18	18	27	9	47	62	9	10	10	10	88	68	18	9
Jan.	59.0	43.8	51.4	82	10	2.48	3.98	T	86	56	8.6	SW	53	58	6.1	8	8	15	9	*	1	4
Feb.	60.4	45.0	52.7	82	7	3.07	4.77	0.1	85	51	9.2	WSW	45 NW	60	5.8	10	7	11	9	*	1	2
Mar.	65.8	50.3	58.1	94	24	3.38	4.07	T	84	51	9.5	SSW	63	65	6.3	8	8	15	9	0	2	2
Apr.	73.3	57.8	65.6	93	32	2.45	8.30	0.0	84	50	9.6	SSW	56 E	72	5.5	11	8	11	7	0	3	3
May	80.0	65.8	72.9	99	45	3.36	5.88	0.0	85	53	8.9	S	59	73	6.0	8	12	11	8	0	7	3
June	86.3	72.9	79.6	104	49	4.29	6.01	0.0	86	59	8.5	SW	47 NW	70	6.0	6	13	11	11	0	11	2
July	88.0	75.0	81.5	104	61	8.04	8.56	0.0	89	64	8.1	SW	52	66	6.4	5	13	13	13	0	15	1
Aug.	87.4	74.5	81.0	102	62	6.54	8.55	0.0	91	62	8.2	SW	63	66	6.0	6	14	11	12	0	12	2
Sep.	84.0	71.3	77.7	100	49	5.31	10.57	0.0	92	63	8.8	NNE	66	67	6.5	5	11	14	10	0	5	2
Oct.	75.4	61.0	68.2	95	37	2.44	9.55	0.0	90	57	8.9	NNE	49	68	5.4	11	8	12	6	0	1	3
Nov.	66.3	50.9	58.6	84	17	1.92	5.84	0.0	89	52	8.5	NNE	43	68	4.9	14	6	10	7	0	1	4
Dec.	59.9	44.4	52.2	81	12	2.71	3.46	0.1	86	56	8.4	SW	63 NE	57	6.0	9	8	14	9	*	*	4
Year	73.8	59.4	66.6	104	7	45.99	10.57	0.2	87	56	8.8	SW	66	66	5.9	101	116	148	110	*	59	32

SAVANNAH, GA. (Travis Field) 32°08' N., 81°12' W. Elevation (ground) 48 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): 7:00 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)				88	88		88	68	70	41	87	18	48	65	18	88	88	88	88	85	83	83
Jan.	62.2	40.9	51.6	84	12	2.45	3.48	T	83	58	8.3	WNW	50 SW	54	5.6	11	9	11	9	*	1	3
Feb.	64.1	42.6	53.4	85	8	2.82	3.35	T	81	56	8.8	WNW	54 SW	55	5.7	10	8	10	9	*	1	2
Mar.	69.8	47.5	58.7	94	24	3.49	3.34	T	82	54	9.1	WNW	52 S	61	5.8	12	10	9	9	0	2	2
Apr.	77.1	54.3	65.7	94	33	2.47	6.12	0.0	79	53	8.8	SSE	56 SW	66	5.1	12	10	8	7	0	3	1
May	83.7	62.1	72.9	101	44	2.91	5.65	0.0	79	54	7.9	SSE	60 W	68	5.2	12	12	7	9	0	6	1
June	89.7	69.3	79.0	103	49	5.17	6.10	0.0	81	58	7.3	SW	57 E	64	5.7	9	13	8	12	0	10	*
July	90.8	71.5	81.2	105	61	7.09	6.43	0.0	85	61	7.0	SW	47 W	60	6.1	7	15	9	14	0	13	*
Aug.	89.8	71.0	80.4	104	60	6.25	8.57	0.0	88	61	6.7	SW	78 N	60	5.7	8	14	9	13	0	11	*
Sep.	86.1	67.3	76.7	102	46	6.50	11.44	0.0	89	62	7.0	NNE	49 NW	58	6.0	10	11	9	10	0	5	1
Oct.	77.6	56.3	67.0	94	28	2.45	7.85	0.0	86	57	7.6	NNE	74 NE	62	4.9	14	9	8	7	0	1	2
Nov.	68.8	46.1	57.5	86	15	1.51	4.15	T	84	56	7.6	NNE	50 SE	63	4.7	13	8	9	6	0	*	2
Dec.	62.5	40.9	51.7	83	12	2.64	3.93	T	84	60	7.9	NE	44 SW	52	5.7	11	8	12	9	0	*	3
Year	76.9	55.8	66.4	105	8	45.75	11.44	T	83	58	7.8	NNE	78 N	61	5.5	129	127	109	114	*	53	17

JACKSONVILLE, FLA., (Thomas C. Imeson Airport) 30°25' N., 81°39' W.; Elevation (ground) 24 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): 7:00 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)				87	87	(b)	87	87	22	22	87	9	87	61	69	87	87	87	87	87	68	13
Jan.	66.3	45.4	55.9	85	15	2.68	3.43	T	88	56	7.7	NW	44 SW	58	5.3	10	10	11	8	0	1	6
Feb.	68.2	46.7	57.5	87	10	2.66	4.16	T	86	51	8.2	SW	66 W	60	5.2	10	9	9	8	*	2	4
Mar.	73.2	51.4	62.3	91	25	3.42	4.47	T	85	49	8.3	WSW	57 SW	66	4.9	12	11	8	8	0	3	3
Apr.	79.0	57.8	68.4	93	34	3.34	4.88	0.0	84	47	8.3	SE	47 NW	71	4.7	12	11	7	7	0	4	3
May	85.2	64.5	74.9	99	46	3.43	9.06	0.0	81	47	7.7	WSW	50 SE	71	4.8	12	12	7	9	0	7	2
June	90.0	70.6	80.3	103	54	6.82	7.66	0.0	84	54	7.5	SW	51 SW	63	5.6	8	14	8	13	0	13	1
July	91.4	72.7	82.1	105	64	7.64	5.49	0.0	85	57	7.2	SW	46 W	62	5.9	7	16	8	16	0	17	*
Aug.	90.7	72.9	81.8	102	64	6.43	6.18	0.0	89	59	7.0	SW	44 SW	63	5.6	7	16	8	15	0	15	1
Sep.	87.5	70.8	79.2	100	49	6.96	10.17	0.0	90	61	7.5	NE	66 SE	58	5.7	8	13	9	14	0	8	1
Oct.	80.0	61.7	70.9	96	37	4.71	9.62	0.0	90	57	7.9	NE	63 E	58	5.1	12	10	9	9	0	2	3
Nov.	71.8	51.4	61.6	87	22	1.62	4.21	T	88	54	7.6	NW	52 S	61	4.7	12	9	9	7	0	1	5
Dec.	66.7	46.0	56.4	84	14	2.37	4.97	T	89	58	7.6	NW	47 SW	53	5.4	11	9	11	8	0	1	5
Year	79.2	59.3	69.3	105	10	52.08	10.17	T	87	54	7.7	SW	66 W	62	5.2	121	140	104	122	*	74	34

DAYTONA BEACH, FLA., (Municipal Airport) 29°11' N., 81°03' W.; Elevation (ground) 31 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): 7:00 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)				24	24		24	24	14	14	13	13			24	24	24	24	24	24	14	14
Jan.	69.3	49.6	59.5	92	18	2.10	2.21	0.0	91	60	8.3	NW			5.3	10	11	10	7	0	1	6
Feb.	71.0	49.9	60.5	89	24	2.40	3.15	T	90	57	9.1	NNW			5.4	9	10	9	7	0	1	4
Mar.	74.4	52.9	63.7	92	29	3.62	5.74	0.0	89	57	9.3	SSW			5.6	8	13	10	7	0	3	4
Apr.	79.6	58.3	69.0	93	32	2.93	4.00	0.0	87	57	9.1	E			5.5	8	13	9	7	0	5	2
May	84.7	64.0	74.4	100	40	3.27	4.22	0.0	86	58	8.3	E			5.2	9	14	8	8	0	9	2
June	88.6	69.6	79.1	102	57	6.69	5.04	0.0	88	63	7.5	SSW			6.0	6	13	11	13	0	14	1
July	89.8	71.7	80.8	99	63	7.11	3.60	0.0	90	67	6.9	SSW			6.5	3	16	12	15	0	19	1
Aug.	89.7	72.1	80.9	101	65	5.82	4.62	0.0	92	69	6.7	SSW			6.1	4	17	10	13	0	17	2
Sep.	87.2	71.5	79.4	99	52	6.52	4.40	0.0	91	68	7.9	ENE			6.4	4	14	12	14	0	9	1
Oct.	81.6	65.2	73.4	94	39	5.89	9.29	0.0	89	66	8.7	NE			5.5	9	12	10	11	0	3	2
Nov.	74.2	55.9	65.1	89	25	2.27	5.64	0.0	90	61	8.1	NW			5.2	10	11	9	7	0	1	4
Dec.	69.7	51.3	60.5	86	24	2.45	3.27	0.0	91	62	8.3	NW			5.7	9	10	12	8	0	1	6
Year	80.0	61.0	70.5	102	18	51.07	9.29	T	90	62	8.2	SSW			5.7	89	154	122	117	0	83	35

MELBOURNE, FLA., 28°06' N., 80°36' W.; Elevation (ground) 26 feet. WB-1951.

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): 7:30 a.m. EST	1:30 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)	14	14	14	14	14	14	14	14	6	6					3	7	7	7	14	14	7	7
Jan.	72.2	52.0	62.1	88	22	1.91	4.28	0.0	91	63					4.6	8	14	9	7	0	1	4
Feb.	72.6	53.2	62.9	91	28	2.23	3.14	0.0	89	58					4.9	8	13	7	6	0	1	2
Mar.	76.8	57.1	67.0	90	31	3.41	2.88	0.0	88	58					5.2	9	12	10	7	0	4	3
Apr.	80.2	62.2	71.2	94	38	2.55	2.55	T	84	59					5.7	8	14	8	6	0	6	2
May	84.8	65.9	75.4	97	50	3.37	4.20	0.0	85	60					4.7	9	13	9	8	0	10	*
June	88.4	71.0	79.7	100	63	6.00	6.85	0.0	85	63					5.6	5	14	11	12	0	13	*
July	89.6	72.3	81.0	99	66	6.41	3.12	0.0	87	67					6.0	2	15	14	14	0	19	1
Aug.	90.0	73.2	81.6	100	66	5.07	6.81	0.0	89	68					6.3	4	13	14	14	0	18	1
Sep.	87.5	72.7	80.1	97	57	8.84	8.20	0.0	88	69					6.0	4	13	13	16	0	10	1
Oct.	82.8	67.4	75.1	95	41	5.52	5.38	0.0	87	65					5.7	6	13	12	13	0	3	1
Nov.	76.8	59.2	68.0	89	30	2.70	4.50	0.0	90	63					4.3	10	11	9	7	0	2	2
Dec.	73.6	54.8	64.2	90	27	1.98	2.16	0.0	91	64					5.6	7	11	13	9	0	1	4
Year	81.3	63.4	72.4	100	22	49.99	8.20	T	88	63					5.4	80	156	129	119	0	88	21

MIAMI, FLA., (International Airport) 25°48' N., 80°16' W.; Elevation (ground) 7 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)				19	19		19	19	19	19	9	10	9		9	9	9	9	9	9	9	9
Jan.	77.9	58.6	68.3	87	28	2.06	2.50	0.0	87	59	8.6	ESE	33 NE		4.4	14	12	5	5	0	1	2
Feb.	79.0	58.4	68.7	89	32	1.78	2.06	0.0	86	56	9.0	N	35 SSW		5.0	10	13	5	6	0	2	1
Mar.	81.3	61.2	71.3	90	33	2.25	7.07	0.0	84	55	8.7	SE	39 WSW		4.8	11	13	7	5	0	2	1
Apr.	84.5	65.3	74.9	93	39	3.99	12.58	0.0	81	56	8.9	ESE	45 SSW		5.4	8	15	7	7	0	4	*
May	87.2	68.8	78.0	94	51	5.55	8.42	0.0	80	59	8.1	SE	41 SW		5.4	8	14	9	10	0	7	1
June	90.0	72.5	81.3	98	61	6.82	5.81	0.0	83	62	7.1	SE	39 SSW		6.0	5	14	11	10	0	11	0
July	91.0	74.1	82.6	100	68	6.73	4.55	0.0	83	64	6.9	SE	27 SW		6.3	3	17	11	16	0	14	0
Aug.	91.2	74.5	82.9	98	68	6.61	3.16	0.0	86	62	6.2	SE	52 SW		6.3	3	20	8	15	0	16	*
Sep.	89.6	73.7	81.7	95	67	8.33	6.52	0.0	88	66	7.1	ESE	32 SSW		6.4	4	15	11	17	0	11	0
Oct.	85.8	70.0	77.9	94	51	8.23	9.95	0.0	88	63	7.6	N	70 NNE		6.5	7	14	10	16	0	5	*
Nov.	80.7	63.5	72.1	90	39	2.41	4.16	0.0	87	60	7.9	N	30 NNW		4.9	10	14	6	7	0	1	1
Dec.	78.5	59.8	69.2	88	35	1.65	1.78	0.0	87	61	5.5	N	28 NNE		5.0	11	11	9	7	0	1	1
Year	84.7	66.7	75.7	100	28	56.41	12.58	0.0	85	60	7.6	SE	70 NNE		5.5	94	172	99	121	0	75	8

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MIAMI BEACH, FLA., (Miami Beach Patrol Station) 25°47' N., 80°08' W.; Elevation (ground) 9 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): 7:30 a.m. EST	1:30 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)				17	17		17						48	48	48	17	17	17	17	17		
Jan.	75.5	64.4	70.0	84	35	2.04	3.07	0.0					57 NE	66	5.0	15	8	8	7	0		
Feb.	76.3	64.1	70.2	87	38	1.75	2.65	0.0					59 SE	72	4.6	15	7	6	6	0		
Mar.	77.8	66.6	72.2	90	46	2.29	2.89	0.0					46 S	73	4.7	17	8	6	6	0		
Apr.	80.5	70.2	75.4	90	48	2.61	2.87	0.0					61 N	73	4.9	14	8	8	7	0		
May	83.3	73.4	78.4	94	60	3.93	5.90	0.0					42 SW	68	5.4	16	9	6	10	0		
June	86.3	76.6	81.5	97	68	5.03	6.64	0.0					42 SE	62	6.2	15	6	9	13	0		
July	87.6	77.4	82.5	98	69	3.83	2.98	0.0					46 SE	65	6.1	13	10	8	15	0		
Aug.	88.0	77.9	83.0	98	68	4.39	5.34	0.0					54 SW	67	5.8	13	12	6	14	0		
Sep.	86.8	77.0	81.9	95	70	5.85	3.42	0.0					115 E	62	6.2	10	11	9	17	0		
Oct.	83.6	73.7	78.7	92	55	7.07	5.85	0.0					106 S	62	5.8	10	9	12	15	0		
Nov.	79.3	68.6	74.0	89	40	2.28	4.02	0.0					82 SE	65	5.2	14	8	8	8	0		
Dec.	76.5	65.3	70.9	86	35	1.83	2.07	0.0					45 S	65	5.2	12	9	10	9	0		
Year	81.8	71.3	76.6	98	35	42.90	6.64	0.0					115 E	67	5.4	164	105	96	127	0		

KEY WEST, FLA., (International Airport) 24°33' N., 81°45' W.; Elevation (ground) 5 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): 7:00 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)				88	88		88	88	19	19	88	78	47	45	58	88	88	88	88	88	75	75
Jan.	75.8	65.8	70.8	90	41	1.54	3.97	0.0	84	69	8.9	NE	37 NW	68	4.3	13	12	6	7	0	1	*
Feb.	76.8	66.3	71.6	87	44	1.64	4.04	0.0	82	66	8.9	NE	44 SW	75	3.8	14	10	4	6	0	1	*
Mar.	79.0	68.4	73.7	89	48	1.57	4.52	0.0	81	67	9.0	E	45 W	78	3.7	16	11	4	5	0	2	0
Apr.	82.3	71.7	77.0	91	54	2.40	7.95	0.0	79	66	8.9	E	43 W	78	3.8	16	10	4	5	0	3	0
May	85.0	74.5	79.8	93	64	2.82	5.83	0.0	77	66	8.2	E	39 W	76	4.4	13	13	5	8	0	4	0
June	87.7	77.4	82.6	96	65	4.01	5.48	0.0	78	68	7.4	SE	36 S	70	5.4	8	15	7	11	0	8	0
July	89.1	78.3	83.7	96	68	4.24	7.46	0.0	77	68	7.1	E	36 NW	69	5.3	8	17	6	13	0	11	0
Aug.	89.3	78.4	83.9	97	68	4.67	8.32	0.0	78	68	7.0	E	37 SW	71	5.3	8	17	6	14	0	12	0
Sep.	88.0	77.4	82.7	95	69	6.05	11.95	0.0	82	71	7.6	E	79 E	65	5.5	7	16	7	16	0	11	0
Oct.	84.2	74.7	79.5	92	59	6.78	13.54	0.0	84	70	8.8	NE	57 SE	65	4.9	11	13	7	13	0	4	0
Nov.	79.1	70.0	74.6	90	51	2.02	19.88	0.0	84	69	9.3	NE	50 NW	69	4.2	13	11	6	7	0	1	0
Dec.	76.6	66.9	71.8	88	44	1.78	3.93	0.0	85	71	8.9	NE	43 NW	66	4.3	13	12	6	7	0	1	0
Year	82.7	72.5	77.6	97	41	39.52	19.88	0.0	81	68	8.3	E	79 E	71	4.6	140	157	68	112	0	59	*

MEAN SURFACE WATER TEMPERATURES AND SALINITIES

Station	Years	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Mean	
		Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo	Temp. °F	Sal. °/oo
Kiptopeke Beach, Va.....	7	40.1	26.9	41.4	25.9	46.7	25.1	54.5	23.7	64.5	23.7	74.6	25.5	79.0	26.3	78.6	27.6	74.4	27.5	64.3	27.7	53.6	26.9	45.3	26.5	59.8	26.1
Old Point Comfort, Va.....	10	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
Diamond Shoal Lightship..	5	61.8	35.3	60.0	35.3	58.6	34.5	62.1	34.8	70.0	35.5	76.0	35.7	79.1	35.5	80.4	35.7	78.3	34.6	73.7	35.0	66.8	34.8	64.4	34.9	69.3	35.1
Southport, N. C.....	9	51.7	20.8	51.6	19.1	55.5	17.4	64.0	19.2	72.9	22.0	79.4	25.6	82.3	23.8	82.3	25.5	78.1	25.9	70.2	26.4	61.4	24.7	53.1	22.7	66.9	22.8
Myrtle Beach, S. C.....	7	49.0	.....	51.0	.....	56.5	.....	63.9	.....	72.2	.....	79.1	.....	83.0	.....	82.0	.....	78.6	.....	69.8	.....	60.3	.....	51.9	.....	66.4	.....
Charleston, S. C.....	17	51.5	18.2	52.7	16.1	57.7	14.2	65.5	14.0	74.1	14.9	80.8	16.1	83.5	17.7	83.4	19.7	79.7	20.0	71.0	21.0	62.5	20.3	53.1	19.1	68.0	17.6
Ft. Pulaski, Savannah River, Georgia.....	19	52.1	15.7	53.6	14.6	59.1	12.2	66.6	12.0	75.0	14.8	81.6	17.8	84.0	19.1	84.1	20.0	80.4	19.7	72.2	20.0	63.3	19.9	54.0	18.0	68.8	17.0
Fernandina Beach, Fla.....	15	57.6	29.1	58.8	29.0	63.4	29.0	69.5	29.3	76.5	31.2	81.6	32.1	83.4	32.1	83.6	31.2	81.6	29.1	74.0	27.1	66.2	28.9	58.4	29.8	71.2	29.8
Mayport, Fla	15	58.3	22.4	59.2	22.5	63.3	23.0	69.1	26.1	75.8	28.5	80.9	29.5	82.5	26.7	82.7	25.6	81.7	23.5	74.7	20.3	67.1	19.1	59.8	21.6	71.3	24.1
Jacksonville, Fla	4	55.3	11.1	59.4	9.5	65.4	11.6	71.4	11.8	79.8	14.6	83.4	13.3	86.6	9.4	85.8	12.7	83.6	11.8	74.6	10.8	67.7	5.6	60.7	7.9	72.8	10.8
Daytona Beach (ocean) Florida.....	16	61.8	34.4	62.0	34.5	64.5	35.1	70.4	35.4	75.8	35.9	78.9	36.2	78.7	36.2	78.4	36.0	81.5	35.7	76.4	34.1	71.1	34.4	65.0	34.1	72.0	35.2
Daytona Beach (Halifax River), Fla.....	2	64.6	22.7	58.6	24.3	68.1	14.1	77.7	13.9	81.7	18.8	84.6	20.6	86.2	12.6	87.4	9.0	84.3	9.8	78.2	11.0	73.4	14.8	66.4	20.6	75.9	16.0
Eau Gallie Beach, Fla.....	13	65.7	35.9	65.7	36.2	68.5	36.4	72.4	36.6	76.5	36.6	79.3	36.4	78.3	36.3	79.9	36.3	82.4	36.3	78.0	35.5	73.1	35.5	67.9	36.0	74.0	36.2
Miami Beach, Fla	17	70.6	35.5	71.3	35.9	73.7	36.2	76.8	36.3	80.3	36.3	84.1	36.3	85.6	36.2	86.2	35.9	84.1	35.1	79.9	34.9	75.9	35.3	72.9	35.4	78.4	35.8
Key West, Fla.....	28	71.3	36.0	72.3	36.2	74.7	36.4	78.6	36.7	82.4	37.0	85.3	36.7	86.7	36.6	87.1	36.6	85.4	36.0	81.3	35.7	75.9	36.3	72.3	36.2	79.4	36.4

For sea water temperature and salinity data in greater detail, see Coast and Geodetic Survey publication 31-1, Surface Water Temperatures and Salinities, Atlantic Coast, North and South America.

HOURS OF OPERATION OF FOG SIGNALS
(U. S. Coast Guard)

Station	9 Calendar Years - 1950 thru 1958														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				
Chesapeake Lightship, Va. 36°58.7'N., 75°42.2'W.	59	56	56	47	53	35	22	22	18	25	31	35	459	863	652	14	1122
Cape Henry Light Station, Va. 36°55.6'N., 76°00.4'W.	44	48	28	28	37	15	7	13	13	20	26	37	316	440	359	65	667
Diamond Shoal Lightship, N.C. 35°05.3'N., 75°19.7'W.	33	23	23	11	14	6	4	9	7	13	14	19	176	314	214	45	504
Frying Pan Shoals Light-ship, N.C. 33°28.0'N., 77°33.8'W.	8	15	9	5	13	2	2	9	8	10	5	11	97	158	95	37	246
Savannah Lightship, Ga. 31°56.6'N., 80°39.8'W.	51	43	29	10	5	1	2	3	7	5	14	34	204	401	182	57	821
St. Johns Lightship, Fla.* 30°23.5'N., 81°18.0'W.	25	15	16	8	2	1	3	6	9	9	14	35	143	163	196	20	401
St. Johns Light Station, Fla.** 30°23.8'N., 81°22.5'W.	69	87	62	40	31	17	1	13	27	55	25	125	552	649	--	--	--

* 5 Calendar Years - 1950 thru 1954
** 2 Calendar Years - 1955 thru 1956
Coordinates are for fog signal location.

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	

COASTWISE DISTANCES

NORFOLK, VA., TO KEY WEST, FLA.

September 12, 1959

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Norfolk, Va., is 503 nautical miles from Savannah, Ga.

	CHESAPEAKE BAY ENTRANCE 36°56.3'N., 75°58.6'W.	Norfolk, Va. 36°50.9'N., 76°17.9'W.	DIAMOND SHOALS 35°08.0'N., 75°15.0'W.	Morehead City, N.C. 34°42.8'N., 76°41.8'W.	Southport, N.C. 33°54.8'N., 78°01.0'W.	Wilmington, N.C. 34°14.0'N., 77°57.0'W.	Georgetown, S.C. 33°21.4'N., 79°16.9'W.	Charleston, S.C. 32°47.2'N., 79°55.2'W.	Port Royal, S.C. 32°22.3'N., 80°41.6'W.	Savannah, Ga. 32°05.0'N., 81°05.7'W.	Brunswick, Ga. 31°08.0'N., 81°29.7'W.	Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.	Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	St. Augustine, Fla. 29°53.6'N., 81°18.5'W.	Port Canaveral, Fla. 28°24.6'N., 80°36.5'W.	Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.	Stuart, Fla. 27°12.2'N., 80°15.6'W.	Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.	Port Everglades, Fla. 26°05.6'N., 80°07.0'W.	Miami, Fla. 25°47.0'N., 80°11.0'W.	Key West, Fla. 24°33.7'N., 81°48.5'W.	STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.
CHESAPEAKE BAY ENTRANCE 36°56.3'N., 75°58.6'W.		27	117	222	315	336	365	402	465	476	527	533	560	557	612	647	665	678	719	742	880	941
Norfolk, Va. 36°50.9'N., 76°17.9'W.	27		144	249	341	362	392	428	492	503	554	560	586	584	639	674	692	704	746	769	907	968
DIAMOND SHOALS 35°08.0'N., 75°15.0'W.	117	144		105	198	219	248	285	348	359	410	416	443	440	495	530	549	561	603	626	764	825
Morehead City, N.C. 34°42.8'N., 76°41.8'W.	222	249	105		133	154	184	220	284	295	346	352	379	377	438	476	497	509	550	573	711	772
Southport, N.C. 33°54.8'N., 78°01.0'W.	315	341	198	133		21	87	130	191	206	260	265	294	296	367	407	423	443	485	508	646	707
Wilmington, N.C. 34°14.0'N., 77°57.0'W.	336	362	219	154	21		108	151	212	227	281	286	315	317	388	428	444	464	506	529	667	728
Georgetown, S.C. 33°21.4'N., 79°16.9'W.	365	392	248	184	87	108		79	141	154	210	216	247	246	324	368	391	407	449	472	610	671
Charleston, S.C. 32°47.2'N., 79°55.2'W.	402	428	285	220	130	151	79		90	102	156	166	197	199	283	329	353	369	411	434	572	633
Port Royal, S.C. 32°22.3'N., 80°41.6'W.	465	492	348	284	191	212	141	90		51	110	120	152	157	251	298	324	341	383	406	544	605
Savannah, Ga. 32°05.0'N., 81°05.7'W.	476	503	359	295	206	227	154	102	51		104	115	145	152	251	298	324	340	382	405	543	604
Brunswick, Ga. 31°08.0'N., 81°29.7'W.	527	554	410	346	260	281	210	156	110	104		50	82	90	195	242	268	285	327	350	488	549
Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.	533	560	416	352	265	286	216	166	120	115	50		53	61	169	216	242	262	304	327	465	526
Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	560	586	443	379	294	315	247	197	152	145	82	53		56	167	214	240	259	301	324	462	523
St. Augustine, Fla. 29°53.6'N., 81°18.5'W.	557	584	440	377	296	317	246	199	157	152	90	61	56		120	167	192	211	253	276	414	475
Port Canaveral, Fla. 28°24.6'N., 80°36.5'W.	612	639	495	438	367	388	324	283	251	251	195	169	167	120		69	91	110	152	175	313	374
Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.	647	674	530	476	407	428	368	329	298	298	242	216	214	167	69		32	52	94	117	255	316
Stuart, Fla. 27°12.2'N., 80°15.6'W.	665	692	549	497	423	444	391	353	324	324	268	242	240	192	91	32		36	78	101	239	300
Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.	678	704	561	509	443	464	407	369	341	340	285	262	259	211	110	52	36		46	68	207	267
Port Everglades, Fla. 26°05.6'N., 80°07.0'W.	719	746	603	550	485	506	449	411	383	382	327	304	301	253	152	94	78	46		27	165	226
Miami, Fla. 25°47.0'N., 80°11.0'W.	742	769	626	573	508	529	472	434	406	405	350	327	324	276	175	117	101	68	27		151	211
Key West, Fla. 24°33.7'N., 81°48.5'W.	880	907	764	711	646	667	610	572	544	543	488	465	462	414	313	255	239	207	165	151		73
STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.	941	968	825	772	707	728	671	633	605	604	549	526	523	475	374	316	300	267	226	211	73	

Each distance is by shortest route that safe navigation permits between the two ports concerned. The navigator must make his own adjustments for non-direct routes selected to run with or avoid the Gulf Stream. For example, the table shows a distance of 561 miles by direct route from Diamond Shoals to Port of Palm Beach; distances via the routes shown in Chapter 3, Coast Pilot 4, are: Outer route, 572 miles; Gulf Stream route, 593 miles; Inner route, 628 miles.

INSIDE-ROUTE DISTANCES

NORFOLK, VA., TO FERNANDINA BEACH, FLA.

September 12, 1959

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Morehead City, N. C., is 445 nautical miles from Fernandina Beach, Fla.

	NORFOLK, VA. 36°50.9'N., 76°17.9'W.	Elizabeth City, N. C. 36°18.1'N., 76°13.0'W.	Hertford, N. C. 36°11.6'N., 76°28.0'W.	Columbia, N. C. 35°55.0'N., 76°15.4'W.	Edenton, N. C. 36°03.3'N., 76°36.6'W.	Plymouth, N. C. 35°51.8'N., 76°45.6'W.	Manteo, N. C. 35°54.6'N., 75°40.2'W.	Belhaven, N. C. 35°32.1'N., 76°37.4'W.	Washington, N. C. 35°32.6'N., 77°03.7'W.	Ocracoke, N. C. 35°06.8'N., 75°59.1'W.	Oriental, N. C. 35°01.5'N., 76°41.8'W.	New Bern, N. C. 35°06.1'N., 77°02.1'W.	Beaufort, N. C. 34°43.1'N., 76°40.2'W.	Morehead City, N. C. 34°42.8'N., 76°41.8'W.	Swansboro, N. C. 34°41.0'N., 77°07.3'W.	Jacksonville, N. C. 34°44.7'N., 77°26.3'W.	Wrightsville, N. C. 34°13.1'N., 77°48.8'W.	Wilmington, N. C. 34°14.0'N., 77°57.0'W.	Southport, N. C. 33°54.8'N., 78°01.0'W.	Little River, S. C. 33°52.2'N., 78°36.6'W.	Bucksport, S. C. 33°39.0'N., 79°05.6'W.	Georgetown, S. C. 33°21.4'N., 79°16.9'W.	McClellanville, S. C. 33°04.7'N., 79°27.6'W.	Charleston, S. C. 32°47.2'N., 79°55.2'W.	Beaufort, S. C. 32°25.6'N., 80°40.2'W.	Savannah, Ga. 32°05.0'N., 81°05.7'W.	Thunderbolt, Ga. 32°01.5'N., 81°02.8'W.	Brunswick, Ga. 31°08.0'N., 81°28.7'W.	FERNANDINA BEACH, FLA. 30°40.3'N., 81°28.0'W.
77*																													
89	43																												
89	44	26																											
98	52	35	25																										
105	60	42	33	14																									
80	39	46	45	54	61																								
120	79	79	78	87	95	70																							
156	114	115	114	123	130	105	39																						
131	91	97	96	104	113	66	43	60																					
160	118	119	118	126	134	109	43	56	41																				
180	139	139	138	146	155	130	63	76	62	23																			
177	134	137	136	144	152	127	61	74	59	22	38																		
178	136	137	136	145	152	127	61	74	59	22	38	3																	
200	158	160	158	166	175	150	83	96	81	44	60	24	22																
231	189	190	189	197	206	181	114	127	112	75	91	55	53	31															
246	204	205	204	213	221	196	130	142	128	91	107	70	69	46	48														
269	227	229	227	236	244	219	153	165	151	114	130	94	92	70	71	23													
268	226	227	226	235	243	218	152	164	150	113	129	93	91	69	70	22	21												
299	257	259	257	266	274	249	183	195	181	144	160	124	122	100	101	53	52	31											
328	286	287	286	294	303	278	211	224	209	172	188	152	150	128	129	82	81	60	28										
352	311	311	310	318	327	302	235	248	233	196	213	177	174	152	154	106	105	84	53	24									
374	332	333	332	340	349	324	257	270	255	218	235	199	196	174	176	128	127	106	75	46	24								
406	364	366	364	373	381	356	290	302	288	251	267	231	229	207	208	160	159	138	107	79	56	32							
486	424	425	424	432	441	416	349	362	347	310	327	290	288	266	268	220	219	198	167	138	116	92	60						
508	466	467	466	475	483	458	392	404	390	353	369	333	331	309	310	262	261	240	209	181	159	135	104	43					
507	465	466	465	474	482	457	391	403	389	352	368	332	330	307	309	261	260	239	208	179	157	133	103	41	14				
595	553	554	553	562	570	546	479	491	477	440	456	420	418	396	397	349	349	327	296	268	246	222	191	130	102	88			
623	581	582	581	589	598	573	506	519	504	467	484	447	445	423	425	377	376	355	324	295	273	249	218	157	130	116	35		

* 44 miles via Dismal Swamp Canal

INSIDE-ROUTE DISTANCES

FERNANDINA BEACH, FLA., TO KEY WEST, FLA.

September 12, 1959

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: St. Augustine, Fla., is 271 nautical miles from Miami, Fla.

	NORFOLK, VA. 36°50.9'N., 76°17.9'W.	FERNANDINA BEACH, FLA. 30°40.3'N., 81°28.0'W.	Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	St. Augustine, Fla. 29°53.6'N., 81°18.5'W.	Marineland, Fla. 29°40.1'N., 81°13.0'W.	Daytona Beach, Fla. 29°12.6'N., 81°00.7'W.	New Smyrna Beach, Fla. 29°01.7'N., 80°55.1'W.	Titusville, Fla. 28°37.3'N., 80°47.9'W.	Cocoa, Fla. 28°21.3'N., 80°43.1'W.	Eau Gallie, Fla. 28°07.9'N., 80°37.1'W.	Melbourne, Fla. 28°05.0'N., 80°35.5'W.	Vero Beach, Fla. 27°39.0'N., 80°22.4'W.	Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.	Salerno, Fla. 27°08.8'N., 80°11.6'W.	Stuart, Fla. 27°12.2'N., 80°15.6'W.	Port Mayaca, Fla. 26°59.1'N., 80°36.8'W.	Clewiston, Fla. 26°45.6'N., 80°55.2'W.	Moore Haven, Fla. 26°50.0'N., 81°05.3'W.	Fort Myers, Fla. 26°38.9'N., 81°52.3'W.	Jupiter, Fla. 26°56.8'N., 80°05.4'W.	Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.	Fort Lauderdale, Fla. 26°06.8'N., 80°07.2'W.	Port Everglades, Fla. 26°05.6'N., 80°07.0'W.	Miami, Fla. 25°47.0'N., 80°11.0'W.	Tavernier, Fla. 25°00.7'N., 80°31.3'W.	Matecumbe Harbor, Fla. 24°51.1'N., 80°44.5'W.	Marathon, Fla. 24°42.2'N., 81°06.7'W.	Flamingo, Fla. 25°08.5'N., 80°55.4'W.	Key West, Fla. 24°33.7'N., 81°48.5'W.
623																													
659	36																												
676	53	49																											
692	69	65	16																										
722	99	95	46	30																									
735	113	108	59	44	14																								
764	141	137	88	72	42	28																							
780	157	153	104	89	58	45	17																						
795	172	168	119	103	73	59	31	14																					
798	175	171	122	106	76	63	34	18	3																				
827	204	200	151	136	105	92	64	47	33	29																			
839	216	212	163	148	117	104	76	59	45	41	12																		
860	237	233	184	169	138	125	97	80	66	62	33	21																	
865	242	238	189	173	143	130	101	85	70	67	38	26	8																
892	269	265	216	200	170	157	128	112	97	94	65	53	35	27															
915	292	288	239	223	193	180	151	135	120	117	88	76	58	50	23														
926	303	299	250	235	204	191	163	146	132	128	99	87	70	61	34	11													
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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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