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DEPARTMENT OF COMMERCE AND LABOR

COAST AND GEODETIC SURVEY

O. H. TITTMANN

SUPERINTENDENT

INSIDE ROUTE PILOT

NEW YORK TO KEY WEST

1912

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DEPARTMENT OF COMMERCE AND LABOR,
UNITED STATES COAST AND GEODETIC SURVEY,
Washington, October 30, 1912.

This volume covers the inland water route from New York to Beaufort entrance and New River Inlet, N. C., the seacoast and inlets between Beaufort entrance and Winyah Bay, S. C., and the inland water route from Winyah Bay to Key West, Fla. It also includes directions for reaching the most important cities near the inland route, but does not cover the rivers and other waterways not necessarily traversed in making the through passage or in going to these cities, except that, when there are two practicable routes between the same points, both are described. It also contains information as to where supplies and fuel can be obtained, where pilots can be found, where repairs can be made, and various other subjects usually included in a Coast Pilot.

The publication is intended primarily for use on small power boats, and for that reason the sailing directions through the deeper waters, as for instance between Norfolk and Beaufort and again between Savannah and Fernandina, are not given as minutely as would be necessary for vessels of the maximum draft that navigate these waters. It is believed that this volume with the accompanying charts will be found a sufficient guide for boats up to about 3 feet draft; but for vessels of greater draft it should be supplemented by a set of the larger scale charts, enumerated in the list to be found in the back of the book.

The information contained herein is derived from surveys by the Coast and Geodetic Survey and by the United States Engineers, and from special investigations by the Coast and Geodetic Survey. The first part of the volume, from New York to Norfolk, was prepared by Herbert C. Graves, Nautical Expert, and the remainder by W. E. Parker, Assistant, Coast and Geodetic Survey.

Valuable information was obtained from the United States Engineers in charge of the several engineering districts and from local pilots and boatmen.

Navigators are requested to notify the Superintendent of the Coast and Geodetic Survey of any errors or omissions they may find in this book, or of additional matter which they think should be inserted.

O. H. TITTMANN,
Superintendent.

NOTE.

Distances are given in nautical miles and may be converted approximately to statute miles by adding 15 per cent to the distances given.

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

Courses and bearings given in degrees are true, reading clockwise from 0° at North through East to 360°, and are followed by the magnetic equivalents in points and fractions in parentheses.

All depths, unless otherwise stated, are at mean low water, except in the nontidal waters, where the depths are at mean water level.

TABLE OF DISTANCES AND DRAFTS, INLAND WATERWAYS.

From—	To—	Distance in nautical miles.	Maximum draft in feet.
New York, N. Y.	South Amboy, N. J.	19	21
	New Brunswick, N. J.	29	10
	Bordentown, N. J.	68	7
	Philadelphia, Pa.	93	7
Philadelphia, Pa.	Delaware City, Del.	35	9
	Chesapeake City, Md.	47	9
	Baltimore entrance, Md	84	9
	Baltimore, Md.	94	9
Baltimore entrance, Md	Annapolis entrance, Md.	15	30
	Patuxent River, Md.	55	30
	Cape Lookout, Potomac River.	72	30
	Old Point Comfort, Va.	138	30
	Norfolk, Va.	148	30
Norfolk, Va.	Elizabeth City, N. C.	44	9
	* Roanoke Marshes light, N. C	84	9
	* Adams Creek, N. C.	164	9
	* Beaufort or Morehead City, N. C	181	9
	* Beaufort entrance, N. C	182	9
Morehead City, N. C.	Bogue Inlet, N. C.	23	4
	Bear Inlet, N. C.	27	4
	New River Inlet, N. C.	38	3
Beaufort entrance, N. C. (outside)	Frying Pan Shoals, N. C.	89	15
	Southport, N. C.	117	15
	Winyah Bay, S. C.	162	15
	Georgetown, S. C.	174	15
Winyah Bay, S. C.	Charleston, S. C.	70	6
Charleston, S. C.	Beaufort, S. C.	75	9
	Savannah, Ga.	118	9
	Brunswick, Ga	206	9
	Fernandina, Fla.	231	9
	St. Johns River, Fla.	256	5
	Jacksonville, Fla.	274	5
St. Johns River, Fla.	St. Augustine, Fla.	34	5
	Daytona, Fla.	80	4
	Mosquito Inlet, Fla.	91	4
	New Smyrna, Fla.	94	4
	Titusville, Fla.	125	4
	Cocoa, Fla.	141	4
	Eau Gallie, Fla.	156	4
	Fort Pierce, Fla.	201	4
	St. Lucie Inlet, Fla.	220	4
	Jupiter Inlet, Fla.	235	4
	West Palm Beach, Fla.	250	4
	New River Inlet, Fla.	287	4
	Fort Lauderdale, Fla.	289	4
	Miami, Fla.	310	4
Miami, Fla.	Bahia Honda Harbor, Fla. (northward of keys)	100	5
	Key West (through Hawk Channel from Bahia Honda)	133	5
	Key West (through Gulf of Mexico from Bahia Honda)	149	5

* Distances are via Dismal Swamp Canal route. For distances via Albemarle and Chesapeake Canal route subtract 2 miles.

INSIDE ROUTE PILOT, NEW YORK TO KEY WEST.

INLAND PASSAGE FROM NEW YORK BAY TO CHESAPEAKE BAY.

From New York Upper Bay the generally used passage is through Kill van Kull and Arthur Kill, and thence around Great Beds lighthouse to the entrance of Raritan River: but strangers frequently take the more open passage through New York Lower Bay and Raritan Bay to Raritan River. Thence the passage leads up Raritan River to New Brunswick, and thence through the Delaware and Raritan Canal to Bordentown. Thence down Delaware River to Delaware City, and thence through the Chesapeake and Delaware Canal to Chesapeake City. Thence down Back Creek and Elk River to the head of Chesapeake Bay at Turkey Point.

A draft of 7 feet can be taken through the passage from New York Bay to Delaware Bay, and 9 feet from Delaware Bay to Chesapeake Bay; the greatest speed permitted in the canals is 4½ statute miles per hour. A vessel with a speed of 10 miles, running in daytime only, can make the passage in two to two and one-half days under favorable conditions. It is advisable to inquire beforehand whether the Delaware and Raritan Canal is open for navigation.

Coal in limited quantities can be obtained at numerous places, but the best and most convenient coaling places are Perth Amboy, Philadelphia, and Baltimore.

Pilots can be obtained on inquiring at Perth Amboy, New Brunswick, Bordentown, Delaware City, Chesapeake City, and Baltimore, for either the whole or parts of the passage. A fisherman or pilot may be obtained at the mouth of Back Creek competent to pilot a vessel to Chesapeake City. The fees are not prescribed by law.

KILL VAN KULL AND ARTHUR KILL.

These passages have a combined length of 17 miles from Robbins Reef lighthouse to **Ward Point**, the southern end of Staten Island, and a width varying from 600 yards to less than 200 yards. There is considerable shipping, especially through Kill van Kull. Strangers should have no difficulty in making the passage with a draft of 10 feet, with the aid of the chart and the directions. The Baltimore & Ohio Railroad crosses Arthur Kill about ½ mile southward of Elizabethport. There is a clear width of 206 feet on each side of the center pier of the draw; the eastern channel has the deeper water and is generally used.

Anchorage is not permitted in the channel of Kill van Kull and Arthur Kill, anchorage limits being prescribed by regulation. The anchorage on the western side of Arthur Kill off Perth Amboy is good and convenient; its eastern limit is a line running northward from the horizontally striped buoy to the Lehigh Valley coal docks.

Tides.—The mean rise and fall of the tides at Shooters Island is 4.6 feet; high water occurs 17m. later than at Governors Island. At South Amboy the mean rise and fall is 5.3 feet, and high water occurs 8m. later than at Sandy Hook.

RARITAN RIVER

has a length of 10½ miles from South Amboy to New Brunswick, a width varying from ½ mile to 125 yards, and is crooked in places. Dredging has been done to obtain a channel 200 feet wide and 10 feet deep to a point ¼ mile above the mouth of South River, and thence 100 feet wide with the same depth to New Brunswick. At high water the marshy banks are generally covered, making it difficult for a stranger to follow the channel. Two drawbridges cross the river near its entrance at South Amboy.

New Brunswick is an important city at the entrance to the Delaware and Raritan Canal from Raritan River. The canal forms a basin abreast the city, which is the harbor of New Brunswick. At high water of spring tides a draft of 8 feet has been taken into the basin through the entrance lock of the canal, but 7 feet is the deepest draft for which the canal company will be responsible. The size of vessels entering the basin is limited to the size of the canal lock. Coal, water, and provisions can be had in the basin.

Sailing vessels which are not going to tow down the Raritan River are advised to remain in the basin at New Brunswick until the wind serves for them to sail down the river. There is no place for some distance below New Brunswick at which a vessel of 7 feet draft can make fast outside of the basin without lying aground at low water, and the river channel is too narrow for vessels to anchor.

Towboats.—A towboat can be obtained at Perth Amboy and South Amboy and sometimes at New Brunswick, and can always be had at New Brunswick by telephoning to Perth Amboy.

Tides.—At New Brunswick high water is 49m. later and low water 1h. 33m. later than at Sandy Hook; the mean rise and fall of tides is 6 feet.

DELAWARE AND RARITAN CANAL.

This canal is 38 miles long from its eastern entrance at New Brunswick on the Raritan River to its western entrance at Bordentown on the Delaware River. The principal places on the canal and their distances, in miles, from New Brunswick are, **Bound Brook** 7, **Millstone** 12, **Kingston** 21, **Trenton** (Coalport Basin) 32, **Bordentown** 38. There are 13 locks in the canal, the dimensions of which are 210 feet long, 23 feet 4 inches wide, and 7 feet deep. The deepest draft permitted through the canal is 7 feet. Masted vessels are limited to masts less than 50 feet above canal level by the arched stone bridge at New Brunswick, which has a clear height of 50 feet in the middle. Coal in limited quantities may be obtained from local dealers at the principal places on the canal, but steamers will find it more convenient to coal at Perth Amboy and Philadelphia than along the canal. The water in the canal is fresh, but is not good for drinking purposes. *Toll rates,* which are subject to change, are charged by the canal company, and are collected at the entrance where the vessel is given clearance. Towage through the canal can be arranged at either entrance.

The following information is taken from the *Rules and Regulations governing the Delaware and Raritan Canal* published by the company, and which will be furnished by them at the canal entrance on application:

When underway at night, a small green signal light shall be carried on the stem; a steamer shall carry in addition a white light at the end of her flagstaff, or if towing other boats two white lights at the end of her flagstaff; no other lights or reflectors shall be carried. No vessel shall carry sail in the canal. The speed shall not exceed 4½ miles (statute) per hour. When a vessel overtakes another, the slower shall give the inner track to the faster, unless within 300 yards of a lock or bridge. When in danger of meeting at a bridge or where both can not pass, the one going westward shall lie-to. Everything towed by horses or mules, and rafts, on meeting steamboats, shall keep on the side next the towpath; in all other cases, everything meeting shall keep to the right. When approaching a lock or bridge, notice shall be given on arriving within 300 yards of the same by a horn, bell, or whistle. Steamboats passing other boats or vessels, either in motion or at stopping places, shall "slow-up" till entirely past, especially in passing Coalport. Steamboats must not check headway by backing while in the locks, nor blow out their boilers while passing locks or bridges. The signal at night that a lock is ready will be two whistles from the lock engine for boats bound west and four for those bound east. No stones, rubbish, dead carcasses, or other offensive matter shall be thrown or dropped in the water.

DELAWARE RIVER, FROM BORDENTOWN TO DELAWARE CITY.

The distance is 60 miles from Bordentown to Delaware City, and the channel generally has ample width and is easily followed; but extra caution is required in the first ½ mile from

Bordentown, where there is a depth of 7 feet in a narrow channel. This is the shoalest place in the channel. Many of the shoals in the river are bare at or before low water, and are generally covered with marsh grass, which makes them usually well defined. The water in the river above Chester is fresh and suitable for boilers; above Bristol the water is ordinarily suitable for drinking purposes, except in dry seasons.

Coal can be obtained at Philadelphia, either at the wharves or by lighters; it can also be obtained at Chester and Newcastle and in limited quantities at Delaware City, but the facilities are not so good as at Philadelphia.

Anchorage.—Except for ½ mile below Bordentown there is a sufficient width at most places in the channel for anchorage, for which the chart must be the guide. The anchorage limits at Philadelphia are prescribed by regulation. Below Marcus Hook suitable anchorage may be selected off the ranges.

Delaware City, at the entrance of the Chesapeake and Delaware Canal from Delaware River, has little commerce except that passing through the canal. Provisions may be obtained. The wharves have a depth of 8 to 9 feet in Delaware River at their ends. There is a depth of 9 feet on the northern side at the entrance to the canal lock, and vessels usually lie here when waiting to lock in.

Tides.—The mean rise and fall of tides at Bordentown is 4.7 feet; Burlington, 5.4; Philadelphia, 5.3; Chester, 5.8; and Delaware City, 5.9. High water occurs at Bordentown 2h. 25m. and at Burlington 1h. 32m. later than at Philadelphia, and at Chester 1h. 24m. and at Delaware City 2h. 53m. earlier than at Philadelphia.

CHESAPEAKE AND DELAWARE CANAL.

This canal is 12 miles long from its eastern entrance at Delaware City, on Delaware Bay, to its western entrance at Chesapeake City, on Back Creek. There are three locks in the canal, the dimensions of which are: 220 feet long, 24 feet wide, and 9 feet deep. The deepest draft permitted through the canal is 9 feet. All bridges over the canal have draws. The water in the canal is fresh, but is not suitable for drinking purposes. *Toll rates*, which are subject to change, are charged by the company, and are collected at the entrance, where a pass bill is given the vessel. Towage through the canal can be arranged at either entrance. Strangers passing through this canal are advised to inquire at the entrance whether there are any shoal places which require attention.

The following information is taken from the *Regulations governing the Chesapeake and Delaware Canal*, published by the company, and which will be furnished by them at the canal entrance on application:

The pass bill must be shown to each lock keeper before passing through. No vessel shall carry sail in the canal, nor shall the speed exceed 4½ miles (statute) per hour. Vessels passing shall keep to the right, but shall give the inner track to vessels in tow of horses or mules. Masted vessels when meeting unmasted boats shall take the outer track. Rafts shall always keep the outer track. When a vessel overtakes another, the slower shall give the inner track to the faster, unless within 300 yards of a lock or bridge. When approaching a lock or bridge, notice shall be given on arriving within 300 yards of the same by a horn or bell. When passing through at night a light shall be carried on the bow. Vessels lying in the canal at night shall carry a light on the bow and at the stern. No earth, stone, timber, or other material shall be placed or put in the canal.

BACK CREEK AND ELK RIVER.

Back Creek has a length of 3¼ miles from Chesapeake City to Elk River. The channel is crooked and narrow, with shoals on both sides, but is marked by buoys. The deepest draft using the creek is 9 feet. For a distance of 1¾ miles below Chesapeake City the depth is 9 feet or over in a channel 120 to 150 feet wide, and below that point to the entrance the channel has a width of 200 to 400 feet. A pilot may be obtained on inquiry at Chesapeake City or the entrance to the creek. The channel in the creek is too narrow for anchorage.

Elk River has a length of nearly 8 miles from Back Creek to the entrance of the river at Turkey Point. The channel is wide and easily followed.

Tides.—At Back Creek entrance high water occurs about 2h. 20m. after high water at Baltimore, and the mean rise and fall of tides is 2.6 feet.

SAILING DIRECTIONS, INLAND PASSAGE FROM NEW YORK BAY TO CHESAPEAKE BAY.

These directions are good in the daytime for a draft of 7 feet to Philadelphia and for a draft of 9 feet from Philadelphia to Chesapeake Bay. Strangers are advised not to run at night.

THROUGH KILL VAN KULL AND ARTHUR KILL TO SOUTH AMBOY, 19 MILES.—Enter Kill van Kull between Robbins Reef lighthouse and the north end of Staten Island, giving the lighthouse a berth of 600 yards and the shore of Staten Island a berth of 200 yards, and follow a mid-channel course for about 2½ miles from Constable Point. Then pass about 100 yards southward of the red buoy eastward of Bergen Point lighthouse, and pass 220 yards south of the lighthouse.

Then steer 267° true (**W** ⅝ **N** mag.) and pass about 75 yards southward of the wharves on the southern side of Shooters Island (which will be recognized by the shipyard on it). When the western end of Shooters Island is abeam, steer about 308° true (**NW** ¼ **N** mag.), and leave a black buoy on the port hand and two horizontally striped buoys on the starboard hand; the two horizontally striped buoys mark a middle ground which is being removed.

Then steer about 269° true (**W** ¾ **N** mag.), leaving a red buoy on the starboard hand, and then follow a mid-channel course past Elizabethport. Vessels of 7 feet draft can pass through either of the wide openings of the railroad drawbridge southward of Elizabethport, although the eastern opening has the deeper water. When ½ mile southward of the bridge, steer 185° true (**S** by **W** ¼ **W** mag.), and pass in mid-channel eastward of Buckwheat Island (small and grassy) and westward of Pralls Island.

From the southern end of Pralls Island follow the western bank at a distance of about 150 yards, except for a distance of ⅜ mile northward of Tufts Point, where that bank should be given a berth of 200 yards. Pass about 150 yards southward of Tufts Point, steer about 270° true (**W** ⅞ **N** mag.), and pass about 150 yards northward of Smoking Point. Then follow the northwestern bank at a distance of about 300 yards, passing northward and westward of the white anchorage buoys and the red buoy at Storys Flats. When past the latter buoy follow the western bank at a distance of 200 yards to Perth Amboy. Anchorage can be had on the western side of the channel at Perth Amboy.

Pass 100 yards eastward of the horizontally striped buoy off Perth Amboy, steer about 153° true (**S** by **E** ⅝ **E** mag.), and pass 100 yards westward of Ward Point, and eastward of the horizontally striped buoy southward of the point. Pass 200 yards eastward and southward of Great Beds lighthouse, and steer 268° true (**W** ⅝ **N** mag.) for black buoy No. 9. Pass about 100 feet northward of this buoy and steer 304° true (**NW** ⅛ **W** mag.), heading for the left draw in the railroad bridge. Anchorage can be had on the north side of the channel, about 150 yards from the wharves below the bridge.

NEW YORK LOWER BAY AND RARITAN BAY TO SOUTH AMBOY.—Pass eastward and southward of the black bell buoy lying ¾ mile northward of West Bank lighthouse, and steer 239° true (**WSW** ⅛ **W** mag.) for 7½ miles, passing ½ mile northward of West Bank and Old Orchard Shoal lighthouses, passing southward of Old Orchard Shoal red buoy, and to a position ¼ mile northward of Conaskonk Point Shoal buoy (can, black, No. 3). Then steer 269° true (**W** ¾ **N** mag.) for 3¼ miles, passing between buoys Nos. 7 and 8 and to a position 200 yards southward of Great Beds lighthouse as in the preceding paragraph.

RARITAN RIVER TO NEW BRUNSWICK, 10½ MILES.—Except at high water, when the marshy banks are covered in places, vessels of 7 feet or less draft, with the aid of the chart, should have no difficulty in going up the Raritan River to New Brunswick.

From the railroad drawbridge at South Amboy pass about 200 feet off Sandy Point, and then go through the draw in the second bridge. Then follow the northern bank, giving the ends of the wharves a berth of 200 to 300 feet, to light No. 1, which is on the lower end of a dike on the northwestern side. Follow this dike and the northwest bank above it at a distance of 200 feet until above the opening in the dike on the southeast side of the channel ½ mile above light No. 2. Then keep in mid-channel as defined by the dikes until ¼ mile above light No. 3, and then pass the point on the north bank, lying opposite the western end of the dike on the southern side, at a distance of 200 feet.

In making the bend around Crab Island follow the dike on the northwest side of the channel at a distance of 300 feet. Then cross over and follow the eastern and southern bank, at a distance of 200 feet, past Sayreville and the canal leading to Washington. From the canal entrance, keep in mid-channel northward through Long Reach for a distance of ¼ mile, and then gradually favor the eastern bank and follow it at a distance of 125 feet in the northern part of this reach. When the river begins to bend northwestward, edge out gradually to mid-channel, and so continue around the bend until approaching the entrance of South River.

Then favor the southern bank past the entrance of South River and the dock ¼ mile westward. When past this dock, edge over gradually and favor the eastern bank northward through Rocky Reach. When the river begins to bend northwestward, edge out gradually to mid-channel, and so continue around the bend to Lawrence Creek (on southern bank) and also in the next reach northwestward to Martins Landing.

There is a stone dock on the north bank 400 yards westward of Martins Landing; favor the north bank between them until 300 yards westward of the stone dock, and then keep in mid river around the next bend until up with the rocky bluff on the southern bank. Then favor well the southern bank to the lock at New Brunswick.

DELAWARE RIVER FROM BORDENTOWN TO DELAWARE CITY, 60 MILES.—A stranger, proceeding with caution in the narrow parts of the river and using the lead, should have little difficulty in making the passage from Bordentown to Delaware City with the aid of the chart and the directions. Extra caution is required in the first ½ mile below Bordentown.

Bordentown to Florence.—On leaving the lock at Bordentown, head so as to pass about 125 feet westward of the old wharf ruin on the east bank just south of the entrance to the creek; and then head about 212° true (**SW** ⅜ **S** mag.), with Bordentown light, on the south bank ⅜ mile distant, a little on the starboard bow. Leave a black buoy 50 feet on the starboard hand, and then haul westward so as to follow the curve of the channel, and pass about midway between the light and a horizontally striped buoy.

When below Bordentown light steer 229° true (**SW** by **W** ⅛ **W** mag.), following at first the southeastern bank at a distance of 100 yards, to a mid-channel position 600 yards above Newbold Island. Then haul westward gradually, giving the northern bank a berth of over 150 yards, and pass in mid-channel northward of Newbold Island until past Penn Manor light; this light is on the north bank westward of a small wharf, and will not be seen from eastward until nearly up to it.

Bring this light astern on a 228° true (**SW** by **W** mag.) course, heading for the outer end of a sand wharf on the southern bank, and pass between the red buoy and black buoy which mark the channel at Kinkora Bar; Kinkora light may be seen behind and a little to the left of the shore end of the sand wharf. When about ¼ mile from the sand wharf, haul westward so as to pass about 150 yards northward of it; and then follow the southern bank at a distance of 150 yards to Florence (large pipe works).

Florence to Torresdale.—Keep in mid-channel in making the bend northward of Florence and then follow the western bank at a distance of 150 yards, drawing in to 100 yards from that bank while passing the shoal which extends 450 yards northeastward from the eastern end of Burlington Island. Then follow a mid-channel course between Burlington Island and Bristol, and when up with the ferry landing (Bristol) bring it astern on a 201° true (**SSW** ⅝ **W** mag.) course and pass 75 to 100 yards westward of a red buoy off the lower end of Burlington Island.

Favor, if anything, the southern bank in passing Burlington until abreast the large brick works at its western end, and then steer 253° true (**W** ¾ **S** mag.) to a position 175 to 200 yards off College Point light (northern bank). Then steer about 248° true (**WSW** ¾ **W** mag.) for the standpipe in the town of Beverly (southern bank); the black buoy near Beverly should be a little on the starboard bow. Pass about 200 feet southward of this buoy and 300 feet off the northerly wharves of Beverly on a 282° true (**WNW** ¼ **W** mag.) course, with an old wharf on the northern bank a little on the starboard bow.

Pass 150 yards southeastward of this wharf, and steer 238° true (**SW** by **W** ⅞ **W** mag.) with the wharf at Torresdale a little on the starboard bow and a concrete tower and high chimney a little on the port bow. This course favors the northern bank, and should lead about 200 yards southeastward of Mud Island and about 30 yards southeastward of the black spar buoy marking it, and about 200 yards southeastward of the wharf at Torresdale (marked by Torresdale light).

Torresdale to Philadelphia.—When 200 yards southeastward of Torresdale wharf (marked by a light), steer 225° true (**SW** ¾ **W** mag.) with the prominent clubhouse and flagstaff on the end of the pier at Riverton a little on the port bow; Riverton light is also on the end of the pier. On this course pass about 100 yards southeastward of the two black spar buoys which lie near the northwestern bank ¾ and 1 mile below Torresdale, and about 200 yards northwestward of the red spar buoy which lies near mid-river, 1½ miles below Torresdale.

Pass 200 yards north of Riverton light (end of pier), and bring the light astern on a 262° true (**W** mag.) course; on this course pass 150 yards north of the red spar buoy 1 mile westward of Riverton. Then follow the western bank at a distance of about 300 yards and pass 150 yards westward of red spar buoy No. 50 off Bridesburg. Then steer 202° true (**SSW** ⅝ **W** mag.) for the draw (draw is 40 feet above high water), and when through the bridge follow a mid-river course in passing Philadelphia. Anchorage can be made on the eastern side of the river, either at Petty Island, 2 miles below the bridge, or from Kaighns Point to Gloucester, 5 to 7 miles below the bridge.

Philadelphia to Chester.—Keep in mid-river in passing Philadelphia, and when up with the ferry landing at Gloucester steer 207° true (**SW** ⅞ **S** mag.) about 1 mile on the Horseshoe east group upper range (ahead). Pass about 200 yards eastward of gas buoy No. 37, and steer 240° true (**WSW** mag.) on the Eagle Point range (ahead).

Pass about 200 yards northward of buoy No. 46 and steer 274° true (**WNW** ⅞ **W** mag.) about 1¾ miles, and when up with buoy No. 44 haul southward and pass about 200 yards westward of it. Then steer 234° true (**SW** by **W** ½ **W** mag.) on the Fort Mifflin Bar range (may be seen over the ferry landing ahead); this course follows the northern bank at a distance of about 300 yards, passes about 300 yards westward of a ruined pier (with white daymark) near mid-river, and leads north of a red nun buoy and south of a black can buoy.

Then steer 251° true (**W** by **S** mag.) for 1¼ miles, giving the southern bank a berth of about 300 yards, to a position 100 yards northward of a red nun buoy. Then steer 272° true (**W** ⅞ **N** mag.), keeping the Tinicum Island range astern, and pass about midway between the nun and can buoys off the western end of Tinicum Island. When nun buoy No. 2 T is on the port beam distant 100 yards, steer 235° true (**SW** by **W** ⅝ **W** mag.) with the Schooner Ledge range astern.

Chester to Delaware City.—Continue on the 235° true (**SW** by **W** ⅝ **W** mag.) course for 7 miles, passing between the red buoys and black buoys which mark the edges of the channel on the Schooner Ledge range. When Grubbs Landing light (crib in water) is about abeam, steer 215° true (**SW** ⅛ **S** mag.) nearly 3 miles on the Bellevue range which is ahead.

When abreast of Edgemoor Rolling Mill and nun buoy No. 2 B is on the port beam, steer 197° true (**SSW** ⅛ **W** mag.) for 4¼ miles with the Cherry Island range astern until at the intersection with the Deepwater Point range and abreast gas and bell buoys No. 2 C. Then steer 234° true (**SW** by **W** ½ **W** mag.) for 3½ miles, passing about 300 yards eastward of black buoy No. 27 and the same distance westward of the horizontally striped buoy at the northeastern end of Bulkhead Shoal; red spar buoy No. 6 should be on the port bow, and as it is

approached should be left 200 yards on the port hand. When abreast of red spar buoy No. 6, steer about 195° true (**SSW** mag.) for 1½ miles, and leave two black spar buoys 150 yards on the starboard hand.

Then haul southward, pass 100 yards westward of gas buoy No. 4, and steer 147° true (**SSE ¼ E** mag.) about 1½ miles to a position about 300 yards off the wharves at Delaware City. Anchorage may be made on the eastern side of the channel, about ¼ mile off the wharves, in 15 to 17 feet. If going into the canal, whistle when ¼ to ½ mile away and slow down. The entrance lock is on the south side of the southernmost wharf, and vessels make fast to the wharf, on the starboard side at the entrance to the lock, until the lock is open and ready to enter. The current in the river setting past the ends of the wharves must be considered and allowed for when turning in for the canal wharf.

THROUGH BACK CREEK AND ELK RIVER TO TURKEY POINT, 11 MILES.—A stranger should proceed slowly in Back Creek, and keep the leads going on both sides, as the slope on either side is sufficient to make the difference in depth, obtained with the two leads, a warning of the approach to the flats. Vessels must slow down when passing other vessels. The buoys are in a depth of 6 feet on the edges of the channel.

From the lock at Chesapeake City favor the northern bank for a distance of ⅜ mile, leaving buoy No. 4 on the port hand, and buoy No. 7 on the starboard hand, at a distance of 25 yards. When past the latter buoy keep near the middle of the creek until approaching the next point on the southern bank, and pass 50 yards northward of it. Then steer 285° true (**WNW** mag.) and leave buoy No. 5 about 25 yards on the starboard hand. Then follow mid-creek, leave buoy No. 2 about 30 yards on the port hand, and then pass 50 yards northward of the next point on the south bank.

Emilys Point, the next point on the north bank, should be passed at a distance of 60 yards, and the next point on the south bank should be passed at the same distance. Then steer for a position in mid-creek a little westward of the marshy opening on the north bank, and then steer 271° true (**W ⅝ N** mag.) for ¼ mile to a position 100 yards from the north bank just westward of a marshy opening. Then steer 260° true (**W ¼ S** mag.) for a little over ¼ mile until buoy No. 3 is about 40 yards on the starboard beam. Then steer 273° true (**W ⅞ N** mag.) and pass 70 yards northward of Randall Wharf light.

Randall Wharf light to Turkey Point.—Round the light at a distance of 70 yards, and steer 218° true (**SW ⅛ S** mag.), with the south point at the entrance to the creek ahead. Leave buoy No. 1 about 30 yards on the starboard hand, and when past it edge a little westward and bring Randall Wharf light astern on a 230° true (**SW** by **W** mag.) course. This course slightly favors the southern bank at the entrance of Back Creek, and leads 275 yards northward of Courthouse Point, which is the prominently projecting point on the south bank ¾ mile from the entrance to Back Creek.

Continue the 230° true (**SW** by **W** mag.) course nearly ½ mile past Courthouse Point, and when Old Field Point light (pile structure in water off prominent point of north bank) bears 286° true (*WNW* mag.), distant nearly ¼ mile, steer 256° true (**W ¾ S** mag.) so as to pass about 225 yards southward of it. Continue the course for ⅞ mile past the light to a position 350 yards northward of Old Town Point Wharf light, and then haul southward to a mid-channel position westward of it. Then steer 225° true (**SW ½ W** mag.), keeping in the middle of the river, for 5 miles to the entrance of the river at Turkey Point.

CHESAPEAKE BAY.

The channel in Chesapeake Bay is well marked and easily followed by the class of vessels using the inland waterway. Coal, gasoline, repairs, and supplies of all kinds can be best obtained at Baltimore and Norfolk. Some supplies and gasoline can be had at numerous places on the tributaries of the bay, the best places near the sailing route being Annapolis, Solomons on the Patuxent River, and Cockrells Creek (Reedville) on the Great Wicomico River. There are small marine railways at Solomons, Reedville, and Carter Creek on the Rappahannock River.

Anchorage can be had at numerous places on the shores of the bay and its tributaries, depending on the direction of the wind. Those most frequently used and easiest of access are:

Severn River, at Annapolis in the mouth of Spaw Creek, depth 13 feet, also in Annapolis Roads southeastward of Greenbury Point Shoal lighthouse.

Patuxent River.—Small vessels usually anchor on the north side, between Drum Point lighthouse and the horizontally striped buoy ⅝ mile westward of the lighthouse, and small craft frequently anchor in the cove on the north side of Solomons Island (1⅝ miles westward of Drum Point lighthouse).

Cornfield Harbor, on the west side of Point Lookout, entrance of Potomac River, is occasionally used; it is sheltered only from northerly and northeasterly winds.

Great Wicomico River and the mouth of Cockrell Creek is a good and convenient harbor. The fish stakes off the entrance may give trouble at times to vessels entering. The depths at the anchorage are 15 to 20 feet.

Rappahannock River.—Anchorage, exposed to southeasterly winds, can be selected in the entrance.

Mobjack Bay is exposed to southerly and southeasterly winds, and except toward its head or in the arms it is exposed to northwest winds also.

Hampton Roads.—Small craft usually anchor in what is locally known as Mother Hawkins Hole, on the north side of the eastern part of Hampton Bar; the entrance is between the wharf at Old Point Comfort and the horizontally striped buoy close westward of it.

Small vessels frequently anchor on the northerly part of Craney Islands Flats westward of the dredged channel leading to Norfolk, also on the shoals eastward of that channel between the Virginian Railroad pier and Bush Bluff light vessel.

Tides.—The mean rise and fall of tides at Baltimore is 1.2 feet; Rappahannock River entrance, 1.2; Old Point Comfort, 2.5; and Norfolk, 2.8.

SAILING DIRECTIONS, CHESAPEAKE BAY.

The following directions are intended for vessels of 9 feet or less draft that use the inland route, but are good for vessels of greater draft in most places. With westerly winds small vessels can follow with advantage the western shore more closely, being guided by the chart, but care should be taken at night to avoid the fish traps which extend long distances from shore in places on the shoals between Great Wicomico River and Old Point Comfort.

TURKEY POINT TO BALTIMORE, 35 MILES.—From the middle of the entrance of Elk River abreast Turkey Point, steer 235° true (**SW** by **W** ½ **W** mag.) for 11 miles, passing ⅜ mile off Howell Point, a little over ¼ mile southeastward of spar buoy No. 5 lying near the middle of the bay off Still Pond, and to a position ¼ mile northwestward of Worton Point Shoal gas buoy.

Then steer 209° true (**SW** ⅞ **S** mag.) for 3¼ miles to a position ¼ mile eastward of bell buoy No. 3. Then steer 252° true (**W** by **S** mag.) for the south end of Pooles Island, and pass 150 yards southward of the bell buoy and to a position 100 yards northwestward of nun buoy No. 2. Then steer 229° true (**SW** ⅞ **W** mag.) for 1½ miles to a position 150 yards southeastward of Pooles Island Flats gas buoy No. 1. Then steer 238° true (**SW** by **W** ¾ **W** mag.) for 9 miles to bell buoy No. 19, Brewerton Channel.

Then follow the dredged channels to Baltimore, courses: 291° true (**NW** by **W** ⅝ **W** mag.) on the Brewerton Channel range, following the line of red spar buoys, to nun buoy No. 30; then steer a little more northward to nun buoy No. 34; and then steer 320° true (**NW** by **N** mag.), following the line of red buoys which mark the eastern side of the Fort McHenry Channel to Lazaretto Point. Then steer more northward into Baltimore Harbor between Lazaretto Point lighthouse and Fort McHenry, passing eastward of the two black buoys on the northeast side of Fort McHenry. The anchorages in Baltimore Harbor are marked by white buoys; they are on the northeasterly side of the harbor between Canton and Fells Point, and in the cove on the southerly side eastward of Federal Hill.

BALTIMORE TO SANDY POINT, 20 MILES.—Follow the dredged channels as described in the preceding paragraphs to bell buoy No. 19, Brewerton Channel, and then steer southeastward following the black can buoys which mark the westerly side of the channel to buoy 15. Then steer 149° true (**SSE** ¼ **E** mag.) on the Cutoff Channel range astern, and follow the black buoys which mark the westerly side of the channel to can buoy No. 7, nearly 1 mile southward of Seven Foot Knoll lighthouse. Then steer 161° true (**S** by **E** ⅛ **E** mag.) for 1½ miles, passing can buoys Nos. 5 and 3. From the latter buoy steer 180° true (**S** ½ **W** mag.) on the Craighill Channel range astern, and follow the red buoys which mark the easterly side of the channel to a position 350 yards eastward of Baltimore lighthouse. Then steer 154° true (**S** by **E** ¾ **E** mag.) for 2¾ miles to a position ¾ mile eastward of Sandy Point lighthouse.

TURKEY POINT TO SANDY POINT DIRECT, 32 MILES.—From the middle of the entrance of Elk River abreast Turkey Point steer 235° true (**SW** by **W** ½ **W** mag.) for 11 miles, passing ⅜ mile off Howell Point, a little over ¼ mile southeastward of spar buoy No. 5 lying near the middle of the bay off Still Pond, and to a position ¼ mile northwestward of Worton Point Shoal gas buoy.

Then steer 202° true (**SSW** ½ **W** mag.) for 7½ miles, passing nearly ⅜ mile westward of a red spar buoy, nearly ¼ mile eastward of spar buoy No. 3, and to a position 300 yards eastward of spar buoy No. 1, lying westward of the summer resort of Tolchester Beach. Then steer 218° true (**SW** mag.) for 3½ miles until Craighill Channel front range lighthouse bears 286° true (*WNW* mag.). Then steer 198° true (**SSW** ⅛ **W** mag.) for 9½ miles, passing over ¼ mile westward of the red spar buoy off Swan Point, and to a position ¾ mile eastward of Sandy Point lighthouse.

SANDY POINT TO NORFOLK, 138 MILES.—From a position ¾ mile eastward of Sandy Point lighthouse steer 197° true (**SSW** ⅛ **W** mag.) for 7½ miles to a position 1 mile eastward of Thomas Point Shoal lighthouse. Then steer 186° true (**S** by **W** ⅛ **W** mag.) for 9 miles, passing 1½ miles westward of Bloody Point Bar lighthouse, and to Poplar Island Shoal gas and bell buoy. Then steer 178° true (**S** ⅜ **W** mag.) for 12 miles, passing 2½ miles westward of Sharps Island lighthouse, and to Sharps Island gas and bell buoy.

From Sharps Island gas and bell buoy make good a 163° true (**S** by **E** mag.) course for 42½ miles, passing a little over 1 mile eastward of Cove Point lighthouse, 2 miles eastward of Cedar Point lighthouse, 2½ miles westward of Hooper Island lighthouse, 1½ miles eastward of Point No Point lighthouse, and to a position ¾ to 1 mile eastward of Smith Point lighthouse.

Then make good a 180° true (**S** ½ **W** mag.) course for 29½ miles, passing close to Tangier Island Shoal Lump gas and bell buoy, 3 ¼ miles eastward of Windmill Point lighthouse and 1¼ miles eastward of the black buoy at the end of Rappahannock Spit, and to a position 1 mile eastward of Wolf Trap lighthouse.

Then make good a 186° true (**S** by **W** mag.) course for 23 miles, passing 1 mile eastward of New Point (Middle Ground) Shoal buoy, 3 miles eastward of York Spit and Back River lighthouses, and in a depth of about 15 feet across the Horseshoe about 1 mile eastward of Thimble Shoal lighthouse.

On approaching Thimble Shoal lighthouse haul westward and pass 300 yards southward of it. Then steer 251° true (**WSW** ¾ **W** mag.), pass about ¼ mile northward of Willoughby Spit gas and bell buoy, and pass about midway between Old Point Comfort and Fort Wool. Then steer 234° true (**SW** by **W** ¼ **W** mag.) for Newport News Middle Ground lighthouse and pass northward of Sewall Point Shoal gas buoy No. 3. Pass about 200 yards westward of this buoy and stand southward in the dredged channel to Norfolk, being guided by the buoys, some lighted, and Bush Bluff light vessel, which mark the edges of the channel. The courses are, 185° true (**S** ⅞ **W** mag.) to abreast Bush Bluff light vessel, then 172° true (**S** ¼ **E** mag.) until abreast the southerly piers at Lambert Point, and then 131° true (**SE** ⅛ **S** mag.) to the city wharves.

The anchorages for small vessels near Norfolk are on the northeast side of the channel opposite Hospital Point, on the west side of the channel between Hospital Point and Portsmouth, and on the south side of the Eastern Branch between Norfolk and Berkley.

CHESAPEAKE BAY TO BEAUFORT ENTRANCE.

From the Southern Branch of Elizabeth River to Albemarle Sound there are two routes that are used—one through the Albemarle and Chesapeake Canal, North Landing River, Coanjock Canal, and North River, and the other through Deep Creek, Dismal Swamp Canal, and Pasquotank River. Thence the route leads through Albemarle, Croatan, and Pamlico Sounds, Neuse River, Adams Creek, canal to Core Creek, and Beaufort Harbor. The passage is good for a draft of 9 feet by the way of Dismal Swamp Canal, and about 8 feet by the way of Albemarle and Chesapeake Canal. The distance from Norfolk to Beaufort is about 180 miles by either route. Boats of 4 feet draft, on the latter part of this route, can go through Core Sound and connecting waters to Beaufort Harbor.

Tides are experienced only in the Southern Branch of Elizabeth River and Beaufort Harbor. In Albemarle and Pamlico Sounds and tributaries winds have considerable effect in raising and lowering the water, as mentioned in the following description.

Pilots for the inland waters can be obtained at Norfolk, Va., and Beaufort, N. C.

Coal, fresh water, gasoline, and supplies can be had at Norfolk, Va., at Elizabeth City, and at Beaufort, and in small quantities at several other places along the route.

Elizabeth River, Southern Branch.—Two branches of the Elizabeth River join at Norfolk and empty into Chesapeake Bay through one deep dredged channel, well marked by lighted buoys, spars, and other aids. The Southern Branch extends 10 miles southward of Norfolk to the entrance to the Albemarle and Chesapeake Canal, and is navigable for a draft of 9 feet to the canal. On the west bank, just above the junction with the Eastern Branch, is the city of Portsmouth and the navy yard, and opposite, between the two branches, is the town of Berkley. Three railroad drawbridges cross the Southern Branch between the navy yard and Deep Creek, and one railroad and one highway drawbridge cross above Deep Creek. Spar buoys mark the channel above the navy yard to the Albemarle and Chesapeake Canal; but they are liable to be dragged out of position by tows of logs, and are sometimes scarred so that their distinguishing colors are unrecognizable.

Deep Creek empties into the Southern Branch about 6 miles above Norfolk, and extends in a general westerly direction for 2½ miles to the Dismal Swamp Canal. A dredged channel 90 to 100 feet wide and 10 feet deep at low tide follows the center line of the creek from river to canal. On the right bank of the creek, at its confluence with the river, there is a large lighted signboard directing the way to the Dismal Swamp Canal.

Norfolk, on the eastern bank of the Elizabeth River, 7 miles above Sewall Point, is an important shipping port for foreign, coastwise, and bay vessels. It has communication by ferry with Portsmouth and Berkley and steamboat connections with Newport News, Old Point Comfort, Washington, Baltimore, and other bay ports. Several lines of coastwise steamers ply between Norfolk and the important commercial ports north and south. There is railroad connection to all parts of the country.

The usual anchorage for large vessels is on either side of the channel between Lambert and Pinner Points; smaller vessels anchor west of the channel above Hospital Point; and yachts and small craft anchor in the shallow waters off the yacht club. Dock facilities are ample and suitable for vessels of all sizes. Coal may be taken at the wharves or from lighters, and fresh water at the wharves or from water boats. Gasoline can be taken conveniently at oil barges. There are several ship yards at Norfolk and Berkley, where repairs to hulls and machinery can be made. The marine railways here haul out vessels up to 1,600 tons; and there are several smaller marine railways.

Dismal Swamp Canal connects Deep Creek with the Pasquotank River; it is about 9 miles long, 60 feet wide, and 9 to 10 feet deep. There are two locks 250 feet long by 39 feet wide; one at the northern end, just inside the canal, and the other at the southern end, about ⅛ mile below South Mills. There are turnouts, about 3 miles apart, where vessels may pass each other. Three drawbridges cross the canal. The settlements on its banks are the post village of Deep Creek, at the northern entrance, Wallacetown, about 8½ miles from the northern entrance, and South Mills. Toll is collected at the northern lock.

Turners Cut is a canal 3¾ miles long, 100 feet wide, and 10 feet deep, which extends in nearly a straight line from the Dismal Swamp Canal to Pasquotank River.

Pasquotank River has a length of 12½ miles from the southerly end of Turners Cut to Elizabeth City, and thence 15 miles to Wade Point lighthouse, at the entrance from Albemarle Sound. The river has been improved by dredging and is good for a depth of 10 feet from Turners Cut to Albemarle Sound. Drawbridges cross the river, one about 3 miles above Elizabeth City and the other at the city.

Elizabeth City is on the west bank of the Pasquotank River, 15 miles above Wade Point lighthouse. It has railroad communication with Norfolk and Edenton, and launch or steamboat connection with most of the towns on the inland waters of North Carolina.

Anchorage may be had just below the city, on the north side of the channel, eastward of red buoy No. 6, in 7 to 12 feet of water. The bulkheads, forming the water front, have a sufficient depth alongside, and a vessel can usually find a berth there. Provisions, some ship chandlery, coal, gasoline, and water can be obtained. There are facilities for repairing wooden hulls and machinery of vessels, and marine railways, the largest of which has a capacity of 800 tons. Pilots for the Dismal Swamp Canal and connecting waterways can be taken here.

Albemarle and Chesapeake Canal connects the Southern Branch of Elizabeth River with the North River, emptying into Albemarle Sound. There are two sections of this canal, one to the upper waters of the North Landing River, about 7½ miles long, and the other, about 3 miles long, between Coanjock Bay and North River. Between the two sections is a natural waterway, improved by dredging, of about 25½ miles. The surface width of the canal is 80 feet, and the average depth of water about 9 feet; but 8 feet is all that can be taken safely through under normal conditions. There is one lock, 220 feet long by 40 feet wide, near the Elizabeth River end of the canal. Toll is collected at this lock.

North Landing River empties into Currituck Sound from northward, and forms one of the connecting waterways of the Albemarle and Chesapeake Canal route. From a width of 2½ miles at the mouth the river narrows gradually to a width of about 200 feet, 9 miles above Currituck Sound, and then trends in a general northward direction 9½ miles to the mouth of the canal. This stretch of the river is from 100 to 200 feet wide and is very crooked; but the bends are as a rule easy, and there is but one place where a stranger could mistake the main stream. About 3 miles below the canal a branch stream, nearly as wide as the main river, leads off to the eastward; it can be recognized by a line of piles along its left bank. A channel 80 feet wide and 8½ to 9 feet deep has been dredged through the wider part of the river; it is marked by lighted beacons and brush stakes.

Currituck is a small village and steamboat landing on the west bank opposite the mouth of the river.

Munden is a post village and terminal of the Norfolk & Southern Railroad on the east bank, 7 miles above the mouth.

Currituck Sound is a narrow and shoal body of water extending from Albemarle Sound in a general north-northwest direction for 25 miles, separated from the ocean by a narrow strip of sand beach. The western part, through which there is a dredged channel from 8 to 9 feet deep, connects the North Landing River Channel with the lower section of the canal; but, eastward of the channel, shoals, over which the depths vary from 2 to 4 feet, extend completely across the sound.

The lower part of the sound is navigable for boats of 4 to 5 feet draft for a distance of 11 miles above the entrance from Albemarle Sound; but the entrance is partly choked by shoals, and shoals extend far off the shores on each side, making navigation difficult for a stranger.

There are no tides in these waters, and the water level depends on the force and direction of the wind. Northerly winds lower the water and southerly winds raise it, and long continued strong winds may cause a difference of 2 feet from the mean level.

Coanjock Bay, 5 miles long by ½ to 1 mile wide, lies west of Currituck Sound and south of North Landing River, and is connected with the former by a narrow passage. The lower part of the Albemarle and Chesapeake Canal cuts across the point of marsh at the southern side

of the opening to Currituck Sound in a southerly direction; thence traverses the southern part of the bay and through the marsh to a point ¼ mile south of the bay, where it bends sharply in a south-southwest direction and enters North River. The canal is dredged to a depth of 9 feet and is marked by lighted beacons, on the marsh, at the entrance to Coanjock Bay, and at the turn south of the bay. On the west bank of the canal, at the first beacon, is a depot of the Lighthouse Service.

North River is narrow and crooked for a distance of 5 miles from the canal to beacon No. 10, below which for 6¾ miles to North River lighthouse, in the mouth, the river is wide and nearly straight. The mouth, which opens into Albemarle Sound, is obstructed by a shoal, through which a channel 70 feet wide and 9½ feet deep has been dredged.

Albemarle Sound has a least depth of 10 feet along the tracks from North River and from Pasquotank River to Croatan Sound and less water eastward of there. During strong westerly winds the passage is uncomfortable and even dangerous for small open boats. Careful lookout should be kept for stakes and fish nets, which often extend long distances from the eastern shores, especially near Croatan Sound.

Croatan Sound, west of Roanoke Island, connects Albemarle and Pamlico Sound and has a navigable depth of 9 feet through a narrow but well marked channel. Stakes and fish nets are numerous and troublesome, especially near Roanoke Marshes.

Roanoke Marshes is the name applied to a small point of marsh and fishing station westward of Roanoke Marshes lighthouse, at the lower end of Croatan Sound. A crooked slough, from 50 to 100 yards wide, cuts in a general north and south direction across the point; and the fishing station, consisting of 20 to 30 huts and as many small wharves, is on the shores of this slough. A small vessel may enter at either end of the slough and find perfect shelter inside from all weather. The least depth at either entrance is 7 feet, and the depth inside varies from 12 to 16 feet.. On account of the narrowness of the passage there is no anchorage inside; but small vessels can make fast to the steep banks or at the wharves.

Directions.—The northern entrance is between the little islet, north of the island on which are the huts, and the mainland. To enter here from the main channel, hold to the westward until the passage between the little islet and the marsh on the mainland opens; then steer southward on a mid-channel course. When the passage between the southern end of this islet and the large island to the south of it opens, haul to westward and round the western point of the larger island; the village will then open up ahead; keep in mid-channel till up to the wharves. To enter by the south end of the slough, hold to westward until the slough opens, keeping 100 yards off the south end of the island, and then steer in on a mid-channel course, about north-northeast. Both entrances are nearly blocked by fish weirs and stakes, but there is a narrow, clear passage through to each.

Roanoke Sound lies between Roanoke Island and a narrow strip of sand beach, which separates it from the ocean; it is about 12 miles long and from 1 to 3 miles broad. A depth of 6 feet can be carried from Albemarle Sound through the northern part of Roanoke Sound and through a dredged channel into Shallowbag Bay, in the east side of Roanoke Island, 3½ miles southeastward of its northern end. There is a narrow channel close to the eastern side of Roanoke Island from Shallowbag Bay to Pamlico Sound, which is navigable for a draft of 4 feet; but this channel is marked only at its southern end by a few brush stakes; and a stranger would have to feel his way through carefully. Fish traps and stakes, at the southern end of the channel, are difficult to avoid. Shallowbag Bay is a safe anchorage for small craft; the town of Manteo and wharves are at the head of the bay. Nags Head is a summer resort on the east side of the bay; there is a hotel and wharf (4½ feet of water at end of the pier) eastward from the northern end of Roanoke Island.

Tides in Croatan and Roanoke Sound depend entirely upon the winds, which may, under exceptional conditions, lower or raise the level as much as 1½ feet from the normal; easterly winds tend to lower the level and westerly winds to raise it. Strong northerly or southerly winds produce perceptible currents, which are especially marked when the wind shifts suddenly to the opposite point.

Manteo is a small village on the west bank of Shallowbag Bay, in the northern half of Roanoke Island. There are several wharves, at which there are depths of 7 feet at the outer ends, in the northwest corner of the bay and along the west side of a narrow slough running north from this corner of the bay. A depth of 6 feet, at normal tide, can be carried from the northern part of Roanoke Sound through a dredged channel, 100 feet wide, into Shallowbag Bay and to the wharves; but the western part of the bay, outside of the channel, and the eastern part of the slough are shallow. There is daily communication by power boats with Elizabeth City and with neighboring villages. There are facilities for repairing wooden hulls and for hauling out vessels of 20 tons weight and 4 feet draft.

DIRECTIONS FROM ALBEMARLE SOUND.—Pass northward of Collington Island Shoal light at a distance not greater than ¼ mile and steer 101° true (**ESE** ⅝ **E** mag.) for 5 miles to Nags Head light, giving Roanoke Island a berth of over ⅝ mile. Pass northward and close eastward of Nags Head light and steer about 163° true (**S** by **E** ⅛ **E** mag.) for 1½ miles to Dolbys Point light, passing eastward of and close to a line of bush stakes. Pass 50 feet eastward of the light and steer about 216° true (**SW** ⅜ **S** mag.), passing eastward of a line of bush stakes. Pass northward of and close to a bush stake about ⅜ mile east of the public wharf at Manteo, and head for the wharf, passing about 50 feet from the point on the east side of the slough. A channel 100 feet wide has been dredged along the wharves.

Pamlico Sound is the largest body of water in North Carolina, and is separated from the Atlantic by a narrow beach extending from Bodie Island lighthouse to Cape Hatteras, a distance of about 35 miles, and thence in a general west-southwest direction for about 35 miles. From Croatan Sound, the northern outlet of Pamlico Sound, to Core Sound, the southwestern outlet, the distance, following along the middle of Pamlico Sound, is about 60 miles; the greatest width of the sound taken in a northwest direction from Cape Hatteras is about 24 miles. Four inlets, namely, Oregon Inlet, New Inlet, Hatteras Inlet, and Ocracoke Inlet, pierce the narrow beach, giving access to the ocean; but all are blocked by inside bars over which the depth of water is too shallow for any but very small vessels to pass.

The northern and western shores of the sound are irregular, being broken by numerous small bays and by two large rivers, Pamlico River and Neuse River, emptying into the western part of the bay. The general depth of water in the middle of the sound is between 3 and 4 fathoms, but shoals in many places extend miles from the shore; northward of Ocracoke Inlet, Bluff Shoal, with 7 to 10 feet over it, extends completely across the sound in a general north and south direction.

Strong winds from any direction raise, in the exposed parts of the sound, a short, choppy sea, uncomfortable for small craft and even dangerous for open boats; but protected anchorages for small craft may be found in the many bays along the northern side, and along the southern side, in several sloughs, which lead to sheltered berths in the lee of high shoals.

Tides, except at the inlets, where there is a rise and fall of about 2 feet, are due entirely to winds and are small except under the influence of very strong winds. Easterly and westerly winds produce the greatest change in water level, which rarely exceeds 2 feet. There are no noticeable currents beyond the shoals at the inlets.

Oregon Inlet, about 2 miles south of Roanoke Sound, is used by small fishing boats and occasionally as a harbor of refuge by small coasting vessels. In 1910 a depth of 10 feet at low water could be carried in from the sea to a sheltered anchorage in the lee of the southern side of the entrance; but 4 feet at high water is all that can be carried across the bulkhead into the sound. The channel is not marked and is said to shift frequently.

Royal Shoal Anchorage.—Royal Shoal is the name given to the hook-shaped shoal extending northwest from Ocracoke Inlet; a lighted beacon marks the point of the hook and an old abandoned beacon marks the northwest extremity of the shoal. Inside of the hook comparatively smooth anchorage may be had in 10 to 11 feet of water.

Neuse River empties into the western end of Pamlico Sound from westward and is one of the important rivers in North Carolina. Its mouth, which is 5 miles wide, is reduced to a navigable width of a little over 2 miles by shoals, extending offshore from each side. Neuse

River lighthouse marks the outer end of the shoal on the northern side; and the southern shoal, off Point of Marsh, is marked by a lighted beacon at its outer end. Garbacon Shoal, 10 miles above the mouth of the river, extends halfway across from the southern shore, leaving a clear navigable width of ⅞ mile; the outer end of the shoal is marked by a lighted beacon. The principal route to the sea is through this river.

Adams Creek, canal, and Core Creek.—The deepest outlet to the sea from Pamlico Sound, and hence the principal inside route from Chesapeake Bay to the ocean south of Cape Hatteras is by way of Adams Creek, Core Creek, and the intervening canal recently completed by the Government. A dredged channel, 10 feet deep, extends from the mouth nearly to the head of Adams Creek, where it connects with a canal of the same depth to the head of Core Creek; a dredged channel, 10 feet deep at low water, completes the passage through Core Creek and Newport River to the deep water of Beaufort Inlet. The minimum bottom width of the canal is 90 feet through the dry cuts, increased to 250 feet in the dredged channels through the broader open waters; there are no locks.

Adams Creek empties into Neuse River on the southern side, about 12 miles above Point of Marsh, just west of Garbacon Shoal and nearly south of the town of Oriental, which is on the north shore of the river. A lighted beacon in the mouth of the creek marks the approach to the channel, and lights or buoys mark the channel at every turn. The channel, from the entrance beacon to the canal, is 5½ miles long.

The distance from Adams Creek to the open water of Core Creek is 5 miles; and vessels are limited to a speed of 6 statute miles per hour through this channel. The canal extends in a series of straight reaches connected by easy curves; it is crossed by one drawbridge about a mile above Core Creek; no toll is collected on this canal.

Core Creek empties into Newport River from northward; a dredged channel runs nearly straight, through the center of the creek to its mouth, a little over a mile below the canal, outside of the channel the creek bed is dry or covered only to a depth of 2 or 3 feet at low water. Lighted range beacons south of the creek mouth and one light in the creek mark the channel.

Newport River is a broad shallow stream emptying into Beaufort Harbor between Beaufort and Morehead City; its mouth is nearly choked by shoals and marshy islands, through which are several shallow passages. The dredged channel from Core Creek crosses the eastern part of the river and follows the eastern side of Newport Marshes to a draw in the railroad bridge near Morehead City railroad wharf. The channel is marked at its turns by lights which must be followed carefully, as the water outside the channel is very shallow and shoals rapidly.

Core Sound is a narrow and shoal body of water extending along and just inside the beach for a length of 27 miles from the southwest end of Pamlico Sound to a point inside Cape Lookout. At its western end Core Sound joins a similar body of water known as Back Sound and a narrower body north of Harkers Island known as The Straits, both of which connect with Beaufort Harbor and Inlet. Core Sound varies in width from 2 to 3 miles and has a general southwesterly trend. It is nearly filled with shoal banks over which the depth ranges from 2 to 4 feet; but a channel, from 7 to 10 feet deep, winds through the sound and is continuous except at three places where bars of 4 feet depth must be crossed. These bars are situated as follows: Harbor Island Bar, at the entrance from Pamlico Sound; Piney Point Bar, off Piney Point, about 15 miles down the sound; and Yellow Shoal, off Bells Point, 6 miles farther southward and westward.

Back Sound trends westward from Core Sound for 6 miles to Beaufort Harbor and varies in width from over 2 miles to ½ mile; passage to Core Sound, except for very light draft boats, is blocked by a shoal at the junction of the two sounds, over which there is but 3½ feet of water.

The Straits parallel Back Sound north of Harkers Island and Middle Marshes, and offer a through deep passage from Core Sound to the western end of Back Sound. The width is from ⅜ to ¾ mile, but the clear channel is only 100 yards wide at places.

Tidal currents of 1 to 2 knots may be found in the lower part of Core Sound.

Beaufort Harbor, N. C., is the main outlet for the inland waters of North Carolina and at the present time is the only passage used to any extent; it is also the most important harbor on the coast between Cape Henry and Cape Fear.

The entrance is about 8 miles west-northwestward from Cape Lookout lighthouse; it is obstructed by a shifting bar which extends nearly 1½ miles seaward and in July, 1912, had 14 feet of water in the channel across it. Buoys and lighted range beacons mark the channel over the bar and into the harbor, but they can not always be depended upon to indicate the best water. The most prominent and easily recognized objects from seaward are the large yellow buildings of the Marine Biological Station and the wireless telegraph poles on Pivers Island, close to and just west of Beaufort, and the tall stand pipe in Morehead City. The harbor is nearly filled by shoals, dry or covered by a foot or two of water at low tide; but there is a good anchorage about ¼ mile wide just inside and close to the western side of the entrance, where the depth varies from 2½ to 5½ fathoms. A deep channel runs close under this shore and to the railroad wharf at Morehead City where it connects with the dredged channel to Neuse River and Albemarle Sound; the channel is marked by buoys. Shark Shoal between Beaufort and Morehead City is said to be encroaching on this channel and to have advanced considerably during the past year (1912). Pilots can be had at Beaufort and they will come out to a vessel if the sea will permit them to cross the bar.

Tides.—The mean rise and fall of tides is 2.6 feet. High water occurs 7 minutes after and low water 10 minutes after high and low water at Charlestown, S. C.

Currents.—The tidal currents in the entrance run with considerable velocity, especially during spring tides. They generally follow the direction of the channel, but on the last quarter of the flood and first of the ebb they are apt to set across the shoals in the entrance.

Beaufort, N. C.—The town of Beaufort is situated on the shore at the southwestern extremity of the land between North and Newport Rivers and faces the mouth of Beaufort Harbor. It is the terminal of one division of the Norfolk & Southern Railroad, which crosses Newport River over a long trestle bridge from Morehead City, and has power-boat communication with Morehead City and the villages along Core and Pamlico Sounds. The town is reached by a dredged channel 100 feet wide and 7 feet deep at low water across Shark Shoal, and thence between the marshy islets to the western end of the town, and from there eastward along the water front. The channel is marked by lighted beacons and is protected by a stone jetty along its western side.

There is no anchorage near the city, but there are several small wharves to which a depth of 7 feet can be taken. Coal, gasoline, fresh water, and some supplies (provisions and ship chandlery) can be obtained. Minor repairs can be made to small craft and vessels of 50 tons and 5 feet draft can be hauled out. Pilots for the inland waters can be had here. Storm warning signals are displayed here and at Morehead City.

Directions for going up to the town of Beaufort.—Leave the black and red beacon on Shark Shoal about 30 yards on the port hand and steer 356° true (**N** mag.) for the black beacon west of Town Marsh; when about 100 yards from this beacon haul to 41° true (**NE** mag.) and then to 86° true (**E** mag.) to pass the northwest end of Town Marsh at a distance of about 40 yards; then follow the southern and eastern shores of the marshy islet north of Town Marsh at about the same distance off (there is a small building and wharf on the southeastern side of this islet). Hold up for the passage between Pivers Island (the small island on which there is a wireless telegraph station and several large yellow buildings) and Beaufort until nearly up to the small wharf at the western end of the town; then, to go to the railroad wharf, continue up this passage, keeping about 100 yards from the western shore of the town; or, to go to the wharves on the southeast shore, hold down for them, keeping within 50 yards of the outer wharf. A depth of 7 feet at low water can be carried to the wharves by following these directions; but the channel is narrow and the water on each side is shallow.

Morehead City, on the west side of Newport River, is a distributing and railroad shipping point for Bogue Sound and tributaries. The railroad wharf extends to deep water of Newport River near the railroad bridge to Beaufort. In June, 1912, dredging was in progress to give a 10-foot channel to and along the sea wall. Provisions, some boat supplies, gasoline, coal, and fresh water can be obtained here; but, until the channel improvement is completed, less than 3 feet can be taken to the city on low tide.

DIRECTIONS FOR THE INLAND WATERS FROM NORFOLK, VA., TO BEAUFORT, N. C.

THROUGH DISMAL SWAMP CANAL.—Enter the Southern Branch between Portsmouth and Berkley and follow closely the buoyed channel for a distance of about 6 miles to Deep Creek, which will be recognized by a large signboard on the southern side of its mouth.

The channel in Deep Creek is about 90 feet wide and is not marked. For a distance of 300 yards from the mouth to the first bend it favors the north side, and then, from the first bend half way to the second bend, it favors the west side. The channel then follows the middle of the creek, except in its widest part, where the channel follows the northwestern side. The creek is 2½ miles long to the canal entrance.

From the canal the course is through Turners Cut for a distance of about 3½ miles, and then down the Pasquotank, following the windings of the narrow river on a general mid-channel course for a distance of about 12 miles to Elizabeth City. Several branch streams empty into the Pasquotank River on its west side, and the rule is, when in doubt, take the port-hand opening, going south. Pass through the drawbridge about 3 miles above Elizabeth City.

From Elizabeth City hold a mid-channel course down the river, passing through the drawbridge at the lower part of the city and leaving the buoys on the side indicated by their colors. Leave the red beacon (white light) off Poquoson Point on the port hand and steer to pass 400 yards northeast of Wade Point lighthouse.

THROUGH ALBEMARLE AND CHESAPEAKE CANAL.—This canal connects with the Southern Branch of Elizabeth River about 4¼ miles above Deep Creek, or 10¼ miles above Norfolk. The channel is buoyed at the turns and at the worst shoals; but a stranger may have some difficulty keeping in the best water, and should proceed cautiously. (See directions for Dismal Swamp Canal route to Deep Creek.) From opposite Deep Creek continue up the river, pass New Mill Creek on the west side and through two more drawbridges to the canal opening. The canal company's buildings, on the north bank of the canal, at the lock, are visible from the river.

From the eastern end of the canal follow the windings of the North Landing River in a general south by east direction for about 10 miles to beacon No. 1, keeping in general a mid-channel course and avoiding the points at turns. At beacon No. 1, which is near the entrance to Blackwater Creek, the North Landing River begins to widen rapidly; but the dredged channel, which has a general width of 80 feet and least depth of 8 feet, is marked by lighted beacons at the turns. Between beacons Nos. 7 and 9 the western edge of the dredged channel is marked by bush stakes; but between beacons Nos. 2 and 7 the bush stakes are on the eastern side. The beacons are cylindrical tanks, painted black or red to indicate the side on which to pass them, and support lanterns showing fixed white lights.

Leave beacon No. 1 on the starboard hand and steer 107° true (**ESE** mag.) for ½ mile. Leave beacon No. 2 on the port hand and steer 155° true (**S** by **E** ¾ **E** mag.) for 2¼ miles. Leave beacon No. 3 on the starboard hand and steer 164° true (**S** by **E** mag.) for 5 miles, passing beacons Nos. 4 and 5 on the port hand. From beacon No. 5, steer 133° true (**SE** ¼ **S** mag.) for 2⅜ miles. Leave beacon No. 6 on the port hand and steer 163° true (**S** by **E** mag.) for about 2⅛ miles. Leave beacon No. 7 on the starboard hand and steer about 188° true (**S** by **W** ⅛ **W** mag.) for 1 mile to the entrance of the cut, leaving beacon No. 8 on the starboard hand. Entering the cut the course is 171° true (**S** ⅜ **E** mag.) for 2¾ miles to abreast the beacon among the trees on the eastern side of the cut; here the course should be changed to 204° true (**SSW** ⅝ **W** mag.), following the cut for 2¼ miles to North River, thence to beacon No. 9, ⅝ mile farther. From this beacon, which is left on the starboard hand, stand southward for about 4½ miles, keeping near the middle of the river until southward of beacon No. 10. Here the North River broadens rapidly, is free from dangers, and a 146° true (**SSE** ⅝ **E** mag.) course for nearly 6 miles should lead to the front range light at the entrance to the dredged cut leading from the river into Albemarle Sound. This cut is straight, about 70 feet wide, 9½ feet deep, and 1½ miles long; it runs in a 186° true (**S** by **W** mag.) direction and is marked by range beacons and buoys.

From Pasquotank or North River, Through Albemarle and Croatan Sounds to Long Shoal Lighthouse in Pamlico Sound.

Pasquotank River.—From a point 400 yards northeast of Wade Point lighthouse steer 143° true (**SSE** ⅞ **E** mag.) for 15 miles to black buoy No. 5 off Caroon Point; leave the buoy 50 yards on the starboard hand and steer to pass 250 yards west of Croatan lighthouse.

North River.—From red buoy No. 2, lying ¾ mile 168° true (*S* ⅝ *E* mag.) from North River lighthouse, steer 155° true (**S** by **E** ⅞ **E** mag.) for 13¼ miles to a position 250 yards west of Croatan lighthouse, leaving Caroon Point black buoy, No. 5, about 200 yards on the starboard hand.

From a position 250 yards west of Croatan lighthouse, steer 133° true (**SE** ¼ **S** mag.) for 3⅞ miles to a position about 200 yards east of Blockade Shoal beacon (black frame, white light). Then steer 169° true (**S** ½ **E** mag.) for 5⅜ miles, and pass 50 to 100 yards eastward of Roanoke Marshes lighthouse. Bring this lighthouse astern and steer 175° true (**S** mag.) for 1½ miles; then steer 167° true (**S** ¾ **E** mag.) for 6 miles until Stumpy Point bears 260° true (*W* ½ *S* mag.). Then steer 180° true (**S** ½ **W** mag.) for 9¼ miles to a position 2¼ miles 131° true (*SE* mag.) of Long Shoal lighthouse.

Vessels up to 6 feet draft can steer 181° true (**S** ½ **W** mag.) from Roanoke Marshes lighthouse to Long Shoal lighthouse, crossing the shoals between, and over Long Shoal on either side of the lighthouse; but a sharp lookout should be kept for stakes and fish traps off Stumpy Point. The distance between lights is 15½ miles, and the course passes the shore north of Stumpy Point at distance of about 900 yards.

From Long Shoal Through Pamlico Sound, Neuse River, Adams Creek and Canal to Beaufort Harbor.

From a position 2¼ miles 131° true (*SE* mag.) of Long Shoal lighthouse, steer 225° true (**SW** ½ **W** mag.) for 27 ½ miles to a position 200 yards south of Bluff Shoal lighthouse; then steer 247° true (**WSW** ⅜ **W** mag.) for 11¾ miles to a position 300 yards south of Brant Island Shoal lighthouse. Then steer 263° true (**W** ¼ **S** mag.) for about 9 miles to black buoy No. 1, off Point of Marsh shoals, passing this buoy about 50 yards on the port side; and change course to 237° true (**SW** by **W** ⅜ **W** mag.) for 11 miles, passing Point of Marsh lighted beacon at a distance of ½ mile, and arriving at a position ⅛ mile north of Garbacon Shoal lighted beacon. Then steer 213° true (**SW** ¾ **S** mag.) for 2¼ miles until the lighted beacon in the mouth of Adams Creek bears 165° true (*S* by *E* mag.), when a 160° true (**S** by **E** ½ **E** mag.) course for 1⅜ miles will lead to black buoy No. 1 in the mouth of the dredged channel, passing the beacon on the starboard hand at a distance of about 175 yards.

The channel in Adams Creek above buoy No. 1 is marked at the turns by red lights; black buoy No. 1 is left 125 feet on the port hand and the lights close to on the starboard hand. Above Isaacs Creek light, the dredged channel runs 241° true (**SW** by **W** ¾ **W** mag.) close to the northern bank until the creek narrows and then follows, in general, the center line of the creek to the canal. The canal has a general south direction to Core Creek; the distance through Adams Creek from the beacon to the canal is 5½ miles, and the distance through the canal to the open water of Core Creek is 5 miles; one drawbridge crosses the canal about a mile above its southern end. A speed of 6 statute miles per hour is permitted in the canal. Leaving the canal at Core Creek upper light, steer 192° true (**S** by **W** ⅜ **W** mag.) for ⅜ mile, and then 177° true (**S** ⅛ **W** mag.) for 1¾ miles with Core Creek range lights in line. Leave the front light about 150 feet on the starboard hand and steer 147° true (**SSE** ⅝ **E** mag.) for 1 mile with Russells Creek light a little on the starboard bow. Leave this light 125 feet on the starboard hand and steer 200° true (**SSW** ⅛ **W** mag.) for 1¼ miles. Leave Newport Marshes upper light about 125 feet on the starboard hand and steer 226° true (**SW** ⅜ **W** mag.). Pass midway between Newport Marshes lower light and buoy No. 8 and steer 201° true (**SSW** ¼ **W** mag.) for the end of the wharf house which shows over the bridge, a little to the right of the draw, and steer for the draw when less than

300 yards from it. From the bridge the channel curves south and southeast to and along the southern shore of the bay to the entrance, and is marked by a red and black horizontally striped buoy, on the starboard hand, at the channel into Bogue Sound, and by a red buoy (No. 6) on the point of Shark Shoal.

Vessels up to 6 feet draft can shorten this track 2 miles by crossing the shoals in Pamlico Sound as follows: From Long Shoal lighthouse steer 227° true (**SW** ⅝ **W** mag.) for 16¾ miles to Gull Shoal lighthouse; passing it 200 yards on the starboard hand, steer 238° true (**SW** by **W** ½ **W** mag.) for about 15⅜ miles to Lower Middle Ground black and red horizontally striped buoy. Then steer 249° true (**WSW** ½ **W** mag.) for 8⅛ miles heading for Brant Island Slue light. Pass about 250 yards southward of this light and steer 230° true (**SW** ¾ **W** mag.) for 6¼ miles to black buoy No. 1 on Point of Marsh shoal.

FROM LONG SHOAL THROUGH PAMLICO AND CORE SOUNDS TO BEAUFORT HARBOR.—This route is about 75 miles long; it should be attempted only by boats of 4 feet or less draft, and by them only during daylight. From Long Shoal lighthouse steer 223° true (**SW** ¼ **W** mag.) for 32¾ miles to a position ¼ mile northwestward of Royal Shoal northwest beacon (old tower), passing Gull Shoal lighthouse on the starboard hand, 1¼ miles off, and Bluff Shoal lighthouse on the port hand, 1⅜ miles distant. Then steer 197° true (**S** by **W** ⅞ **W** mag.) for nearly 9 miles until Harbor Island Bar lighthouse bears 221° true (*S W* mag.), when a 221° true (**SW** mag.) course passing the light about 50 yards on the starboard hand will lead over the bar in the best water (4 feet).

The channel through Core Sound and The Straits is marked by channel stakes on each side, and by fairway beacons and lights at the turns. The fairway beacons (half white, half black) are left on either side and the lights and channel stakes on the side indicated by their colors; red lights and red stakes to starboard and white lights and black stakes to port, going west. The channel winds so that a complete list of the courses would confuse rather than assist a stranger; but a few general directions are given to aid in picking up the beacons. However, one must not follow these courses rigidly, but rather take these general directions and rely upon the stakes to keep in the best water. From Harbor Island Bar lighthouse the trend is about 187° true (**S** by **W** mag.) for 3½ miles to a fairway beacon; thence about 246° true (**WSW** ¼ **W** mag.) for 1⅝ miles to a fairway beacon; thence about 222° true (**SW** ⅛ **W** mag.) for 7¾ miles to a fairway beacon, 1 mile southeastward of Mill Point, but, for the first mile of the last course, the channel bends southward of the course around a middle ground. The channel then trends 263° true (**W** ¼ **S** mag.) for ¾ mile to a fairway beacon; thence 221° true (**SW** mag.) for 1¾ miles until ⅜ mile past a fairway beacon; it then makes a reversed curve, 1½ miles long, to northwest and back to southwest over Piney Point Bar, where it is well marked by side stakes. It then trends about 204° true (**SSW** ½ **W** mag.) for 3¾ miles; thence about 240° true (**SW** by **W** ¾ **W** mag.) for 1⅜ miles; and thence about 162° true (**S** by **E** ¼ **E** mag.) for 1 mile; fairway beacons mark all these turns. From the last beacon the channel curves gradually westward, and follows a general west course through The Straits; the distance to The Straits is 2 miles, and the distance through, to the west end of Harkers Island, is 3½ miles; the channel is narrow and well marked by stakes on each side. From the west end of Harkers Island the channel crosses, in a southwest direction to the northeast end of Middle Marshes; thence westerly, north of the black buoy lying midway between the marshes and Carrot Island; and thence about 243° true (**WSW** mag.) to Shackleford Point; the distance is 3½ miles to Shackleford Point.

DIRECTIONS FOR BEAUFORT HARBOR, N. C.—The entrance to Beaufort Harbor, which is about 1¼ miles wide between points, is blocked by a shifting shoal, extending about 1½ miles seaward. A channel has been dredged across the bar; and in July, 1912, it had a least depth of 14 feet at low water. A bell buoy marks the approach to the seaward end of the channel, about 1¾ miles offshore. From the buoy, Fort Macon, on the western point of entrance, bears about 8° true (*N* by *E* mag.) and Cape Lookout lighthouse about 106° true (*ESE* ¼ *E* mag.); the large yellow buildings and wireless telegraph poles west of Beaufort show just to the right

of Fort Macon. From the bell buoy Shackleford Point range (two white lights) leads onto the bar, where a second range (two red lights), to the left of the former, leads up the channel and into the harbor; the channel is also marked by buoys. Inside the points of land, a buoyed channel runs each way close to the north shores of these points. The channel to the northwest leads to Beaufort, Morehead City and the canal to the inland waters. The eastern channel, narrow and not over 6 feet deep, leads to Core Sound.

BEAUFORT ENTRANCE, N. C., TO CAPE FEAR RIVER, N. C.

Westward of Beaufort, N. C., there is an inside passage as far as Bear Inlet for boats of 4 feet draft and as far as New River for 3 feet draft; 2 feet can be carried at high tide as far as Wrightville Inlet. There are several inlets between Beaufort and Cape Fear, where 6 or 7 feet at high tide may be taken in to sheltered anchorages, but all are obstructed by shifting bars, on which the sea breaks heavily when at all rough. From the sea buoy off Beaufort entrance to the light vessel off Frying Pan Shoals the distance is about 87 miles, and the distance from the light vessel to smooth water in Cape Fear River is 25 miles, making a total distance of 112 miles between ports open to vessels of moderate draft, and over the shortest course that a stranger could follow safely. Pilots for the inland and open waters and for the inlets between Beaufort and Charleston can be had at Beaufort.

Bogue Sound is a shallow body of water extending westward along the coast from Beaufort Harbor for 21 miles to Bogue Inlet and separated from the ocean by a wooded beach, less than ⅛ mile wide at one place. The sound has a maximum width of about 2 miles for one-third of its middle length, but narrows at each end; its western end is partly closed by marshy islets. A channel, improved in places by dredging, extends through to the inlet, and is navigable at low tide for a draft of 3 feet. The channel has a least width of 40 feet, and is well marked along the dredged cut by lighted beacons; buoys and channel stakes mark the eastern part of the channel.

Tides in Bogue Inlet vary from about 3½ feet average rise and fall at each end, near the inlets, to about 1 foot where the tides meet, near the middle. Strong south or southwest winds may raise the tide a foot or even more, and north to northwest winds lower it a corresponding amount.

Directions for Bogue Sound.—From Beaufort Harbor nearly to Carolina City the channel is marked by black and red buoys; a large fertilizer plant (fish factory) stands on the north shore at Carolina City. West of Carolina City the channel follows the north shore at a distance of little over ⅛ mile, and is marked by a few stakes with black or red hand boards pointing to the best water. Red stakes are left on the starboard hand and black on the port, going west. About 2 miles west of Carolina City there is a short dredged cut through a shoal; the dredge pile on the south side of this cut can be seen for a distance of about a mile. Between the fertilizer plant and this cut there are several stakes on shoals south of the channel; these must be given a wide berth. Leaving the dredged cut, the north shore is followed at a distance of from ⅛ to ¼ mile for about 5¼ miles to a black beacon off the mouth of Gales Creek; 1⅞ miles farther is a black, lighted beacon, visible from the former. From here to Shelly Point, 4⅜ miles westward, the channel follows close under the north shore and is well marked by black and red lighted beacons; dredge piles on one or both sides in many places define the channel. At Shelly Point the channel curves up into the bight west of the point, following close under the west shore of the point until north of the little islet, then runs out into the sound close to the west side of the beacon in the bight. The next beacon (red), off Guthries Point, is passed on the starboard hand, and the next, the last large beacon, on the port hand. From here the channel, marked by red and black stakes, passes close under the south end of Hunting Island, thence over to the marshy islets west of the former, and thence northward between these marshes and the woods on the north side of the sound.

From here on through Burthen Channel there are no stakes, but the passage through the marshes is easily recognized. Near the western end of Burthen Channel, where it bends south-

ward, there is a dredged cut through the north bank to a channel leading into Main Channel to Swansboro.

To go to Bogue Inlet or to the inside passage to New River Inlet pass this cut and follow the right-hand side of Burthen Channel around into Main Channel, then through Main Channel, about 50 yards distant from the marshes on the north side, and north of two little islets, which are connected by sand bars with Bogue Island. From the west point of these marshes cross over to the marshes on the west side of Bank Channel, passing northward of a shoal in this channel, then haul southward for the life-saving station on the east side of Bogue Inlet, passing between two high shoals marked by small stakes.

Bogue Inlet is 22 miles westward of Beaufort Entrance, and is connected with Beaufort Harbor by Bogue Sound and connecting passages. The opening of the inlet is about ¾ mile wide between low, bare, sand spits; there is a life-saving station on the inside of the eastern spit, about ¾ mile from the end. The town of Swansboro, 3 miles inland, bears about 354° true (*N* ¼ *W* mag.) from the middle of the opening. The entrance is obstructed by a shifting sand bar, extending about ½ mile seaward, through which the channel depth varies from a minimum of 4 feet at low tide in some years to a maximum of 14 feet at high tide in other years. In February, 1912, there was 5 feet at low tide on the bar and 6 feet and over just inside. The average rise and fall of tide is about 3½ feet; high water occurs on the bar 2 hours earlier than inside. The channel is marked by a sea buoy ½ mile outside of the bar, and by fourth-class buoys on the bar and in the entrance. There is no shipping out of Bogue Inlet at present, but it is used considerably by pleasure craft and fishing boats. Inside the entrance channels lead to Swansboro, at the mouth of White Oak River, to Bogue Sound, and to the inside passage to New River; but the inlet outside of these channels is very shallow, and the channels through the shoals are not easy for a stranger to follow. Small craft may find anchorage in Bank Channel, off the life-saving station, or in the lee of and close to the western sand spit.

The channel to Swansboro is obstructed by a bulkhead, over which there is but 4½ feet at low tide; and at high tide the marshes on each side of the channel are covered, rendering the passage difficult for a stranger to follow.

Directions.—On account of frequent shifting of the channel no definite directions for entering can be given. A pilot can sometimes be had from the life-saving station by signaling from off the bar, but one can not be certain of getting one; there are no pilots stationed here. A stranger should wait for a rising tide and should never attempt to enter when the bar is breaking; the bar buoys can not be seen when there is any sea on. The coast is safe 1 mile off shore on either side of the inlet; and the sea buoy is placed in about 6 fathoms of water. Having made this buoy, be guided by the channel buoys until inside the sand spits. Then, to go to Bogue Sound, after passing the red buoy, haul eastward and follow the inside of the spit as far as the life-saving station; then cross over to the marshes on the north side of the inlet, passing between two sand bars that are marked by small stakes; then round the bar on the starboard hand, passing north of it, and cross over to the marshes on the east side of Main Channel, following this channel eastward about 50 yards from the north shore.

To go to the inside passage to New River Inlet, from the red buoy at the entrance haul westerly and pass close under the inside shore of the western point of entrance. Follow this wooded shore to the bend, where the dredged channel will be seen beside a small hammock of scrub trees northwest of the woods.

Bear, Brown, and New River Inlets are, in the order given, respectively, 25½ miles, 28½ miles, and 35 miles westward of Beaufort entrance. All open on a continuous inside passage and have openings about ¼ mile wide, obstructed by shifting sand bars, extending about ½ mile seaward. Channels of various depths lead into the inlets from the sea, and are used to some extent by small craft in search of anchorage and as entrance to the inside passage. None of these channels are marked in any way.

Bear Inlet is considered the safest along this coast, and is used considerably by pleasure craft bound to or from the inside waters. It has a narrow, nearly straight channel between high, well-defined shoals. In May, 1912, there was 6 to 7 feet at low tide on the bar. At that

time the channel had a north and south direction; and a clump of low trees and a house, on the marsh north of the inlet, bearing 357° true (**N** mag.) led over the bar.

Brown Inlet is shallow and should not be used by a stranger.

New River Inlet is considered by local pilots to be dangerous, and should not be entered by a stranger except under the most favorable conditions. A strong ebb current sets out here, sometimes as long as 3 hours after low tide, and causes a heavy break on the bar when there is any sea outside. In May, 1912, there was 4 feet at low tide on the bar, 4 to 6 feet in the channel, inside the bar, and 8 feet in the inlet; the bar was broad and showed no well-defined channel. On the western side of the opening there is a small wooded hammock on which there is one house, partly concealed among the trees.

Tides.—The mean rise and fall at these inlets is about 3.5 feet; but freshets, particularly in New River, may raise the level a foot more inside. High water occurs 29 minutes before and low water 19 minutes before high and low waters at Charleston, S. C.

INSIDE PASSAGE FROM BOGUE SOUND TO NEW RIVER INLET.

A passage, mostly natural, but improved at many places by dredging, and at some places by cuts through dry land, extends along just inside the beach between Bogue Inlet and New River Inlet and, at the former, connects with Bogue Sound. This passage has a minimum width of 40 feet in the cuts and a minimum depth of 4 feet at mean high tide; it is not marked in any way; but the evidence of dredging is, at present, sufficient guide to a stranger, except through the marshes between Bear and Brown Inlets, where a stranger may encounter some difficulty.

Tides in this passage vary from an average rise and fall of about 3½ feet at the inlets to 1½ feet at the more remote places. Strong southerly winds increase the rise to 2 feet at places most distant from the inlets.

DIRECTIONS FOR THE INSIDE PASSAGE.—See directions for Bogue Sound and for Bogue Inlet. From opposite the life-saving station in Bogue Inlet, cross over to the west side of the inlet, passing close to the red channel buoy, and keep close under the wooded shore on the west side. Follow this shore to an opening in the marsh beside a small hammock of scrub trees northward of the woods. Enter here, passing through a short dredged channel to natural passages running approximately parallel to the coast line; take the left-hand passage where there are passages of about the same width and be guided by evidence of dredging. When approaching Bear Inlet keep close to the sand beach to avoid shoals extending well off the marshes. Strangers are advised to leave the inland waters and pass out at Bear Inlet (see description of Bear Inlet); but, if the tide is high and they are willing to risk getting aground, they can continue on to New River Inlet. Cross Bear Inlet and then follow the sand beach to the marshes. The channel leaves the beach beyond here to a distance of ¾ mile and winds through passages in the marsh; this is the most difficult place for a stranger; there are evidences of dredging in places, but one must be guided principally by the trend of the passages and by two or three small stakes (passed on the port hand). Passing through this marsh, the channel trends southward for the beach at Brown Inlet. Keep close under the beach and across the inlet to the beach on the west side, following it into the next passage, which turns northwestward opposite several huts on the sand. From here on to Crag Point the channel is easier to follow; it runs approximately parallel to the seashore at a distance of about ⅛ to ⅜ mile and passes through one pond a little over ¼ mile long. The shallowest place is just east of Crag Point, where some care is necessary to keep in the best water. From Crag Point the channel enters a dredged cut across the end of Salliers Bay and runs westward through the marshes and north of Wrights Island to New River; the entrance in New River is about ⅜ mile above the inlet.

INSIDE PASSAGE BETWEEN NEW RIVER INLET AND WRIGHTSVILLE INLET.

There is a continuous passage through here said to be navigable for a draft of 2 feet at high tide. It is used to some extent by fishermen in small power boats, but is said to be difficult to follow.

New Topsail Inlet is 18 miles westward of New River Inlet and 53 miles westward of Beaufort entrance. The opening is about ⅜ mile wide between low sand spits, and is obstructed by a shifting sand bar which extends nearly ¼ mile seaward. A small house stands on the eastern sand spit, about ⅛ mile from its end. This inlet is used sometimes as an anchorage by small pleasure craft; the channel is not buoyed. In May, 1912, there was, at low tide, a least depth of 6½ feet in the channel over the bar, 7½ feet inside the bar, and from 3 to 4 fathoms inside the inlet, close to the western side. At that time the mouth of the inlet was closed by shoals, dry at low tide, except for a narrow channel close to the western sand spit. This channel crossed the bar in a general northwest and southeast direction and ran in close to the western sand spit, where it branched, one part following close under the northern shore of the spit and the other, turning northward, skirted the northern side of the shoal, which blocked the entrance, to the eastern sand spit opposite the house. Both channels were very narrow, between high shoals, and varied in depth from 8 to 24 feet.

Tides.—The average rise and fall is about 3 feet. High water occurs 11 minutes before and low water 9 minutes after high and low waters at Charleston, S. C. Strong ebb currents are found in the mouth of the inlet, especially after heavy rains.

Old Topsail, Rich, and Queens Inlets, are, respectively, 2 miles, 5 miles, and 8½ miles westward of New Topsail Inlet, and have channel depths over their bars of about 4 feet at low tide. They are used to some extent as anchorages by small pleasure craft, but are not recommended to strangers.

Wrightsville Inlet is 11½ miles southward of new Topsail Inlet and 23¾ miles 22° true (*NNE* ⅛ *E* mag.) from Cape Fear lighthouse. Lying 2½ miles southwestward is Masonboro Inlet, and between the two inlets, along the seacoast, is the summer resort of Wrightsville Beach, the large hotels and buildings of which are visible from far offshore. Wrightsville Inlet is easily entered and is used to a considerable extent as an anchorage for small yachts. The opening is a little over ⅛ mile wide, between low sand spits, and is from ¼ to ½ mile northeasterly of the most northern hotel on the beach. A bar extends less than ½ mile seaward from the opening, and in May, 1912, the minimum channel depth on it was 6 feet at low water. At that time shoals extended seaward, on each side of the channel, from the spits at the opening; and a shoal reached more than half way across the opening from the southern spit, leaving a narrow channel close under the northern spit. Vessels can find anchorage in the lee of either spit or can go southward as far as the bridge, carrying from 5 to 7 feet. An electric railway connects Wrightsville Beach with Wilmington, crossing from the mainland on the bridge referred to above.

Tides.—The average rise and fall is about 4 feet.

Corncake Inlet, 5 miles northward of Cape Fear, is connected with Cape Fear River by a shallow passage north of Smith Island, known locally as Cedar Creek or The Thoroughfare; it is used much by small craft to avoid rough water on Frying Pan Shoals and is a short cut from the northward into Cape Fear River. In May, 1912, there was 3½ feet, at low water, on the bar and 1½ feet, at low water, in the shallowest part of the channel through to Cape Fear River. The bar was short and close to the entrance and the channel over it was narrow and well defined by high shoals on each side, the shoal on the northern side nearly bare at low tide; the entrance was ⅛ mile wide between low sand spits. Boats often enter the inlet as soon as the height of tide permits and anchor just inside, close to the southern spit, until able to go through into the river.

Directions from Seaward.—The bar and entrance are subject to changes, and no directions that could be depended upon can be given.

Having entered the inlet, haul sharply southward and follow the western shore of the southern spit at a distance of 50 to 100 yards; anchor anywhere along the shore northward of the marshes until the tide has made enough to continue into the river. If able to get through, continue along the sand beach to within 50 yards of the marsh, and then cross Buzzard Bay on a course about 245° true (**WSW** mag.). This is the shallowest place, and when past here there should be little difficulty getting into the river. Follow the marshy islets on the western

side, going southwestward and southward, 50 to 100 yards off the islets, until down to the last little islet (showing at high tide only as a few tufts of grass above water). Round this islet and steer about 324° true (**NW** by **N** mag.); when abreast of a concrete pile on the starboard hand, steer about 245° true (**WSW** mag.) and follow the northern shore of Smith Island. Pass close to a narrow point of marsh on the starboard hand and steer 285° true (**WNW** ½ **W** mag.) until abreast of a small hammock of cedars on the marsh near Cape Creek; then steer 268° true (**W** mag.) for the water tower at Fort Caswell. When Smith Island rear range beacon is in line with Cape Fear lighthouse, steer about 223° true (**SW** mag.) into the river.

Tides.—The average rise and fall is about 4 feet, and high water occurs 19 minutes before and low water 30 minutes before high and low waters at Charleston, S. C.

Cape Fear Swash is a narrow channel across Frying Pan Shoal about ½ mile southward of the tip of Cape Fear. It is used to a considerable extent by local craft, and vessels up to 9 feet draft have gone through on high tide; but the shoals shift so frequently that no directions that would be of any assistance to a stranger can be given. Local pilots and fishermen, who use this swash, depend entirely upon soundings and the appearance of the breakers to find the best water. There is a high shoal south of the swash on which the sea usually breaks, and the channel is said to run in a general west-northwest direction close under the lee of these breakers.

SAILING DIRECTIONS, BEAUFORT ENTRANCE TO CAPE FEAR RIVER.

From the sea buoy off Beaufort entrance, a 220° true (**SW** ⅛ **S** mag.) course for 87 miles leads to the light vessel off Frying Pan Shoals, crossing the outer shoals in 4½ to 5 fathoms of water. From the light vessel a 291° true (**WNW** mag.) course for 4 miles followed by a 328° true (**NNW** ⅝ **W** mag.) course for 17 miles leads to the whistling buoy off Cape Fear River and passes close to red whistling buoy No. 2, 5 miles from the turn. The bell buoy at the mouth of Bald Head Channel is 2 miles 30° true (*NNE* ⅞ *E* mag.) from the whistling buoy; and from there in the channel is marked by buoys and lighted range beacons.

The above courses give the shortest passage for a vessel obliged to go outside the entire distance and around Frying Pan Shoals; but light-draft boats may find an advantage in following the coast more closely and be in position to go into the inlets if desired. For their use the following courses are given:

From the sea buoy at Beaufort entrance, a course 264° true (**W** ¼ **S** mag.) for about 21 miles leads to the sea buoy off Bogue Inlet; thence 237° true (**SW** by **W** ⅜ **W** mag.) for 30½ miles to a position 1 mile southeast of New Topsail Inlet; thence 221° true (**SW** ⅛ **S** mag.) for 11 miles to a position 1 mile southeast of Wrightsville Inlet (this inlet can be recognized by the large hotels and buildings on the beach just southwestward of it); thence 202° true (**SSW** ¼ **W** mag.) for 19 miles to a position a little over a mile eastward of Corncake Inlet. Boats up to 5 feet draft can enter here and go through into the Cape Fear River, but must wait for high water (see description of Corncake Inlet); and boats up to 6 feet draft can cross Frying Pan Shoals by the swash channel, provided the tide is up and the sea is smooth enough. Vessels drawing more than 6 feet should not attempt to cross the shoals inside of the light vessel.

CAPE FEAR, N. C., TO WINYAH BAY, S. C.

Southwestward of Cape Fear River there is another stretch of open water for about 73 miles to Winyah Bay; there is no inside passage along this coast, but there are three inlets open to light-draft vessels, one of which can be entered easily by a stranger.

Cape Fear River enters the ocean just west of Cape Fear and is navigable for a draft of 26 feet to Wilmington, 27 miles above the mouth. The main channel over the bar, known as Bald Head Channel, is well marked by buoys and lighted range beacons as follows: From the bell buoy off the mouth of this channel the first course is 59° true (**NE** by **E** ½ **E** mag.) on the New Channel range (two white lights on white frame structures, the front range beacon on the shoal westward of Bald Head lighthouse and the rear range near the marsh northward of this lighthouse). Black buoys Nos. 1 and 3 and red buoys Nos. 2 and 4 are passed on this range. When red buoy No. 4 is abeam, the course changes to 85° true (**E** ¼ **N** mag.) on the

Bald Head range (two red lights on white structures on the shore southward of Bald Head lighthouse). Black buoy No. 5 is passed, and at red buoy No. 6 the course changes to 34° true (**NE ¾ N** mag.) on the Smith Island range (two red lights on red structures on the shoal northward of Bald Head lighthouse). This range is held until the red beacon (red light) north-northwestward of Bald Head lighthouse and close to the shore on that side is in range with the lighthouse, when the course is changed to 335° true (**NNW** mag.) and the beacon and lighthouse kept in range astern. This course is held past black buoy No. 7, past Fort Caswell, on the west bank at the mouth of the river, and about 300 yards past the beacon (red light) southwestward of Battery Island, when the course is changed gradually to starboard to pass close to the wharves at Southport.

Western Bar Channel, close to Oak Island at Fort Caswell, is used considerably by small craft bound westward along the coast. It is good for about 4½ feet at low tide, but is not buoyed. The best water lies from 100 to 150 yards off shore south of Fort Caswell; and from there the channel through the shoals runs about 256° true (**W** by **S** mag.). Abreast the life-saving station the shore should not be approached closer than ¼ mile.

Southport, on the west bank of the Cape Fear River, 1½ miles above Fort Caswell, is a small town of little commercial importance. There is good anchorage in the river abreast the town and deep water at the wharves. A railroad connects with Wilmington; and there is also connection by river steamboat. Fresh water and gasoline can be had at the wharves. Weather Bureau storm signals are displayed at Southport and at the life-saving station west of the river mouth.

Lockwoods Folly Inlet is about 11 miles westward of the Cape Fear River. The depth of the bar is from 3½ to 4 feet at low tide, and there are no aids for entering; the passage into the river is said to be difficult for a stranger. There are several small towns on Lockwoods Folly River that are reached by small sail and power boats.

Shallotte Inlet is about 18½ miles westward of Cape Fear River. It is said to be comparatively easy for a stranger to enter, although there are no aids to navigation, and changes have occurred at the mouth since the survey on which the chart is based. The depth on the bar at low water is about 4 feet; and sailing vessels of 5½ feet draft are able to cross at most stages of the tide. Shallotte, an incorporated town on this inlet, has considerable trade with Wilmington by means of small sailing and power craft.

Little River Inlet, S. C., is about 27 miles westward of Cape Fear River, and is the outlet for Little River and for several small creeks eastward of the river. The opening, about 1¼ miles wide between sand spits, is partly filled by Bird Island, ¾ mile wide. The main channel is westward of Bird Island, close to it, and is well marked by a sea buoy and by three fourth-class red buoys. Little River enters the western part of the inlet and trends northward for 1½ miles, and thence westward for about 5 miles. There is a large sawmill on the right bank, about 2 miles above the mouth, and another on the left bank, about 1 mile farther up; the town of Little River is about 3½ miles above the mouth. In May, 1912, there was 8½ feet on the bar at low tide and 5 feet up to the town; but above the lower sawmill the river was so obstructed by shoals as to be difficult for a stranger to navigate. Steamboats of 6½ to 7 feet draft go regularly to the wharf just below the town.

DIRECTIONS.—The most prominent landmark from offshore is a very high, yellow sand dune on Waiters Island, just west of the entrance; there are several huts on the beach in front of the dune. The sea buoy (second class) is about 1 mile offshore southward of Bird Island, in about 4 fathoms of water. The channel runs about 336° true (**NNW** mag.) from this buoy, and then curves northward, passing close to the western side of Bird Island; it is marked by fourth-class red buoys along the eastern side, and, along the western side, by a high shoal on which the sea breaks. From the inside red buoy on the west end of Bird Island, follow about a mid-channel course up the river to Battery Island, where there are some buildings on a bluff on the west bank. Above Battery Island, keep to the outside of the bends up to the sawmill on the right bank, above which a stranger should not attempt to go.

Tides.—The mean rise and fall of tides is 4.8 feet. High water occurs 16 minutes before and low water 29 minutes before high and low waters at Charleston, S. C.

North Inlet, S. C., about 7 miles northward of Georgetown lighthouse, is connected by creeks with Winyah Bay. At present there are two inlets here, separated by about ½ mile of beach; both are connected with the same inside passages. The high sand dunes on the beach between the two inlets are the most conspicuous along this section of the coast and are the only prominent landmarks. Shifting sand bars extend a mile seaward at both inlets, and from the beach 2 miles southward of the lower inlet. The mouth of the northern or old inlet is nearly blocked by a high shoal, on which the sea breaks continuously; but there is a narrow channel inside of this shoal close under the north spit. This channel begins about ½ mile northward of the entrance, close to the beach, and follows the beach at a distance of about 100 feet to the entrance, then crosses the mouth to the sand spit on the southern side; in May, 1912, there was from 3 to 5 feet at low tide in this channel. A stranger should not use this channel, as for over a mile he would have to run broadside to the breakers with the beach close aboard, and, in case of grounding, would be in a dangerous position.

The southern or new inlet had in May, 1912, a short bar, close in, with a least depth over it, at low tide, of 3 feet; the only danger was a shoal that extended northward about 100 yards from the southern side of the opening; shoals extended seaward a short distance on each side of the channel. Winyah Bay may be reached from either inlet by going westward and southward through Town and No Mans Friend Creeks or by going southward through Jones Creek; the latter route is easier for a stranger and is good for 6 feet at high tide, but care is necessary to keep in the best water.

Directions.—From the northward follow the coast, at a distance of 1 mile off, past the old inlet and the prominent sand dune just north of the new inlet, until this inlet opens and a prominent clump of trees on a hammock west of the entrance is made out. When inside haul southward to pass midway between the sand spit and the marsh, and follow the marsh on the starboard hand southward through Jones Creek. One mile below the inlet, Jones Creek bends west-southwest, then south; beyond this last bend keep to the left at all openings. From the southern end of the creek, steer about 218° true (**SW ½ S** mag.) for red buoy No. 4 in Winyah Bay.

Tides.—The average rise and fall is 4.5 feet. High water occurs 18 minutes before and low water 16 minutes before high and low water at Charleston, S. C.

Winyah Bay is the first opening and harbor southward of Cape Fear River navigable for vessels of moderate draft. It is the northern limit of the continuous inland waterways of the south Atlantic coast. The opening is between North and South Islands, and is marked by Georgetown lighthouse, near the southern end of North Island. The channel into the mouth of the bay is maintained by jetties, extending eastward from the southern tip of North Island and from a point on South Island southwest of the former. A depth of 15 feet at low tide can be carried, through a dredged channel, 11 miles up the bay to the city of Georgetown, at the junction of the Sampit and Peedee Rivers. Jones Creek enters the bay, through North Island, 3½ miles above the mouth, and the Estherville and Minim Creek Canal opens on the opposite side of the bay, 258° true (*W* by *S* mag.) of the creek.

Pilots for the bar and bay are stationed on North Island and may be had by making the usual signal while outside.

Directions.—The end of the south jetty is marked by a white occulting light and there is a bell buoy at the approach to the channel. From the bell buoy bring South Jetty Channel range (two white lights on pyramidal structures on South Island) on and steer 270° true (**W ⅛ N** mag.) for them until Middle Ground Channel range (two white lights on similar structures, northward of the former) are on, bearing 311° true (*NW ¼ W* mag.). Steer this range until the beacon (red light) on North Island, southward of the lighthouse, is in range with it; then haul slowly to 336° true (**NNW** mag.) to pass the lighthouse at a distance of ¼ mile. Continue this course 1 mile above the lighthouse, when a sand point on the west side will be abeam;

then follow the western shore at a distance of ¼ mile until it turns westward and the black beacon (white light) close to this shore bears 280° true (*W* by *N* mag.). Then steer 288° true (**WNW** ¼ **W** mag.) for about 2 miles, passing this beacon at a distance of 150 yards and arriving at a position 75 yards north of a similar beacon (No. 1). For the next 4 miles the channel is marked on its southern and western side by black beacons (white lights), about ½ mile apart, which should be left 75 yards on the port hand. From the last beacon (No. 15) steer 6° true (**N** ⅝ **E** mag.) for 1¾ miles, leaving beacon No. 2 (white light) 100 yards on the starboard hand, to a position 150 yards west of red buoy No. 10. Then steer 30° true (**NNE** ¾ **E** mag.) for beacon No. 4 (red with red light) until on Sampit River range. The beacons for this range are white structures, the front a red light and the rear a white light, in the river north of Rabbit Island. With these beacons in range over the stern, steer 335° true (**NNW** ⅛ **W** mag.) until up to red buoy No. 14; then follow the east bank of the river to Georgetown.

Georgetown, S. C., is at the head of Winyah Bay, about 11 miles above Georgetown lighthouse. It has railroad connections, and steamboat communication with Baltimore and New York. There is sufficient depth at the wharves for vessels able to enter the bay; and there are convenient, sheltered berths for small craft. Provisions, ship chandlery, coal, gasoline, and fresh water can be obtained. Facilities for making repairs are limited; there is one marine railway of about 100 tons capacity. Pilots for the inland waters can be found here at times. Storm-warning signals are displayed at Georgetown and near the lighthouse.

SAILING DIRECTIONS, CAPE FEAR TO WINYAH BAY.

From the light vessel off Frying Pan Shoals, a 251° true (**WSW** ½ **W** mag.) course for 67 miles leads to the whistling buoy off the entrance to Winyah Bay, and a 257° true (**W** by **S** mag.) course for 3 miles from there leads to the south jetty.

From the bell buoy at the mouth of Cape Fear River, a 234° true (**SW** by **W** mag.) course for 66 miles leads to the sea buoy, 1¼ miles off the south jetty; the course in is 270° true (**W** ⅛ **N** mag.) from this buoy.

The above are the most direct courses, but for those who prefer to run closer to the coast, the following courses may be substituted.

From the bell buoy at the mouth of Bald Head Channel, a course 268° true (**W** mag.) for a little over 25 miles leads to the sea buoy off Little River Inlet.

Or, by way of the Western Bar Channel, from a position 150 yards off shore south of Fort Caswell, a 251° true (**WSW** ½ **W** mag.) course for 1¾ miles followed by a course 264° true (**W** ⅜ **S** mag.) for 25¼ miles leads to Little River Inlet sea buoy.

From Little River Inlet sea buoy a course 239° true (**SW** by **W** ⅜ **W** mag.) for 19 miles leads to a position 1 mile southeast of Myrtle Beach, a summer resort (hotel and several cottages on the seashore). Thence a course 213° true (**SW** ⅞ **S** mag.) for 24¼ miles leads to a position 1 mile east of the new North Inlet; or a course 204° true (**SSW** ¼ **W** mag.) for 31¼ miles leads to the bell buoy at the end of the south jetty, mouth of Winyah Bay.

WINYAH BAY, S. C., TO CHARLESTON, S. C.

The distance from Winyah Bay to Charleston is about 70 miles through inside waterways and passages; the shortest distance outside, over navigable waters, between the same points is about 62 miles. A draft of 4 feet can be carried through at mean low water except around Bull Bay, where, at present, there are depths of 3 feet at low water; improvement work is now in progress that will shortly give a minimum depth of 4 feet at mean low water there. By leaving the sheltered waters for a distance of about 7 miles and passing to seaward of the shoals in Bull Bay, a draft of 4 feet can be carried through at mean low water.

Tides and tidal currents are found at all parts of this inside passage. The mean rise and fall of tides vary from 3.5 to 5 feet, depending upon the distance from the inlets. During freshet conditions there are ebb currents in the Santee Rivers and Six Mile Creek amounting to 3 or 4 knots in strength.

DIRECTIONS FOR THE INLAND PASSAGE FROM WINYAH BAY.

The Estherville and Minim Creek Canal enters the southwestern part of Winyah Bay, about 1¾ miles westward of red buoy No. 4 and about 6½ miles below Georgetown; the entrance is marked by a black beacon, close to the shore on the eastern side of the entrance. The canal is reached by the dredged channel to Georgetown, which here lies close to the western shore.

The canal is 4⅛ miles long, 40 to 50 feet wide, and 6 feet deep at mean low water; it leaves Winyah Bay in southwesterly direction, thence curves south to Minim Creek; the southern entrance, in Minim Creek, is marked by a black and white striped beacon on the east bank of the canal. A ferry crosses the canal at Smithville, 1¾ miles from the northern entrance.

Leaving the canal go southward in Minim Creek past the first passage on the west side and enter Big Duck Creek, between Crow and Little Crow Islands. Give the eastern end of Little Crow Island a berth of 50 yards in turning, and follow the shore of Crow Island to its western end (there are two large cedars in the water off this point). The distance from the canal to this point is 1⅞ miles and the least depth is 6 feet at low water.

Cross over to the south bank of the North Santee River and follow the track of the ebb current about 3½ miles up river to Six Mile Creek, which enters the south bank of the river.

Six Mile Creek is about 3 miles long, from 50 to 100 yards wide, and 10 to 20 feet deep; it joins the North and South Santee Rivers. The entrance from the South Santee is recognized by a line of piles along the northern bank of the river, just below the creek mouth. During freshets the water runs each way from Dark Creek and attains a velocity of 3 or 4 knots, but ordinarily the ebb current runs through from South Santee to North Santee. Passage through this creek is easy for a stranger.

Arriving at the South Santee River hold to the northern bank for a little over ¼ mile, and then cross over to the southern bank; then follow the track of the ebb current, avoiding smooth water. Pass north of Brown Island, keeping close to the northern bank there, and follow this bank down to Alligator Creek, 4 miles below Six Mile Creek. In the South Santee there are many shoals, dry or nearly so at low tide, and careful attention to the appearance of the water is necessary in order to avoid them. Smooth water with little indication of current should be regarded with suspicion. There is at least 8 feet in the channel up to the crossing just below Six Mile Creek, and 6 feet here at low water.

Alligator Creek runs, from the south bank of South Santee River, ¾ mile below Brown Island, 6¼ miles westward and southward to the ocean near Cape Romain Harbor; it is about 4 feet deep at low tide. The banks, in general, are steep and well defined, but at a few places mud flats reach out for a few yards. A small beacon (white boarded tripod, No. 1) marks the end of an oyster rock at the western side of the entrance from the sea. A broad sand bank extends southward from the point at the other side of the mouth of the creek.

Cross over from the north bank of South Santee River and enter Alligator Creek close to the eastern side (about 10 feet from the bank), to avoid a mud flat extending nearly across from the western side at the entrance. Then follow a mid-channel course, keeping clear of the points at bends; and, when down to an island, take the passage eastward of it. Avoid the eastern shore near the mouth and pass out close to the beacon, leaving it on the starboard hand.

From the beacon steer about 151° true (**SSE ½ E** mag.) for ⅞ mile, and then haul southwestward, passing red buoy No. 2 close to on the starboard hand, and round the low sand spit, at the north end of Cape Island, into Cape Romain Harbor. Cross the harbor in a 201° true (**SSW** mag.) direction and enter the short passage north and west of Marsh Island. Through this passage keep close to the northwest shore, avoiding Marsh Island after passing it close to at the northern entrance. Leaving that passage at the Romain River, proceed up river about 2 miles to Clark Creek, favoring the outside of the bends and passing one broad stream on the starboard hand and a narrow passage on the port hand, below the former. The distance from Alligator Creek to Clark Creek is 6 miles and the least depth 4 feet at low tide.

From here on there are two routes, one across the open water at the mouth of Bull Bay, and the other through narrow and shallow passages (3 feet at low tide, at present) around the head of this bay.

For the former route, enter Clark Creek in mid-channel and proceed westward through this and Key Creek, following the starboard hand bank and passing several creeks on the port hand. Key Creek enters Five Fathom Creek 1 mile above the mouth, and the distance through Key and Clark Creeks is 3 miles. Leaving Key Creek, hold a mid-channel course down Five Fathom Creek into Bull Bay. Round a long shoal (usually breaking) northwest of the river mouth, and head out to sea on a 157° true (**SSE** mag.) course, through a channel about 200 yards wide, well defined by a line of breakers on each side. Stand out until clear of the breakers, and the woods south of Bull Bay lighthouse bear 236° true (**SW** by **W** mag.), and then head for the woods, gradually hauling in for the lighthouse as it is approached. Follow the shore of Bull Island northward and westward, at a distance of about 300 yards off, until into Bull Harbor; there head about 247° true (**WSW** mag.) for Bull Creek; pass northward of the small island just inside the mouth of the creek. At the first creek trending northwestward, 1¼ miles inside Bull Creek, the passage around the head of Bull Bay is met. The distance from the east entrance of Clark Creek to this point is about 16 miles.

To go around the head of Bull Bay, continue on up Romain River past Clark Creek, above which the south bank is favored, pass Sett Creek on the port hand and Nellie Creek on the starboard hand, to the head of the river in Five Fathom Creek, a distance of 3 miles. Follow Five Fathom Creek northward 2 miles to the mouth of Town Creek, keeping about in mid-channel. Town Creek trends northward 1 mile to McClellanville, and, at present, is dry at low tide for about half its length. At the mouth of Town Creek bear off westward through Mathews Creek and Cut, a narrow winding passage through the marsh, marked by finger boards at places. There is a sawmill and wharf on the north bank of the cut; the distance through creek and cut is about 2 miles. Leaving the cut, follow Harbor River southwestward, passing west of a mid-channel shoal in the first reach and south of an island in the second reach, thence in mid-channel for about 3 miles to Owendaw Creek. Go up Owendaw Creek about 2 miles, passing east of an island near the river, to a short canal through the south bank to Graham Creek. Pass through this canal and down Graham Creek to the bend at the head of the first reach above the bay. Enter a canal here leading to Saltpond Creek, and pass through it and down that creek to the head of the first reach above the bay; thence through a canal to Belvedere Creek and down to the mouth of that creek; thence through a canal, across the marsh between Belvedere and Venderhost Creek; thence up Venderhost to the first bend, and through a canal to Van Ross Creek. There is a driven well on the north bank of Van Ross Creek, just above this canal, and boats can get water here conveniently. Follow Van Ross Creek, keeping to the starboard hand at branch passages, to its head in Seewee Bay and steer 213° true (**SW** by **S** mag.) into the middle of the bay, until abreast some houses on the west bank. Then haul southeast and then east through a staked channel into Seewee Creek. Follow this creek down until Bull Bay opens ahead, between the shores of the creek, and then take the south branch back into Seewee Bay, crossing it in a generally southwest direction, southward of the first crossing. This channel is between oyster shoals and is marked by stakes at the turns. Leave the bay by a creek which winds through the marsh in a general southeasterly direction to Bull Creek. The most difficult and shallowest part of this route is through Seewee Bay; and here one must be guided by a few stakes and by soundings, but largely, at present, by his judgment in selecting the best passage between the shoals and islets. The canals are about 60 feet wide and 4 feet deep at low water. The distance from Owendaw Creek to Bull Creek is about 11½ miles.

From the junction of the two routes in Bull Creek, continue westward, past an opening into Seewee Bay and through a new canal that cuts off the southern loop of Bull Narrows, into Price Creek, a distance of 2¾ miles. Cross Price Creek and enter Santee Pass, ⅛ mile upstream on the opposite side. Santee Pass makes several sharp bends but is easily followed; at the end of the first reach there is a stream leading northward; at the end of the third reach the channel is separated from Mark Bay by little islets, and just west of here are streams, one leading eastward and one westward. Follow the pass through to Caper Creek, keeping close to the left bank after entering the broader water; and, rounding the west end of Caper Island at a distance

of 50 yards, follow this shore southeastward nearly to the eastern point of the opposite shore (Dewees Island). The distance from Price Creek to this position is 4¼ miles.

Cross over to the eastern point of Dewees Island and follow the north shore westward, at a distance of 20 to 30 yards, to Bullyard Sound. Cross Bullyard Sound, passing piles, which mark the north and west sides of a dredged cut, at a distance of 20 feet on the starboard hand; and, when up to the last pile, haul southward to pass between Dewees Island and the island west of it. This passage leads to Dewees Creek. The distance from Caper Creek to here is 3 miles, and the least depth is 4 feet, at low water, in Bullyard Sound.

Entering Dewees Creek, through the above-mentioned passage, follow a mid-channel course westward up this creek to Hamlin Sound, thence along the southern side of the sound and out between this sound and Gray Bay, through a dredged channel, to Hamlin Creek. The channel through the sound is defined by islets and oyster banks on the northern side, separating it from the open water of the sound, and, in the vicinity of Gray Bay, by piles surmounted by black barrels, along the eastern side of the channel. These piles should be left at a distance of 20 to 30 feet on the port hand. In Hamlin Creek, below the second bend, there is a small mid-channel islet that should be passed on the starboard hand, going west. Continue down Hamlin Creek to the Isle of Palms, a summer resort on a narrow strip of beach between this creek and the ocean, favoring the northern or marsh shore westward of this resort.

Cross Breach Inlet and follow the direction of the railroad into and up Conch Creek. Take the left branch of Conch Creek to the canal which cuts off the southern loop of Sullivan Narrows; and, leaving the canal, continue through the narrows to The Cove. The passage through The Cove is marked by a black and a red beacon (white and red lights, respectively). Pass the black beacon on the starboard hand and hold down for the red beacon; when nearly to it hold up for the drawbridge. Go through the northern opening in the drawbridge, passing, on the port hand, a small spindle which marks a rock pile, 100 yards southeast of the southern abutment of the bridge. The passage out of The Cove is marked by a red beacon (red light) on the point of Sullivans Island, and by a white beacon (white light) on the shoal north of the channel. Leave the latter on the starboard hand. The distance from the entrance into Dewees Creek to this beacon is about 10½ miles, and the depth is 4 feet at low tide.

From the last beacon steer about 275° true (**W ½ N** mag.) for Folly Channel to Charleston, passing black buoys Nos. 1 and 3 on the port hand and Castle Pinckney (buoy depot) red light on the starboard hand.

If intending to stop at Charleston, hold up for the wharves on the west bank of the Cooper River, passing red buoy No. 14 on the starboard hand; but, to continue southward by the inside route, haul southwestward when abreast of Castle Pinckney light, leaving black buoy No. 3 and red buoy No. 12 on the port hand, and, crossing the shoal southward of Charleston just inside the black and red striped buoy, go up the Ashley River, west of the city, to Wappoo Creek. The distance from The Cove entrance beacon to Charleston is 3 miles and to Wappoo Creek 4½ miles.

Charleston, S. C., is situated on the point of land at the junction of the Cooper and Ashley Rivers, and has water front and wharves on each; but the wharves on the Cooper River are more convenient to the city. There are railroad connections with all parts of the country, and communication by steamboats with New York, Baltimore, Savannah, and Jacksonville. River boats give communication with the towns and plantations along the numerous rivers and inland waterways. Yachts and small craft usually anchor in the Cooper River below the coal wharf. There is good landing for boats at the customhouse dock (the stone piers in front of the customhouse), where there are steps leading up from the water. The wharves along the Cooper River are most convenient for small vessels. Pilots for the inside waters can usually be had here. Provisions, ship chandlery, coal, gasoline, and fresh water can be obtained here. Facilities for hauling vessels out are not good; but all repairs to hulls and machinery, not requiring dry docking, can be made. Storm-warning signals are displayed from a tower in the customhouse yard and at Moultrieville

CHARLESTON, S. C., TO FERNANDINA, FLA.

Between Charleston and Fernandina there is a continuous inland waterway, navigable at low tide for a draft of 6 feet. Parts of this waterway are narrow and crooked, and only by careful steering can this depth be carried; but at the more difficult places there are ranges or other guides, and by close attention to them and to the charts one should have no difficulty in getting through. All of these streams and passages are tidal and are subject to a mean rise and fall of from 5 to 7 feet. The bottom is soft, or at most sandy, unless covered by oyster shells; there is no hard rock.

CHARLESTON TO ST. HELENA SOUND, 55 MILES.—Wappoo Creek enters the Ashley River through its west bank about 1 mile above the Battery, the south water front of Charleston, and is marked by red beacon No. 2 (red light) on the north side of the entrance. The creek runs westerly and is connected by Elliott Cut with the Stono River, giving a through deep passage 3 miles long. One bend of the creek is cut off by New Cut, a dredged passage; the creek is crossed by a drawbridge just east of the first bend. The west end of Elliott Cut is marked by a lighted beacon (white light) on the shore south of the cut, close to the bushes.

From the Ashley stand upstream until abreast of the beacon, keeping well over to the city side, and then steer fair into the creek, passing close to the beacon on the starboard hand. Keep about in mid-channel through Wappoo Creek; two openings in the north bank will be passed after rounding the fourth bend.

From the west end of Elliott Cut cross Stono River on about a 273° true (**W** ⅜ **N** mag.) course, and keep close to the south bank for a distance of 1 mile, nearly to the bend. Then favor the north side as far as the phosphate works and wharf at the next bend; then favor the southern side nearly to the wharf, which is just below the next bend. Favor the north side of this bend and the south side at the bend ½ mile above. Favor the south side for a distance of ½ mile above the last bend, and then the north side nearly to the wharf and phosphate works on the north bank. From opposite this wharf keep about in mid-stream for ⅞ mile to Rantowles Creek; there are two branches here, both narrow streams.

Enter the southern opening and steer mid-stream courses for about 4 miles to Church Flats, where the creek widens. The channel through Church Flats is very narrow, but is good for 6 feet at low tide; it is marked by two beacons, square white targets, numbered 1 and 2, on single piles. Tides meet about 1 mile eastward of Church Flats. Leave beacon No. 2 close to on the starboard hand and beacon No. 1 close to on the port hand, and then favor the eastern side to the next bend. For the next 2 miles, to Wadmelaw River, the best water is near the outer sides of the bends and about in mid-stream between the bends. Follow the direction of ebb tide, and give the points a wide berth when turning at the bends.

The upper waters of Wadmelaw River are broad and are filled with small islands and shoals, between which the channel winds. The channel, though narrow, is a good 10 feet deep and is marked by three lighted beacons, two white lights on black day marks (Nos. 1 and 3) and one red light on red day mark (No. 2). Leaving New Cut, from Stono River, hold to the south bank in the bend; then pass midway between two small islands on the starboard hand and one on the port and steer a little southward of beacon No. 3. Pass this beacon at a distance of about 50 yards on the starboard hand and haul down to pass beacon No. 1 at the same distance on the starboard hand; when past the latter haul around slowly to pass beacon No. 2 at a distance of 50 yards on the port hand. Then haul down for the wooded left bank and follow this shore past two wharves in the bend, leaving them at least 50 yards off, and around the next bend to Youngs Village. The distance is about 4 miles.

Youngs Village is a small settlement and railroad terminus on the right bank of Wadmelaw River. It is connected with river towns and settlements by steamboats. Gasoline and some supplies can be obtained here. Storm-warning signals are displayed. Depth of 7 to 8 feet can be taken alongside the wharf.

At Youngs Village favor the right bank down to the wharf; pass north of the little wooded islet south of the village, keeping 75 yards off this islet to avoid a shoal south of the wharf; then

head for Martins Point, on the left bank at the turn. At Martins Point hold over to the right bank and keep close under this bank until down to the houses on the opposite bank, ½ mile from Martins Point; then favor the left bank, passing south of an islet opposite a long wharf on the left bank. Favor the left bank past several marshy islands below the wharf, and head over for the right bank at McClauds Creek, below which there is an old wharf and shack. Follow this bank ½ mile to White Point at the mouth of Dawho River. The distance from Youngs Village is 5⅜ miles.

Dawho River enters North Edisto River south of White Point, 6½ miles above the ocean, and winds through the marshes in a general west-northwest direction 11¾ miles to South Edisto River, 16 miles above its mouth. It varies in width from about 75 yards to over 700 yards, and has a deep, well defined channel, except through the broader waters near the North Edisto, where a depth of over 6 feet, at low water, can be taken through a narrow channel. This channel is marked by 6 beacons—piles with white or red square targets, on which are the numbers of the beacons; the white beacons are left on the port hand and the red on the starboard hand, going westward; frequently some of these beacons are down. The entrance from South Edisto River is so narrow and, as approached from that river, resembles so closely some of the small drainage streams, that a stranger might pass it by mistake; an old shack and wharf on the south bank, just inside the opening, serves to mark this entrance. Tides meet in the Dawho River about 2 miles from the South Edisto entrance.

From North Edisto River enter the Dawho River, passing White Point at a distance of 150 yards, and steer to pass beacon No. 1 (northwestward of and close to a little marshy islet) at a distance of at least 75 yards on the port hand. Pass beacon No. 2 at a distance of 75 yards on the starboard hand, and haul up slowly to round beacon No. 4 at a distance of 75 yards on the starboard hand, and then steer to pass beacon No. 6 at a distance of 50 to 75 yards on the same side. When beacon No. 6 is abeam, haul sharply westward to pass beacon No. 3 at a distance of 50 yards on the port hand and hold this direction for 500 yards beyond No. 3, passing a shoal on the starboard hand, sometimes marked by a beacon, and a shoal opposite on the port hand. From the last position come slowly to about a northwest course and follow the marshes on the starboard hand (left bank) at a distance of 100 yards off until up to the first bend; then steer mid-channel courses and, at the bends, favor the outside shore. At North Creek, about 5 miles above the last beacon, take the starboard hand passage; and at the cut-off, 1¼ miles farther up stream, avoid turning too soon into the new passage, as a shoal makes well off the point on the northern side of the passage.

Entering South Edisto River, turn down stream (southward), keeping close to the left bank until abreast of the western end of a little mid-channel island; then bring a low bushy tree on the right bank to bear 244° true (**SW** by **W** ¾ **W** mag.) and steer for it, crossing over to the right bank through a narrow channel, 6 feet deep at low water, between mid-river shoals. Keep close to the right bank as far as the bend; then favor the left bank nearly to the next bend, the right bank around this and the next bend, and the left bank at the bend below; then work over slowly to the right bank and follow it close nearly to the next bend. Cross over to the left bank at an old house and some outbuildings and favor this side for a distance of 1 mile; then cross to the right bank and follow it to the canal. This canal cuts through the narrowest part of Fenwick Island, affording passage from South Edisto River to Ashepoo River. It is about 700 yards long, 60 feet wide, and 8 to 11 feet deep; its high, reddish slopes are visible from a distance of half a mile or more in both rivers.

After passing through the canal into Ashepoo River, turn southward down this river, keeping about a mid-channel course to red buoy No. 2 in the mouth. Pass this buoy on the port hand and black buoy No. 1 (farther down) on the starboard hand; and haul down to round, at a distance of 300 yards on the starboard hand, a small black and white horizontally striped beacon in St. Helena Sound. The distance from the canal to this beacon is 4½ miles.

St. Helena Sound to Port Royal Sound, 31½ miles.—There are two inside routes between St. Helena Sound and Port Royal Sound; one by way of Coosaw River, Brickyard Creek, and Beaufort River, past Beaufort and Port Royal; and the other by way of Harbor

River, Story River, and Station Creek. The distance by the former, or inland route, is about 31½ miles, and the least depth, at low tide, is 7 feet; while the distance by the latter, or coast route, is about 26 miles, and the least depth about 4 feet. The former is decidedly easier for a stranger; but the latter route can be used by drafts of 3 or 4 feet and, at high water may be shortened 3 to 4 miles by crossing a shoal in St. Helena Sound.

INLAND ROUTE.—After rounding the beacon referred to above, stand up the Coosaw River 13 miles to Brickyard Creek, being guided by the buoys, and leaving black buoys on the port hand and red buoys on the starboard. The buoys are located as follows: Black buoy No. 5 on the edge of Pelican Bank, ¾ mile westward of the beacon, red buoy No. 4 on the edge of the same shoal as the beacon, west-northwest from it, black buoy No. 7 on shoal northeastward of Morgan Island, red and black striped buoy at the mouth of Combahee River, and red and black striped buoy at mouth of Bull River (both on starboard hand), red buoy No. 2 in mouth of Parrots Creek, black buoy No. 1 at next bend in Coosaw River, black buoy No. 3 and red buoy No. 2 near the right bank below the next bend, red buoy No. 4 at this bend, black buoy No. 5 and red buoy No. 6 half way from the last bend to Brickyard Creek, and red and black striped buoy marking the entrance to the creek.

The entrance to Brickyard Creek is between marshy shores, but the marsh on the southern side is narrow and terminates just inside the creek in a red, eroded bank leading up to somewhat higher ground; this eroded bank is visible from the Coosaw River at the entrance buoy. From the entrance buoy, steer to pass the marsh on the port hand at a distance of 75 yards, and follow this shore, at about this distance, around the eroded point and nearly to the head of the bight south of it, keeping off about twice that distance when opposite the creek at the head. Then steer about mid-channel courses through the creek, following in general the curves of the port-hand shore (eastern). West of the eroded bank, on the other side of the creek, is a high, wooded point fringed by a narrow belt of marsh land; a prominent white house stands among the trees. At Mulligans Creek, 1 mile southward of this point and on the same side of Brickyard Creek, there is a short stretch of dry land along the creek bank and several shacks and a couple of palmettos close to the bank. Otherwise the western shore of the creek is marshy. The eastern side is higher land, especially at the points, and presents a more definite shore line. The eastern side, at the entrance from Beaufort River, is high, sparsely wooded land, on which there is a white house seen readily from down river. The distance through Brickyard Creek is 3¾ miles. Tides meet about midway through the creek.

Leaving Brickyard Creek at Beaufort River, turn eastward down river, favoring the right bank and passing southward of the wrecked river boat stranded on a shoal in mid-channel. At the next bend cross over to the left bank and follow it down to the point of marsh; then run down to the point of marsh on the other side, from there working over to the marshes southeast of the city of Beaufort. Hold to this side until the wharves bear north, when they may be approached.

Beaufort, S. C., is on a point of land stretching out from the right bank of Beaufort River, 10 miles above its mouth and 3 miles below Brickyard Creek. It is on the Charleston & Western Carolina Railroad, and has steamboat connections with Savannah, Ga., and with the United States naval station near the mouth of this river. The wharves are at the southern extremity of the point on which the city is located, and are at the only part of the point that may be approached by a vessel of any draft; depths of 14 to 16 feet are found at the wharves. Fresh water, coal, and gasoline can be had at the wharves. Provisions and some other ship stores are obtainable here. There is fair anchorage in the stream off the wharves.

Leaving Beaufort, favor the left bank until red buoy No. 10 is picked up; pass it on the port hand and hold down along the right bank nearly to black buoy No. 13; pass it on the starboard hand and continue down about in mid river to black buoy No. 11 at the mouth of Battery Creek.

Port Royal, on the left bank of Battery Creek, 1 mile above buoy No. 11, is the terminus of the Charleston & Western Carolina Railroad. It has a large wharf, at which coal can be

obtained. United States Weather Bureau storm-warning signals are displayed from a tower here, visible from the river.

From buoy No. 11 continue down river past red buoy No. 6 on the port hand, black buoys Nos. 9 and 7 on the starboard hand, to black and red striped buoy on the end of Paris Island Spit, in Port Royal Sound at the mouth of Beaufort River.

Coast Route.—From a position 700 yards northeastward of the black and white beacon in St. Helena Sound, at low tide steer 146° true (**SE** by **S** mag.) for 2½ miles to cross Pelican Bank in 6 feet of water; then steer 224° true (**SW** mag.) for 500 yards to clear the shoal, and steer 298° true (**NW** by **W** ½ **W** mag.) for 2 miles. Egg Bank, a sand pile awash at high tide, will then be seen about ¾ mile westward of this position. Haul westward and southwestward to round the western end of Egg Bank at a distance of about 150 yards. The above courses may be modified considerably, depending upon the draft of the boat, the stage of the tide, and condition of the sea on the bank; at high tide 4 or 5 feet can be taken across Pelican Bank on a course about 213° true (**SW** by **S** mag.) from the beacon.

Pelican Bank is a narrow ridge of sand extending 118° true (*SE* by *E* ½ *E* mag.) from Morgan Island, through St. Helena Sound, to the ocean; at low tide it is dry for a distance of 3½ miles from the island, and covered to a depth of 6 feet at 1 mile farther out. In crossing this bank one should go very slowly and sound continuously, as depths decrease very rapidly after the edge of the bank is reached.

The passage through the shoals west to south of Egg Bank is marked by iron rods; the first of which is left on the starboard hand and all others on the port, westward bound. The passage is very narrow and should be navigated cautiously by a stranger.

At the last iron rod on the shoals, steer about 219° true (**SW** ½ **S** mag.) into Harbor River, and keep about in mid-channel to the first bend; then favor the marshy islets on the starboard hand. The channel through here is narrow and difficult to follow, especially at high tide; and one should go slowly and sound continuously. It trends about southwest, but winds considerably, for a distance of 3¼ miles from the northwestern end of Harbor Island; then turns sharply south-southeastward through a narrow passage in the marsh. There is a prominent small hammock of palms and other small trees on the left bank of this narrow passage ¾ mile from the northern entrance. Follow this passage down to Fripps Inlet, which opens straight to seaward, and then turn to westward into Story River.

The channel through Story River is easily followed; it holds straight through past several sloughs on the northern side. The mouth of the river at Trenchards Inlet is obstructed by a sand bar, over which there is 4½ feet at low tide.

When down to the mouth of Story River hold straight out, about 247° true (**WSW** mag.), across the bar and over to the western shore. Follow this shore northward to the point, and around the point westward, into Station Creek. Steer a mid-channel course, about 264° true (**W** ½ **S** mag.), for 1½ miles from the point, past a creek on the starboard hand; and then follow the shore on the starboard hand around the bend to northward and westward. Then follow the marshy islets on the starboard hand southward 1 mile to a westward bend. After rounding this bend, keep close to the bank on the port hand, to avoid a shoal (dry at low tide) nearly in mid-channel (there is 4 feet in the channel at low tide). Then follow the port hand shore around a sharp bend to southeastward, passing eastward of an islet. After rounding the next bend to westward, hold over to the starboard shore to avoid a shoal, and, after rounding the next bend to southward, hold to the port shore for the same reason. The channel westward of here is easily followed. At the mouth of Station Creek, hold down southward along the shore south of the creek, at a distance of about 200 yards off, until Horse Island Creek opens, bearing about 101° true (*E* by *S* mag.); then haul out into Port Royal Sound. A shoal, partly dry at low tide, extends southwesterly from the shore north of Station Creek, and half way between the creeks there is a depth of but 3 feet on it at low tide; the channel is eastward of this shoal and is good for about 8 feet. On the shore, north of and close to the mouth of Station Creek, are four tall trees, three of them palms, standing in a row.

PORT ROYAL SOUND TO SAVANNAH, GA., 32 MILES.—From Paris Island Spit buoy (red and black striped), steer 270° true (**W** mag.) for red buoy No. 2, and, leaving it to starboard, steer for the white beacon (white light) north of the entrance to Skull Creek. When about 300 yards from the beacon, haul in for the creek, passing Bobbs Island on the port hand at a distance of 150 yards, and follow the marsh on the starboard hand at a distance of 75 to 100 yards until beacon No. 1 opens. Then be guided by the beacons (five in all), leaving the black (odd numbers) on the port hand and the one red (No. 2) on the starboard hand. After leaving the fifth beacon (No. 7), hold over for the cannery on the north end of Jenkins Island, and favor this side until around the bend. The western entrance to Skull Creek is between a dry wooded point (palmetto trees) on the northern side and small marshy islets on the southern side; south of the marsh, on Jenkins Island, is a wooded bluff, on which there is an old house, seen from Calibogue Sound.

From Skull Creek steer southward down Calibogue Sound, leaving red buoy No. 2, westward of Jenkins Island, on the port hand, and then following mid-channel courses for 5 miles to Cooper River, on the west side of the sound. There are two lighted beacons, the northern one on a building, south of the mouth of Cooper River.

Enter Cooper River favoring the south bank; cross over to the north bank west of Bulls Creek (the second creek on that side); and return to the right bank at the western end of the marsh on that side. Then follow mid-channel courses to Ramshorn Creek, the first opening in the southern bank, visible when up to the marshy point where the river bends from a westerly to a northeasterly direction. The channel through Ramshorn Creek is unmistakable, and is good for about 6 feet at low tide; tides meet north of Pine Island, a wooded hammock on the west side, and run with considerable strength each way.

Leaving Ramshorn Creek, continue southward down New River, past a cannery and several wharves, ½ mile below on the left bank, and a broad creek farther down on the same side, to a creek opening in the right bank, 2¼ miles below Ramshorn. A narrow passage, about ⅜ mile long, runs straight through from the mouth of this creek to Wrights River. Take this passage to Wrights River, and follow up the left bank (starboard) of this river nearly ¾ mile to Mud River entrance, on the other side. No directions are necessary for Mud River. It opens into Savannah River east of the end of a training wall and westward, ¼ mile, from the upper of two range beacons (red lights) on Jones Island.

From Mud River enter Savannah River, and follow the marked channel 4 miles westward and northward to the western end of Elba Island; here the inland route turns away from Savannah. To go to the city of Savannah, continue westward 3½ miles, following the right (port) bank.

Savannah, Ga., is on the right bank of the Savannah River, 14 miles above its mouth. It is an important shipping port, and has railroad connections with all parts of the country and connections by steamships with the principal ports of this coast. Quays extend along the entire river front of the city and for about a mile down river, below the city; in the left bank, opposite the city, are deep slips for cargo vessels. Vessels lying at the quays are exposed to the swash from shipping in the river, and, for this reason, and also because the quays are high above the river, small craft usually stop at Thunderbolt, unless loading stores. There is no anchorage near the city. Provisions and ship chandlery of all kinds, coal, gasoline, and fresh water can be had at the wharves. The facilities for making extensive repairs to hulls and machinery of vessels are good, and there are marine railways, the largest of which has a capacity of 1,500 tons. Storm-warning signals are displayed in the city and at Tybee lighthouse.

The mean rise and fall of tides is 6.5 feet. High water occurs about 2 hours later and low water about 3 hours later than high and low waters at Tybee. The current at ebb tide is strong, especially after heavy rains. The river at the city is always fresh.

SAVANNAH RIVER TO OSSABAW SOUND, 22¾ MILES.—From the Savannah River, above Elba Island, enter South Channel, passing south of Elba Island, through an opening in the training wall, which extends partly across from the west end of this island to the mainland. Pass the white beacon (white light) north of the mainland, just inside the training wall, on

the starboard hand and keep close to Elba Island for nearly a mile until Wilmington River opens. Then enter on a 169° true (**S** by **E** mag.) course, passing close to the western side of the entrance, and follow, in general, mid-channel courses down river. Pass through a drawbridge near the entrance; pass St. Augustine Creek on the port hand, ¾ mile from the entrance, and a creek on the starboard hand 1 mile farther; and, after leaving two creeks, one on each side, hold to starboard, passing three openings on the port hand. When approaching Thunderbolt, a village on the right bank, keep to the east side of the river until down nearly to the bend.

Thunderbolt is a small village and pleasure resort on the right bank of the Wilmington River. The Savannah Yacht Club is here; and yachts and small craft usually stop here rather than at Savannah. There is good anchorage in the river, and small wharves along the right bank, at which there are depths of 3 to 4 feet at low tide. An electric-car line connects with Savannah; the running time is about 30 minutes. Gasoline, fresh water, and some provisions can be obtained here. There are boat-building and repair shops, and marine railways of about 40 tons capacity.

Leaving Thunderbolt favor the right bank to Herb River, 1 mile down stream; then cross over to the left bank, and work back to mid-stream ½ mile below. Two miles below Thunderbolt, Skidaway River enters Wilmington River from southward, and from here there are two routes to Vernon River. The shorter, deeper, and easier passage is by way of Skidaway River and Narrows; and it is the only one recommended to a stranger.

Enter Skidaway River, favoring the east bank, and hold about mid-channel after the first ½ mile. At the second bend, opposite a creek on the west side, follow the southern bank through the next course, then the northern bank westward to Isle of Hope, a small pleasure resort on the left bank. Rounding the bend at Isle of Hope, follow the eastern bank at a distance of 100 to 150 yards to a wooded point; there turn southeastward around this point into the dredged channel through Skidaway Narrows.

This channel is 75 yards wide and 6 feet deep at low tide, and is marked by 10 ranges. Each front beacon is a single pile on which is a white, slatted, diamond-shaped target, with the range number in black. Each rear beacon is a tripod and white, circular, slatted target, with the range number in black.

Bring corresponding numbers in line and hold these beacons on until another set of ranges close; then steer by that range. After leaving the last range, continue down past Back River, on the starboard hand, passing close to the island in the mouth of Back River, and follow mid-channel courses down Burnside River, past a small settlement of new houses on the right bank. Enter Vernon River, around the next bend below these houses, and follow the left bank to the mouth of Little Ogeechee River; then cross over toward the right bank below Little Ogeechee. A passage will then be seen between Little Don Island and the marshes west of it; local boats of 4 feet draft use this passage at half tide. Follow the eastern shore of Little Don Island, keeping 150 yards offshore (there is shallow water farther offshore), to the passage between it and Raccoon Island, southeastward of the former. Hold to mid-channel through this pass and then favor Raccoon Island into Ogeechee River at Ossabaw Sound.

The distance from Savannah River to Ogeechee River by this route is about 22¾ miles, and the least depth in the channel at low tide is 6 feet.

ANOTHER ROUTE BETWEEN WILMINGTON RIVER AND VERNON RIVER.—Since the improvement of Skidaway Narrows most vessels follow the route given above; but the older route, by way of Parsons Cut, is still used to some extent, although the channel has shoaled to a depth of less than 3 feet at low tide and is difficult, especially for a long boat.

Directions for this route.—Pass the mouth of Skidaway River and continue down Wilmington River, favoring the left bank to the bend and then the right bank until up to a narrow passage on the starboard hand, about 5 miles below Skidaway River and nearly to the mouth of Wilmington River. Take this passage through to Romerly Marsh Creek and, on leaving the passage, hold 135° true (**SE** mag.) to the middle of the creek and past the mouth of the creek on the opposite side of the former. Then enter the latter creek on a 236° true (**SW** by **W** mag.)

course and follow its bends for 1½ miles to Parsons Cut, a canal about 50 feet wide running due south.

There is an oyster cannery on the west bank of the canal, to which a depth of 3½ feet can be carried at low tide. A little below this cannery the canal enters Wassaw Creek, where there is a sharp bend eastward and a narrow, difficult channel for the next mile. Through there a depth of but 2½ feet at low tide can be carried in a channel about 20 feet wide, between shoals dry at that stage of the tide. One mile below Parsons Cut the channel deepens and is easily followed to the mouth of Wassaw Creek. Leaving Wassaw Creek, turn northward up Odingsell River to Romerly Marshes, thence westward around the bend into Adams Creek, and down this creek to Vernon River. From the mouth of Adams Creek steer 248° true (**WSW** mag.) across the river to Raccoon Island, and when 200 yards distant from this island turn westward for the passage between this island and Little Don Island, keeping 200 yards off Raccoon Island shore. At this place the two routes from Wilmington River meet. The distance from Savannah River to Ogeechee River by this route is about 28½ miles.

Romerly Marshes.—The old passage through Romerly Marshes, which was used before either of those described above, is practically closed to navigation now, only very shallow draft boats being able to get through at any stage of the tide.

Ossabaw Sound to St. Catherines Sound, 13½ miles.—From the passage west of Raccoon Island turn westward and northwestward up Ogeechee River, favoring the northern shore but keeping at least 200 yards off the point of the mainland. Take the passage through Middle Marsh (two low, grass-covered islets in mid-channel, separated by a passage over 10 feet deep at low tide), or follow the northern shore into the bend north of the islets, and continue up river to Florida Passage, the first break in the south bank of the Ogeechee River. Enter the mouth of Florida Passage, favoring a little the western side, and then hold about to mid-channel for 2 miles to Bear River; Florida Passage enters Bear River about at right angles to the latter. At Bear River turn westward and keep about 100 feet from the starboard bank until halfway to the bend below, then work out into mid-channel. There is a shoal, covered to a depth of 1 foot at low tide, about 200 feet off the northern shore of the river at the junction with Florida Passage, and shallow water eastward of it. A least depth of 6 feet at low tide can be carried through by following the directions given above. From the bend below Florida Passage follow the path of the ebb current down river to St. Catherines Sound, and, after entering the sound, hold down to the wooded point of Ossabaw Island, on the port hand, to avoid high shoals on the starboard hand at the mouth of the river and a middle ground south of the river. Cross the mouth of the sound close to the red and black buoy, which is about midway between the wooded shores at the entrance from the sea.

The distance from the mouth of the Ogeechee River at Ossabaw Sound to this buoy is about 13½ miles.

St. Catherines Sound to Sapelo Sound, 12½ miles.—Cross the middle ground, close to the red and black buoy, and follow the wooded shore of St. Catherines Island into Walburg Creek, avoiding the shoal on the west side of the creek mouth. Favor the shore on the eastern side (St. Catherines Island) until around the first bend, then the shore on the starboard hand to the next bend, then the shore on the port hand past a creek on the opposite side. West of here Walburg Creek widens and the channel is close to the north shore. Leaving Walburg Creek at North Newport River, turn southward along the eastern shore of the river and enter Johnsons Creek, ½ mile southward of the former creek and on the same side of the river. Just inside the mouth of Johnsons Creek is another creek leading south. Pass this creek on the starboard hand, and hold about to midstream down Johnsons Creek, past a creek on the port hand, 1⅜ miles from the entrance, two on the starboard hand, a little farther down, and a second on the port hand, just before coming to an oyster cannery. This cannery is on a small slough that makes in from the eastern side of Johnsons Creek and is conspicuous from Johnsons Creek and from South Newport River below the southern entrance to the creek. At each of these creeks keep over to the opposite bank, to avoid shoals at the mouths of the creeks, and keep close to

the western bank when abreast the cannery, to avoid a shoal just north of the slough leading to the cannery. Below the cannery the best water is along the western bank, which should be followed close to, on leaving the creek. The northern side of the southern entrance to Johnsons Creek is a white shell beach, off which shallow water extends more than half the width of the mouth. On leaving Johnsons Creek hold to the eastern shore until well into South Newport River; then steer southward for the red and black buoy in Sapelo Sound.

The distance from the buoy in St. Catherines Sound to this buoy is about 12½ miles.

SAPELO SOUND TO DOBOY SOUND, 12 MILES.—From the red and black buoy in the mouth of South Newport River, steer for the quarantine station (a structure on piles northward of Sapelo Island), and, when ¼ mile from it, haul westward for the mouth of Mud River, leaving black can buoy No. 3 on the port hand and a red and black buoy on the starboard hand. From the latter buoy steer 226° true (**SW** mag.) to leave red nun buoy No. 2 close to on the starboard hand, and then steer by the ranges through the dredged channel in Mud River to New Teakettle Creek. These ranges are marked by pairs of red, white, or black targets on piles, with the number of the range on the targets. Corresponding numbers and shapes are brought into line and held thus until the beacons bearing the next consecutive number close, when the next range is followed. The first range beacons stand on a shoal, well clear of the banks, and are seen plainly from buoy No. 2. The other beacons are on the western side of the river; numbers 2 and 5 are front ranges, going south, and numbers 3 and 4 and 6 are rear ranges. Hold to range No. 6 until into New Teakettle Creek, and then keep about in mid-channel down this creek to Old Teakettle Creek, passing two creeks on the port hand and one on the starboard, all of about the same width as New Teakettle. In Old Teakettle Creek, which is broader than the one just left, hold southward along the left bank to Doboy Sound, and, when the sound opens, steer for red buoy No. 8, southward of the creek mouth.

The distance from the buoy in the mouth of South Newport River to this buoy is about 12 miles.

DOBOY SOUND TO ALTAMAHA SOUND, 6¼ MILES.—Leave red buoy No. 8 (referred to above), which marks a shoal on the western side of the mouth of North River, on the starboard hand and enter North River, favoring the western shore until abreast of the north end of Doboy Island. Then favor the shore of Doboy Island, and pass close to the south end of this island. Doboy Island is wooded, and there are several ruined buildings on its southwestern end. Leaving North River at the southwestern end of Doboy Island, cross Back River on a 181° true (**S** mag.) course and favor the eastern shore to South River, passing Darien and Rockdedundy Rivers on the starboard hand. At South River, which runs eastward to Doboy Sound, follow the western shore southward into Little Mud River, keeping well over to westward, to avoid a shoal at the entrance to South River. Then, when well into Little Mud River, keep close to its eastern shore and follow this shore down to beacon No. 2 in Altamaha Sound.

The distance from the buoy in Doboy Sound to this beacon is 6¼ miles.

ALTAMAHA SOUND TO ST. SIMON SOUND, 19 MILES.—From beacon No. 2 cross the sound to beacon No. 1, 240° true (*SW* by *W* ¼ *W* mag.) from the former, on the western side of a small island; but, in crossing here, it is necessary to hold, first, eastward of this direction, to avoid a shoal off the mouth of Little Mud River, and then westward, to avoid the shoal north of the island on which is beacon No. 1. Pass close to beacon No. 1 and the west shore of that island; then along the south shore of the sound, westward to beacon No. 4. From beacon No. 4, circle northward of a little islet, passing close to beacon No. 4 and the north shore of Buttermilk Sound. Follow the northwestern shore of Buttermilk Sound to beacon No. 6, and then cross diagonally over to the eastern shore, at the point where that shore bends sharply southeastward. Pass this point close to and then follow the direction of the eastern shore. Two creeks, close together, are passed on the port hand and one broad opening, farther south, on the starboard hand. The passage then narrows, and Frederica River is entered. Keep about in mid-channel down this river, and, at the broad opening westward into Mackays River, turn eastward and follow the wooded eastern shore to red buoy No. 4, in the mouth of Frederica River; pass this buoy on the

port hand, black buoy No. 1, farther down, on the starboard hand, and cross St. Simon Sound to red buoy No. 16, in the mouth of Brunswick River.

The distance from beacon No. 2 in Altamaha Sound to buoy No. 16 is about 19 miles.

Brunswick, Ga., is on the left bank of Brunswick River, 7¼ miles above St. Simon lighthouse and 4½ miles off the track of the inside passage southward. It is an important shipping port, and has railroad connections with interior and seacoast cities and steamship connections with coast cities; river steamers connect with Fernandina and Darien.

There are extensive wharves, suitable for vessels of all sizes; and coal, water, and gasoline can be taken easily at the wharves. Supplies and ship chandlery can be had here. There is one shipyard at which repairs to hulls and machinery can be made. It has one marine railway of about 300 tons capacity and a small railway for launches. Storm-warning signals are displayed from a tower in the city.

Directions for Brunswick.—Leaving red buoy No. 16 in the mouth of Brunswick River, on the starboard hand, steer 226° true (**SW** mag.) on the Jekyl Island range, marked by two white beacons (white lights) on the southern side of the river. Leave red buoy No. 18 on the starboard hand, and haul slowly westward to pass red buoy No. 2 on the starboard hand and bring the red lights of the Colonels Island range in line. Steer 290° true (**WNW** ¼ **W** mag.) on this range until the red lights of Brunswick Harbor range are in line, bearing 344° true (**N** by **W** ½ **W** mag.); then follow this course into Brunswick Harbor.

St. Simon Sound to St. Andrew Sound, 8¾ miles.—Leave red buoy No. 16, in the mouth of Brunswick River, on the starboard hand and steer 215° true (**SW** by **S** mag.), keeping 400 yards off the eastern shore until on the Jekyl Creek Jetty range. This range is marked by two beacons on the western side of Jekyl Creek as follows: Front beacon, a red light over a square red target, and rear beacon, a white light over a square black target. A rock jetty extends along the western side of the dredged channel marked by this range, and the outer end of the jetty is marked by a cluster of piles. The dredged channel in Jekyl Creek is marked by three sets of range beacons on the eastern shore (Jekyl Island) as follows: The first is a rear range, bound south, marked by two piles with red triangular targets, numbered 3; the second is a front range of triangular white targets, numbered 2; and the third is a rear range of two square black targets, numbered 1. Leave the piles, at the end of the jetty, on the starboard hand and steer the first range into Jekyl Creek; then keep to mid-channel until the first rear range beacons, No. 3, are in line. Hold this range until the forward range beacons, No. 2, are in line; then steer for them until the next rear range beacons, No. 1, are in line. Hold the last range to the middle of the creek, and then work slowly to the eastern bank and follow close to this bank to Jekyl Sound. Then, after entering Jekyl Sound, follow the eastern shore, at a distance of 250 to 300 yards, to St. Andrews Sound; and cross the mouth of this sound to the wooded north end of Little Cumberland Island, on which is a lighthouse, passing on the starboard hand the black and red beacon (white light) in the mouth of the sound.

The distance from buoy No. 16 in St. Simon Sound to St. Andrews Sound beacon is about 8¾ miles.

St. Andrews Sound to Cumberland Sound, 20½ miles.—When nearly down to the north end of Little Cumberland Island and lighthouse steer about 203° true (**SSW** mag.) up Cumberland River to pass the western side of this island at a distance of about 300 yards and the marsh on the port hand, opposite Floyds Creek, at about the same distance. Just above Floyds Creek Brickhill River enters Cumberland River from southeastward, and there is a small creek between the two. Continue up Cumberland River, passing on the port hand, at a distance of 200 yards, the marsh at the junction of the rivers; the channel here is narrow with shallow water on each side. Then haul over to the northern bank, just east of a creek mouth, and passing the eastern side of this creek mouth at a distance of 150 yards hold about 200 yards off this shore (western) until it bends westward again. Then follow the same shore, at a distance of 100 yards, around the bend to a small creek south of the point in the opposite shore. Here take the opposite (northern) side nearly to a larger creek on the starboard hand. Then

follow close to the southern shore, crossing over to the eastern shore where the former curves southward. Three range beacons will then be seen on the eastern side, south of the opening into Brickhill River. Follow close to the eastern shore until the first range closes; it is marked by two triangular, red targets, numbered 2. Keep this range until 200 feet from the shore; then follow the shore at this distance, passing close to a little islet on the port hand. When the second range, marked by two square, white targets, numbered 1, closes (the center beacon is common to both ranges), hold it so and cross over for the marsh on the western side. Pass this marsh at a distance of 150 yards and steer 175° true (S ⅝ E mag.), passing the western sides of two marsh islands at a distance of 100 to 150 yards. When a mile south of the northern end of the second island, a small island will be seen right ahead; leave this on the port hand at a distance of 100 yards and after passing it hold a little west of south for ¾ mile, to avoid shallow water south of the island. Then follow mid-channel courses to the red and black buoy in the mouth of Cumberland Sound.

The distance from St. Andrews Sound beacon to this buoy is 20½ miles.

Fernandina, Fla., is on the right bank of Amelia River, 2 miles southward from the red and black buoy in Cumberland Sound. It is a shipping port for lumber and naval stores and is connected by steamboat with Brunswick and St. Marys. One railroad enters the city. The wharves extend for about a mile along the river bank and have deep water up to them. Coal, fresh water, and gasoline can be had at the wharves; gasoline is received from tank wagons. Provisions and some ship supplies can be had here. There are no facilities for making repairs to vessels. Storm-warning signals are displayed from a tower in the post-office yard and are visible from the river.

CUMBERLAND SOUND TO ST. JOHNS RIVER.

The inside passage between Fernandina and St. Johns River is in places shallow and difficult to follow. The channel, at the worst places, is marked by stakes and range beacons; but these are insufficient in number to guide a stranger past all difficulties. Through Sister Creek, the shallowest section of this passage, a draft of 3 feet can be carried at mean low tide; but the channel here is very narrow and crooked. A stranger should attempt this passage only on a rising tide and preferably on the first of the flood, as the channel is easier traced then. The bottom is soft except at a few oyster beds. The average rise and fall of tides is from 3 to 6 feet, depending upon the place. With favorable weather and sea, better progress can be made by going outside from Cumberland Sound to St. Johns River, a distance of about 25 miles.

Directions for the Inside Route, 28 miles.—From the red and black buoy in Cumberland Sound, enter Amelia River, southward of the buoy, and follow the eastern bank past the city of Fernandina. Then haul westward, keeping about in mid-river, and round the bend to southward. Pass one creek on the port hand, one on the starboard, and enter Kingsleys Creek, the second creek on the port hand. A railroad bridge and, 100 yards or so south of it, a highway bridge, cross Kingsleys Creek; both have draw openings of sufficient width for any craft able to take this passage. Kingsleys Creek enters South Amelia River ¼ mile below the highway bridge; and from here southward for 2 miles a narrow channel winds through shoals and marsh islets, covered at high tide.

Entering South Amelia River from Kingsleys Creek, look for channel stakes, as these, at high water, are the only guides to the channel, and leave them on the side indicated by the finger boards. Pass a small islet, submerged at high tide, and a stake, close to, on the starboard hand; and turn slowly westward to pass an islet close to, on the port hand. Continue over to the western shore, just north of a wide opening; then, turning slowly to southeastward and eastward, pass several islets and a stake, on the starboard hand; then southward past two stakes on the port hand. From the last stake hold southward to the marsh on the starboard hand, and follow it to a small settlement on the eastern shore. Then follow the left bank southward, past a small creek, and westward to the turn. Cross over to the right bank

here and follow it to the next bend, at which there is a stake. Favor the left bank below there until nearly to the mouth of the creek, and then the right bank to its end in Nassau Sound. A shoal extends ¼ mile southeast from this point. When clear of this shoal, hold down the sound in mid-channel for a distance of 1 mile below the point. Then follow the western shore at a distance of 200 yards, watching out for the middle ground shoal on the port hand, and pass the entrance to Sawpit Creek, 1½ miles below South Amelia River, keeping 500 yards off the shore south of the creek until that distance below the entrance. Then haul in for the shore and follow it northwestward into Sawpit Creek.

Keep about in mid-stream for nearly 3 miles up Sawpit Creek, and then look for two range beacons, each a white, square target with black circle in center, on the eastern bank. Hold these beacons in line until the next range, marked by similar beacons on the northern bank, is nearly closed; then haul southward for Gunnisons Cut and keep the latter beacons in line until through the cut and the creek bends eastward. Then hold to mid-stream for about 700 yards until two slatted beacons on the western bank are in line; then steer by this range, passing close to the marsh on the starboard hand. Below this range the best water is indicated by stakes with white finger boards, which should be passed close to. Keep about in mid-stream, except at these stakes, turning first to southwestward from the range, then eastward, then southward, past an opening on the port hand, to a place where one passage runs southward and another eastward. Take the latter, past an opening on the port hand, and keep to starboard, past another opening on the same side, to Fort George River, running southeastward to the inlet of that name.

Pass this river, following the direction of the western bank into Sister Creek, and keep in midstream down past the woods on the western side to a small stream on the same side, a mile below the woods. There is a stake on the bank just east of the entrance to this stream, and another on the opposite bank, a little downstream from the former. Pass close to the mouth of this stream and 25 feet from the bank at the first stake; and then head over for the second stake, 81° true (**E** ⅞ **N** mag.) from the former, leaving a shoal on each side, and approaching the left bank within 25 feet. Follow this bank to the next bend, and then the right bank, below the bend, at a distance of 20 feet, to a stake, passing west of a mid-channel shoal. Favor the right bank for 1½ miles, past three openings in the left bank. Then hold to the right bank, at a distance of 10 feet, past two stakes 400 feet apart, and, at the second stake, cross to the left bank, past a wide opening on the port hand. Follow this bank, at a distance of 20 feet, around the bend, and then keep about in midstream for ½ mile, past an opening in the left bank and around two bends. After rounding the last bend (where the creek trends southward again) some old buildings will be seen on the right bank; and just above them is the shallowest and most difficult place along this route. Favor the right bank until nearly abreast of a small opening in this bank, just north of the buildings; then keep close under the left bank until past this opening. Here oyster rocks extend nearly across from the right bank and are sometimes indicated by ripples; there is a strong current here at times. After passing this shoal haul sharply over to the right bank, to avoid another shoal on the left side, just below the former. Favor the right bank past the buildings and then cross over to the left bank, leaving the point here, at the entrance to a slough, at a distance of about 25 feet. Cross the mouth of this slough, steering so as to be 25 feet off the left bank of Sister Creek when about 300 yards from the point below. Follow this bank down, gradually increasing this distance to 100 feet at the point, and, rounding the point, hold southward 100 feet from the bank until on the range for entering St. Johns River. The beacons for this range are square, white targets with circular black centers, mounted on piles on the left bank of Sister Creek. When on this range, steer 181° true (**S** mag.) on it into St. Johns River.

The distance from the red and black buoy in Cumberland Sound to St. Johns River, by the inside route, is about 28 miles.

Directions for Going Outside, from Cumberland Sound to Mayport, on St. Johns River.—From the red and black buoy in Cumberland Sound, hold a little south until on Tiger

Island range, two white towers (red lights) on the shoal westward of the buoy, and then steer 81° true (**E** ⅞ **N** mag.) on this range. When nearly down to red buoy No. 4, Fort Clinch range, two black towers (white lights) on the shore near Fort Clinch, will close; and this range, 73° true (**ENE** ⅜ **E** mag.), will lead to the bell buoy, past three black buoys on the starboard hand, and red buoy No. 2, off the end of the north jetty. Continue out to the whistling buoy, ¾ mile eastward of the bell and 4 miles from Fort Clinch, and then steer 178° true (**S** ¼ **E** mag.) for 19 miles to the bell buoy off St. Johns River.

There are strong tidal currents in St. Johns River, which require special attention at the entrance between the jetties. With northeasterly winds there is a strong southerly set on the flood at the end of the north jetty, and the conditions here are often dangerous in heavy weather. Strangers should not attempt to enter at night.

Passing 100 yards northward of the bell buoy off St. Johns River entrance, steer 276° true (**W** ½ **N** mag.), keeping the lights of the Wards Bank range (pyramidal structures, half black, half white) in line ahead, and pass about midway between the black buoys and the north jetty. When about ⅜ mile inside the end of the north jetty, steer 255° true (**WSW** ⅝ **W** mag.), keeping the lights of the Crossover range, similar to the preceding range and show to the left of St. Johns River lighthouse, in line ahead, and pass about 100 yards off the south jetty.

Leave gas buoy No. 6 about 200 feet on the starboard hand and steer 289° true (**WNW** ⅜ **W** mag.), keeping the lights of the Fort George Island range (white structures) in line ahead. When about 250 yards from the north bank and past buoy No. 1, haul westward gradually and bring the lights of the Magic City range (white skeleton structures) in line astern on a 245° true (**SW** by **W** ¾ **W** mag.) course. Leave buoy No. 4 about 100 yards on the starboard hand and bring the lights of the Pilot Town range (red daymarks) in line astern on a 202° true (**S** by **W** ⅞ **W** mag.) course until up with the railroad wharf at Mayport.

Mayport, Fla., is on the south bank of St. Johns River, 1½ miles below Sister Creek and ½ mile above St. Johns River lighthouse. Storm-warning signals are displayed from a tower visible from the river. There is daily communication with Jacksonville by railroad and by river steamboat. Coal and fresh water can be obtained at the railroad wharf. Gasoline can be had, in small quantities, at the wharves and, in large quantity, from a supply boat, which comes down from Jacksonville two or three times a week. Small craft can find protected berths on the inshore side of the railroad wharf; mooring at the other wharves is forbidden. There is a good place to beach a small craft just below the lowest wharf; the bottom is hard sand and smooth but so steep that boats should lie parallel with the shore; the average rise and fall of tides is 4.2 feet.

Jacksonville is on the north bank of St. Johns River, about 23 miles above the ends of the jetties. It has railroad connections with all parts of the country, and communications by steam vessels with Charleston, Philadelphia, New York, and Boston, and with river landings. Extensive wharves extend along the north bank and are convenient for large and small vessels. Coal, gasoline and fresh water can be taken conveniently at the wharves. Provisions and ship chandlery, of all kinds, are obtainable. The facilities for making repairs to hulls and machinery are excellent and there are marine railways for hauling out large vessels.

The mean rise and fall of the tides is about 1 foot; and there are strong currents especially on ebb tide.

Pilots for the inland waters can be had here and at Mayport.

ST. JOHNS RIVER TO KEY BISCAYNE BAY.

From St. Johns River to Miami, on Key Biscayne Bay, there is a continuous inside waterway through canals and natural channels, in which the controlling depths vary from 3 to 7 feet; but power boats, drawing 4 feet and even a little over, are able, under favorable conditions, to drag through the very soft bottom at the shallowest places.

These waters are nontidal, except in the vicinity of the inlets; but are affected to a considerable extent by strong northerly and southerly winds, which may alter the surface level as much as 2 feet in places. Some boats, to avoid the shallow water of Halifax River, go out

at St. Johns River or at St. Augustine Inlet and coast as far as Mosquito Inlet, below which the least depth inside is 4 feet. A stranger should have but little difficulty in taking through a draft up to 3 feet, except, perhaps, at a few shallow places; but, for a greater draft, he should employ a pilot over parts of the route at least. Pilots for the whole distance can be had at Jacksonville and Mayport, and local pilots at many other places along the route. Supplies, fresh water, and gasoline can be obtained at convenient distances, and repairs can be made at several places along the route; but coal is scarce between St. Augustine and Miami and can be had only by arrangement with the Florida East Coast Railroad.

The inland waters are well marked by channel stakes as far south as Jupiter Inlet, but, below there, there are few Government marks until one gets to Miami. The usual type of channel stake is a palmetto pile with red or black finger board and number; but some are iron pipes with finger boards painted but not numbered. Going south, the black boards and odd numbers are left to port and the red and even numbers to starboard. Except where otherwise stated hereafter, the stakes are passed close to on the side indicated as above. Some of the red boards have changed by weathering or otherwise, until they appear white. Besides the Government stakes described above, and south of Jupiter Inlet, where there are very few Government stakes, there are privately established marks, consisting of a pile or stake with a finger board pointing to the best water. These boards may or may not be colored, but generally are white, regardless of the side of the channel which they mark.

ST. JOHNS RIVER TO ST. AUGUSTINE INLET, 34 MILES, LEAST DEPTH 5½ FEET.—The approach to the canal leading to the inside waterways south of St. Johns River is by way of Chicopit Bay, which is reached by passing inside of the training wall at Great Marsh Island, about south of Sister Creek. The front beacon of the lower Mile Point Cut range stands on the shore of Great Marsh Island, west of the end of this training wall. Pass between the training wall and Great Marsh Island and keep close to the training wall until opposite the stake on the east end of the little island southeast of the former; then cross to this stake and follow the northern shore of this island westward, giving the stake in the water, east of Great Marsh Island, a wide berth. Round the western end of the little island at the stake and haul eastward to red stake No. 4, which marks the entrance to the canal. Distance from river 1½ miles.

This canal extends southward, nearly parallel to the coast, for about 17 miles to Tolomato or North River; it is 50 feet wide on the bottom and at least 5½ feet deep at mean low tide. Beginning in Chicopit Bay, near the mouth of the Pablo Creek, it follows, in general, the old creek bed for about 8 miles, but leaves the creek frequently to cut across wide bends in the old bed. A highway bridge crosses the canal about 3 miles below Chicopit Bay and a railroad bridge about 2½ miles farther down; both have draw openings of ample width. After leaving the old creek bed the canal cuts through high wooded ground for about 7 miles and then for 2 miles through marsh, and extends in a series of long straight reaches connected by easy curves. The southern entrance is easily recognized by dry sand banks on each side. There are no channel stakes in the canal, and in the northern section, at the places where it crosses Pablo Creek, one may be in doubt as to which course to take; the only guide here is the evidence of dredging on the canal banks. Tidal currents amounting to 2 knots are encountered at the railroad bridge; they set north with ebb tide.

The **Tolomato** or **North River** flows southward 14 miles from the canal mouth to St. Augustine Inlet, and varies in depth from 5½ to 30 feet at low tide. The channel is sufficiently marked by stakes for a distance of 3½ miles below the canal. From stake No. 16 (red), favor the right bank to a little islet on that side, 1 mile below No. 16; then keep close to the marsh on the port hand nearly to stake No. 9 (black). After rounding the bend below stake No. 15 (black), keep in midstream to the next bend below; keep close to the right bank throughout this bend; and then, when the river turns southward again, hold to the left bank for 1 mile. There is a red buoy (No. 2) at the mouth of the river, and there are stakes showing the channel to St. Augustine.

St. Augustine Inlet is used to a considerable extent by yachts bound for St. Augustine; it is marked by St. Augustine lighthouse and a wireless telegraph station on the southern side

of the entrance. The channel is marked by fourth-class buoys and by a second-class sea buoy, "St. A," which are shifted to conform to the best water. Licensed pilots are stationed at the city of St. Augustine and will come out to a vessel in answer to a signal; but the usual practice is to telegraph ahead from the last port. The bar and channel are said to shift frequently and to be impassable during fresh easterly winds. In April, 1912, the depth on the bar at mean low tide was 5 feet. At that time the channel ran in 248° true (**WSW.** mag.) for the wireless telegraph pole farthest north of the lighthouse, past a red nun buoy, and there turned and followed the southern shoal into the inlet.

The average rise and fall of tides is 4.5 feet; and high and low waters occur 8 and 19 minutes, respectively, before high and low at Charleston, S. C.

St. Augustine is a popular winter resort for tourists and yachtsmen, and has several fine hotels, open during the winter season. A railroad connects with Jacksonville, and there are biweekly connections by steamboat through the inside waters; a power boat runs to Daytona three times a week during the tourist season. The channels to St. Augustine from the sea and through the inside waters are well marked by buoys and stakes and present no difficulties for a draft of 6 feet. There is good anchorage abreast of the city in the Matanzas River, both above and below the bridge, through which there is a wide draw. The wharves north of the bridge have depths of about 10 feet across the ends; and most of them are piped for fresh water. The first wharf south of the bridge, a recreation pier, has a depth of 7 feet at its end; but the wharves south of it are in shallow water. Provisions, some yacht supplies, coal, gasoline, and fresh water can be had here. There are facilities for making minor repairs to hulls and machinery, and ways for hauling out craft of about 10 tons. Storm-warning signals are displayed from a tower at Fort Marion.

San Sebastian River flows past the west side of the city of St. Augustine and empties into Matanzas River 1½ miles south of the bridge. It is navigable for a draft of 7 feet as far as the highway bridge. Supplies may be taken at a wharf on this river on the west side of the city.

ST. AUGUSTINE INLET TO MOSQUITO INLET, 57 MILES, LEAST DEPTH 3 FEET.—Matanzas River trends southward from its junction with Tolomato River at St. Augustine Inlet, past the city of St. Augustine, for about 15 miles to Matanzas Inlet. The channel through the broader section of the river is very narrow and winds between high shoals; but it is well marked by stakes and requires no directions.

Matanzas Inlet has a least depth of 5 feet on the bar at mean low tide; but the channel in the mouth of the inlet is obstructed by a ledge of rock, over which the depths vary from 2 to 9 feet. Strangers should not attempt to use this inlet.

A canal runs southward from Matanzas Inlet for 21½ miles to Halifax River and parallels, in general, the coast line. It varies in width from 60 to 100 feet at the water level, and is comparatively straight, except near the lower end. Where it traverses broader waters, the canal limits are shown clearly by banks of dredged material, often above the water level. A highway drawbridge crosses the canal 1½ miles north of Halifax River; it is not tended, and boatmen must open and close it themselves. Tidal currents are experienced for a distance of about 6 miles south of Matanzas Inlet; and below there a current usually sets southward regardless of the tide; it has a strength of about 1 knot. The least depth from St. Augustine to Halifax River is 5 feet; but the depth in the canal is affected to a considerable extent by strong northerly and southerly winds.

DIRECTIONS.—From the old fort on the western bank of Matanzas River, near Matanzas Inlet, keep close to the eastern shore nearly down to the inlet, and then cross over to the beacon in the southwest corner of the inlet. Leave this beacon 50 feet on the starboard hand and haul southwestward into the canal, taking care to avoid getting into the old channel which runs south. No further instructions are necessary until one gets to Halifax River; the lower part of Halifax Creek is marked by white hand boards on the side of the best water.

Halifax River for 5 miles northward of Mosquito Inlet, into which it empties, is a narrow stream, winding through marshes; but northward of there for 15 miles it is a shallow lagoon,

about ½ mile wide, separated from the ocean by a strip of wooded beach from ¼ to ½ mile wide. A draft of 5 feet can be taken up to Daytona, about 10 miles above the inlet. The channel depth in the northern part of the river, for a distance of about 3 miles southward from Halifax Creek and Canal, varies from 3 to 4 feet; but the bottom to a depth of 6 feet is very soft mud, through which a power boat of 4¼ feet draft can drag. Five drawbridges cross the river. The mean rise and fall of the tides at the inlet is 2.3 feet and at Daytona about 0.7 foot; but river tides are influenced to a considerable extent by strong northerly and southerly winds.

DIRECTIONS FOR HALIFAX RIVER.—On leaving Halifax Creek, follow the line of piles for 3½ miles, leaving them all on the port hand at a distance of 20 to 30 feet. Then keep about 200 yards off the eastern shore, hauling in to 100 yards at the last boathouse on this shore; and when abreast of this boathouse, head for the draw in the Ormond bridge. After leaving this bridge steer to pass the stakes south of it at a distance of 15 feet on the port hand, and then bring them in line with the draw tender's house. Steer by this range until the next stakes, 1¼ miles northward of the next bridge, are picked up. Pass these stakes at a distance of 25 feet on the port hand and head for the draw in the next bridge. Pass through the third drawbridge and then haul slowly eastward for the fourth draw, which is near the eastern end of this bridge. The channel to Daytona is south of this bridge; see description of Daytona. South of the fourth bridge favor the eastern shore, keeping at first 100 yards off and then gradually increasing the distance to 350 yards when below the next point on the western side. Haul in to 200 yards when 1 mile from the next bridge (Port Orange), and then be guided by the stakes to the bridge. Below this bridge the channel through the marsh is sufficiently marked by stakes to Ponce Park, on the eastern shore, 1 mile above Mosquito Inlet.

The distance from St. Augustine Inlet to Mosquito Inlet is about 57 miles.

Mosquito Inlet, from ½ to 1½ miles southward of Mosquito Inlet lighthouse, is used by small craft bound for New Smyrna and by yachts unable to get through the shallow waters of the upper Halifax River. A shifting bar extends about ¾ mile seaward, beyond which depths increase rapidly from 3 to 10 fathoms. The channel across the bar shifts position frequently, but maintains a depth of about 6½ feet at mean low tide; it is marked by a fourth-class red buoy and the approach by a second-class sea buoy. Inside the inlet the channel branches, one part winding northward, through high shoals, to Halifax River, and the other turning southward to Hillsborough River; both are deep (9 feet and over at low tide). A red and black buoy marks the junction of the two channels; and two red buoys and one black buoy mark the channel to Halifax River; the buoys are shifted to conform to changes in the channel. A bar pilot lives at Ponce Park, near the lighthouse, and will come out to a vessel in answer to a signal, if it is seen; but the safest plan is to write or telegraph ahead for a pilot. The average rise and fall of tides is 2.3 feet; high water occurs 1 hour and 41 minutes before and low water 1 hour and 8 minutes before high and low at Old Point Comfort, Va.

Daytona is a popular winter resort on the western bank of Halifax River, about 9½ miles above Mosquito Inlet lighthouse. It is on the Florida East Coast Railroad and is connected during the tourist season with St. Augustine, Palm Beach, and intermediate points by large power boats, carrying passengers and freight. Approach to Daytona is obstructed by a shoal from ½ to 2 feet deep, extending along the entire water front and out to the narrow river channel, which here is near the eastern shore. The wharves are reached by narrow channels which have been dredged through this shoal. The city wharf is about 30 yards southward of the fourth bridge and is reached by a narrow channel from 4 to 4½ feet deep, running parallel to the bridge from the main channel at the draw; the channel is marked by stakes on both sides. In April, 1912, there was a depth of 3½ feet along the southern side of this wharf and scarcely any water on the northern side; but there was a project on foot then to improve the water front by dredging a channel and basin deep enough for any craft able to get up here. The Halifax River Yacht Club is south of the city wharf and is reached by the same channel. Provisions, some yacht supplies, gasoline, and fresh water can be obtained here; water is piped to the end of the city wharf. The facilities for making repairs to hulls and to the machinery

of power boats are good; and there are ways for hauling out craft up to 80 tons and 4½ feet draft.

The mean rise and fall of tides is about 0.7 foot.

New Smyrna is a winter resort on the western bank of Hillsborough River 3 miles from Mosquito Inlet. It is on the Florida East Coast Railroad and is a flag stop for boats of the inland waterways. The draft that can be carried to there is limited only by the depth on Mosquito Inlet Bar; the depth at the city wharf is 14 feet. This wharf, which is the first coming from the inlet and is nearly opposite the hotel, is piped for fresh water. Provisions and gasoline can be obtained here. Pilots for the inland water can be obtained here. There are strong tidal currents in the river abreast the city.

MOSQUITO INLET TO ST. LUCIE INLET, 129 MILES, LEAST DEPTH 4 FEET.—**Hillsborough River** winds southward about 15½ miles through the marshes to Mosquito Lagoon, and is a narrow, tortuous passage, requiring careful steering and close attention to the channel stakes. One drawbridge crosses the river, 1¾ miles above its mouth. A draft of 6 feet can be carried for a distance of 8 miles to a black stake (next above red stake No. 8); but for the next 3 miles a draft of 4 feet is all that can be taken through at low tide; and there are several places where a slight divergence from the best water will take one into depths of 3 feet. The mean rise and fall of tides here is said to be 1 foot and to occur about 3 hours later than at New Smyrna. The river is well marked by stakes, which are a sufficient guide for a draft of 3 feet; but for a greater draft a pilot should be taken.

DIRECTIONS.—From the mouth of Halifax River be guided by the buoys across Mosquito Inlet, passing a black buoy on the starboard hand, 2 red buoys on the port hand, and, finally, a red and black striped buoy on the starboard hand. Then follow the eastern bank of Hillsborough River to the drawbridge, keeping close to this bank. The channel is well marked from here up and requires directions only at a few places. After leaving red stake No. 6, 1½ miles above New Smyrna, the remains of an old wharf will be seen extending out from the western shore. There is a shoal in mid-channel just north of it; to avoid which, when abreast of the last island on the starboard hand, haul in to pass the outer pile at a distance of 50 feet. When up to stake No. 8, slow down and take the next 3 miles at very slow speed. Around the point beyond stake No. 16, known locally as Shipyard Point, the channel is very narrow and passes between two hard shoals. Stakes are sometimes down here, and then one must feel his way carefully with a sounding pole.

Mosquito Lagoon is a broad body of water from 1 to 10 feet deep, extending southward from Hillsborough River and connected with Indian River by a short canal, known as the Haulover. A draft of 4 feet can be carried through into the Indian River. The distance from Hillsborough River to the Haulover is about 10 miles. The entrance from Hillsborough River is marked by stakes and by narrow islets of dredged materials on each side of the cut; there is a pile with crossed boards, at the turn, and a pile, marking a rock, south of the channel.

Leave the beacon (crossed boards) on the port hand and steer 152° true (**SSE ½ E** mag.), parallel to the western shore at a distance of ½ mile, until down to the stakes, 2 miles from the Haulover. Then be guided by the stakes, but do not head in for the Haulover until the cut opens, bearing 220° true (**SW ½ S** mag.).

The **Haulover** is a canal ⅜ mile long through the strip of high, wooded land that separates Mosquito Lagoon from Indian River. Seen from westward (in Indian River) the cut appears first as a square notch in the foliage, but on near approach the canal is seen. Dredged channels, 4 feet deep, lead up to it at each end; but the land cut is 11 feet deep. The water level at the Haulover varies as much as 1½ feet from normal level under the influence of strong northerly or southerly winds; northerly winds lower the level here and in the northern part of the Indian River. At such times there is a current through the canal of as much as 3 knots, setting in the direction of the wind. On the southern side of the canal are the homes of several fishermen, and on the northern bank, at the entrance from Mosquito Lagoon, is the post office of Allenhurst, in front of which a wharf extends about 75 yards along the bank. Provisions, gasoline, and fresh water can be obtained here, and sometimes a pilot for the inland waters.

Indian River extends southward along the coast to St. Lucie Inlet, which, measured along the channel, is about 103 miles below the Haulover. It is, in general, a broad lagoon from 6 to 15 feet deep, although at one place (abreast Grant Island) it shoals to but little over 4 feet. At a distance of 63 miles below the Haulover the river is narrow and is nearly closed by shoals and small marshy islets, through which there is a clear, well-marked, but narrow channel of at least 6 feet depth.

The river is nontidal at a short distance above the inlet, but may vary in depth as much as 2 feet under the influence of strong northerly or southerly winds. The important towns are on the western bank, on the Florida East Coast Railroad, and are Titusville, 8½ miles; Cocoa, 24½ miles; Eau Gallie, 39 miles; Fort Pierce, 84 miles; and Jenson, 97 miles from the Haulover.

Directions for Indian River.—From the Haulover follow the directions o the channel stakes through the dredged channel and then steer 226° true (**SW** mag.) for 3 miles to a pile with crossed boards. Leave this on the starboard hand and steer 181° true (**S** mag.) heading for Titusville. When 1 mile from the stake (red No. 2) off Titusville, haul out to pass it on the starboard hand at a distance of 100 to 200 yards, and, if bound for Titusville, hold down on this course until abreast of the wharf before heading in for it.

Titusville.—A depth of 5 feet can be carried to the end of the public wharf; but the shoal, marked by the red stake, extends nearly down to a line running eastward from the wharf. Provisions and gasoline can be had here.

Directions for Indian River (continued).—From a position 200 yards east of stake No. 2 (at Titusville), steer 162° true (**S** by **E** ¾ **E** mag.) for about 5 miles to a position 200 yards east of the next stake on the same side; then 169° true (**S** by **E** mag.) for about 4 miles to a position 450 yards eastward of the next stake; then 167° true (**S** by **E** ¼ **E** mag.) for 5¼ miles to a stake on the same side, off Magnolia Point; and then 161° true (**S** by **E** ¾ **E** mag.) for 1⅝ miles to position abreast of Cocoa.

Cocoa.—A depth of 6 feet can be taken to the city wharf, which is the most northern of the several wharves. Provisions, some yacht supplies, and gasoline can be had here. There are small repair shops but no marine railway.

Directions for Indian River (continued).—From the last position continue this course for 1¼ miles, or, from 200 yards off the wharves at Cocoa, steer 153° true (**SSE** ½ **E** mag.), to a position 200 yards west of the stake opposite Rock Ledge. Then steer 157° true (**SSE** ⅛ **E** mag.) for 10 miles, past one stake (close to) on the port hand; and then, to go to Eau Gallie, steer 167° true (**S** by **E** ¼ **E** mag.) for 3¼ miles to the wharves.

Eau Gallie.—A depth of 4½ feet can be taken to the railroad wharf. Gasoline and provisions can be had here. A draft of 3 feet can be taken into Elbow Creek to a place where water can be had; but the channel into the creek is narrow. The entrance to Elbow Creek is marked by a light on the northern side; and the channel in the creek is marked by stakes.

Directions for Indian River (continued).—From a position ½ mile eastward of Eau Gallie, steer 157° true (**SSE** ⅛ **E** mag.) for 7 miles, passing a black stake on the port hand at a distance of 350 yards; and then haul eastward a little to pass the next red stake at a distance of 200 yards on the starboard hand. From this stake (red) steer 161° true (**S** by **E** ¾ **E** mag.) for 4 miles and then haul in for black beacon No. 7. Then be guided by the channel stakes along the dredged channel westward of Grant Island, disregarding entirely the old red beacon northwestward from this island. There is an old boiler, the remains of a wreck, on the western side of the channel, about 1¼ miles southward of Grant Island. Leave this boiler about 200 yards on the starboard hand and the stake below it about 100 yards on the same side. Then steer 154° true (**SSE** ⅜ **E** mag.) for 8¼ miles, keeping about ½ mile from the western shore to Barkers Bluff, which is a prominent white sand bank on this shore, 3¾ miles below Sebastian Creek, and passing the islets on the port side below the bluff at a distance of 300 yards. When nearly down to the black beacon on the port hand, steer to pass it at a distance of 100 yards, heading for the outer end of the wharf at Orchid (on the same side). The channel through the Narrows is sufficiently marked by stakes, which are left close aboard in passing. South of the Narrows, the channel as far as Fort Pierce is very narrow, and in places is dredged through shoals, but is sufficiently marked by stakes.

Fort Pierce.—The longest wharf has depths of 5 to 6 feet at the outer end and along its northern side; and 5 feet can be taken to it. It is piped to the outer end for fresh water. Provisions, some yacht supplies, and gasoline can be had here. There are facilities for making minor repairs to hulls and machinery, but no means for hauling out vessels; small boats are hoisted in slings.

Indian River Inlet, 3 miles above Fort Pierce, is nearly closed at present, and is used only by small fishing boats at high water.

DIRECTIONS FOR INDIAN RIVER (CONTINUED).—Southward of Fort Pierce the river channel is broader and deeper. Keep ½ mile from the western shore nearly to beacon No. 17 (black), ⅜ mile from shore in passing this beacon, and then about ½ mile off to the next stake (red), north of Jensen. Southward from Jensen, keep ½ mile from the western shore until the stakes at Sewalls Point are picked up.

Jensen.—A depth of 4 feet can be carried to the outer wharf by steering square in for it; but there are shoals of 3 feet depth on each side of this channel. Provisions and gasoline can be had here. There is a small machine shop, and a marine railway of about 10 tons capacity.

St. Lucie Inlet is the entrance from sea to St. Lucie and Indian Rivers, and is used to some extent by yachts and fishing boats. The inlet and approach from seaward are partly closed by shoals which shift with every storm. The channel depth on the bar is said to vary from 5 to 6 feet at low tide; and in April, 1912, there was a clear channel, 5 feet deep and over, from the bar to both rivers. There are no buoys nor other marks from seaward; and directions, on account of frequent changes, would be useless. There are no regular pilots stationed here; but sometimes a fisherman can be engaged to bring in a vessel. A stranger should not attempt to enter this inlet. The mean rise and fall of tides is about 1.5 feet. A channel, well marked by stakes, crosses the head of the inlet from Indian River, past Sewalls Point and the mouth of St. Lucie River, to Great Pocket, on the south side.

ST. LUCIE INLET TO JUPITER INLET, 15 MILES, LEAST DEPTH 4 FEET.—The older route southward from St. Lucie Inlet was through the arm eastward of Long Point to North Jupiter Narrows; but recently a canal 35 feet wide and 5 feet deep has been cut through from the head of Great Pocket, on the western side of Long Point, to the head of Peck Lake; thus avoiding the shifting sands in the more exposed part of the inlet.

Cross St. Lucie Inlet, by the channel indicated by stakes, to a stake north of Long Point, a mangrove point separating two long lagoons south of the inlet; turn into the western lagoon (Great Pocket), passing the mangroves at a distance of about 100 feet, and steer for the head of this lagoon, about 158° true (**SSE** mag.). When nearly to the head of Great Pocket, several small stakes will be seen ahead, marking the sides of the dredged channel. A depth of 4 feet can be carried through to the canal and 5 feet and more through Peck Lake. Stakes mark the channel in Peck Lake leading from this canal and also the approach to South Jupiter Narrows, at the lower end of the lake.

South Jupiter Narrows are not difficult, but there are a few shallow places that must be avoided. Just north of the first opening in the eastern bank is a narrow shoal on the other side; 1¾ miles below there is a narrow dredged channel marked by a red stake; and below this bend the best water is along the starboard bank. A highway drawbridge crosses the stream near its lower end.

Hobe Sound and **Jupiter Sound** are small bodies of water but little over ¼ mile wide at the broadest part. The channels through both are well marked by stakes; and careful attention should be given to them, as the bottom in many places is hard sand or rock. At Conch Bar, which joins the two sounds, careful steering is necessary in rounding red beacon No. 24, as there is a hard shoal close to the western side of the channel, just south of the beacon.

The distance from St. Lucie Inlet to Jupiter Inlet is about 15 miles.

Jupiter Inlet is obstructed by a sand bar which shifts with every storm and at one time entirely closed the mouth of the inlet. In April, 1912, there was 4 feet on the bar and 2½ feet inside the mouth of the inlet. It is used only by small local boats at high tide. A lighthouse and wireless telegraph station are on the northern shore of Jupiter River, about 1 mile

above the inlet. The river is shallow eastward of the entrance to Jupiter Sound and nearly to the western side of that entrance; but there is a narrow channel close under the point on which there is a stake. An oyster bar fills the river west of the lighthouse, except for a narrow dredged cut, which is marked on each side by stakes. The average rise and fall of tides at the inlet is 1½ feet.

JUPITER INLET TO NEW RIVER INLET, 52 MILES, LEAST DEPTH 4 FEET.—Lake Worth Creek and Canal together are about 8 miles long and connect Jupiter River (near the inlet) with Lake Worth. For a distance of about 3 miles, the canal follows the old creek bed in places, but frequently cuts across bends, and intersects many sections of the old creek. Below there the canal extends in a series of straight reaches connected by easy curves. The controlling depth is 4 feet; but in many places the banks have caved, and power boats, getting aground, have thrown up shoals which are difficult to avoid. Tidal currents of 1 knot strength may be found in the canal; and probably there is a rise and fall of from 6 inches to 1 foot.

From Jupiter River, abreast the lighthouse, follow the direction of the stakes through the oyster shoal and to the point at the west end of the south shore. Round this point and follow the shore on the port hand until into Lake Worth Creek. The only guide for the next 3 miles will be the evidence of dredging, as shown by low, vegetation-covered mounds on the banks of the canal; there are few if any stakes. Go very slowly, keeping, in general, to the outer side of the bends and watching out for shoals. After reaching the straight stretches no difficulties will be found.

Lake Worth extends 18 miles southward from the canal entrance, which is ¾ mile from the head of the lake, and is separated from the ocean by a strip of beach, but 200 yards wide at places. The lake varies in width from ½ to 1 mile and in channel depth from 4½ to 11 feet. The entrance to the canal leading northward is recognized at a distance of over a mile by a white sand ridge at its mouth; and the approaches to this canal and to the canal leading out of the south end of the lake are marked by small stakes. The average rise and fall of tides is said to be from 3 to 6 inches; but the lake is said to have risen 3 feet during a storm.

Lake Worth Inlet cuts through the beach about 3 miles below the northern end of Lake Worth and affords the only direct connection with the ocean. Boats of 3 feet draft can get through on high tide; the depth on the outer bar is about 1 foot greater than over shoals in Lake Worth. The inlet is used to some extent by fishermen and by small pleasure boats, but should not be attempted by a stranger.

West Palm Beach is a small city on the west shore of Lake Worth, 7 miles below the northern entrance canal, and on the Florida East Coast Railroad. It is connected by railroad and highway bridges and by ferry with the fashionable winter resort of Palm Beach, which is due east from it (between Lake Worth and the ocean). A line of large light-draft power boats ply between West Palm Beach and Daytona, through inland waterways, stopping at all the important intermediate towns. Depths of 3 to 5 feet can be taken to the various wharves, and a depth of 4 feet to the city wharf, which is just south of the city park. Provisions, gasoline, and fresh water can be had. Repairs to hulls and machinery of launches can be made at West Palm Beach and at Lone Cabbage Island, 1 mile south of the city. At the latter place there is a marine railway said to haul out vessels up to 100 tons and 4 feet draft. Storm-warning signals are displayed from a tower in the city park.

DIRECTIONS FOR LAKE WORTH.—On leaving the canal at the northern end of the lake be guided by the stakes until clear of the last, and then steer to pass the south end of the island at about ⅓ the distance to the western shore. Then steer 181° true (S mag.) until the first stake is picked up (a pipe surmounted by a white can), leaving it on the starboard hand. Leave the next stake on the port hand, and then haul in slowly for the east shore; follow this shore at a distance of 150 yards nearly to the drawbridge. After passing the first draw keep to the eastern side until abreast of the wharves at West Palm Beach. South of the second drawbridge keep about 150 yards west of the rocks and islets on the east side for 4 miles, and then favor a little the west side to the canal at the south end of the lake. As the south end of the lake

is approached the canal will be recognized by the notch in the foliage; steer for it and keep the notch open.

This canal extends southward from Lake Worth about 13½ miles to Hillsboro River, crossing three small ponds, the largest of which are called Lake Wyman and Lake Boca Raton. From the junction with Hillsboro River the canal cuts across two bends and then follows the direction of the old river bed to Hillsboro Inlet, 3¼ miles below the first crossing. The canal between the lake and river presents no difficulties, although at places it is quite crooked; through Lake Wyman the channel is indicated by clumps of mangrove on each side. A drawbridge crosses the canal about ½ mile from Lake Worth and another about 4 miles farther south; both are tended. In the wider part of Hillsboro River a channel has been dredged along the western side, leaving a submerged ridge along the center. The least channel depth found in the river and canal was 4½ feet; the bottom and sides are hard sand and rock.

Entering Lake Boca Raton from the north, turn sharply southward and follow the western shore until the canal opens. At Hillsboro River hold southward through two short cuts to the old river bed, below a couple of eastward bends. Take the next bends at slow speed, turning carefully, to keep the propeller clear of the rocky sides of the channel. When the river widens, about 1½ miles from the lighthouse, keep close to the west bank, to avoid a high ridge in midstream, and follow this shore past a lagoon and to the next narrow opening on that side.

Hillsboro lighthouse stands on the north side of the entrance to Hillsboro Inlet, which is very shallow.

A canal and natural waterway extends about 9½ miles south to New River Inlet; the passage is about of the same class as that north of Hillsboro Inlet and is good for a draft of 4 feet. A highway drawbridge crosses about 2 miles below Hillsboro Inlet.

After leaving the straight canal at a little pond, about 6½ miles from Hillsboro Inlet, go slowly, keeping a sharp lookout for shoals. No directions can be given for avoiding them; but as the water is usually clear one can see them in time to sheer off if moving slowly. At the mouth of this stream (marked on the east side by a small private stake) haul slowly eastward, keeping about in midchannel until past the mangrove point on the west side and then close to the east shore. Leave the little islet on the starboard hand and then haul off a little to avoid a shoal on the east side. Below this shoal keep close to the east side down to abreast of the house of refuge, on the north side of New River Inlet.

New River Inlet is 9 miles south of Hillsboro Inlet and lighthouse (measured along the seacoast) and is the only break in this coast between this lighthouse and the new entrance to Miami. The inlet is used by small local boats and by a few light-draft yachts, but is too shallow to be of any importance. In April, 1912, the least channel depth on the bar was 3½ feet and over the inside swash 2½ feet, at mean low tide. The average rise and fall of tides is about 1½ feet. Strangers should not attempt to enter; and there are no pilots near the inlet. Three branches of New River meet at the inlet; one from the north; one from the south, close under the coast and separated from the ocean by a very narrow strip of sand that is submerged near the inlet on high tide; and the third from the west. The western branch varies in depth from 5 feet at its mouth to 40 feet at Fort Lauderdale, 1¾ miles above the inlet. The river is said to be deep for a distance of 7 miles above Fort Lauderdale to the south drainage canal, which joins the canal from the Miami River to Lake Okeechobee. The north drainage canal enters this river about 1 mile above Fort Lauderdale and runs direct to the lake.

Fort Lauderdale is a small produce-shipping station on the railroad. Provisions, gasoline, and fresh water can be obtained here. There is a repair shop for power boats, and a marine railway of 30 tons capacity. Drawbridges cross the river above and below the town.

New River Inlet to Miami, 23 miles.—From a position close to the east shore of the inlet abreast the house of refuge, cross over to the point on the south side of the inlet, watching out for shallow water on the starboard hand. Then steer to pass northward of the small islets west of this point. To go to Fort Lauderdale, continue along the north shore into the western

branch and then mid-channel up this river. To go south, take the second opening between the islets on the port hand (just above this opening is a small clump of mangroves in the river) and steer 181° true (**S** mag.) for the eastern shore of the lagoon. Follow this shore at a distance of 50 to 100 feet to a well-defined mangrove point. Pass this point at a distance of 50 feet and then haul off a little and continue at a distance of 100 to 150 yards from the eastern shore. Near the lower end of this passage a narrow channel has been dredged, leaving high shoals on each side. A stake, if in place, marks the west side of this cut.

At the lower end of this passage is a small circular lagoon, known as Lake Mabel. A draft of 3 feet can be carried through at low tide, and there is a rise and fall of about 1½ feet. From the cut and stake, referred to above, steer to pass the east side of the entrance to Lake Mabel at a distance of 50 to 100 yards, and then haul slowly eastward until the canal out of the side of the lake bears 91° true (**E** mag.). Shallow water will be passed on both sides until the canal is reached. There are strong tidal currents in this canal, especially on ebb tide, when the current sets eastward.

New River Toll Chain.—From the short canal out of Lake Mabel, the route is south, through the south branch of New River, for 1¾ miles to the entrance of the last canal on this coast. Just inside the mouth of this canal a chain stretches across from shore to shore and prevents passage until toll is collected. Toll is at the rate of 10 cents per foot of length for passage one way; and payment of 1½ tolls entitles one to free passage returning. The toll keeper's house is on the west bank of New River, on the north side of the canal. The mean rise and fall of tides here is said to be 2½ feet, and there are tidal currents of 2 knots strength.

The canal is nearly straight for about 7 miles to Dumfounding Bay, and has an average surface width of 40 feet and depth of 4 feet and over at low water. About 1 mile southward from the toll chain, a small canal from Dania enters this canal through its western bank.

Small private stakes mark the passage across Dumfounding Bay; the direction across to the southern outlet is about 209° true (**SSW ½ W** mag.). The passage south of Dumfounding Bay is very crooked and requires careful steering to avoid the shoals at the bends; a few private stakes mark the crossing of Snake Creek. Turn sharply to eastward when this creek is reached; then to southward. A little farther down there are two branches; take the western branch. There are sometimes tidal currents of ½ to 1 knot in this creek. This creek enters the head of Key Biscayne Bay through two mouths, close together; the western is preferable.

Directions for the north end of Key Biscayne Bay.—At the mouth of the creek keep close to the bushes on the port hand, to avoid a shoal south of the creek, until nearly abreast of a stake. Then haul southward, passing this stake close to on the starboard hand and the islet on the port hand. Steer for the stakes leading out of this arm, passing them close to on the port hand, as the channel through here is narrow. At the third stake below the islet turn sharply westward for a stake close to the mangroves and north of a little creek on the west side. Leave all stakes on the port hand, except where two stakes close together indicate that the channel is between them. The channel is not over 100 yards from the western shore after crossing over from the third stake. From the last stake in this part of the bay (third below the double stakes and 1½ miles below the little creek referred to above) steer 175° true (**S ½ E** mag.) until a small red beacon is picked up, and then steer for it. This beacon marks the northern end of a 5-foot cut through a shoal that extends completely across the bay. Leave this beacon close to on the port hand and steer for the Royal Palm Hotel, the most prominent building on the eastern side of Miami. The eastern side of the cut is marked by several small stakes and a small white beacon at its lower end. Pass all close to on the port hand and continue on this course for a distance of ¾ mile past the white beacon; then steer 181° true (**S** mag.) for ½ mile, and then steer for the hotel again.

The distance from New River Inlet to Miami is about 23 miles.

Miami is on the west shore of Key Biscayne Bay, 9 miles below its head and 7 miles above Cape Florida. It has some commercial importance and is becoming a popular winter resort. Until recently it was the terminus of the Florida East Coast Railroad; but the railroad, within the last year, has been extended across the keys to Key West. Provisions, ship chandlery, coal,

gasoline, and fresh water can be obtained here. There are good facilities for repairing hulls and machinery of small craft and several small marine railways, at the largest of which 120 tons can be hauled. Vessels of 10 feet draft can come to the railroad wharf. Storm-warning signals are displayed from a tower on the water front near Twelfth Street and are visible from the bay.

The bay in front of and just south of Miami is very shallow, except where channels have been dredged; one channel leads from the deeper water south of the city to a turning basin at the railroad wharf and another from a new cut north of Norris Cut; both are marked by piles and beacons. A narrow channel, 5 feet deep, leads along the water front, past the ends of the small wharves to the Miami River.

Small craft usually anchor off the city just north of Twelfth Street and east of the channels, in 6 or 7 feet of water, or go to a wharf. Large vessels must go to the railroad wharf or anchor below the shoals, 3 miles south of the city. Vessels of 6 or 7 feet draft can go to any of the wharves in Miami River below the bridge; and 4 feet can be taken to the wharf at Twelfth Street. There is no city wharf, but boats may lie at the Twelfth Street or Royal Palm Wharves for a small charge.

The mean rise and fall of tides at Miami is 1.1 feet.

Miami River trends westward, through the southern part of the city of Miami, to the Everglades, and is navigable for a draft of 6 feet to the drainiage canal, about 3 miles above its mouth. Three drawbridges cross the river, to the lowest of which a draft of 8 feet can be carried. To enter the river from the main ship channel bring the eastern wing of the Royal Palm Hotel to bear 336° true (**NNW ¼ W** mag.) and steer for it until the river opens fair.

ENTRANCES TO MIAMI FROM THE OCEAN.—Vessels up to 10 feet draft enter by a channel through the shoals south of Cape Florida to Key Biscayne Bay, thence up the bay to a dredged channel leading to the railroad wharf. This channel is well marked by beacons and buoys; and the directions for it are as follows: Leave the black bell buoy No. 1, about 2¼ miles north of Fowey Rocks lighthouse, on the port hand and steer 285° true (**WNW ¾ W** mag.) for Cape Florida Shoal beacon (red with red light). A black and white fairway buoy is passed at a little more than half way to the beacon, and, near the beacon, a red buoy is passed on the starboard hand and a black buoy on the port hand. Beacons mark each side of the channel through the shoals to Key Biscayne Bay. When well past the last beacon on the starboard hand, steer about north for the dredged channel to Miami, passing red buoy No. 4 on the starboard hand and black buoy No. 7 on the port hand.

Small vessels under 6 feet draft frequently use Cape Florida Channel; but this channel is not marked. From Cape Florida Shoal beacon haul slowly to 319° true (**NW ¼ N** mag.) to pass 150 yards westward of the Cape Florida, and, when up to this point, follow the southwest shore of Key Biscayne at a distance of about 100 yards. When the shore bends northwestward, steer about 277° true (**W ½ N** mag.) into Key Biscayne Bay.

The new cut, about ½ mile north of Norris Cut, is used considerably by small craft bound for the fishing ground outside the keys. The approach is between two short rock jetties. A depth of 6½ feet can be carried through a narrow channel close under the end of the north jetty; but through the land cut a current of 3 to 4 knots may be found. Inside the bay a dredged cut, 10 feet deep, marked by stakes on its northern side, extends to Miami.

FROM MIAMI TO KEY WEST.

The passage inside the reefs east and south of the Florida Keys, from Fowey Rocks, at the entrance to Miami, to Key West is known as Hawk Channel. It is navigable for a draft of 10 feet and is well marked by beacons and buoys. The passage is protected, except at a few places, by offshore reefs, and is comparatively smooth in ordinary weather. The distance from Miami to Key West by this channel is about 136 miles.

Vessels drawing less than 5 feet can go west and north of the keys to Bahia Honda Harbor, and from there, either through Hawk Channel or by way of the Gulf, to Key West. This route is through smooth waters, and is well suited to small craft. It leads through a series of small

sounds and protected bays from 6 to 10 feet deep, separated by coral reefs, through which narrow channels have been cut to a depth of 5 feet. The cuts are marked by piles or stakes, which, however, are not easily seen until close to; but the reefs show clearly and are easily avoided.

The mean rise and fall of tides is from 1 foot to 1½ feet along these keys; and there are strong tidal currents through the passages between the keys. The distance from Miami to Bahia Honda Harbor, by the inside passage, is 100 miles; from Bahia Honda to Key West, by the Hawk Channel, 33 miles; and from Bahia Honda Harbor to Key West, by Big Spanish Key Channel, Gulf of Mexico, and Northwest Channel, 49 miles.

Pilots for Hawk Channel and for the passages north of the keys can usually be found at Miami. Anchorages, sheltered from all ordinary weather, may be found anywhere along these passages, in the lee of the keys and the high reefs.

Directions for the Passage North of the Keys.—The courses given here, if made good, will lead to the cuts through the reefs; but one must take into account cross currents, which, near the openings between keys, are often quite strong. During flood tide the current sets through from Hawk Channel and in the opposite direction during ebb tide. From Miami take the ship channel through the dredged cut to black buoy No. 7. Leave this buoy close to on the starboard hand and steer 186° true (**S** ⅜ **W** mag.) for 12 miles to a position 300 yards west of a pile which marks the western extremity of the reef west of Ragged Keys. About ½ mile west of this pile is a cluster of piles marking the north end of Featherbed Bank. Steer 142° true (**SE** ½ **S** mag.) for 1⅜ miles to a short cut, 50 feet wide and 6 feet deep, through a reef, marked by two little stakes. After leaving this cut steer 207° true (**SSW** ¼ **W** mag.) for 9 miles to a cut, 5 feet deep, through the shoal extending from Totten Key to Arsenicker Keys. This cut is about 1 mile long and is marked by piles along its eastern side and a cluster of piles near its southern end.

From the southern end of this cut steer 228° true (**SW** ⅛ **W** mag.) for 4¾ miles to a cut, 5 feet deep, near Card Point; it is marked by stakes and piles on both sides, and there is a blind passage opening into its western side. After leaving this cut steer 213° true (**SSW** ¾ **W** mag.) for 1½ miles to a cut close under the mangrove point on the port hand. This cut, 5 feet deep, is marked by small stakes on both sides and leads into Barnes Sound.

Cross Barnes Sound on a 193° true (**S** by **W** mag.) course for 5 miles to Jewfish Creek, leading into Blackwater Sound. The passage is marked by small stakes and is crossed by a drawbridge. Keep to port at all openings. From Jewfish Creek steer 221° true (**SW** ½ **S** mag.) for 2¾ miles to a passage eastward of Bush Point, leading into Tarpon Basin. On entering Tarpon Basin haul sharply westward, avoiding the southeastern end; then head for the west corner of the basin, keeping close to the southern shore when up to the passage out. The southeast end of Tarpon Basin is shallow, and there is a shoal at the west end, on the north side of the channel to the outlet.

When clear of the passage out of Tarpon Basin, steer 215° true (**SW** by **S** mag.) for the cut through the mangroves, about 2 miles distant. On leaving this cut look out for a shoal on the starboard hand, and hold down 100 yards from the opening before turning; then steer 231° true (**SW** ⅜ **W** mag.) for Pigeon Key, passing a rock awash 200 yards on the port hand and a shoal about the same distance on the starboard hand. Circle north and west, half around Pigeon Key, at a distance of 500 yards from it, and then steer 176° true (**S** ½ **E** mag.) for the west side of Hammer Point.

Haul slowly westward to pass 400 yards northwest of Hammer Point and between it and a small stake about 600 yards northwest of the point, and then steer for a cut 1 mile west-southwest of Hammer Point. This cut is marked by small stakes on each side, visible at a short distance only. From this cut steer about 241° true (**SW** by **W** ¼ **W** mag.) to pass, close to on the port hand, a pile close to a mangrove point, ¾ mile distant; and then steer about 218° true (**SW** ¾ **S** mag.) for another cut, ¾ mile farther. The last cut is through a clump of mangroves, which line each side of the passage and extend, scattered, for a short distance north and west.

From the mangrove cut steer 244° true (**SW** by **W** ½ **W** mag.) for 2¼ miles and then 252° true (**WSW** ¼ **W** mag.) for 3½ miles to a cut marked by a single stake on its southern side. At the change in course a small reef, awash at high tide, lies 400 yards on the starboard hand, and 2 miles farther a rock, marked by a pile, is 600 yards on the port hand. From this cut steer 228° true (**SW** ⅛ **W** mag.) for 4¾ miles to a cut southeast of the southernmost of three little keys (Bowlegs Keys). This cut is well marked by stakes on each side, and the reefs here show so clearly that the passage could be found easily without stakes.

Between the last two cuts is a passage, east of Lignum Vitae Key, to a drawbridge in the railroad, through which vessels may go to Hawk Channel.

Long Key Fishing Camp is on the western end of Long Key and is reached by water from the north side of the keys. There are accommodations for fishermen at the camp and sheltered berths for a few small boats alongside the wharf. Fresh water and some gasoline can be had here during the winter season. A depth of 4 feet can be carried to the camp by steering, from the cut at Bowlegs Key, 226° true (**SW** mag.) for 4½ miles to a pile marking the northern end of a shoal off Long Key, and then following the shore of Long Key at a distance of ¼ mile to the camp. Or, from the same cut, steer 240° true (**SW** by **W** ⅛ **W** mag.) for 9 miles; thence 151° true (**SSE** ¾ **E** mag.) for 1 mile, past a beacon on the port hand, and then 114° true (**ESE** mag.) to the camp. The latter courses pass over a least depth of 5 feet.

Directions to Key West (continued).—From the cut near Bowlegs Key, steer 240° true (**SW** by **W** ⅛ **W** mag.) for 10 miles to a position 300 yards south of a reef awash at high tide; and watch out for shallow places on each side. At the end of this course the reef referred to will be recognized easily by discolored water. The next course is 252° true (**WSW** ¼ **W** mag.), but if the preceding course has not been made good it will be necessary to alter the last course to get through a reef 1 mile from the last. There are several passages through this reef, the most southern of which is marked by stakes, but possesses no other advantage over the northern passage; the color of the water is a sufficient guide to any of them. Steer 252° true (**WSW** ¼ **W** mag.) for 12 miles to a position 500 yards southeast of Crescent Shoal (bare at high tide); then 230° true (**SW** ¼ **W** mag.) for 1¾ miles to Bethel Bank, the most southern of several dry ridges. Follow along the north side of the bank at a distance of 300 yards, and from the west end steer 240° true (**SW** by **W** ⅛ **W** mag.) for 4¼ miles, across Moser Channel, to a position 300 yards north of a sand pit extending northward from the railroad. Moser Channel leads to a drawbridge, which offers the last opportunity for a masted vessel 22 feet high to get into Hawk Channel. From the last position steer 247° true (**SW** by **W** ¾ **W** mag.) for 4¾ miles to Bahia Honda Harbor.

Westward of Bahia Honda Harbor there is no sheltered passage practicable for a stranger. Local boats of 2½ feet draft find passages between the keys, but a stranger would be almost certain of getting aground. A stranger may either pass under the railroad bridge, which here has a clear headroom of 21½ feet above mean high water, and continue by way of Hawk Channel; or he may enter the Gulf through Big Spanish Key Channel and proceed northward of the keys. The choice of the two routes depends upon the direction of the wind and sea.

Directions from Bahia Honda Harbor to Key West Harbor.

By Hawk Channel.—Pass under the railroad between any of the central piers. All spans have clear headroom (from the lowest part of the girders) of 21½ feet at mean high tide or 23 feet at mean low tide. Tidal currents attain a velocity of 3 to 4 knots through these openings at certain stages of the tide; flood tide sets northward and ebb tide southward. From the railroad steer 176° true (**S** ½ **E** mag.) for 1 mile, and then steer 241° true (**SW** by **W** ¼ **W** mag.) for 3½ miles. Then steer 258° true (**WSW** ¾ **W** mag.) for 24 miles, leaving Loggerhead Key red buoy (No. 12 L K) about ⅜ mile on the starboard hand, Nine-Foot Shoal beacon (red and black, white light) 150 yards on the port hand, black buoy No. 17 about ⅜ mile on the port hand, black buoy No. 19 P K about ⅛ mile on the port hand, and to the fairway buoy southeast of Key West. Then steer 289° true (**WNW** ½ **W** mag.) to red buoy No. 6, and from there to red buoy No. 8 and into Key West Harbor.

By Big Spanish Key Channel and Gulf of Mexico.—Big Spanish Key Channel trends northwestward from Bahia Honda Harbor for about 8 miles, then northward for 4 miles, along the west side of Big Spanish Key and a shoal extending north from this key, to the Gulf of Mexico. The minimum depth is 5 feet, which is about 1 mile south of Big Spanish Key. Stand up Bahia Honda Harbor on a 339° true (**NNW** mag.) course until a 317° true (**NW** mag.) course can be laid so as to pass 400 yards northeastward of No Name Key, the large key on the northwest side of the harbor. Then steer 317° true (**NW** mag.) for a distance of 3½ miles beyond the northeastern point of No Name Key to a position midway between Mayo and Crawl Keys (Mayo is the second key on the port hand above No Name and Crawl Key is the next north of Mayo.) Then steer 305° true (**NW** by **W** mag.) for 2½ miles and then 317° true (**NW** mag.) for nearly a mile, until up to the shallow water south of Big Spanish Key. Here the channel is marked by small stakes with white finger boards pointing to the best water. The channel curves northward close to the west side of a shoal surrounding Big Spanish Key. From the last stake haul slowly to 339° true (**NNW** mag.) so as to bring the center of Big Spanish Key right astern, and steer this course into the Gulf. After clearing the shallow waters north of Harbor Key, steer 245° true (**SW** by **W** ½ **W** mag.) for about 28 miles to a black buoy which marks the end of the east jetty of the Northwest Channel. Round this and the other black buoys in this vicinity on the port hand, pass northeastward of Northwest Bar light, and be guided by the buoys into Key West Harbor.

Key West is the terminus of the Florida East Coast Railroad and is connected by steamship lines with New York, Tampa, Mobile, Galveston, and Habana. The harbor is west and north of the city, which is on the west end of the island, and is navigable for deep-draft vessels. The anchorage is due west of the city; and north of it, in a pocket between the shoals, known as Man of War Harbor. The wharves along the west side of the city belong to the Navy Department and Lighthouse Service; north of which are the commercial wharves, along the northwest and north side of the city; the railroad wharf is the most northerly of all. Large vessels may go to most of these wharves; and at the head of the slips and in the cove south of the railroad wharf are convenient berths for small craft.

Provisions, ship chandlery, coal, gasoline, and fresh water can be had here. The facilities for making repairs to hulls and machinery of vessels are good and there are marine railways for hauling out vessels up to about 1,000 tons.

Storm-warning signals are displayed from a tower in Key West and at Sand Key.

LIST OF THE MOST NECESSARY CHARTS AND OTHER PUBLICATIONS COVERING THE INLAND WATERWAYS.

New York to Delaware River:
- Chart 369. New York Bay and Harbor, price $0.75.
- Chart 375. Raritan River, price $0.50.
- Chart 126. Delaware River, price $0.50.

Chesapeake Bay to Neuse River:
- Chart 78. Chesapeake Bay in one sheet, price $0.50.
- Charts 136, 135, 134, 133, 1223, 1222. Chesapeake Bay in six sheets, price of each $0.50.
- Chart 78 can be used in place of these charts—for through courses—in Chesapeake Bay.
- Chart 137. Norfolk to Albemarle Sound, price $0.50.
- Chart 407. Pasquotank River, price $0.20.
- Charts 140, 142, 143. Albemarle and Pamlico Sounds, price of each $0.50.
- Chart 144 [2]. Neuse River, price $0.40.

Beaufort Harbor to Winyah Bay:
- Charts 147, 148, 149, 150, 151, 152, price of each $0.50.
- Charts 147 and 150 show Beaufort Harbor and Cape Fear River, and with these exceptions Chart 11—Cape Hatteras to Cape Romain, price $0.50—can be used in place of these charts for coasting.

Winyah Bay to St. Johns River:
- Charts 153, 154, 155, 156, 157, and part of 158, price of each $0.50.
- Chart 577, Fernandina to Jacksonville, price $0.50, is recommended for the passage from Fernandina to St. Johns River and for going up to Jacksonville.

St. Johns River to Miami:
- Charts 158, 159, 160, 161, 162, 163, 164, 165, price of each $0.50.

Miami to Key West:

Charts 166, 167, 168, 169, price of each $0.50.

A special edition is published of charts 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, on which the inland waterway is indicated by a broken red line, and these special charts will be furnished in place of the regular coast charts if desired.

Charts 1, 2, 3, 4, 5, 6, 7, and 8 of Inland Route, New York to Key West, price of each $0.10. These are the same as the charts contained in this publication.

The route is covered in the following publications:

U. S. Coast Pilot, Part V, New York to Chesapeake Bay entrance, price $0.50

U. S. Coast Pilot, Part VI, Cheaspeake Bay and Tributaries, price $0.50.

U. S. Coast Pilot, Part VII, Chesapeake Bay to Key West, price $0.50.

Tide Tables, Atlantic Coast ports of the United States, price $0.15.

The following publications of the Bureau of Lighthouses describe the aids to navigation, and can be obtained free of charge on application to the Division of Publications, Department of Commerce and Labor, Washington, D. C.:

List of Lights and Fog Signals, Atlantic and Gulf Coasts of the United States.

Lists of Buoys and other Aids to Navigation for the following lighthouse districts:

Third District, Narragansett Bay to Cape May, including Long Island Sound, New York Harbor, and Tributaries.

Fourth District, Delaware Bay and River.

Fifth District, Cape Henlopen to Cape Lookout, including Chesapeake Bay and North Carolina Sounds.

Sixth District, Coast and Tributaries from New River Inlet, N. C., to Jupiter Inlet, Fla.

Seventh District, Florida Reefs and Gulf Coast to Cedar Keys.

A catalogue showing additional charts, principally of the harbors along the route, can be obtained free of charge on application to the Coast and Geodetic Survey, Washington, D. C., or to any of its agents. A list of agents for the sale of charts and other publications of the Coast and Geodetic Survey is given in the catalogue, and also in the first notice each month of the Notice to Mariners, published weekly by the Bureau of Lighthouses and the Coast and Geodetic Survey.

LIST OF COAST PILOT PUBLICATIONS OF THE COAST AND GEODETIC SURVEY.

	Price.
U. S. Coast Pilot, Atlantic Coast, Parts I–II, from St. Croix River to Cape Ann	$0.50
U. S. Coast Pilot, Atlantic Coast, Part III, from Cape Ann to Point Judith	.50
U. S. Coast Pilot, Atlantic Coast, Part IV, from Point Judith to New York, including Long Island Sound	.50
U. S. Coast Pilot, Atlantic Coast, Part V, from New York to Chesapeake Bay entrance	.50
U. S. Coast Pilot, Atlantic Coast, Part VI, Chesapeake Bay and Tributaries	.50
U. S. Coast Pilot, Atlantic Coast, Part VII, from Chesapeake Bay entrance to Key West	.50
U. S. Coast Pilot, Atlantic Coast, Part VIII, Gulf of Mexico, from Key West to the Rio Grande	.50
Inside Route Pilot, New York to Key West	.20
U. S. Coast Pilot, Pacific Coast, California, Oregon, and Washington	.50
U. S. Coast Pilot, Pacific Coast, Alaska, Part I, from Dixon Entrance to Yakutat Bay	.50
U. S. Coast Pilot, West Indies, Porto Rico	.50

COAST PILOT NOTES, ALASKA AND HAWAIIAN ISLANDS.

Bulletin No. 38. Prince William Sound, Cook Inlet, Kodiak Island, and route from Unalaska to Chignik.....

Coast Pilot Notes from Yakutat Inlet to Cook Inlet and Shelikof Strait.....

Coast Pilot Notes on Bering Sea and Arctic Ocean.....

Coast Pilot Notes on Hawaiian Islands.....

SAILING DIRECTIONS, PHILIPPINE ISLANDS.

Section I. North and west coasts of Luzon and adjacent islands.....

Section II. Southwest and south coasts of Luzon and adjacent islands.....

Section III. Coasts of Panay, Negros, Cebu, and adjacent islands.....

Section IV. Coasts of Samar and Leyte and the east coast of Luzon.....

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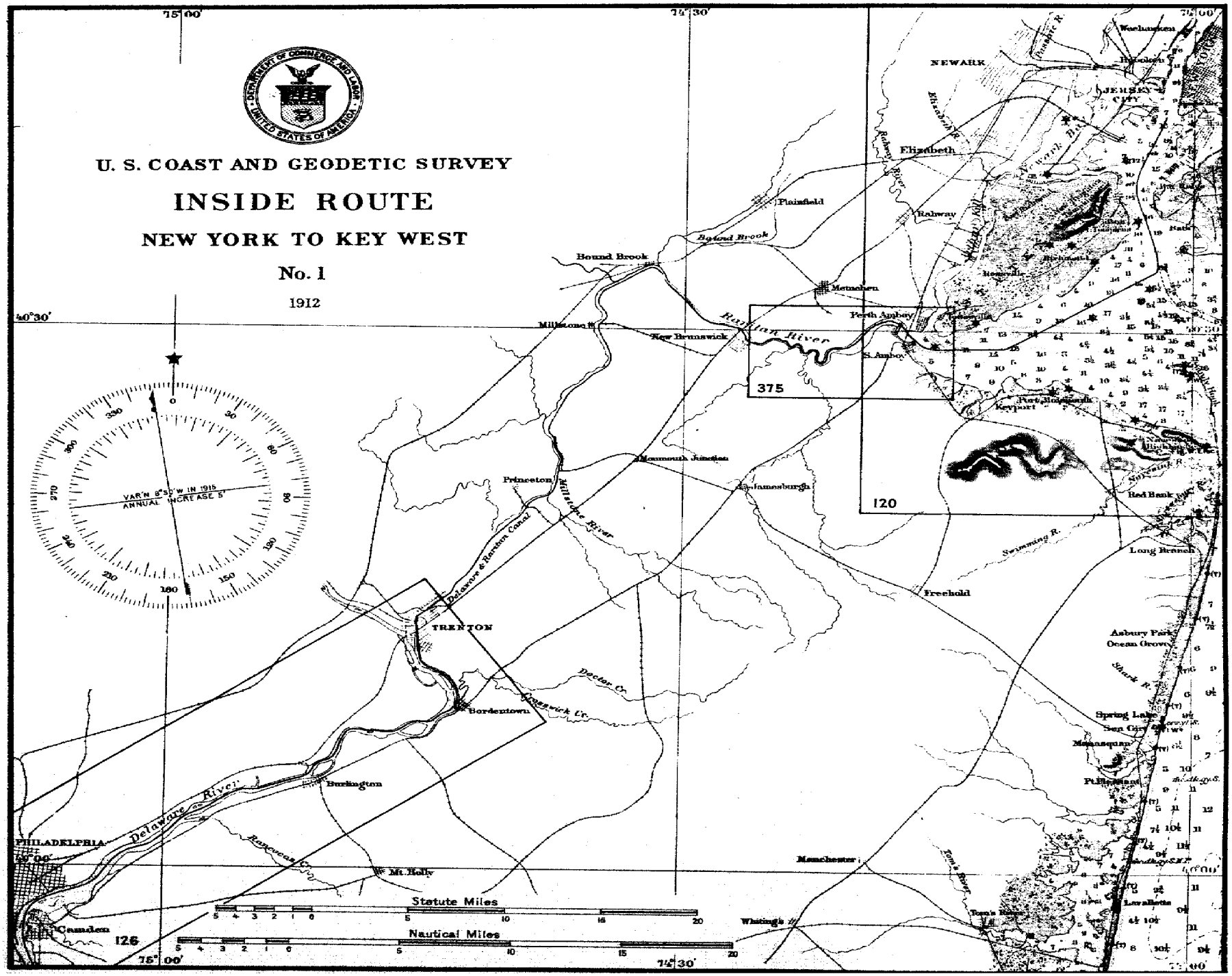
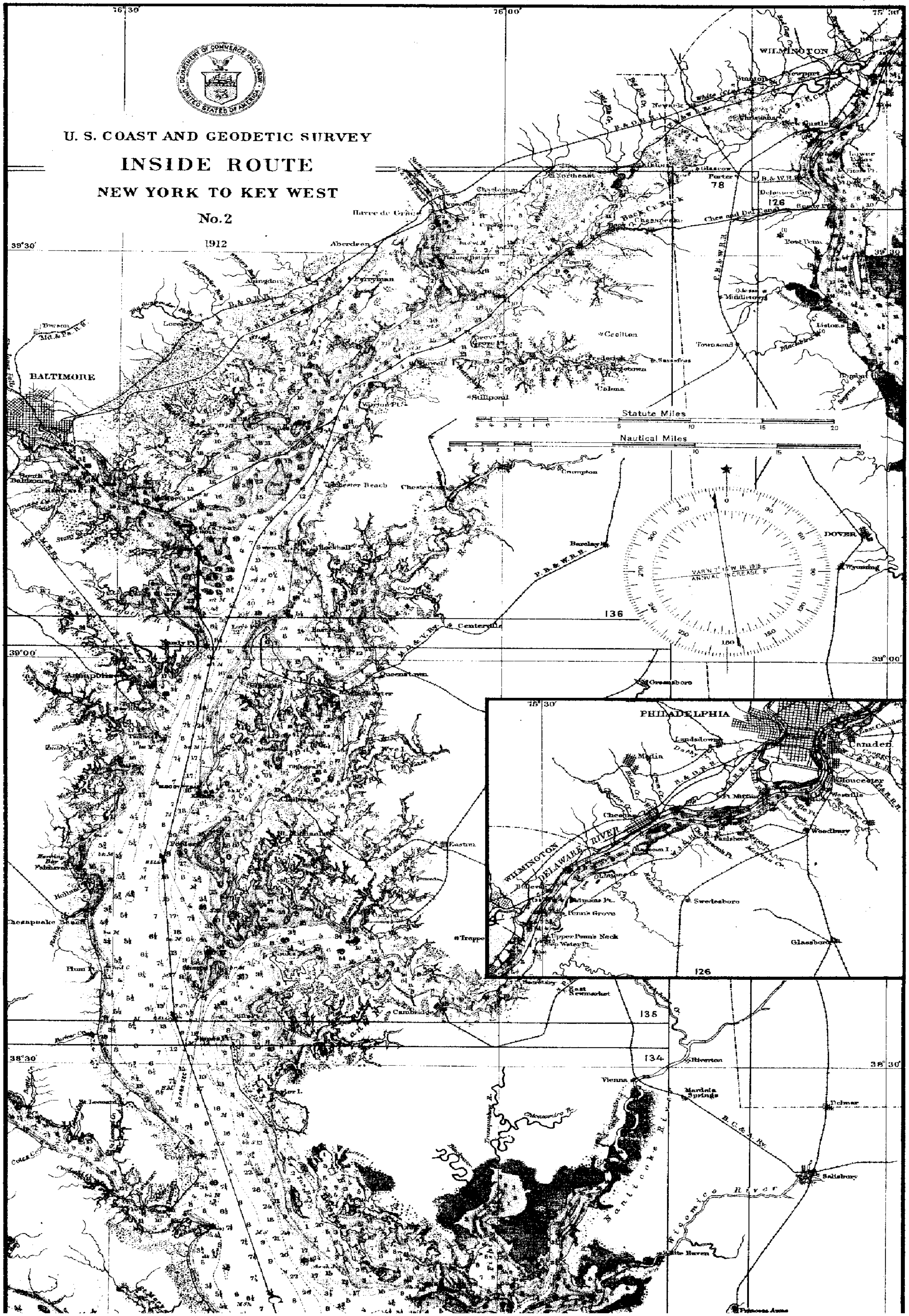
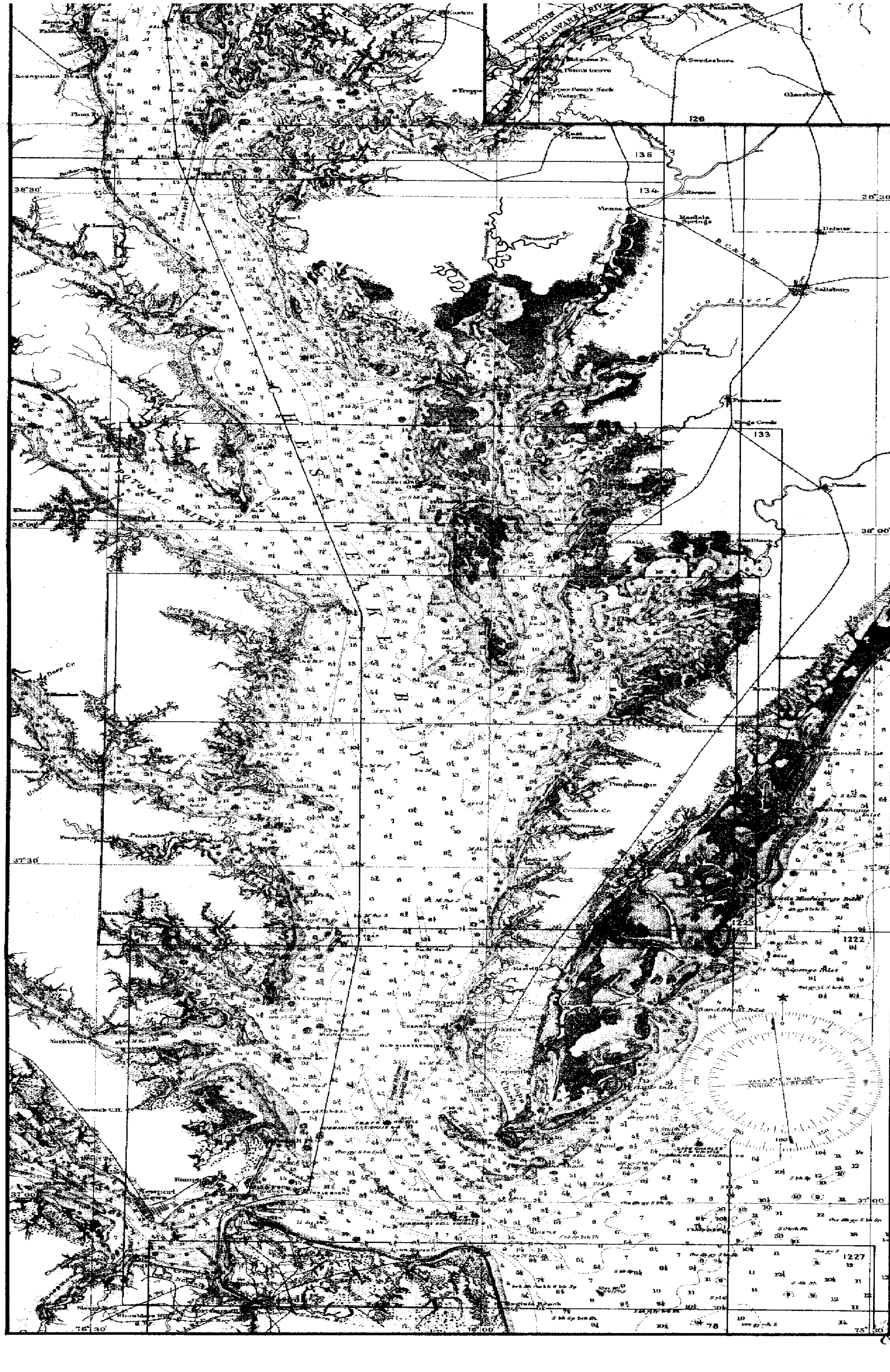
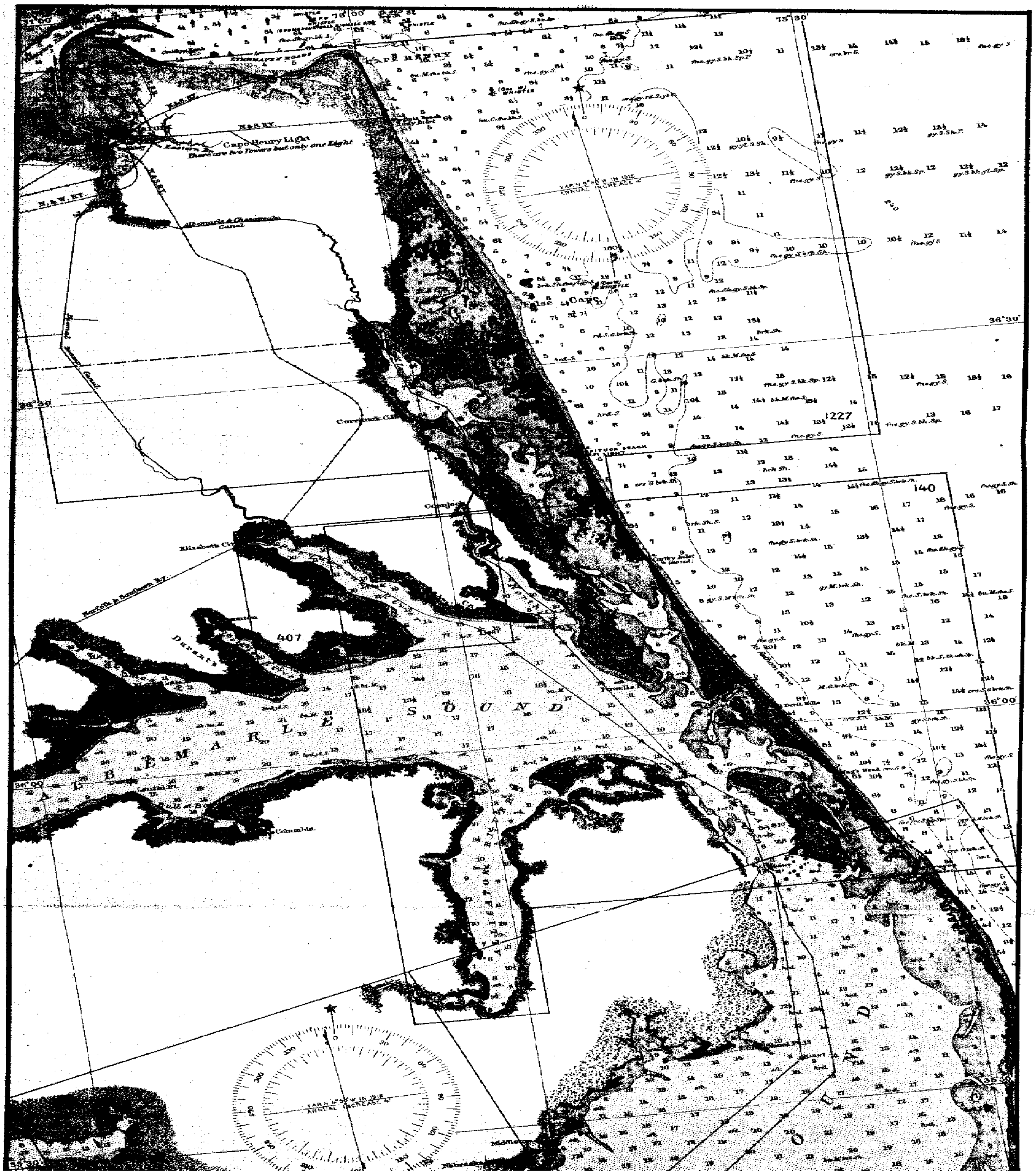
1


U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No. 1
1912
VAR'N 8°50'W IN 1915
ANNUAL INCREASE 5'
Statute Miles
Nautical Miles
NEWARK
JERSEY CITY
Elizabeth
Rahway
Plainfield
Bound Brook
Metuchen
Perth Amboy
S. Amboy
Millstone
New Brunswick
Raritan River
Keyport
Port Monmouth
Monmouth Junction
Princeton
Jamesburgh
Millstone River
Delaware & Raritan Canal
TRENTON
Bordentown
Doctor Cr.
Crosswick Cr.
Burlington
Delaware River
PHILADELPHIA
Rancocas Cr.
Mt. Holly
Camden
Freehold
Swimming R.
Red Bank
Long Branch
Asbury Park
Ocean Grove
Shark R.
Spring Lake
Sea Girt
Manasquan
Pt. Pleasant
Manchester
Whiting's
Toms River
Lavallette
375
120
126
75°00'
74°30'
40°30'
40°00'

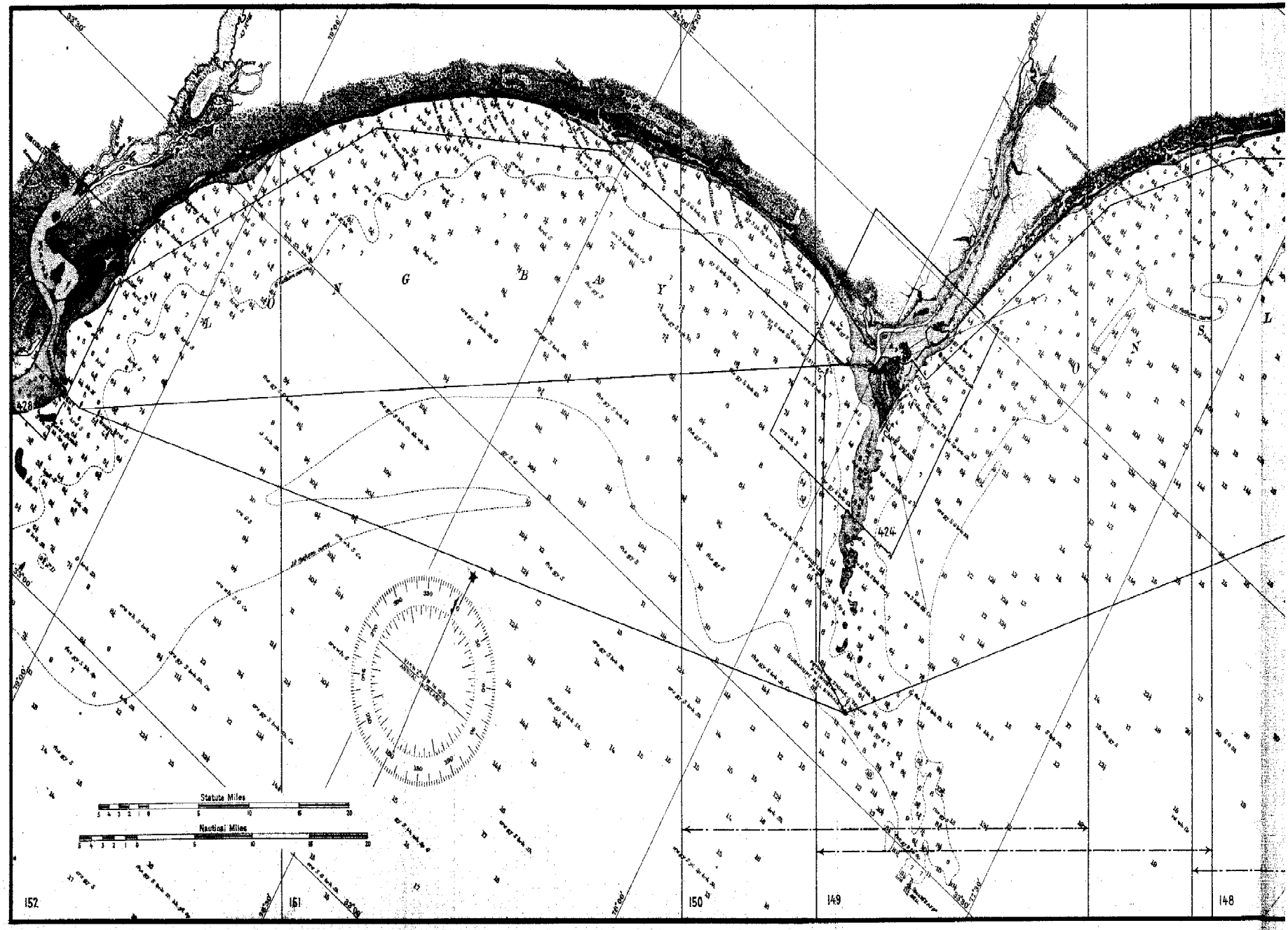


U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No. 2
1912
76°30'
76°00'
75°30'
39°30'
39°00'
38°30'
WILMINGTON
BALTIMORE
Havre de Grace
Aberdeen
Perryman
Chesapeake
Middletown
Townsend
Chestertown
Crumpton
Barclay
Centerville
Queenstown
Greensboro
Annapolis
Easton
Cambridge
East Newmarket
Vienna
Riverton
Mardela Springs
Delmar
Salisbury
Nanticoke River
Wicomico River
White Haven
Princess Anne
Chesapeake Beach
DOVER
Wyoming
Statute Miles
Nautical Miles
VAR'N 7°15'W IN 1915
ANNUAL INCREASE 5'
PHILADELPHIA
Camden
Gloucester
Media
Chester
DELAWARE RIVER
Woodbury
Swedesboro
Penn's Grove
Upper Penn's Neck
Glassboro
126
134
135
136
78

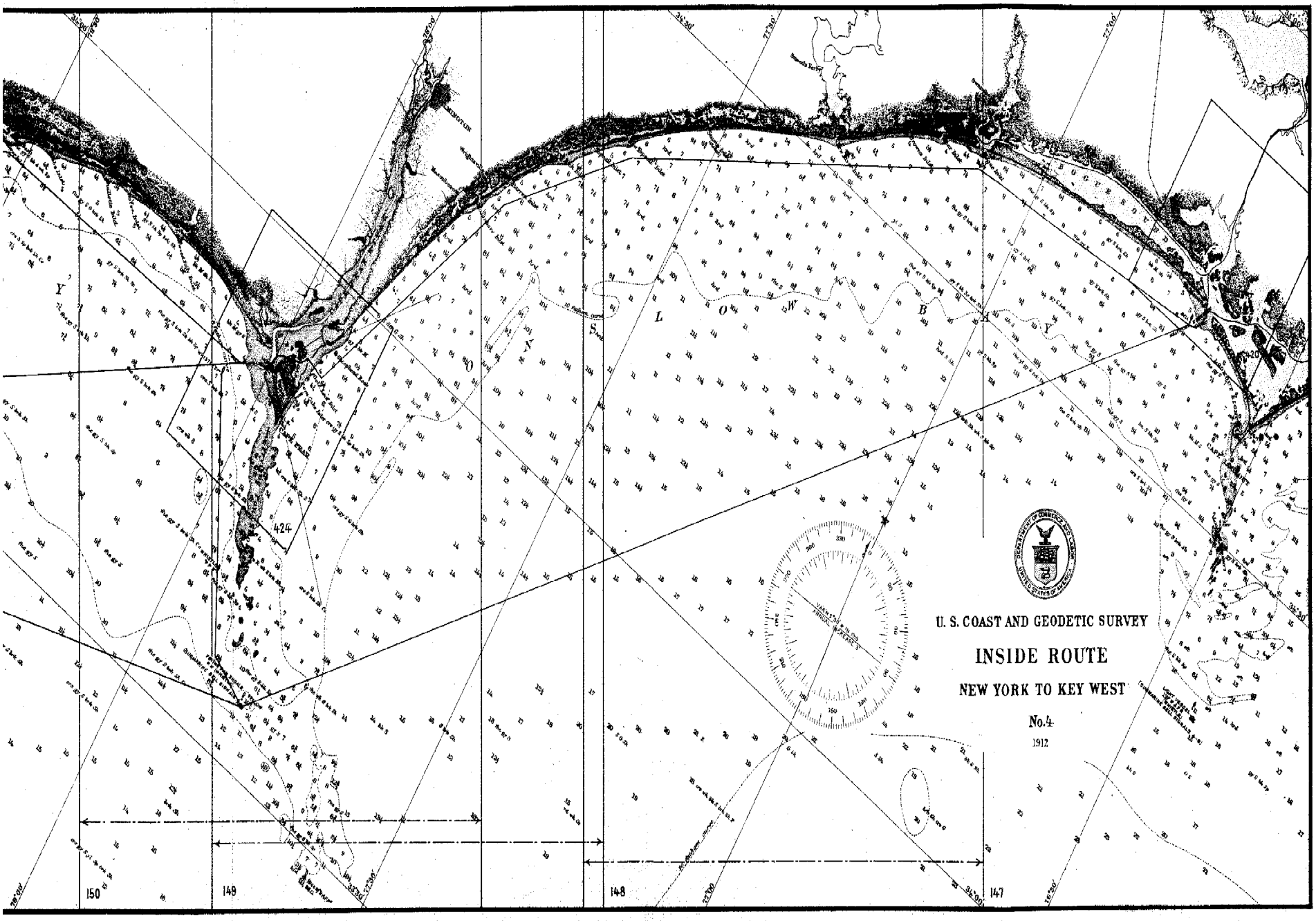

CHESAPEAKE BAY
POTOMAC RIVER
DELAWARE RIVER
WILMINGTON
Swedesboro
Glassboro
Cambridge
Vienna
Salisbury
Wicomico River
Nanticoke R.
Princess Anne
Kings Creek
Pocomoke
Onancock
Pungoteague
Craddock Cr.
Cape Charles
Yorktown
Newport
Hampton
Great Wicomico R.
Piankatank River
Urbanna
Cherrystone
Sand Shoal Inlet
Little Machipongo Inlet
Metompkin Inlet
Wachapreague Inlet
Chesapeake Beach
126
133
134
135
1222
1225
1227
38°30'
38°00'
37°30'
37°00'
76°30'
76°00'
75°30'

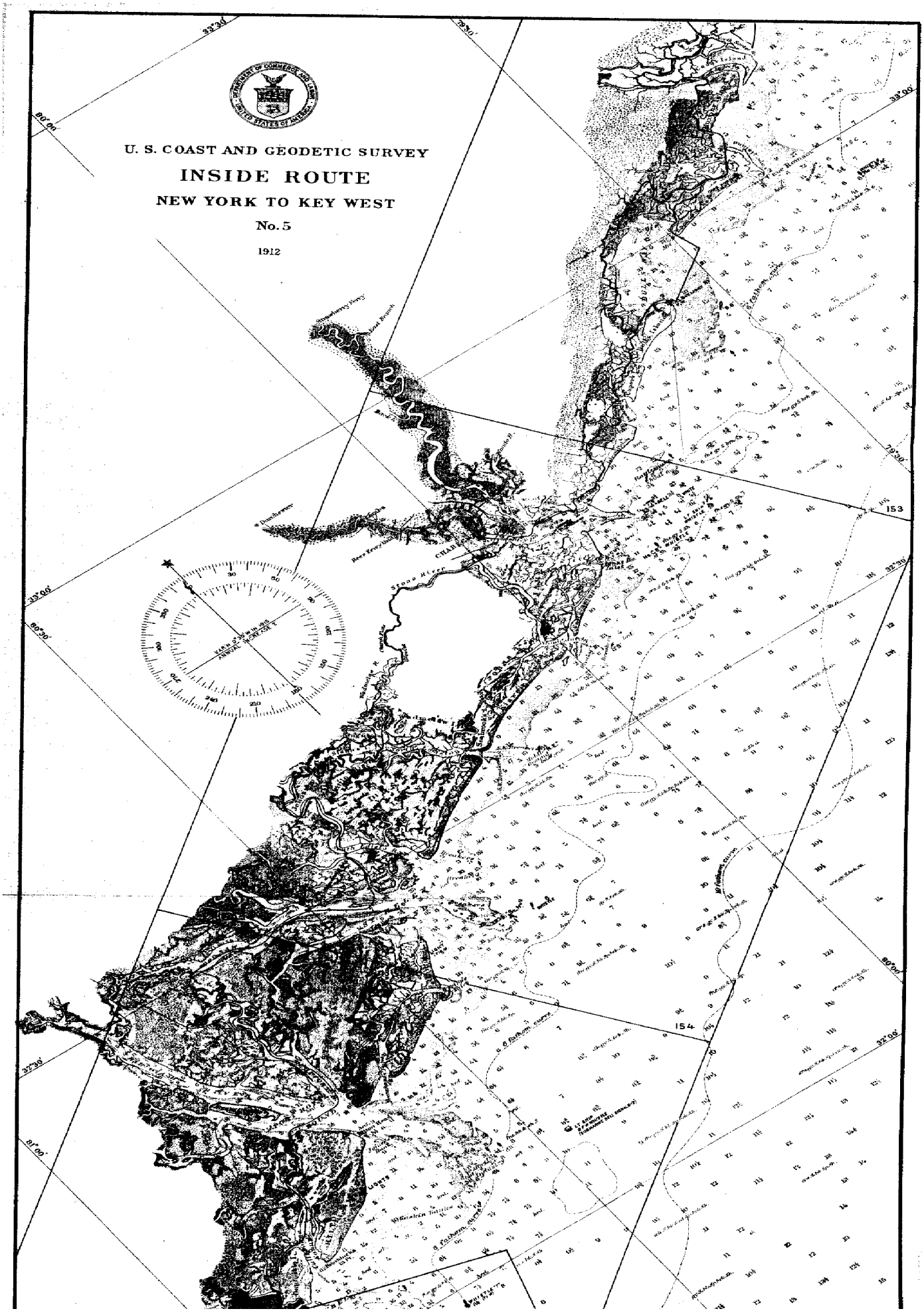

Cape Henry Light
There are two Towers but only one Light
Albemarle & Chesapeake Canal
ALBEMARLE SOUND
407
1227
140
False Cape
Columbia
36°30'
36°00'
75°30'
76°00'

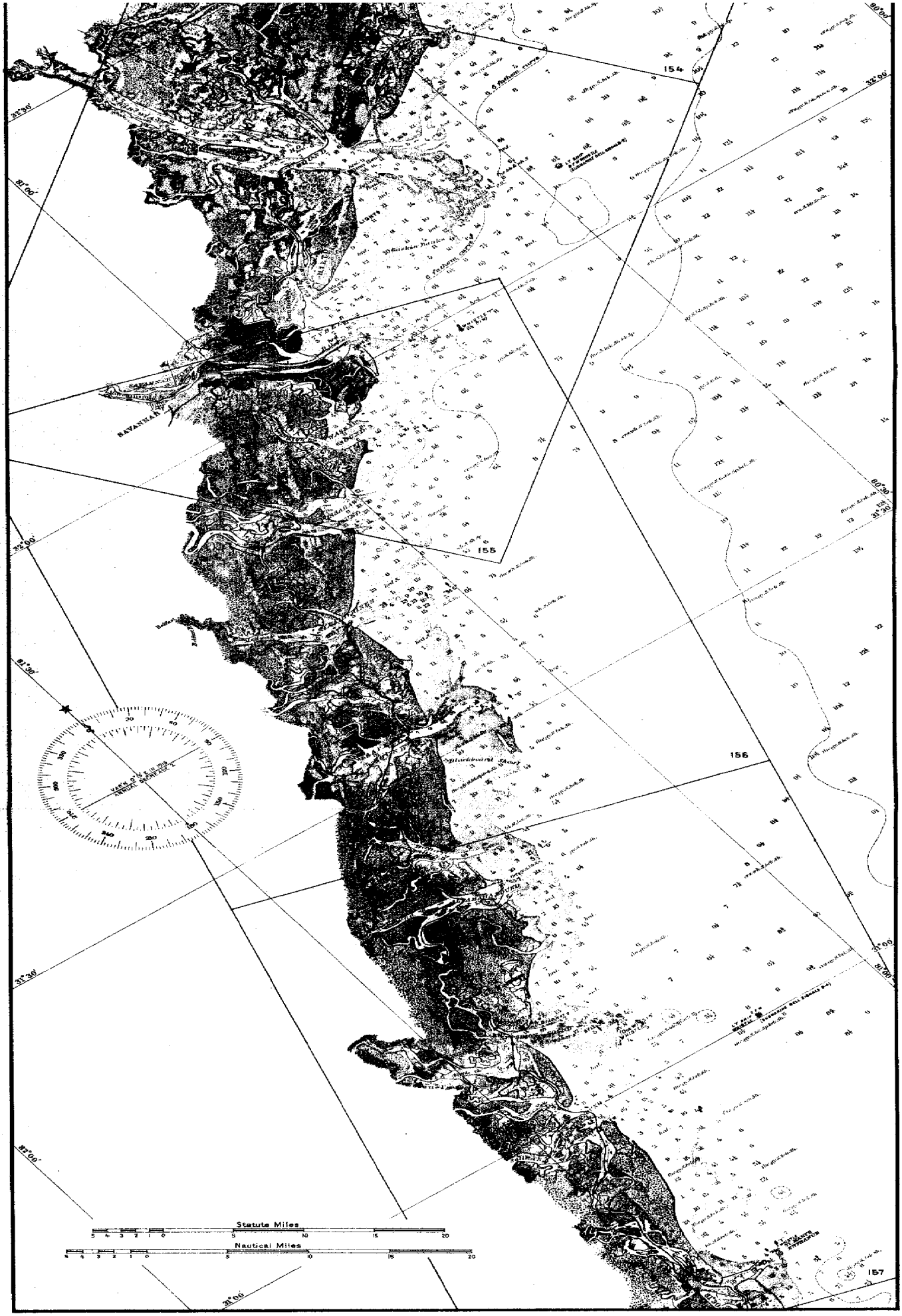
U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No. 3
1912
Statute Miles
Nautical Miles
CAPE LOOKOUT
407
143
142
147
36°00'
35°00'
34°30'
76°30'
76°00'

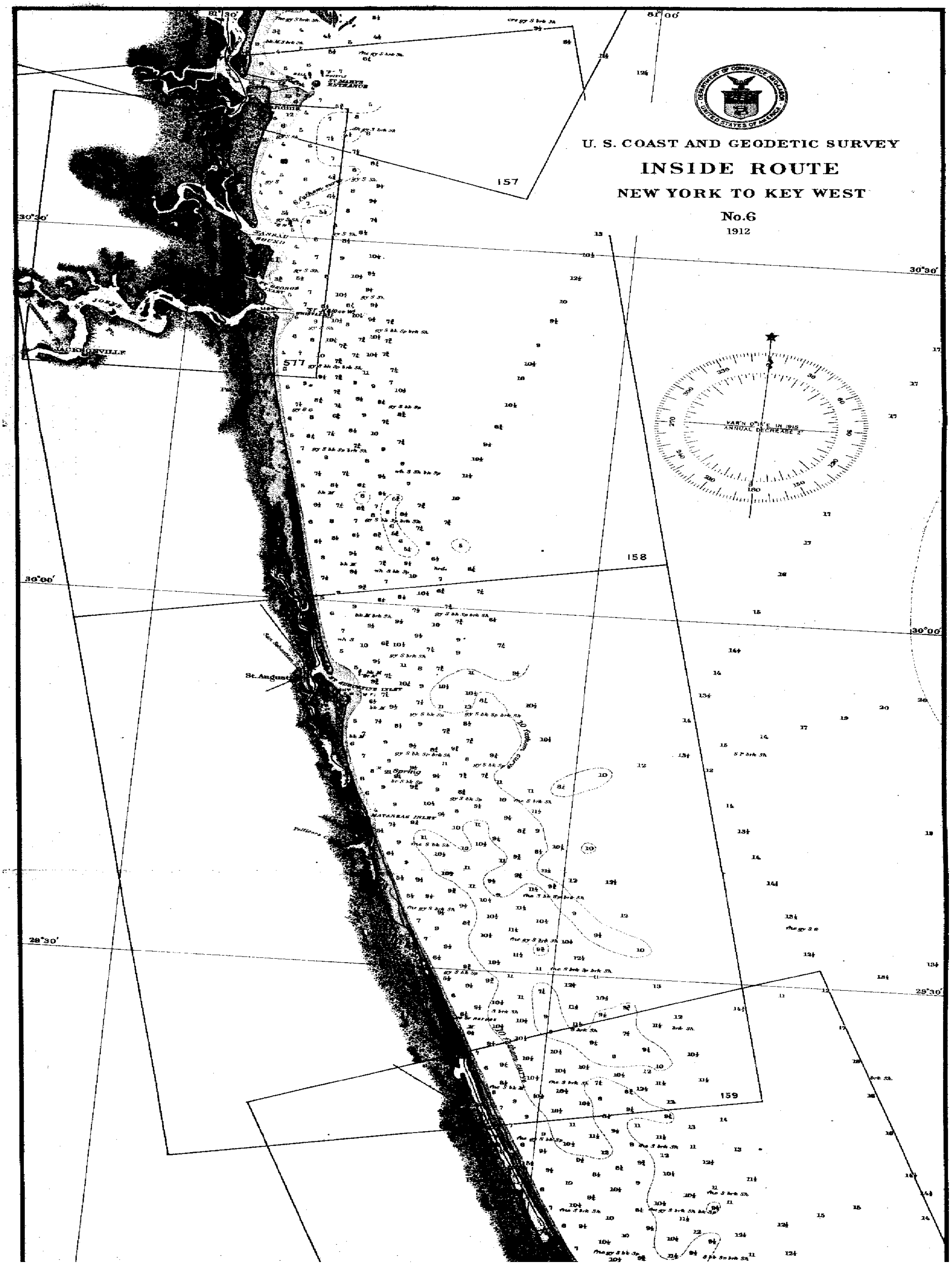


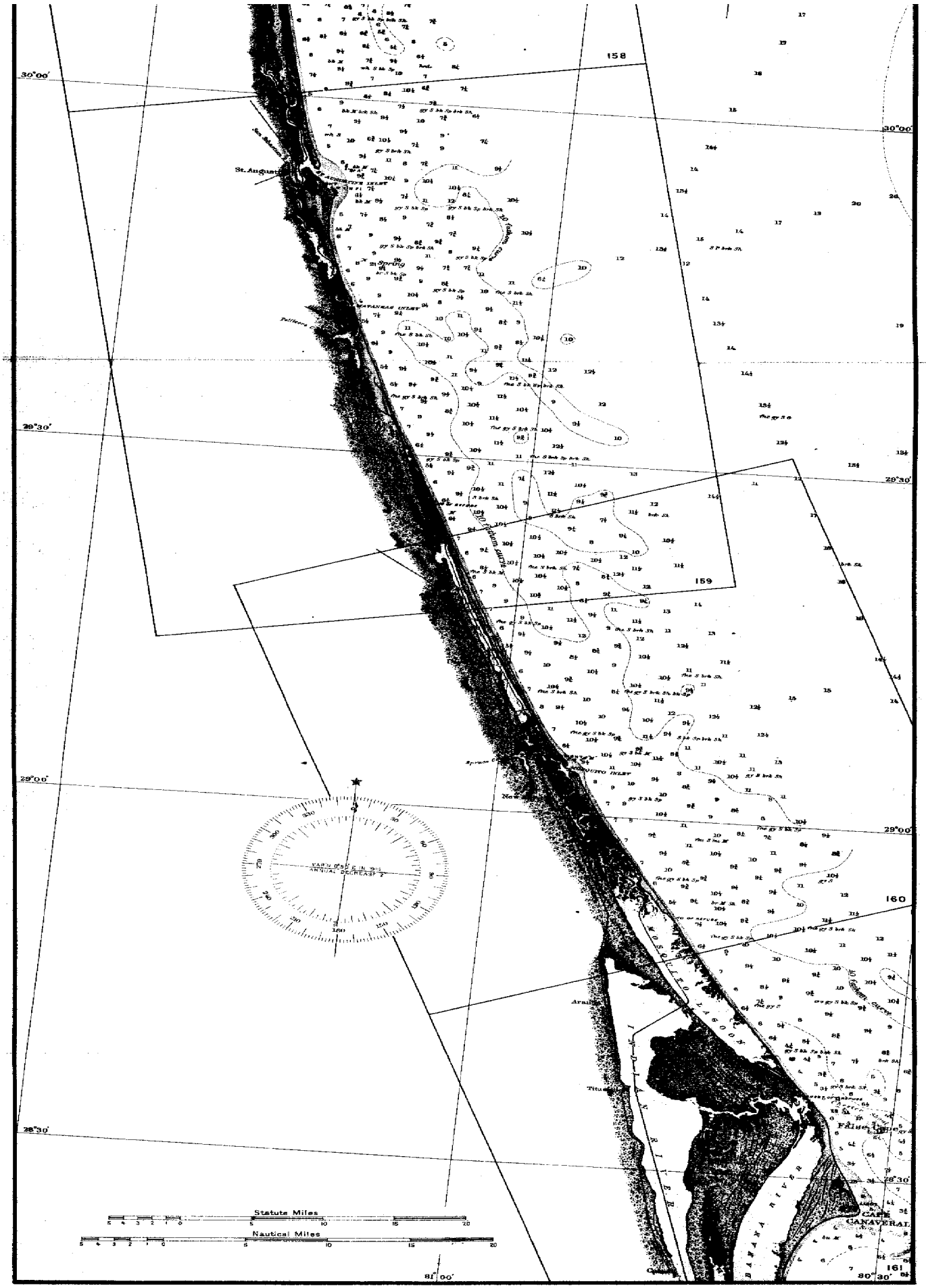
Statute Miles
Nautical Miles
152
151
150
149
148
424
428

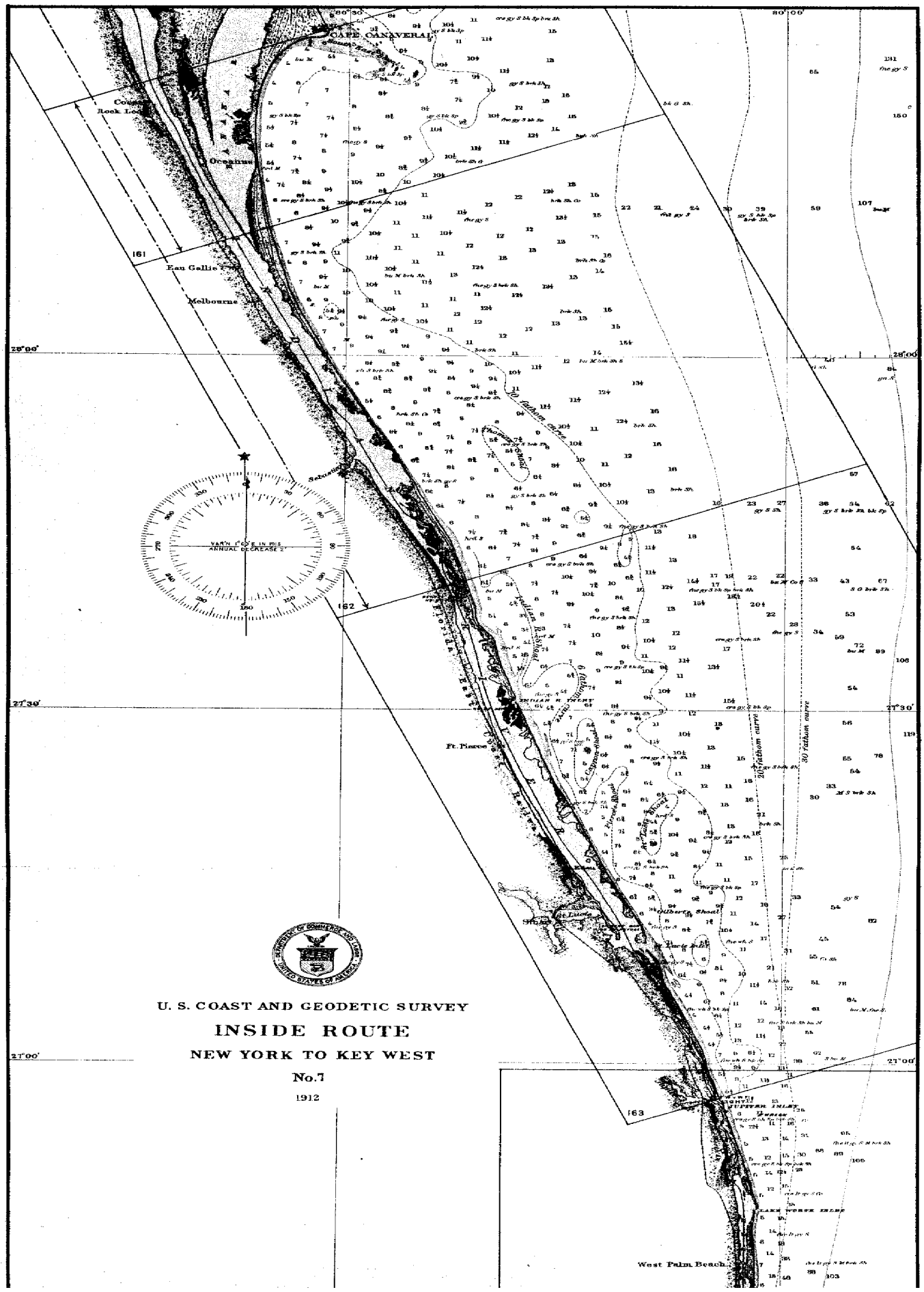

U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No.4
1912
150
149
148
147
424


U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No. 5
1912
153
154


154
155
156
157
SAVANNAH
Statute Miles
Nautical Miles


U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No.6
1912
81°30'
81°00'
30°30'
30°00'
29°30'
157
158
159
577
ST MARYS ENTRANCE
JACKSONVILLE
St. Augustine
MATANZAS INLET


30°00'
29°30'
29°00'
28°30'
81°00'
80°30'
158
159
160
161
St. Augustine
Spring
Pellicers Creek
Spruce Creek
Arnaud
Titusville
False Cape
CAPE CANAVERAL
MOSQUITO LAGOON
INDIAN RIVER
BANANA RIVER
Statute Miles
Nautical Miles



U. S. COAST AND GEODETIC SURVEY

INSIDE ROUTE

NEW YORK TO KEY WEST

No. 7

1912

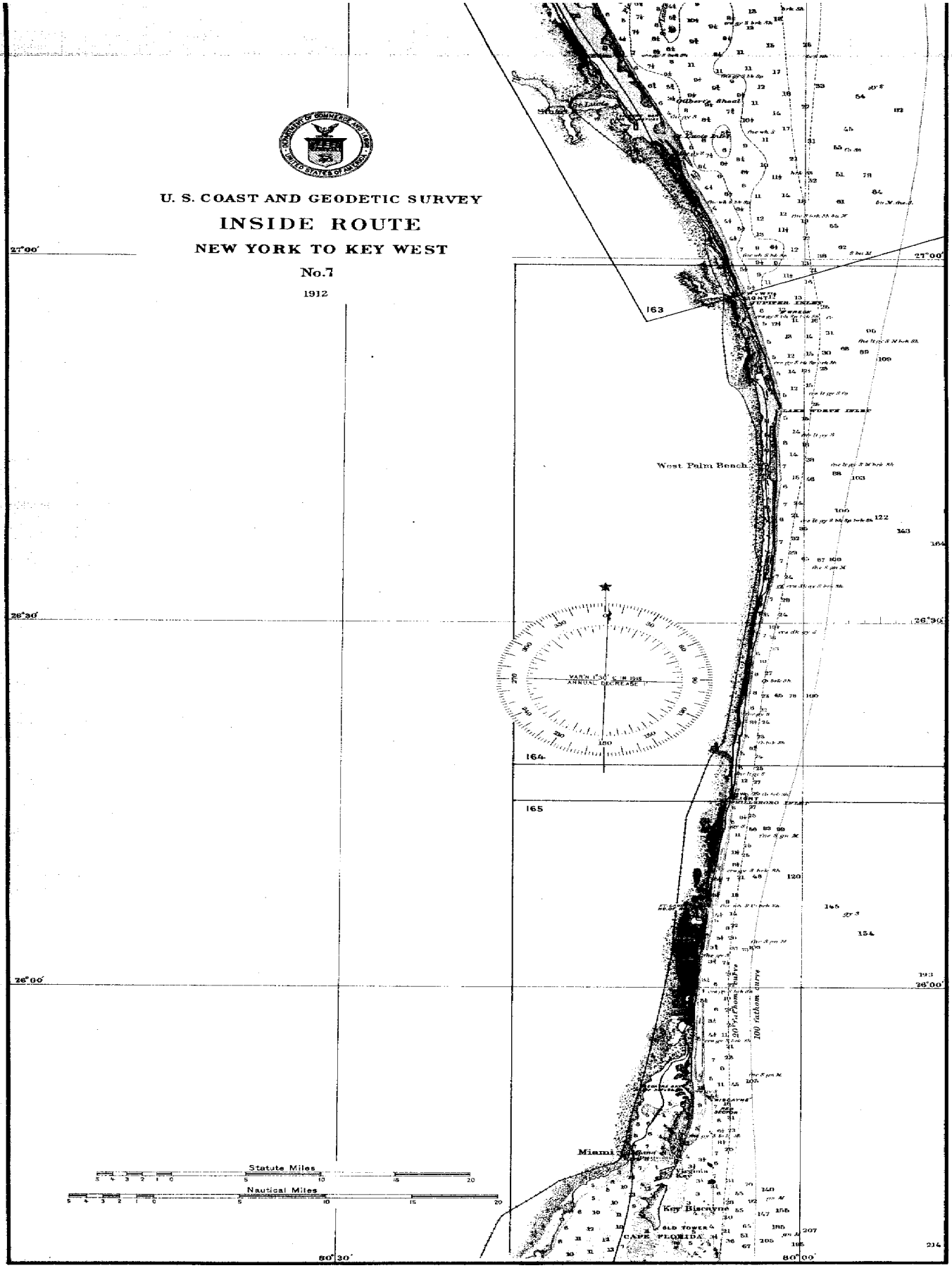
U. S. COAST AND GEODETIC SURVEY

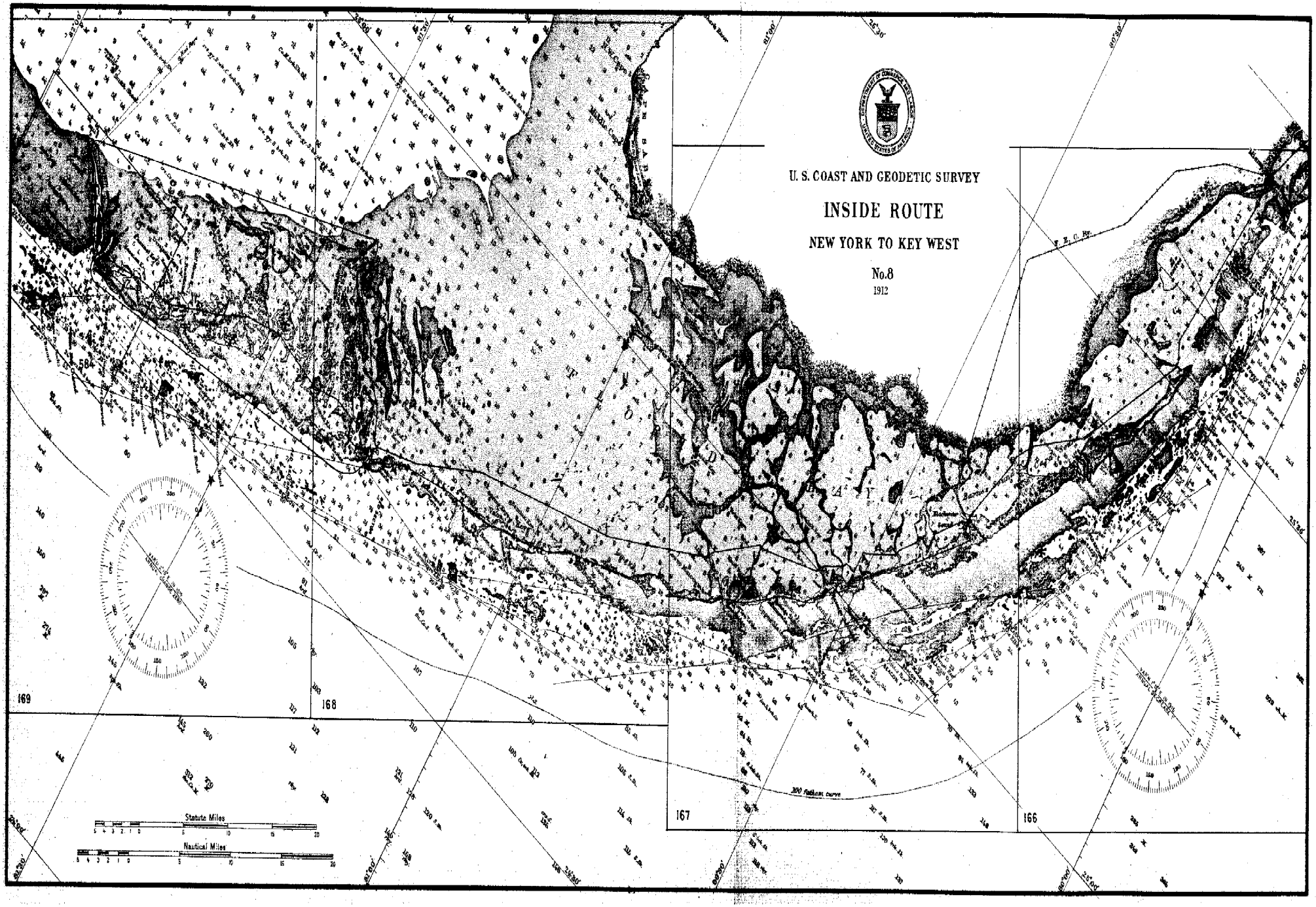
INSIDE ROUTE

NEW YORK TO KEY WEST

No.7

1912




U. S. COAST AND GEODETIC SURVEY
INSIDE ROUTE
NEW YORK TO KEY WEST
No.8
1912
169
168
167
166
Statute Miles
Nautical Miles
300 Fathom Curve