

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

O. H. TITTMANN, SUPERINTENDENT

INSIDE ROUTE PILOT

KEY WEST TO NEW ORLEANS

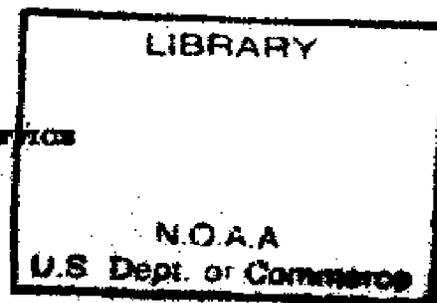
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DEPARTMENT OF COMMERCE,
UNITED STATES COAST AND GEODETIC SURVEY,
Washington, December 1, 1914.

This publication has been prepared for the guidance of those who desire to navigate the coast in small craft, making use of the inside passages as much as possible and, where there are none, keeping as close as practicable to the shore and avoiding long stretches of open water. For this kind of navigation, the publication is believed to contain all necessary information, but it is not to be regarded as a complete coast pilot for this section of the coast, as little attention has been given to the open waters where there are inside routes available.

This volume covers the coast of the Gulf of Mexico from the Florida Keys to the Mississippi River and is a continuation of the earlier publication, the Inside Route Pilot, New York to Key West. It contains descriptions of the coast and of all navigable bodies of water on this coast, with directions for navigating them, information concerning the port facilities, places where supplies and fuel can be had, where repairs can be made and much other information usually contained in a coast pilot publication. It also contains information regarding, and directions for navigating, the shallow-water route across Florida from the Atlantic to the Gulf of Mexico.

Descriptions and general information have been separated as far as possible from the sailing directions, and only where it seemed imperative that certain facts should be brought to the attention of the navigator at that particular place has this rule been deviated from. The arrangement of subjects is such as will be most convenient for persons going from east to west. Descriptions of, and general information regarding, bodies of water, their tributaries and the towns, villages, etc., on their shores are grouped under the name of the body of water. Directions for navigating these waters follow closely under headings "Sailing directions," and where two or more large bodies of water connect, the sailing directions are usually interrupted when the limit of the first body has been reached and continued after the description of the second. Cross references by page numbers enable one to turn quickly from the sailing directions for one body of water to those of the next if inside navigation is continuous. The courses given herein (true and magnetic) are for going westward or for entering a port from the Gulf, but if bound in the opposite direction it is only necessary to reverse the courses, subtracting or adding 180 degrees to the true

course and changing the magnetic course to the opposite point of the compass.

The charts contained in the envelope at the back of the book show the through routes which are practicable for small vessels, and are for the purpose of making the sailing directions more easily understood. No other charts are necessary for a boat of a draft well within the controlling depth of any passage, but if the draft approaches closely to the least depth a larger scale chart should be procured. A list of the charts of these waters is given at the back of the book.

The information contained herein is derived from surveys by the United States Coast and Geodetic Survey and by the Corps of Engineers, United States Army, and from special investigations by the Coast and Geodetic Survey. Much valuable information was contributed by the United States Engineers and by local pilots, fishermen, and boatmen. The information was gathered and compiled by W. E. Parker, assistant, United States Coast and Geodetic Survey.

As these waters are subject to frequent and important changes, due to natural causes as well as to the agencies of man, a work of this kind can be correct only for the date of the latest survey or information received. Navigators and all persons having later information will confer a favor by notifying the Superintendent of the United States Coast and Geodetic Survey of errors which they may discover, or of additional matter which they think should be inserted.

O. H. TITTMANN,
Superintendent.

INSIDE ROUTE PILOT, KEY WEST TO NEW ORLEANS, 1914.

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.

SYSTEM OF BUOYAGE ADOPTED IN UNITED STATES WATERS.

In conformity with section 4678 of the Revised Statutes of the United States, the following order is observed in coloring and numbering buoys along the coasts, or in bays, harbors, sounds, or channels, viz:

In approaching the channel, etc., from seaward, **RED BUOYS**, with **EVEN NUMBERS**, will be found on the **STARBOARD** side.

In approaching the channel, etc., from seaward, **BLACK BUOYS**, with **ODD NUMBERS**, will be found on the **PORT** side.

BUOYS painted with **RED** and **BLACK HORIZONTAL STRIPES** will be found on **OBSTRUCTIONS**, with channelways on either side of them, and may be left on either hand in passing in.

BUOYS painted with **WHITE** and **BLACK PERPENDICULAR STRIPES** will be found in **MIDCHANNEL** and must be passed close-to to avoid dangers.

All other distinguishing marks on buoys will be in addition to the foregoing, and may be employed to mark particular spots. A description of such marks is given in the Buoy List.

Perches with balls, cages, etc., will, when placed on buoys, be at turning point, the color and number of the buoy indicating on which side it shall be passed.

Nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side, of channels.

Day beacons (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

GENERAL REMARKS ON TIDES, CURRENTS, AND WEATHER.

Tides.—Along the Gulf coast of Florida, from Cape Sable to Apalachee Bay, high water occurs at about the time of the moon's upper or lower transit (meridian passage). In this region there are usually two high waters and two low waters daily, even at the times of extreme declination. The high water occurring near the time of an upper transit is the higher high water of the day, the moon's declination being north. The high water occurring near the time of a lower transit is the higher high water of the day, the moon's declination being south. The low water occurring about six hours after the time of an upper transit is the lower low water of the day, the moon's declination being north. The low water occurring about six hours after the time of a lower transit is the lower low water of the day, the moon's declination being south. By north declination is meant that the moon is north of the Equator and so runs high in its apparent diurnal course; by south declination that the moon is south of the Equator and so runs low.

Between Apalachee Bay and the Passes of the Mississippi River but one high water and but one low water occur daily when the declination of the moon is considerable.

The rise and fall of tide is greater when the moon is far from the Equator, either north or south, and if the moon's greatest declination occurs at full and change the range will be greatest. About the time that the moon's declination is zero the rise and fall is less, and if the moon's zero declination occurs in its first and last quarter the range will be least. When the moon is near the Equator there are sometimes four small tides in 24 hours; this may be expected when new or full moon occurs at that time. With north declination a high water generally follows the moon's lower transit, and with south declination it follows the moon's upper transit.

The above remarks apply when there is no disturbing action of the wind. Strong winds will nearly always retard or accelerate the tides, and at times during heavy gales the action of the tides will apparently be suspended or reversed.

Coast and tidal currents.—Along the coast of the United States bordering on the Gulf, the currents are almost entirely influenced by the force and direction of the winds. The normal tidal currents have little velocity except in the entrances to the bays and harbors; here, in some cases, they have a velocity of $1\frac{1}{2}$ to 2 knots, but this velocity is decreased or accelerated greatly by the force and direction of the winds. After a norther a current of considerable velocity will be found setting over the bars into the harbors and bays. Along the coast, inside of the 50-fathom curve, it has been noticed that during the months when the prevailing winds are from southward there is generally an easterly set alongshore from the Rio Grande to the

Mississippi River and to Cape San Blas, and a northerly set along the west coast of Florida. During the months that the prevailing winds are from eastward and northward the set is generally westerly along the coast from Cape San Blas to the Rio Grande and variable along the west coast of Florida.

Prevailing winds at most places along the Gulf coast between Key West and the Mississippi River are northerly during the fall and winter months and southerly during the spring and summer months. The following table shows the mean direction of the prevailing winds for each of the seasons at selected stations where long series of observations have been made:

Direction of prevailing winds.

At—	Winter.	Spring.	Summer.	Fall.
Key West.....	NE.	E.	SE.	NE.
Fort Myers.....	NE.	S.	S.	E.
Tampa.....	NW.	W.	E.	NE.
Pensacola.....	N.	SW.	SW.	NE.
Mobile.....	N.	S.	S.	N.
Biloxi.....	N.	S.	S.	S.
New Orleans.....	SE.	SE.	SE.	NE.

Northers are violent north winds which blow, mainly during the winter months, over Texas and the Gulf of Mexico. These winds come on after but short warning, and usually follow light southerly breezes and warm, moist weather. The indications of a norther are a thick bank of dark clouds in the north or northwest with lightning, falling barometer, and lowering temperature; it begins with a strong squall, which usually strikes the observer when the bank of clouds is at an altitude of 45 degrees above the horizon. During this squall the temperature may drop 20 degrees in 10 minutes. After the first squall the wind gradually increases but does not reach its maximum velocity until after the barometer has begun to rise; the temperature, however, may drop as low as 18° F. The northers are more frequent and more strongly marked along the coast of Texas than eastward, but the general characteristics of these winds are alike all over the Gulf of Mexico; their duration is from one to four days, the latter being exceptional. There are two types of northers, known locally as 'dry norther' and "wet norther;" the indications are practically the same for both, except that a wet norther is usually preceded by rain, perhaps a thunderstorm; the shift of wind northward is more sudden and the squall accompanying the shift generally heavy. This type is confined mostly to the eastern part of the Gulf and is not as common as the other. Northers are not dangerous for large vessels, but small vessels are sometimes blown offshore: they affect, however,

the depth of water in the harbors and on the bars by blowing the water offshore; in some cases the water will be lowered 4 feet. This should be borne in mind by vessels attempting to enter the harbors on the Gulf coast during or just after a norther.

Southeast gales are dangerous to shipping along the Gulf coast of the United States westward of Apalachee Bay. They are liable to occur at any time of the year, but are most dangerous in winter and early spring. During a heavy southeaster the bars at the entrance to the harbors are made impassable for deep-draft vessels on account of the heavy sea which breaks in depths of about 4 fathoms. The usual local indications of a southeaster is a breeze freshening at **ENE** or **E** and hauling southward, accompanied by a falling barometer, a rising temperature, and an increasing swell. The lowest reading of the barometer is usually reached immediately after the wind gains its maximum velocity at **SE**. When the wind hauls southward of **SE** it is an indication that the gale is breaking, which is usually followed by heavy squalls; as it hauls westward of **S** first rain squalls, and then clearing weather, may be expected, unless, as is sometimes the case, the southeaster be followed by a norther. Southeast gales raise the water in the harbors along the Gulf coast, in some cases, to a height of 6 feet above the normal. Along the west coast of Florida, from Cape Romano to Apalachee Bay, southeast gales are not so dangerous to shipping; vessels well found in ground tackle can anchor in shoal water under the lee of the land and hold on until the gale abates.

West India hurricanes.—Occasionally during July, August, September, and October, and at rare intervals in June and November, cyclonic storms, known as hurricanes, may be encountered in the Gulf of Mexico. In addition to a motion around its center a hurricane has a progressive motion, following a track which, in the part of the Gulf of Mexico treated in this volume, usually has a direction between **N** and **E**, although some have been known to travel in a direction westward of **N**. This progressive motion varies in velocity, but is said to average about 300 miles in 24 hours; the diameter of a hurricane may vary from 100 to 300 miles, the diameter of its center being also variable. Shipping and property in or near the center of a hurricane seldom escape without damage or destruction, as, in addition to the force of the wind, it may be that a wave, moving forward like a tidal wave at the rate of the hurricane's progress, accompanies the hurricane in its track; this causes sudden inundations along the low shores of the Gulf of Mexico lying in the track of the hurricane, and endangers shipping and property. During the hurricane season the mariner should note every change in the weather signs and carefully watch the barometer for indications of a hurricane, so as to take every precaution to avoid it when at sea, or to make preparations for riding it out in safety when at anchor in port.

TIDES FROM KEY WEST TO MISSISSIPPI DELTA.

Tropic tides are those high and low waters which occur near the times when the moon attains its greatest declination either north or south. The tropic lunitidal intervals are marked *a* and *b*.

a indicates that an upper transit (i. e., upper culmination or meridian passage) is to be used when the declination is north or a lower transit when the declination is south.

b indicates that a lower transit is to be used when the declination is north or an upper transit when the declination is south.

The plane of reference referred to in the table is the plane to which soundings on United States Coast and Geodetic Survey charts are reduced, commonly termed the plane of mean low water.

At places where the tides are chiefly diurnal (i. e., where there is but one high water and one low water per day, when the moon's declination is considerable) the semidaily portion of the tide becomes apparent and controls the tide when the moon is upon or near the Equator. The intervals and ranges of these semidaily tides are inclosed in brackets.

Excepting a period extending from two days before the time of the moon's crossing the Equator to two days after such time, tropic intervals are usually preferable to mean intervals for ascertaining the times of the tides from the times of the moon's transits.

Lunitidal interval is the number of hours and minutes after the meridian passage of the moon to the following high or low water.

Station.	Lunitidal interval.					
	Mean tides.		Tropic tides.			
	High water.	Low water.	Higher high water.	Lower high water.	Lower low water.	Higher low water.
	H. m.	H. m.	H. m.	H. m.	H. m.	H. m.
Key West Harbor.....	9 20	2 36	8 44 ^b	10 14 ^a	3 22 ^a	1 32 ^b
Northwest Passage light.....	11 30	5 09				
Dry Tortugas.....	9 44	3 21	8 47 ^b	11 32 ^a	4 14 ^a	1 36 ^b
Content Key.....	11 28	5 37				
Cape Sable.....	1 04	7 26	0 51 ^a	1 46 ^b	7 09 ^a	7 13 ^b
Shark River (mouth of).....	0 52	7 14				
Lossman River Entrance.....	0 44	7 07	0 57 ^a	1 12 ^b	6 55 ^a	6 38 ^a
Round Key.....	0 27	6 51	0 05 ^a	1 03 ^b	7 17 ^a	6 49 ^b
Coon Key.....	0 42	6 41				
Punta Rasa, San Carlos Bay.....	12 02	5 52	12 10 ^b		6 43 ^a	
Fort Myers.....	1 16	8 30				
Captiva Pass.....	[0 25]	[6 24]	11 24 ^b		7 18 ^a	
Cape Haze, Charlotte Harbor.....	[1 49]	[8 01]	11 14 ^b		8 32 ^a	
Mouth of Peace River, Charlotte Harbor.....	[2 14]	[8 42]	0 42 ^a		10 42 ^a	
Sarasota.....	11 47	6 28				
Egmont Key, Tampa Bay.....	11 24	4 56	10 02 ^b		5 30 ^a	
Tampa (Hillsboro Bay).....	1 19	8 50	11 56 ^b		9 52 ^a	
Anclote Anchorage.....	11 27	5 27	9 38 ^b	2 08 ^a	7 08 ^a	3 38 ^b

Station.	Lunifidal interval.					
	Mean tides.		Tropic tides.			
	High water.	Low water.	Higher high water.	Lower high water.	Lower low water.	Higher low water.
	H. m.	H. m.	H. m.	H. m.	H. m.	H. m.
Bayport.....	0 34	7 36	-0 30a	1 57b	8 37a	6 00b
Chambers Island, Withlacoochee River.....	1 44	8 08	.....	.....	.....	.....
Cedar Keys (Way Key).....	0 46	7 06	-0 04a	1 44b	7 34a	6 34b
St. Marks light.....	1 29	7 46	0 30a	.....	8 03a	.....
Dog Island (west end).....	1 19	7 46	-0 14a	2 19b	7 52a	6 14b
St. Vincent's Island, West Pass.	2 25	8 54	11 36b	.....	8 52a	.....
St. Josephs Point.....	.....	.....	7 43b	.....	7 25a	.....
Warrington Navy Yard, Pensacola.....	[11 19]	[4 08]	9 41b	.....	8 46a	.....
Pensacola (Jefferson Street).....	[12 04]	[5 39]	.....	.....	.....	.....
Bohemia, Escambia Bay.....	[13 44]	[6 37]	.....	.....	.....	.....
Mobile Point (Fort Morgan).....	[11 19]	[3 15]	9 31b	.....	8 36a	.....
Mobile (St. Francis Street Wharf).....	.....	.....	12 37b	.....	12 21a	.....
Horn Island.....	.....	.....	8 05b	.....	8 26a	.....
Biloxi.....	[1 01]	[6 00]	9 54b	.....	8 08a	.....
Cat Island.....	[0 23]	[6 35]	10 24b	.....	8 27a	.....
East Rigolet Lighthouse, Lake Borgne.....	[5 03]	[10 35]	.....	.....	.....	.....
Port Eads.....	[10 55]	[4 42]	8 15b	.....	7 04a	.....
Carrollton, Mississippi River (annual fluctuations).....	(¹)	(²)	.....	.....	.....	.....

Station.	Rise and fall of tides.					Plane of reference below mean sea level.
	Mean range of tide.	Tropic tides; heights from plane of reference.				
		Higher high water.	Lower high water.	Lower low water.	Higher low water.	
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Key West Harbor.....	1.2	1.6	0.8	-0.3	0.3	0.6
Northwest Passage light.....	2.6	.....	.....	.....	.....	.....
Dry Tortugas.....	1.1	1.6	.7	-.5	.6	.6
Content Key.....	3.6	.....	.....	.....	.....	.....
Cape Sable.....	2.9	3.2	2.7	-.6	.6	1.5
Shark River (mouth of).....	3.7	.....	.....	.....	.....	.....
Lossman River Entrance.....	3.7	3.8	3.4	-.4	1.2	1.8
Round Key.....	3.4	3.5	3.2	-.9	.9	1.7
Coon Key.....	2.5	.....	.....	.....	.....	.....
Punta Rasa, San Carlos Bay.....	1.6	2.0	.....	-.8	.....	1.0
Fort Myers.....	.8	.....	.....	.....	.....	.....
Captiva Pass.....	[1.0]	1.5	.....	-.6	.....	.6
Cape Haze, Charlotte Harbor.....	[1.3]	1.7	.....	-.5	.....	.7
Mouth of Peace River, Charlotte Harbor.....	[1.6]	1.7	.....	-.4	.....	1.0
Sarasota.....	1.2	.....	.....	.....	.....	.....
Egmont Key, Tampa Bay.....	1.3	1.8	.....	-.8	.....	.7
Tampa (Hillsboro Bay).....	2.2	2.6	.....	-.7	.....	1.1
Anclote Anchorage.....	2.2	2.8	1.4	-1.1	1.3	1.0
Bayport.....	2.4	2.9	1.6	-.6	.6	1.2

¹ About Apr. 20.

² About Nov. 25.

Station.	Rise and fall of tides.					Plane of reference below mean sea level.
	Mean range of tide.	Tropic tides; heights from plane of reference.				
		Higher high water.	Lower high water.	Lower low water.	Higher low water.	
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Chambers Island, Withlacoochee River.....	2.6					
Cedar Keys (Way Key).....	2.5	2.8	1.7	— .8	1.1	1.2
St. Marks light.....	2.5	2.7		— .9		1.2
Dog Island (west end).....	1.6	1.9	1.4	— .8	.9	.9
St. Vincents Island, West Pass.	[.6]	1.2		— .5		.7
St. Josephs Point.....						
Warrington Navy Yard, Pensacola.....	[.1]	1.4		— .3		.5
Pensacola (Jefferson Street).....	[.4]					
Bohemia, Escambia Bay.....	[.5]					
Mobile Point (Fort Morgan).....	[.2]	1.3		— .1		.6
Mobile (St. Francis Street Wharf).....		1.7		— .6		.7
Horn Island.....		1.7		— .3		.7
Biloxi.....	[.3]	1.9		— .4		.7
Cat Island.....	[.3]	1.8		— .3		.7
East Rigolet Lighthouse, Lake Borgne.....	[.3]					
Port Eads.....	[.1]	1.4		— .3		.5
Carrollton, Mississippi River (annual fluctuations).....	(¹)					

¹ Rise above 16 feet.

Regular seasonal fluctuations in the height of the Gulf's surface.

[Heights are reckoned from mean Gulf level.]

Location.	Highest stage.		Lowest stage.	
	Date.	Height.	Date.	Height.
Key West.....	Oct. 30	<i>Feet.</i> 0.45	Apr. 10	<i>Feet.</i> —0.30
Cedar Keys.....	Sept. 21	.33	Jan. 17	— .51
Pensacola.....	Sept. 4	.26	Dec. 21	— .46
Port Eads.....	Oct. 18	.45	Feb. 17	— .49

This table gives the probable dates on which the surface of the Gulf (mean height for the day) at these places will be the highest and lowest for the year and the probable amount by which it will differ from the yearly average.

CURRENTS AT KEY WEST AND VICINITY.

In each of the narrow passages connecting the Florida Straits and the eastern portion of Florida Bay the flood, or north-going, stream attains its greatest velocity a few minutes before the time of high water off the outer end of each passage and the ebb a few minutes before the time of outside low water.

In the openings occurring between Vaca Keys and Key West, the flood stream attains its maximum velocity about two hours before the time of high water off the outer end of each opening, or about three hours before the time of high water at Key West, and the ebb stream attains its maximum velocity about two hours before outside low water and about two and one-half hours before low water at Key West.

The tidal currents in Key West Harbor, Man of War Harbor, Calda Channel, and Northwest Channel are very nearly simultaneous in their occurrence. The flood, or north-going, stream attains its maximum velocity 1 hour and 45 minutes before high water at Key West. The ebb attains its maximum velocity 1 hour and 14 minutes before low water at Key West. The current turns from flood to ebb 1 hour and 20 minutes and from ebb to flood 1 hour and 52 minutes after the respective times of high and low water at Key West. The directions of the currents agree well with the trend of the channels.

At the entrance to Man of War Harbor the velocity of flood or ebb at the times of an ordinary maximum is 1.7 knots; and in the axis of this harbor, 1 knot. In the axis of Northwest Channel, abreast of Middle Ground, the velocity is 1.4 knots; and between Whitehead Spit and Kingfish Shoals the velocity is about 1 knot.

Generally speaking, the tidal streams through the passages and openings flow at any given time toward that body (Florida Strait or Florida Bay) whose surface happens to be the lower at the time specified. And so northwesterly winds give rise to southerly currents, and southwesterly winds to northerly currents.

TIDES AND CURRENTS IN THE RIGOLETS.

In the Rigolets the tides and currents are generally diurnal in their character. The greatest rise and fall of tide and the strongest tidal currents occur near the times when the moon attains its extreme declination north or south. At such times the range of tide is about 1.4 feet at the drawbridge and about 0.7 foot at West Rigolets light.

At the drawbridge high water follows an upper-north or lower-south transit of the moon by about one hour, and low water follows a lower-north or upper-south transit by about the same interval.

Throughout the Rigolets the flood or westerly stream attains its greatest velocity at the time of high water at the drawbridge, and the ebb at the time of low water. The ordinary maximum velocities of the flood and ebb streams, near the time of extreme declination, are 0.6 knot at the drawbridge and 1 knot at West Rigolets light.

CURRENTS, MISSISSIPPI RIVER.

The semidaily portion of the tide at Port Eads has a mean range of only 0.1 foot and the daily range of tide varies from zero to 2 feet in value, according to the declination of the moon and sun. The

portion of the current due to the tides would, therefore, be very small and could seldom amount to as much as ½ knot above the Head of Passes. This value may be exceeded somewhat in the shallower waters below this point, but the tidal current is nowhere strong.

Mean cross-sectional velocity.

Month.	Section midway between "The Jump," Grand Pass, and Fort St. Philip.	Section at steamboat wharf, New Orleans.	Month.	Section midway between "The Jump," Grand Pass, and Fort St. Philip.	Section at steamboat wharf, New Orleans.
	<i>Knots.</i>	<i>Knots.</i>		<i>Knots.</i>	<i>Knots.</i>
January.....	3.2	2.9	August.....	1.2	1.1
February.....	6.5	5.8	September....	.8	.8
March.....	4.7	4.2	October.....	1.2	1.1
April.....	3.7	3.2	November....	1.9	1.8
May.....	3.4	2.9	December.....	2.0	1.8
June.....	3.1	2.8			
July.....	2.2	2.0	Mean..	2.8	2.6

The greatest velocity in a given section is generally about one and one-third times as great as the cross-sectional velocity.

The velocities in narrower portions of the Passes are probably a little greater than those at the steamboat wharf at New Orleans.

DISTANCES AND DEPTHS.

Table of distances and depths.¹

From—	To—	Distance in nautical miles.	Depth in feet.
Key West.....	Drawbridge at Moser Channel.....	39½	13
	Ponce de Leon Bay, (1) via Hawk and Moser Channels.	80	7
	Ponce de Leon Bay, (2) direct from northwest channel entrance.	67	7
	Coon Key via (1) to Cape Sable....	119	4
	Coon Key via (2) to Cape Sable....	106	4
Coon Key.....	San Carlos Bay entrance (shortest route).	113	.....
	Big Marco Pass entrance (inside)...	11	4
	San Carlos Bay entrance.....	28	.....
Big Marco Pass entrance.....	Fort Myers.....	21½	9
	St. James City.....	11	11
San Carlos Bay entrance.....	South Boca Grande (inside).....	31	6
	Lake Okechobee (approximate distance).	60	4
	Fort Lauderdale (approximate distance).	136	4
Fort Myers.....	Punta Gorda.....	22	10
	Boca Grande entrance.....	4½	.....
	Big Sarasota Pass via Swash Channel.	38	6
	Big Sarasota Pass via Main channel.	42	.....
South Boca Grande.....			

¹ The depths given in this table are the maximum depths that can be carried at mean low tide for the tidal waters and at normal water level for the nontidal waters. The maximum depths that can be carried with favorable tide are given with the descriptions of the waters.

Table of distances and depths—Continued.

From—	To—	Distance in nautical miles.	Depth in feet.
Boca Grande entrance.....	Tampa Bay Southwest Channel entrance.....	58	.....
Big Sarasota Pass entrance.....	Tampa Bay (inside).....	21	5
Tampa Bay Southwest Channel entrance.	Tampa.....	34	16
Sarasota Pass (entrance from Tampa Bay).	St. Petersburg.....	19½	16
	Tampa.....	31	8
Tampa.....	St. Petersburg.....	16½	8
	Boca Ceiga Bay.....	9½	7
	St. Petersburg.....	18	20
	Boca Ceiga Bay.....	23	7
	Clearwater (inside).....	47	5
	Anclote Anchorage (inside).....	61	4
Anclote Anchorage.....	Cedar Keys entrance (shortest distance).	56	5½
	Cedar Keys entrance (following the coast at distance of 7 miles).	63	4
Cedar Keys entrance.....	St. Marks entrance via Northwest Channel.	88	5
St. Marks entrance.....	St. George Sound East Pass entrance (outside).	36½	.....
	Carrabelle (outside).....	43	10
	Carrabelle via Crooked River.....	47	3
St. George Sound East Pass entrance.	Apalachicola Bay West Pass (inside)	33	8
Apalachicola.....	Apalachicola.....	23½	8
	Panama City (St. Andrews Bay) via canal.	53	5
Apalachicola Bay West Pass entrance.	St. Andrews Bay entrance (outside).	42	.....
St Andrews Bay entrance.....	Choctawhatchee Bay East Pass.....	49½	.....
	Pensacola Bay entrance.....	88	.....
	Pensacola Bay entrance (following coast line).	93	.....
	Pensacola Bay via East Pass and Santa Rosa Sound.	90	6
Pensacola Bay entrance.....	Pensacola.....	10	30
	Mobile Bay entrance.....	40½	.....
	Mobile Bay via Swash Channel.....	39	7
Mobile Bay entrance.....	Mobile.....	31½	26
	Pass aux Herons.....	11	10
	Horn Island Pass (outside).....	25	.....
	Ship Island Bar (outside).....	49	.....
	North Pass of Mississippi River.....	76	.....
	South Pass of Mississippi River.....	90	.....
Pass aux Herons.....	Pascagoula.....	25	10
	Biloxi.....	45	8
	Gulfport.....	54	10
	Lake Borgne light.....	72	7
Lake Borgne light.....	The Rigolets.....	9	7
	Lake Pontchartrain.....	17	7
	New Orleans via Lake Pontchartrain.	40	5½
	Lake Borgne Canal.....	24	6
	New Orleans via Lake Borgne Canal	40	6
Ship Island Bar.....	South Pass of Mississippi River.....	82	11
South Pass entrance.....	New Orleans.....	93	28

DESCRIPTIONS AND SAILING DIRECTIONS.

KEY WEST HARBOR TO SAN CARLOS BAY.

Vessels bound from Key West up the west coast of Florida can lay a straight course from the Northwest Channel entrance buoy to Sanibel Island light, at the entrance to San Carlos Bay, and then either enter San Carlos Bay and pass through Pine Island Sound to Boca Grande, or continue outside. This course lies well clear of all dangers, and the lighthouse on Sanibel Island is a good landfall during the day or night. However, on account of the frequency of "northers" (violent northerly winds that spring up after but short warnings), usually during the winter months, this track is not recommended for small power boats. The distance from Key West to San Carlos Bay is 118 miles.

Vessels of 6 feet or less draft can follow the keys, either north of them or through Hawk Channel, from Key West to Moser Channel, and then across to Cape Sable and follow the coast line to San Carlos Bay, thus greatly reducing the distance between protected anchorages and, by keeping in shallow water, have less sea to contend with. The distance by this route is about 158 miles, but the greatest distance between protected anchorages is less than 40 miles.

Coast south of San Carlos Bay.—The coast from Cape Sable, the southwest end of the mainland of Florida, to Cape Romano is broken by innumerable small islands and keys, known as the *Ten Thousand Islands*, between which a network of small rivers and bayous lead to the interior. The keys are all densely wooded and so like in appearance as to be very nearly impossible of identification by a stranger, unless close to them and possessed of fairly accurate knowledge of his position. There are no prominent objects along this coast. Drafts of 3 to 7 feet can be taken into many of these rivers, but local knowledge is necessary. Depths of 6 feet are found $\frac{1}{2}$ mile to 3 miles offshore and depths of 12 feet from 4 to 6 miles.

Cape Romano Shoals, detached lumps at various depths, extend 10 miles southward of Cape Romano to Cape Romano Shoals whistle buoy, and depths of from 1 to 6 feet may be found at a distance of more than 6 miles from the cape.

North of Cape Romano the coast is broken by many small inlets but is quite regular in outline. At a distance of $\frac{1}{2}$ mile from the shore the depth is 12 feet or more, except at the entrances of Big Marco Pass and Big Carlos Pass, where shoals extend 1 mile offshore.

With the exception of Caximbas, Big Marco, and Big Carlos Passes the mouths of the inlets are so small as to be difficult to recognize unless close to the shore. The only objects that can be readily identified by a stranger are the lighted beacon (white light) in the mouth of Big Marco Pass and several large buildings and a wharf on the Gulf coast at Naples, 24 miles below San Carlos Bay.

Supplies and repairs: The best places to take on fuel and supplies and to make repairs are Key West and Fort Myers, but some supplies can be had and minor repairs can be made at Marco.

Pilots: Persons acquainted with this coast who will act as pilot can be found at Key West, Marco, and Fort Myers.

Key West, on Key West Island, is connected by railroad with Jacksonville and by steamships with New York, Tampa, Mobile, Galveston, Habana, and Colon. Small sailing vessels connect with Miami and the Bahama Islands. Coal, gasoline, fresh water, and supplies of all kinds can be had, and there are facilities for making repairs to wooden hulls and light repairs to machinery of vessels. There are marine railways up to about 1,000 tons capacity. Vessels anchor on the west side of the channel, off the Government wharves, or north of the railroad wharf in Man-of-War Harbor. The commercial wharves are along the northwest and north sides of the city and have depths ranging from 10 to 27 feet. At the heads of the slips and at the small wharves in the bight south of the railroad wharf are convenient berths for small craft. Storm-warning signals are displayed from towers at Key West and Sand Key. There is a United States Marine hospital at Key West. Pilots for the harbor can be had by making signal when outside the reefs.

Ponce de Leon Bay and Shark River.—Ponce de Leon Bay is a nearly rectangular bight, 2 miles wide by $1\frac{1}{2}$ miles long, in the west coast of Florida, 7 miles north of Cape Sable Northwest Cape and 14 miles north of the southern extremity of the mainland. Shark Point, on the north side of the entrance, and the point on the south side, for which there appears to be no name, are heavily wooded quite to the water's edge and when seen from a few miles offshore, either above or below the bay, stand out in bold relief against the tree line at the head of the bay. The point on the south side of the entrance is quite prominent when seen from southwestward and should be easily identified from this description. A small river empties into the Gulf about 1 mile south of the bay, and the mouth of this stream can be seen at a distance of a mile or two. The head and the northern part of the bay are shallow, but there is a good and convenient anchorage for vessels of 6 feet draft in the southern half of the entrance, from $\frac{1}{4}$ to $\frac{1}{2}$ mile northwestward of the southern shore. Several narrow streams, of which Shark River is the most important, empty into the head of Ponce de Leon Bay. Shark River discharges through

two mouths, close together and about east-northeast from the south side of the entrance to the bay, but these mouths are not easily distinguished from the other passages through this mangrove-fringed shore. The two branches of Shark River meet at a point about 2 miles inland, where there is an old wharf and abandoned mill, and are navigable for a draft of 6 feet to this point. Many yachts and small craft come to Shark River during the winter season for the fishing and hunting and usually take a guide at Fort Myers or at Marco. The river, because of its intersection by many creeks and bayous, is difficult for a stranger.

Directions for entering Ponce de Leon Bay.—Coming from southward, follow the coast at a distance of 1 mile after leaving Northwest Cape and until the south side of the entrance bears northeast. Then follow this shore at a distance of $\frac{3}{8}$ to $\frac{1}{2}$ mile and, when the coast south of the little river (1 mile south of the bay) is shut out, come to anchor in 7 to 10 feet of water. If coming from northward, keep at least 3 miles offshore until a northeast course will clear the south shore of the bay from $\frac{3}{8}$ to $\frac{1}{2}$ mile and then stand in on this course until the coast south of the little river is just shut out. Here there will be shelter from winds east of north or south, and the shoal northwest of the position will afford considerable protection from that direction. Boats drawing over 4 feet should not proceed farther into the bay until an examination has been made; on account of the absence of any distinguishing marks, no direction that would be of use to a stranger can be given.

Seminole Point, 15 miles northward of Shark Point, and *Pavilion Key*, 21 miles northward of Shark Point, are fairly prominent when coming up the coast at a distance of 2 or 3 miles from it. Seminole Point is the southwest end of the southern one of two small keys lying $1\frac{1}{2}$ miles from the mainland, and is the most westerly land seen until Pavilion Key is picked up. After leaving Seminole Point two long, low islands will be seen standing off the coast, the distance between them apparently four or five times the distance from the inner island to the mainland. On nearer approach, when the outer island, which is Pavilion Key, bears about north-northwest, a small key will be seen between the other two and the gap between the inner and the mainland will have closed.

Indian Key Anchorage, 30 miles northwestward of Shark Point and 10 miles below Big Marco River, is well protected from all winds and is good for drafts under 7 feet. The anchorage is easily entered during daylight and presents no difficulties after Indian Key, at the entrance, has been made out; but until this key has been positively identified one should proceed cautiously. Indian Key is about 1,000 yards long and 200 yards wide and lies with its major axis in a north-northeast and south-southwest direction; it is wooded and resembles,

except for its shape, all neighboring keys. The anchorage is northeast of the key and is more easily reached by the passage east of the key, as on this side depths of 7 to 13 feet extend close to the key. A red nun buoy (No. 2) lies $3\frac{1}{2}$ miles 206° true (*SSW $\frac{1}{8}$ W mag.*) from Indian Key and $9\frac{1}{2}$ miles 61° true (*NE by E $\frac{1}{4}$ E mag.*) from Cape Romano Shoals whistle buoy, and serves as a guide to the anchorage.

Directions for Indian Key Anchorage.—Having made the buoy or having positively identified Indian Key, stand in for the key, steering 25° true (*NNE mag.*) when that course will leave it 200 yards on the port hand. When 500 yards past the key, steer a midchannel course (about northeast) to the anchorage, and come to anchor when about 1 mile from the key, in a depth of 14 feet, gravel bottom.

Big Marco Pass and Big Marco River, together, offer a convenient and safe passage for small vessels past Cape Romano and are much used by yachts and small craft. Big Marco Pass, 8 miles northward of Cape Romano and 33 miles southward of San Carlos Bay, is marked by a lighted beacon (white light on a black, slatted, pyramidal structure) close inshore on the north side of the pass. The channel across the bar changes somewhat from time to time but is usually good for about $6\frac{1}{2}$ feet at mean low tide. It is marked by buoys which are shifted as often as is practicable to conform to changes in the channel. In April, 1913, the channel was marked by two perpendicular striped black and white buoys placed in midchannel, the outer a second-class can in a depth of 16 feet and the inner a third-class nun in 7 feet. These were left close-to on either side and the beacon 100 to 150 yards on the port hand, and a least depth of $6\frac{1}{2}$ feet at low water was carried in. Shoals extended $1\frac{1}{2}$ miles seaward on each side of the channel, the shoal on the north side was plainly indicated by breakers or by discolored water.

Big Marco River trends eastward and then southward from Big Marco Pass to the Gulf at Gullivan Bay, 4 miles northeastward of Cape Romano. The river is about 8 miles long and is navigable throughout its entire length for a draft of 4 feet at mean low water. The channel is very narrow and crooked and is marked only by snags and bushes that have lodged on the shoals along its sides. The southern approach to the river is across a shoal having a least depth of 4 feet at mean low tide, and is difficult for a stranger to find because of the absence of markers. It is protected from all directions except between southeast and southwest, but a wide expanse of gradually shoaling depths greatly reduces any possible sea from those directions. At high tide a draft of 6 feet can be taken through the river and out the southern passage, but good local knowledge is necessary. Pilots can be had at Marco, and directions for the river are given under the sailing directions on page 21.

Coon Key marks the southern approach to Big Marco River, and if it can be recognized, a stranger need have no fear of entering the river with a draft of 4 feet. Approaching from southeastward, Coon Key can be seen from the deck of a launch at a distance of 7 miles. At that distance it shows clear of all adjacent keys and Cape Romano can be seen only in a few detached spots near its western end. As the key is approached the land back of it becomes visible on each side, but Coon Key always stands well above all land in that vicinity. When near to the key it can be recognized by its large quantity of high, dead timber, it appearing to carry higher and a greater percentage of dead trees than any of the neighboring keys. At low tide an extensive reef can be seen west of the key and a short stretch of yellow sand beach east of the key. When nearly up to Coon Key a narrow gap can be seen east of it, between the back keys; this is the entrance to Big Marco River.

Marco is a post office and small settlement on the south bank of Big Marco River, 1 mile in from the beacon. It is a distributing point for this vicinity, and has a small hotel and a general store where gasoline, water, and some supplies, including ship chandlery, can be had. There is a small machine shop and a marine railway of about 50 tons capacity; vessels 70 feet long drawing 6 feet can be hauled. The wharf and marine railway are on the east bank of Collier Creek and can be reached by a draft of 6 feet. (See sailing directions for Big Marco River on p. 21.)

Gordon, *Big Hickory*, and *Big Carlos Passes*, 25, 9, and 6 miles, respectively, southward of San Carlos Bay, are used to some extent by small local boats, but all are shallow and are subject to frequent changes. They are not marked and should not be attempted by a stranger.

Matanzas Pass opens into the eastern part of San Carlos Bay, 3 miles east of Sanibel Island lighthouse. Small vessels can find safe and convenient anchorages just inside the pass, where there will be shelter from all directions. The channel, although narrow and unmarked, is not difficult, and it is said to change very little. A draft of 9 feet can be taken into a safe anchorage, 5 feet can be taken to Carlos post office, $2\frac{3}{4}$ miles from the mouth, and 4 feet through Estero Bay and out Big Carlos Pass, but strangers are advised not to go beyond the post office.

Directions.—From red buoy No. 4 on the dredged channel to San Carlos Bay, steer northeast until Bowditch Point, a long, low sand spit, is made out and the pass is nearly open. Then haul in gradually to east-northeast and east, keeping north of and close to the line of breakers which, if there is any sea running, will make on the shoal west of Bowditch Point. The shoal north of the channel will not show clearly, and one should be careful not to get too far northward

of the breakers. Follow the shore of Estero Island (Bowditch Point is the west end of this island), at a distance of 100 yards from it, until past the point on the north side and then come to anchor in a depth of 10 or 12 feet with the entrance nearly closed. Do not enter the bight east of the point on the north side of the entrance, as there is a shoal there nearly bare at low tide and the depth decreases very rapidly after the channel is left. To go to Carlos, follow the shore of Estero Island at a distance of 100 yards until the shore bends southward, then haul off gradually to a distance of 250 yards, and close in again to 100 yards when the next point on the south side is reached. Leave the first small stake on the port hand, the second on the starboard, and the third on the port, and then keep 50 yards from the island shore until the post office is reached.

SAILING DIRECTIONS FROM KEY WEST TO SAN CARLOS BAY.

By Northwest Channel and straight course to San Carlos Bay.—Leave black buoy No. 13, west of the lower coal wharf at Key West, on the starboard hand and steer 299° true (NW by W $\frac{5}{8}$ W mag.) to leave black buoy No. 15 on the starboard hand, and then steer for the perpendicular striped midchannel buoy, a little north of the last course. Leave this buoy close-to and steer 332° true (NNW $\frac{3}{4}$ W mag.) for the second perpendicular striped buoy. Then steer 317° true (NW mag.) for $2\frac{1}{4}$ miles, passing 100 yards westward of black buoy No. 11 and arriving at a position 100 yards eastward of red buoy No. 6. Then steer 295° true (WNW mag.) to leave black buoys Nos. 9 and 7 about 50 yards on the starboard hand and with Northwest Bar light a little on the port bow. Leave black buoys Nos. 5 and 3 between 50 and 100 yards on the starboard hand, and from the latter steer about 353° true (N $\frac{1}{8}$ W mag.) to pass midway between red buoy No. 2 and black buoy No. 1A, keeping Northwest Bar light a little on the starboard quarter.

From the bell buoy (black No. 1) make good a 359° true (N $\frac{3}{8}$ W mag.) course for 105 miles to the bell buoy (red No. 2) at the entrance to San Carlos Bay, and then follow the directions for San Carlos Bay on page 23. If due to make San Carlos Bay at night, it is safer to steer 357° true (N $\frac{1}{2}$ W mag.) for Sanibel Island light (a fixed and flashing white light on a brown, pyramidal, skeleton tower, visible at a distance of about 15 miles), and when the light is picked up steer for it until nearly 5 miles distant. Then steer northeast until on Punta Rasa range (two white lights in San Carlos Bay), leaving on port hand a black buoy that marks the shoal southeast of Sanibel Island light; the bell buoy will be well on the starboard hand.

By inshore courses northward of the keys.—Follow the directions given above through Northwest Channel. From the bell buoy steer 44° true (NE $\frac{1}{4}$ N mag.) for 55 miles, heading for the south side of the entrance to Ponce de Leon Bay. (See description of Ponce de

Leon Bay on p. 16, and for continuation of the sailing directions up the coast see p. 30.)

By inshore courses and Hawk Channel.—Leave red buoy No. 8, west of Fort Taylor, 50 yards on the port hand and red buoy No. 6, 150 yards on the port hand, steering 185° true (**S** $\frac{1}{4}$ **W** mag.). Round buoy No. 6 and steer 108° true (**ESE** $\frac{5}{8}$ **E** mag.) for a perpendicular striped black and white buoy. From this buoy steer 78° true (**ENE** $\frac{3}{4}$ **E** mag.) for $28\frac{1}{4}$ miles, passing 300 yards north of black buoy No. P. K. 19, $\frac{1}{2}$ mile north of black buoy No. 17, 200 yards north of Nine-Foot Shoal beacon (red and black horizontally striped, white light), and $\frac{3}{8}$ mile south of red buoy No. 12 LK, and arriving at a perpendicular striped black and white buoy south-southeast of Bahia Honda Harbor. From this buoy steer 64° true (**NE** by **E** $\frac{1}{2}$ **E** mag.) for $6\frac{1}{4}$ miles until the draw in the railroad bridge bears 357° true (**N** $\frac{1}{2}$ **W** mag.), and then steer for the draw. The opening at this draw is 106 feet wide; but when approaching with the tide the vessel should be kept well in hand, as strong tidal currents set through these openings—flood current sets northward and ebb southward. The head room under the solid spans is 18 feet and the openings are 65 feet wide.

After leaving the bridge steer 354° true (**N** $\frac{3}{4}$ **W** mag.) for $3\frac{1}{2}$ miles, and then about northeast through a passage $\frac{1}{2}$ mile wide between reefs bare at low tide. Leave the northern reef $\frac{1}{4}$ mile on the port hand and steer 348° true (**N** by **W** $\frac{1}{4}$ **W** mag.) for $1\frac{3}{4}$ miles, passing midway between a reef on the port hand, bare at low tide, and a small $2\frac{1}{2}$ -foot shoal. Then steer 357° true (**N** $\frac{1}{2}$ **W** mag.) for 26 miles to a position $1\frac{1}{2}$ miles west of Cape Sable Northwest Cape. If bound into Ponce de Leon Bay, follow the coast northward at a distance of 1 mile from it until the south side of the entrance bears northeast, and then follow the directions on page —, Ponce de Leon Bay; but if bound up the coast, keep off $1\frac{1}{2}$ miles.

From a position $1\frac{1}{2}$ miles off the coast south of Ponce de Leon Bay with the south side of the entrance bearing northeast, steer 340° true (**NNW** mag.) for 18 miles to a position 2 miles southwest of Seminole Point. From this position a 283° true (**W** by **N** mag.) course for 20 miles will lead to Cape Romano Shoals whistle buoy (red No. 16), and a 311° true (**NW** $\frac{1}{2}$ **W** mag.) course for 14 miles will lead to Indian Key sea buoy (red No. 2). But if intending to go through Big Marco River, steer 314° true (**NW** $\frac{1}{4}$ **W** mag.) for 24 miles to a position $1\frac{1}{2}$ miles southeast of Coon Key, leaving Indian Key sea buoy $\frac{3}{4}$ mile on the port hand. (See descriptions of Coon Key and of Big Marco River on p. 18.)

Directions for Big Marco River.—When about $1\frac{1}{2}$ miles southeast of Coon Key, bring its north end to bear 317° true (**NW** mag.) and steer for it, going very slowly and sounding continuously until past the south end of the key and the water begins to deepen. If drawing

over 4 feet or if at all uncertain of the key, it is advisable to stop when in a safe depth (a mile or so southeast of the key) and examine the approach from a small boat. Pass nearly 500 yards east of the south end of the key and then gradually reduce the distance to 100 yards when the middle length of the key has been passed. From the north end of Coon Key follow closely the shore on the east side for a distance of 500 yards, until it bends northward. Then favor a small island on the west side and return to mid-channel when passing the point north of this island. North of this point a bayou will be seen leading northeast; keep close to the eastern side of the river (100 yards or less) when passing this bayou and until 500 yards past it, and then the western side until $\frac{5}{8}$ mile past the bayou. Then take the north branch, steering about north so as to pass close to the east side of Goodland Point (the bold point between the two branches). Follow the shore of Goodland Point, at first closely for a distance of 350 yards, then favoring the other side as the river broadens and until Goodland Point trends nearly west, and then close to the point again.

The river here expands into a wide, shallow lake, nearly filled by shoals except for a very narrow channel along the south and west shores. Follow the south shore (Goodland Point) as close as 25 yards, nearly to the west shore, but do not enter the small bight there. Turn sharply when nearly into the bight and steer 328° true (NW by N mag.) to clear the west shore 30 yards, heading for a point on that shore west of an island. Pass along the west side of this island, less than 30 yards from it, and enter the river north of the island. Steer mid-river courses for $1\frac{1}{2}$ miles and, when the river broadens again, favor closely the northern side past a little bayou on that side. After leaving the bayou, keep 50 yards from the north shore for a distance of 225 yards and then steer 244° true (SW by W $\frac{1}{2}$ W mag.) to pass 20 yards south of a mid-river island, leaving a shoal (sometimes marked by snags) close-to on the starboard side. Continue this course until midway between the island and the southwest bank and then steer to pass the point south of the west end of the island at a distance of 30 yards. Then after clearing a shoal (sometimes marked by snags) on the starboard hand, steer 289° true (WNW $\frac{1}{2}$ W mag.), heading midway between the point on the north side of the river and the point west of it on the south side; and when three-fourths the distance to the north point, steer west and follow the southern bank at a distance of 75 yards until the river broadens. Then edge over gradually to the north bank and follow it at a distance of 100 yards.

When nearly to the broad bayou north of the river, steer 292° true (WNW $\frac{1}{4}$ W mag.), heading for a wharf on the south side of the river. Go slowly and sound continuously, as there are shoal spots here. Hold this course until a narrow bayou on the south side

is abeam and a prominent point on the north side (west side of the broad bayou referred to above) is nearly abeam and then keep a little farther from the southern bank. Favor the southern side of the river until nearly up to Marco, the settlement on the south bank; but when passing Collier Creek, on the east side of which is the village, keep well over to the north bank of the river, to avoid shoals extending into the river from each side of the creek. The wharf at Marco is reached by bringing the post office to bear southeast and steering in on this course.

After leaving Collier Creek, keep about in mid river, but give the eastern bank a berth of about 200 yards when passing the broad bayou between the last bend and the mouth. The channel across the bar is sufficiently marked by buoys and a beacon. (See description of Big Marco Pass on p. 18.)

From Big Marco Pass northward.—Stand offshore $1\frac{1}{2}$ miles from the beacon before turning northward, in order to avoid shoals north of Big Marco Pass, and then follow the coast northward for 28 miles to the bell buoy at the entrance to San Carlos Bay. This shore may be approached as close as $\frac{1}{2}$ mile after clearing the shoals at Big Marco Pass and until Big Carlos Pass is reached.

SAN CARLOS BAY

is a small body of water north and east of Sanibel Island, connected by Pine Island Sound and Matlacha Pass with Charlotte Harbor, but important chiefly as the approach to Caloosahatchee River. Sanibel Island lighthouse (fixed and flashing white light on a brown, pyramidal, skeleton tower) on the east end of that island, is a prominent mark from the Gulf and from all parts of the bay. A dredged channel, 200 feet wide and 12 feet deep at mean low tide, leads from the Gulf into the eastern part of the bay to Punta Rasa and Caloosahatchee River. A narrow channel with a least depth of 11 feet at mean low tide leads along the northeast side of Sanibel Island to the wharf at St. James City; it is marked by buoys. The remainder of the bay is filled by shoals, over which the depths vary from 1 to 6 feet. Fair anchorage, although exposed to strong tidal currents, can be found in the channel west of Punta Rasa and in the channel close to Sanibel Island. Vessels of less than 5 feet draft can find good anchorages, protected from all winds and free from currents, north of and close to Fishermans Key. There are no licensed pilots stationed here.

SAILING DIRECTIONS FOR SAN CARLOS BAY.

Approaching from southward.—Keep at least $1\frac{1}{2}$ miles off the coast southward of Sanibel light until up to the bell buoy (red No. 2) or until on Punta Rasa range. Then steer 317° true (NW mag.), keeping Punta Rasa range beacons (white lights on white, slatted, pyram-

idal structures) in line ahead and leaving all buoys on the starboard hand. The bank on the northeast side of the channel is very shallow and even bare in places.

To go to Caloosahatchee River.—Hold Punta Rasa range until 150 yards past buoy No. 10, and then steer 7° true ($N \frac{1}{2} E$ mag.), passing close to the wharves at Punta Rasa. Then see directions for Caloosahatchee River on page 27.

To enter the anchorage north of Fishermans Key.—Bring the lower wharf at Punta Rasa to bear about southeast by south over the stern and steer midway between the cluster of keys on the west side of the channel north of Punta Rasa and the small round key northwest of these. Go slowly after leaving the channel and look out for a long sand spit that extends northeast from the end of Fishermans Key. When past this spit, follow the north side of Fishermans Key at a distance of 100 yards and anchor off the middle of the key in a depth of 6 feet, mud bottom.

To go to Pine Island Sound.—Leave Punta Rasa range at red buoy No. 6 and steer about 261° true (W by S mag.) to clear the north shore of Point Ybel (east end of Sanibel Island, on which is the lighthouse of that name) about 200 yards. Then see directions for Pine Island Sound on page 30.

CALOOSAHATCHEE RIVER

rises in Lake Okechobee and flows in a westerly direction to San Carlos Bay, where it empties through a narrow, deep channel close to Punta Rasa. For a distance of 17 miles from the mouth the river has an average width of about 1 mile, but above that point it is a narrow, crooked stream from 50 to 100 feet wide in many places during the dry season. A canal connects the headwaters of the river, which at one time extended only to the swamp west of the lakes, with Lake Hicpochee, and a similar canal joins Lakes Hicpochee and Okechobee. The distance from the mouth at Punta Rasa to Lake Hicpochee is about 67 miles and to Lake Okechobee about 74 miles. A dredged channel, 100 feet wide and with a least depth of 9 feet at mean low tide, extends from the mouth to the turning basin at Fort Myers, a distance of 14 miles. Above there, except for the first 6 or 7 miles, where there is a 5-foot depth at low water, the depth in the river varies greatly with the seasons. At the close of the dry season, usually in March but sometimes as late as May, the river has a depth of but $2\frac{1}{2}$ feet at several places in its upper reaches, while during the late fall and early winter months these depths are increased from 2 to 4 feet. Freshets, lasting usually about two weeks, occur during the summer and early fall months and raise the river anywhere from 4 to 17 feet, depending upon the locality. Strong currents are prevalent in the upper reaches, especially during high-water stages. Below Fort Myers there are strong

currents only at ebb tide and in the cuts at Shell and Mangrove Points, 2 and 2½ miles, respectively, above Punta Rasa. The river is tidal as far as Labelle and has a mean range of about 1.6 feet from its mouth to that point. There are several villages and boat landings along the banks, the most important of which are Alva, Fort Denaud, Labelle, and Fort Thompson, 19, 27, 32, and 37 miles, respectively, above Fort Myers. Four bridges span the stream, the first at 4 miles above Fort Myers and the others at Alva, Fort Denaud, and Labelle. All have draw openings 50 feet or more in width. The dredged channel to Fort Myers is marked by lights and day beacons and presents no difficulties during clear weather, although at one place (described in the sailing directions) there are dangerous submerged rocks close to the channel on both sides. There are few marks above Fort Myers, but there are few places where a stranger would be liable to miss the main stream. However, on account of the sharp bends and the shoals in the narrow stretches of the river, even the best-informed boatmen touch bottom frequently when the water is low, and in the stretches above Fort Thompson the bottom is rocky in many places.

Fort Myers, on the south bank of Caloosahatchee River, 14 miles above its mouth, is the commercial center for the country south and east of Charlotte Harbor, as far east as Lake Okechobee and south to Cape Sable. It is the terminus of a railroad and is connected by steamship with Tampa and Key West. Steamboats and launches ply between this town and the villages and landings on Caloosahatchee River, Pine Island Sound, and the inland waters south of the river. When navigation is possible in the upper reaches of Caloosahatchee River and across Lake Okechobee, a regular boat schedule is maintained with Fort Lauderdale on the Atlantic coast. There are several commercial hotels here, and one large tourist hotel is open during the winter. Several large and small power craft (launches and houseboats) are kept at Fort Myers and can be hired for cruises along the coast or through the inland waters. Drafts of from 5 to 8 feet can be taken to the various wharves, the greatest draft to the railroad wharf. Fresh water, provisions, gasoline, and ship chandlery (principally yacht supplies) can be had here. Bituminous coal in small quantities can be had by arrangements with the railroad, but no large supply is kept on hand. The facilities for making repairs to gas engines and to the machinery and hulls of small vessels are fair. Vessels of about 90 tons, of a length of 80 feet and draft of 5 feet, can be hauled out here. There is a small shipyard on Orange River, about 6 miles above Fort Myers, to which a draft of 5 feet (at extreme high tide, 6 feet) can be taken. Repairs to machinery can be made there, and the marine railway is of sufficient capacity to haul out any vessel not over 110 feet in length that can reach the yard.

**ROUTE ACROSS SOUTH FLORIDA VIA CALOOSAHATCHEE RIVER,
LAKE OKECHOBEE, AND DRAINAGE CANALS.**

The opening of the State drainage canals from Lake Okechobee to the Atlantic coast has created a waterway, navigable for shallow-draft vessels, between the Atlantic Ocean at Fort Lauderdale and Miami and the Gulf of Mexico at San Carlos Bay. One steamboat and several gasoline launches operate over this route between Fort Myers and Fort Lauderdale when the stage of the water permits, carrying passengers and freight. The western section of the route has been described under the heading "Caloosahatchee River." The head of that stream is connected by canal with Lake Hicpochee, which is connected with the southwest corner of Lake Okechobee by a similar canal.

Lake Hicpochee is a body of fresh water lying nearly 3 miles southwest of Lake Okechobee; it is from 3 to 5 miles across in any direction. The lake is very shallow but the bottom is so soft that any boat able to reach it can cross without difficulty.

Lake Okechobee is an approximately circular fresh-water lake in south Florida, about 26 miles from the Atlantic coast, 50 miles from the Gulf coast, and 90 miles from the south end of the mainland. The lake varies in width from about 22 to 30 miles and is shallow within a distance of from 1 to 2 miles from its shores. The center of the lake is comparatively deep. The present average low-water surface of the lake is about 20 feet above mean low tide of the Gulf, but the drainage project of the State of Florida contemplates a reduction to elevation 16 and prevention under any condition of a rise above 19 feet. The navigational route across south Florida crosses the southern part of the lake, from the canal at its southwest corner leading into Lake Hicpochee to one of the drainage canals which leave its southeast corner. The shallowest place that a boat must cross is the approach to the canal to Lake Hicpochee, where for a distance of $1\frac{1}{2}$ miles the channel depth during westerly winds is about $\frac{1}{2}$ foot less than in the shallowest part of Caloosahatchee River (least depth about 2 feet at extreme low water). The bottom of the lake for a distance of 2 or 3 miles from shore is carpeted with a thick growth of tenacious grass which renders navigation difficult unless equipped with a weedless propeller. There is a small hotel on Ritta Island, a small island in the southern extremity of the lake, where lodging and meals can be had. Landing is made at a long pier on the south side of the island.

North New River Canal extends from the southeast corner of Lake Okechobee to a point on New River about 3 miles above Fort Lauderdale, or 5 miles above the ocean. The canal is 51 miles long, 50 to 100 feet wide, and of an average depth of from 5 to 8 feet, depending

upon the water level in the lake. But there are several places in the canal where a boat drawing 3 feet may touch unless skillfully handled, and the approach from Lake Okechobee is good for only about 3 feet when the lake is low. The bottom and sides of the canal are rocky—New River is from 10 to 20 feet deep from the canal to a point 1 mile below Fort Lauderdale and at least 5 feet deep from there to New River Inlet. The maximum draft that can be carried in the inlet is $3\frac{1}{2}$ feet.

Miami Canal enters Lake Okechobee due south of Ritta Island and connects with Miami River at a point about 3 miles above its mouth. This canal is 68 miles long and is navigable for a draft of only about 2 feet when the lake is full.

South New River Canal extends from New River, at the mouth of the north canal, to Miami Canal; it is of no importance to navigation.

Two other drainage canals are under construction and will extend from Lake Okechobee to the Atlantic, one at the town of Deerfield and the other at West Palm Beach.

SAILING DIRECTIONS FOR CALOOSAHATCHEE RIVER.

After leaving Punta Rasa range, steer 7° true (**N** $\frac{1}{2}$ **E** mag.) until the lower dock at Punta Rasa closes on Sanibel Island lighthouse bearing south, and then steer 2° true (**N** mag.) until up to the first of three little islets on the port hand and about midway between this islet and one on the starboard hand. Then steer 339° true (**NNW** mag.) for beacon No. 5 (black), at the entrance to the first river cut, Cut D. Leave this beacon 50 feet on the port hand and steer 24° true (**N** by **E** $\frac{7}{8}$ **E** mag.) on Cut D range, the front a white light over a square, black day mark and the rear a red light over a circular, white day mark. When nearly up to the front light, No. 7, steer 45° true (**NE** $\frac{1}{8}$ **N** mag.) on Cut E range; the front is No. 11, a square, black day mark, and the rear is a circular, white day mark. When beacon No. 9, white light over a square, black day mark, closes on the rear beacon of Cut D range, steer 67° true (**NE** by **E** $\frac{3}{4}$ **E** mag.) into Cut F, with these lights on range astern. Hold this range past beacon No. 13, which is 300 yards northward of Mangrove Point, and then steer to leave beacons Nos. 15 and 17 on the port hand and to enter Cut G on a 81° true (**E** by **N** mag.) course with the beacons of this range on line ahead. The front beacon of the range shows a red light over a diamond-shaped, white day mark and the rear a white light over a circular, white day mark. These beacons are sometimes difficult to pick up, especially during rainy or misty weather, and unless exactly on range after leaving beacon No. 17, about 1 mile east of Mangrove Point, there is danger of striking submerged rocks on either side of the cut. Some of the rock exca-

vated from this cut (it was dumped on each side) is visible at certain stages of the tide, but as there is also a spoil bank of earth about 100 feet north of the cut, strangers, having missed the range, are liable to get between this earth bank and the northern rock pile.

Leave Cut G range, passing 100 feet westward of the red beacon which is just west of the front range light, and steer to bring this light in line with a circular, white day mark southwest of it. Steer 51° true (**NE** $\frac{3}{8}$ **E** mag.) on this range, the beacons in line astern, and leave beacons Nos. 17A and 19, both black, square day marks, 50 feet on the port hand. Then change course gradually to 22° true (**N** by **E** $\frac{3}{4}$ **E** mag.) to leave beacon No. 21, square, black day mark, 50 to 75 feet on the port hand. Then steer 14° true (**N** by **E** mag.) to beacon No. 23, leave it 50 feet on the port hand, and steer 42° true (**NE** $\frac{1}{2}$ **N** mag.) to leave beacon No. 25 the same distance on that side. When past No. 25 alter the course one-fourth point northward, heading for beacon No. 27, and when up to it steer 42° true (**NE** $\frac{1}{2}$ **N** mag.) on Cut P range, the beacons for which are No. 28; a red, triangular day mark, and a rear beacon with a circular, white day mark. Leave beacon No. 28 on the starboard hand, No. 29 (black) at least 100 feet on the port hand, and No. 30 (red) on the starboard hand. When past No. 29 steer 13° true (**N** by **E** mag.) on Cut Q range, the beacons for which are No. 33, a square, black day mark, and a rear beacon with a circular, white day mark. Leave all beacons hereafter on the port hand and steer as follows: 27° true (**NNE** $\frac{1}{4}$ **E** mag.) on Cut R range, then 44° true (**NE** $\frac{1}{4}$ **N** mag.) on Cut S range, and finally 57° true (**NE** $\frac{3}{8}$ **E** mag.) to the turning basin at Fort Myers. The beacons for the last two ranges are similar to those for Cut Q; there is no range for the last course. The turning basin is 10 feet deep and is between beacons 39, 41, and 43 and the wharves. Outside of this dredged area the depth is 7 feet or less.

Above Fort Myers.—From the turning basin, steer about 36° true (**NE** by **N** mag.) for a distance of $2\frac{3}{4}$ miles to a cluster of piles supporting a triangular, white target. Leave this beacon 50 feet on the port hand, leave the next pile, which marks the west end of a bulkhead visible at low tide, and the bulkhead, the same distance on the port hand, and then leave all other piles about 50 feet on the starboard hand. From the last pile steer so as to leave the west end of Beautiful Island about 100 yards on the starboard hand and head for the draw in the railroad bridge. When past the bridge, steer so as to leave the first islet about 20 yards on the starboard hand, and the second and third islets about 50 yards on the port hand. The wooded swamp on the starboard hand will then give way to an open prairie with here and there a few palms, and the river will divide at the prairie. Keep to the northern arm—the other is Orange River—leave two boathouses on the port hand, and favor the starboard side

until the river narrows. Above this point the river flows between clearly defined banks, at least during normal stages, and is easily followed except at a few places. Just below the village of Upcohall (name on a building at the landing) a somewhat smaller stream is left on the starboard hand, and a little above this village a stream is passed on the port side. At Palm Grove (white house on the south bank) the river bends sharply to the right and there is a branch leading downstream from there; follow the bank on the starboard hand. After passing Fort Denaud careful handling will be necessary to keep in the best water and some difficult bends will be encountered. During flood stages, the banks are entirely submerged in the vicinity of Fort Thompson, but the channel is indicated by tall iron pipes carrying pointers; these are placed from 20 to 30 feet back from the banks.

Fort Thompson is the last settlement on the south bank of the river; it sets back from the stream among the trees, and only the ice plant, with its tall iron chimneys, and a few houses are visible from the water. Eastward of here the river is diverted from its old course into a narrow, rock-lined canal that lies southward of Lake Flirt. About 12 miles above Fort Thompson there is a boat landing on the north bank, from which a road leads to Citrus Center, a mile north of the river. Four miles eastward of this landing is Lake Hicpochee. A small hut stands on the south bank of the canal where it enters the lake. The approach in Lake Hicpochee to Three-mile Canal, which connects this lake with Lake Okechobee, is marked by a stake surmounted by a barrel. Entering Lake Hicpochee from the river, steer eastward until the barrel is picked up, leave it on the port hand, and enter Three-mile Canal close to its southern bank.

Lake Okechobee.—The eastern end of Three-mile Canal is marked by a lone, flat-top cypress on its northern bank close to Lake Okechobee; a small hut stands on the southern bank a little back from the lake. The approach to this canal in Lake Okechobee is marked by stakes for a distance of $1\frac{1}{2}$ miles. On leaving Three-mile Canal steer so as to pass all stakes close to on the port hand. From the last mark (the last two are tripods of saplings) steer about northeast by east so as to pass about 1 mile northward of the fish houses north of Observation Island. Leave a stake surmounted by a barrel well on the starboard hand and steer about east-southeast until 3 miles past Observation Island. Then steer about south by east for Ritta Island (not visible at first from the deck of a launch). If intending to stop at this island, pass about $\frac{1}{2}$ mile westward of it and haul in for the wharf when a little south of its outer end. To go to North New River Canal, steer for Ritta Island until about 1 mile distant and then steer so as to pass eastward of the island; follow the south shore of the lake at a distance of about 1 mile until the canal is reached. It is the extreme southeast corner of the lake, and its approach is marked by stakes.

MATLACHA PASS

extends northward from San Carlos Bay to Charlotte Harbor, between Pine Island and the mainland. It is navigable for a draft of 4 feet, but the channel is narrow and very crooked and is not marked. Strangers should not use this pass.

PINE ISLAND SOUND.

west of Pine Island, is the main thoroughfare between San Carlos Bay and Charlotte Harbor, a distance of about 15 miles. It is navigable at high tide for a draft of 7 feet, but the channels at each end of the sound are narrow and are poorly marked. A stranger following closely the directions given here and with the aid of a chart should have no difficulty getting through with a draft of 5 feet, but for a greater draft a pilot should be taken.

Captiva Pass leads from the Gulf into Pine Island Sound at a point 6 miles south of Boca Grande. It is used to some extent by yachts and small fishing boats and is good for about 6 feet at mean low tide. In March, 1913, the channel trended northeast by north to the point on the north side of the pass and, although unmarked, was quite easily followed. Shoals extended nearly 1 mile into the Gulf on each side of the channel and at the bar the channel was quite narrow.

Anchorage at Captiva Pass.—There is a fair anchorage for small boats in a basin about 200 feet across and from 7 to 8 feet deep, south of a small point in Pine Island Sound $\frac{1}{2}$ mile south of Captiva Pass. The holding ground is said to be good, and the anchorage is well protected from all directions except between east and southeast. This anchorage is reached from Captiva Pass by following the shore southeastward at a distance varying from 150 feet at the pass to 50 feet at the point $\frac{1}{2}$ mile southeast of the pass, passing inside of the shoals, nearly bare at low tide, and between the point and some stakes. At the point the channel bends sharply westward to the anchorage, which is close to the point and between it and a shoal that uncovers at low tide.

SAILING DIRECTIONS FOR PINE ISLAND SOUND.

Entering the channel north of Point Ybel in San Carlos Bay, keep about 200 yards offshore until past red buoy No. 2. Then, to carry the greatest depth, steer so as to leave the next buoy (black, No. 1) close-to on the port hand and the next red buoy (No. 4) close-to on the starboard hand, but a depth of 8 feet can be carried by following the shore at a distance of 200 yards until up with the last wharf (Reed's) on the northeast shore of Sanibel Island. From buoy No. 4 steer 325° true (NW $\frac{3}{4}$ N mag.) to leave black buoy No. 3 close-to on the port hand; from there steer 289° true (WNW $\frac{1}{2}$ W mag.) to

leave black buoy No. 5 close-to on the port hand. Then steer for the wharf at St. James City.

When about 100 yards from the wharf, steer about 233° true (**SW** $\frac{1}{2}$ **W** mag.) for the highest part of the woods on Sanibel Island until a stake is picked up and then steer so as to leave the stake 50 yards on the starboard hand. Then steer about 283° true (**W** by **N** mag.) for the right side of a dark, wooded point until a gap in the woods about 7 miles distant shows midway between two other stakes and bears about 317° true (**NW** mag.). Head for this gap, bringing a similar gap over the stern, and leave the first of these stakes 200 yards to starboard and the second the same distance to port. Continue on this course for a distance of 250 yards past the second stake and then steer about 272° true (**W** mag.) for the small building on piles about $\frac{1}{2}$ mile from shore, known locally as Wulfort Bulkhead. When 200 yards distant from the building, steer 2° true (**N** mag.) for the third (counting from the right) of a line of piles that extends northwestward from Chino Island; it is a cluster of three piles. Leave this marker 60 feet on the starboard hand and steer about 317° true (**NW** mag.) with the first and second piles in line astern, showing a little inside the west end of Chino Island. Leave the next marker at the same distance on the starboard hand and hold this course for $\frac{1}{4}$ mile past the marker. Then steer 334° true (**NNW** $\frac{1}{2}$ **W** mag.), heading for the west side of Palmetto Island, which is the wooded island west of Useppa Island. Useppa Island can be recognized at a considerable distance by a large house and a windmill on its summit. When Captiva Pass is abeam and two little wooded islets to the left of Useppa Island close on this island, steer 5° true (**N** $\frac{1}{4}$ **E** mag.) for the east side of Patricio Island, giving Useppa Island a berth of $\frac{1}{2}$ mile.

There is a hotel on the north end of Useppa Island, and the east shore of this island should not be approached closer than $\frac{1}{2}$ mile until north of this hotel, when a depth of 6 feet can be taken to the wharf. Two passages lead from here to Charlotte Harbor, one along the shore of Lacosta Island to Boca Grande, the entrance to Charlotte Harbor from the Gulf, and the other through a dredged channel north of Pine Island. The former is more convenient if bound out to the Gulf, and the latter if bound up the harbor; both are good for about 7 feet at mean low tide.

To leave by the western passage.—When nearly up to the hotel on Useppa Island, bring the south end of Mondongo Island, which is north of Useppa and west of Patricio Islands, to bear 323° true (**NW** $\frac{1}{2}$ **N** mag.) and steer for it until nearly up to a stake that marks the south end of the shoal surrounding Mondongo Island. The stake is little more than halfway from Useppa to Mondongo Island. Leave this stake, and another west of it, close-to on the starboard

hand and then haul gradually for Punta Blanco, the east end of Lacosta Island. When 250 yards distant from this point, steer north-northwest until the outer end of the wharf at the Quarantine Station, on the north end of Lacosta Island, is in line with the left side of the phosphate elevator at South Boca Grande, and then steer this range 320° true (**NW $\frac{1}{4}$ N** mag.), to the Quarantine Station.

To leave by the eastern passage.—When abreast the middle of Useppa Island, haul in slightly toward this island so as to be $\frac{1}{4}$ mile off when up to its north end. Then steer to pass midway between Patricio Island and a small fish house in the water east of it. From the fish house steer 24° true (**NNE** mag.), heading for the left hand of two piles and with the southeast end of Patricio Island over the stern. Enter the dredged cut at the first pile, leaving it and the second pile 30 feet on the port hand.

CHARLOTTE HARBOR

is a landlocked, right-angle-shaped bay 10 miles long in an east and west direction, the same in a north and south direction, and about 5 miles wide throughout. It opens on its south side into Pine Island Sound and Matlacha Pass, on its north side into Gasparilla Sound, and its north end is the outlet for Miakka and Peace Rivers. The general depth varies from about 8 to 15 feet but a depth of 12 feet can be carried through dredged channels to the head of the bay and 24 feet can be taken to an anchorage in the mouth of the bay.

Boca Grande.—The entrance from the gulf, known as Boca Grande, is 125 miles northward of Key West Northwest Channel entrance and 63 miles south-southeastward of the main entrance to Tampa Bay. It is $\frac{1}{2}$ mile wide and can be recognized from offshore by a high water tank and a tall yellow chimney $\frac{3}{8}$ mile north of the entrance, and at night by Gasparilla Island range lights. These lights, the rear a flashing, white light on a white frame house and the front a fixed white light on a black pyramidal structure, on the south end of Gasparilla Island, form a range for crossing the crest of the bar, $3\frac{1}{2}$ miles outside the entrance, along a course good for about 18 feet. During the early part of 1913 a channel 300 feet wide and 24 feet deep was dredged across the bar at an angle with this range, and the buoys were shifted to conform with the new channel. Shoals, bare in places, extend from the bar to the shores on each side of the channel, between which and inside of the bar there is a deep channel, from 300 feet wide at the bar to $\frac{3}{8}$ mile wide at the entrance. Licensed pilots are stationed at South Bocagrande, near the lighthouse, and can be had by making the usual signal from off the bar. Tidal currents in the entrance to the bay have considerable strength, especially on ebb tide, and are said to attain occasionally a velocity of from 3 to 4 knots.

Swash Channel.—A break in the shoal along the north side of the Boca Grande Channel forms what is known as the Swash Channel, a narrow passage 6 feet deep, close to the south end of Gasparilla Island. This channel is used to a considerable extent by small local craft, and is said to change but very little from time to time. However, a stranger should attempt it only when the sea is so smooth that the shoals can be seen clearly and should keep in mind that changes both in depth and direction may have occurred since the last examination. In April, 1913, the channel followed close around the point (about 50 yards off) until the shore turned northward, when the channel took a general northwest direction.

South Bocagrande, on the south end of Gasparilla Island, is the terminus of a railroad. The place consists of large phosphate elevators, a few dwelling houses, and a wharf to which any vessel that can enter the harbor can go. A high water tank and a very tall yellow brick chimney here are prominent objects from offshore. The light-house, south of the town, is rather inconspicuous during daylight. Pilots for the bar and inside waters can be had here.

Bocagrande is a winter resort on the same railroad, 2 miles north of South Bocagrande. A small wharf in Charlotte Harbor, 2 miles north of the wharf at South Bocagrande, leads to the town. South of this wharf is a small landlocked lagoon, in which small craft can find anchorages in a depth of 4 to 5 feet, mud bottom. It is reached by a dredged channel, about 20 feet wide and 8 to 9 feet deep, running east and west about 200 yards south of the wharf.

Punta Gorda is a town on the south bank of Peace River near the head of Charlotte Harbor and is second in size to Fort Myers. It has railroad connections with the interior of the state and with Fort Myers. A draft of 10 feet can be taken to the town and alongside the public wharf (the longest wharf here). A draft of 6 feet can be taken to the railroad wharf, east of the public wharf. Good anchorage, in depths ranging from 6 to 9 feet, can be found off the town. Fresh water, gasoline, and some supplies can be had here. Storm-warning signals are displayed from a tower on the water front. Minor repairs to engines and machinery can be made, and there are lift-ways of about 30 tons capacity but limited to drafts of 4 feet. At Cleveland, 3 miles above Punta Gorda, on the same bank, there is a marine railway of about 30 tons capacity, on which vessels of 5 feet draft can be hauled.

SAILING DIRECTIONS FOR CHARLOTTE HARBOR.

To enter from the Gulf during daylight.—Bring the chimney and water tank at South Bocagrande to bear 45° true ($NE \frac{1}{4} N$ mag.) while more than 4 miles offshore and stand in on this course until

the bell and gas buoy is picked up. From this buoy steer 36° true (**NE** by **N** mag.) for $2\frac{1}{2}$ miles with the beacons which are north of the entrance in range leaving two black buoys 50 yards on the port hand and two red buoys 50 yards on the starboard hand. At the second red buoy, No. 4, haul eastward to leave the third red buoy, No. 6, 50 yards on the starboard hand. And then steer for the middle of the passage between Gasparilla Island and Lacosta Island.

To enter at night with a draft of 12 feet or less.—Bring Gasparilla Island light (flashing white light) to bear 55° true (**NE** $\frac{3}{4}$ **E** mag.) while more than 4 miles offshore and steer for it until the front range light (fixed white light) is picked up. It should be seen in line with, and below the other light. Then steer this range until $1\frac{1}{4}$ miles from the lights and the depth has increased to 30 feet. Then steer 67° true (**NE** by **E** $\frac{3}{4}$ **E** mag.) so as to pass $\frac{1}{4}$ mile south of the lights.

When past the lights, haul slowly northeastward and anchor in 4 fathoms with the rear light bearing about **WSW** distant $\frac{3}{4}$ mile, or if drawing 6 feet or less steer about north-northeast past the wharf and anchor anywhere within $1\frac{1}{2}$ miles northward of the light and $\frac{1}{2}$ mile off the east side of Gasparilla Island.

To go to Punta Gorda.—Steer 72° true (**ENE** $\frac{1}{4}$ **E** mag.) with Charlotte Harbor light a little on the port bow, leaving red buoys Nos. 8 and 10 150 yards on the starboard hand. When buoy No. 10 is abeam steer 75° true (**ENE** $\frac{1}{2}$ **E** mag.) until Charlotte Harbor light bears 13° true (**N** by **E** mag.), and then steer 44° true (**NE** $\frac{1}{4}$ **N** mag.) to a position 100 yards east of black buoy No. 7. Then steer 354° true (**N** $\frac{3}{4}$ **W** mag.) for Mangrove Point beacon (flashing white light), leave it 100 yards on the port hand, and steer 16° true (**N** by **E** $\frac{1}{4}$ **E**) so as to leave Peace River beacon (flashing red light) 100 yards on the starboard hand. From a position 200 yards north of the last beacon steer 69° true (**ENE** mag.) for $\frac{7}{8}$ mile, and then steer 92° true (**E** mag.) so as to leave a wreck and the remains of a wharf 60 yards on the starboard hand. From there steer 69° true (**ENE** mag.) to the public wharf or to the anchorage off the wharf.

GASPARILLA SOUND AND PASS.

Gasparilla Sound extends northward of Charlotte Harbor for a distance of about $7\frac{1}{2}$ miles between Gasparilla and Little Gasparilla Islands and the mainland. It is navigable for a draft of 5 feet at high tide, but requires local knowledge. A railroad trestle crosses the sound north of Gasparilla Island. Gasparilla Pass enters the sound between Gasparilla and Little Gasparilla Islands. It usually has a depth of 6 feet, but both the depth and position of the channel change so frequently that directions would be useless.

COAST FROM CHARLOTTE HARBOR TO TAMPA BAY.

The coast trends about northwest by north and is a nearly straight sand beach, broken at a few places by small inlets. The shore is wooded nearly to the water's edge and has few prominent features that can be recognized from offshore. At a safe coasting distance for small vessels the buildings at Boca Grande, at Sarasota, and at several of the inlets can be made out, and the water tower at Sarasota can be seen from some distance offshore. Except in the vicinities of the entrances to Charlotte Harbor and Tampa Bay, 18 feet can be carried up to within $\frac{3}{4}$ mile from the shore, and this distance, increased to 1 mile at the inlets, is a safe coasting distance for small vessels. Back of the coast line are shallow bays and lagoons that can be entered by the inlets, but there is no continuous inside passage. Strangers bound up the coast should leave Charlotte Harbor by Boca Grande or Swash Channel and may, if the sea is smooth and their draft will permit, enter the inside waters by Big Sarasota Pass or by Longboat Inlet, but it is safer to continue outside to Tampa Bay Southwest Channel. The distance from the bar at Boca Grande to the bar at the Southwest Channel is 58 miles, and a 334° true (**NNW $\frac{1}{2}$ W** mag.) course from the bell and gas buoy at Boca Grande will lead to the bell buoy at Southwest Channel, crossing the shoals at the latter in a depth of 14 to 15 feet, but otherwise through deep water.

Big Sarasota Pass leads into Sarasota Bay 38 miles northwestward of Gasparilla Island light and 20 miles southeastward of Tampa Bay Southwest Channel entrance buoy. It lies between Sarasota Key and the small islets north of this key and can be recognized, coming from the southward, when nearly up to Sarasota Point, the low sandy west end of Sarasota Key. A high water tower at Sarasota and a hotel and windmill on Bird Island will be seen as the pass opens. This pass is the most difficult of any of its depth on this coast and should be attempted by a stranger only when the sea is smooth and preferably on a rising tide. The difficulty lies in the approach to the pass, where the channel for a distance of about 1 mile runs nearly parallel to the beach, between it and a shifting shoal on which the sea usually breaks, and over a shifting bar. After the bar has been crossed, the channel can be followed easily. In the spring of 1913 this channel had a least depth of 6 feet on the bar, and the following directions lead through the best water, but subsequent storms may have changed it:

Approach the bar on about a northwest by north course so as to pass inshore of the outer breakers and from 200 to 300 yards off Sarasota Point, and keep a sharp lookout for the shoal on the inshore side, as the sea may not break on it. The channel is only about 50 yards wide on the crest of the bar and the only guides are the color

of the water and the breakers. Haul gradually northward as Sarasota Point is approached, and come about to northeast by east when rounding the point, decreasing the distance from the shore to about 100 yards. Here, if there is any sea on, breakers will appear to extend off the northwest side of the point, but the channel is between these and the shore, as will be seen on closer approach. The channel follows the northwest side of Sarasota Key at a distance from the shore of about 100 yards until Sarasota Bay is reached. (See directions for Sarasota Bay on p. 42.)

Longboat Inlet leads to Sarasota Bay 11 miles northward of Big Sarasota Pass. It has a depth of only 5 feet on the bar, but the channel is straight and is much easier for a stranger than is Big Sarasota Pass. On the south side of the inlet is a white house with a cupola and on the north side several unpainted buildings on the beach. In the spring of 1913 the channel bore seaward in a south-southwest direction from the opening and was well defined by prominent shoals on each side. After entering the inlet turn northward and keep close to the shore until abreast the wharf. Then be guided by the color of the water until the staked channel is reached.

Stump Pass, Casey Pass, and Little Sarasota Pass are used occasionally by small local boats, but should not be attempted by a stranger.

TAMPA BAY AND TRIBUTARIES.

TAMPA BAY

is about 20 miles long and from 6 to 7 miles wide. It has a general depth of from 3 to 5 fathoms along its central line, between broad shoals that extend far from the shores on all sides. Channels 300 feet wide and 24 feet or more deep have been dredged where necessary to give a depth of at least 24 feet to the head of the bay and into Old Tampa and Hillsboro Bays. The buoys and beacons are placed with reference to these cuts, except as described in the sailing directions. The entrance is divided by Egmont Key, forming two channels, known as the North and the Southwest Channels. Egmont Key lighthouse, a tall white tower, showing a fixed white light with two red sectors, on the north end of Egmont Key, is a prominent mark from offshore and from anywhere in the lower part of the bay.

North Channel has a depth of 25 feet across the bar in a dredged channel 500 feet wide, and greater depths inside the bar. It is marked by buoys and a range and at night by the northern red sector of Egmont Key light. A pilot boat is usually near the bar and there is a pilots' lookout on Egmont Key.

Southwest Channel has a depth of 16 feet and is marked by buoys. Both channels are comparatively easy.

St. Petersburg is a large winter resort on the west shore of Tampa Bay. It is the terminus of a railroad and is connected by steamboats with Tampa and the towns on the bay. There is good anchorage off the wharves in depths of from 15 to 25 feet, but with a fresh breeze from anywhere east of north or south this anchorage is too exposed for very small vessels. A depth of 15 feet can be taken to the railroad (the longest wharf) and from 7 to 9 feet to the wharf north of it. Small craft may land at the public wharf at the head of the basin between the long wharves (depth 7 feet), but may not remain there. The best anchorage for small craft is in Bayboro Harbor, an artificial basin 1,360 feet long, 450 feet wide, and about 10 feet deep, $\frac{1}{2}$ mile south of the center of the town. This basin is reached by a channel, 9 feet deep and about 30 feet wide at this depth, running east and west, close to the north side of a sandy point $\frac{3}{4}$ mile south of the railroad wharf at St. Petersburg. A depth of 6 feet can be carried through a dredged channel into Coffee Bayou, $1\frac{1}{8}$ miles north of the railroad wharf. Fresh water, gasoline, provisions, and yacht supplies can be had at St. Petersburg, and there are facilities for making repairs to small machinery. Vessels of about 100 tons can be hauled out here. Storm-warning signals are displayed from a tower near the wharves.

SAILING DIRECTIONS FOR TAMPA BAY.

To enter by the North Channel.—When at least 5 miles off Egmont Key bring the light to bear 98° true (*E* $\frac{1}{2}$ *S* mag.)—the lighted whistling buoy is 7 miles from the light on this bearing—and steer for the light. Keep in the red sector of Egmont light and on the range formed by this light and a white beacon showing a flashing white light, leaving two black buoys on the port hand and two red buoys on the starboard hand. After passing the second black buoy steer 81° true (*E* by *N* mag.) for a distance of $1\frac{1}{4}$ miles to a PS gas and bell buoy. Leave it close-to and steer 98° true (*E* $\frac{1}{2}$ *S* mag.) for a distance of $4\frac{5}{8}$ miles to a PS gas buoy in Tampa Bay, passing close to a PS buoy soon after bringing Egmont Key light abeam. From the last gas buoy steer 68° true (*NE* by *E* $\frac{7}{8}$ *E* mag.) for a distance of 5 miles to a red buoy (No. 2 B) at the southern end of the first dredged channel in the bay, Cut B, leaving a PS buoy close-to after passing Mullet Key Shoal light, on the port hand. From the red buoy follow directions on page 38.

To enter by the Southwest Channel from southward.—Keep more than 3 miles off the coast until Egmont Key light bears 30° true (*NNE* $\frac{1}{2}$ *E* mag.) and then steer for it until up to the bell buoy. At night the vessel when on this course should be in the red sector. From the bell buoy steer 58° true (*NE* by *E* mag.) for $3\frac{1}{2}$ miles,

leaving a black buoy 150 yards on the port hand, a red buoy 300 yards on the starboard hand, and Southwest Channel beacon (white light) $\frac{1}{4}$ mile on the port hand. When the beacon is abeam steer 62° true (**NE** by **E** $\frac{3}{8}$ **E** mag.) for $7\frac{1}{4}$ miles to red buoy No. 2 B at the southern end of Cut B. (See p. 37.)

Coming from Sarasota Bay.—Leave black buoy No. 1 on the starboard hand and steer 30° true (**NNE** $\frac{1}{2}$ **E** mag.) for $3\frac{1}{4}$ miles to red buoy No. 4. Leave it on the starboard hand and steer 47° true (**NE** mag.) for $4\frac{1}{4}$ miles to red buoy No. 2B.

From buoy No. 2B to Tampa or Port Tampa.—Steer 38° true (**NE** $\frac{3}{4}$ **N** mag.) for $3\frac{1}{2}$ miles so as to leave two red buoys 50 yards on the starboard hand and two black buoys 50 yards on the port hand. Then steer 61° true (**NE** by **E** $\frac{1}{4}$ **E** mag.) for 2 miles on Cut C range, leaving a red buoy 50 yards on the starboard hand and a black buoy the same distance on the port hand. The beacons for this range are pyramidal structures, slatted above small houses, on piles; the front beacon is red and shows a red light, and the rear is white and shows a white light. Steer 27° true (**NNE** $\frac{1}{4}$ **E** mag.) for $2\frac{1}{2}$ miles so as to leave two black buoys 50 yards on the port hand. When the beacons of Cut E range (similar to Cut C beacons—the easterly pair of four beacons at the head of the bay) close, bearing 18° true (**N** by **E** $\frac{3}{8}$ **E** mag.), steer this range and leave two red buoys 50 yards on the starboard hand. When Cut F range closes (similar beacons, west of the former), steer 0° true (**N** $\frac{1}{8}$ **W**) on this range to buoy No. 3F (black). See sailing directions for Hillsboro Bay, page 40, and sailing directions for Old Tampa Bay, page 41.

From buoy No. 2B to St. Petersburg by the West Channel (for a draft of 10 feet or less).—Steer 38° true (**NE** $\frac{3}{4}$ **N** mag.) for 2 miles to red buoy No. 4B. Then steer 355° true (**N** $\frac{5}{8}$ **W** mag.) for $6\frac{1}{2}$ miles, so as to leave Point Pinelos beacon (black pyramidal structure, white light) 200 yards on the port hand, a red buoy northeast of it the same distance on the starboard hand, a single, slatted pile $\frac{1}{4}$ mile on the starboard hand, and arrive at a black and white striped buoy off St. Petersburg.

From the northern part of Tampa Bay to St. Petersburg.—If drawing 10 feet or less, steer for the standpipe on the hill at St. Petersburg when it bears anywhere between 278° true (**W** $\frac{1}{2}$ **N** mag.) and 255° true (**WSW** $\frac{1}{2}$ **W** mag.), unless east of Cut E beacons.

If coming from Hillsboro Bay, a draft of 20 feet can be carried by steering 261° true (**W** by **S** mag.) from a position 50 yards north of red buoy No. 10. The standpipe on the hill at St. Petersburg should be right ahead and two black and red striped buoys should be left on the port hand and red buoy No. 2G on the starboard hand.

When 2 miles from St. Petersburg steer for the black and white striped buoy off the wharves, or steer for the longest wharf.

HILLSBORO BAY,

8 miles long and 4 miles wide, is the northeast arm of Tampa Bay. It has a natural channel from 2 to 3 fathoms deep and about 1 mile wide, extending along its central line to within about 3 miles of its head. Outside the channel the natural depths decrease gradually to the shores on all sides. A channel from 150 to 200 feet wide and 24 feet deep has been dredged from the deep water of Tampa Bay through Hillsboro Bay to its head. It is marked by lighted beacons and by buoys.

Tampa is an important manufacturing city and shipping port at the head of Hillsboro Bay. It has good railroad connections with the North and with the towns along the Gulf coast. Steamship lines connect with New Orleans, Habana, Key West, and New York, and several lines of bay steamers ply between Tampa and the towns on Tampa Bay and tributaries. Fresh water, coal, gasoline, and supplies of all kinds can be had here. The facilities for making repairs to hulls and machinery of small vessels are good. There are several marine railways, at the largest of which vessels 180 feet long and of 12 feet draft can be hauled out. There is no anchorage within 2 miles of the city, but there are ample docking facilities almost in the heart of the city.

Hillsboro River flows nearly through the center of the city of Tampa to the head of Hillsboro Bay. A straight channel, 150 feet wide and 24 feet deep, has been dredged through the shoals in the head of the bay to a turning basin at the mouth of the river. From there a channel 300 feet wide and 24 feet deep has been dredged eastward along the south water front of Tampa to the railroad bridge, beyond which there is an uncompleted channel extending into and up Ybor Estuary. A channel 200 feet wide and 12 feet deep extends upriver from the turning basin to a point 100 feet below the first bridge (Lafayette Street Bridge). The ocean steamship docks are along the south end of the city, on the deeper channel, and the docks for bay steamers and small vessels are along the east bank of the river below the first bridge. The river is navigable for a distance of about 8 miles above the first bridge, to Sulphur Springs, above which the depth decreases rapidly and there is a dam across the stream. The stream is narrow and generally quite deep below Sulphur Springs, but at several places shoals extend nearly or entirely across, and there are no marks. Five drawbridges cross the river at Tampa and a little above the city limits. A draft of 12 feet can be taken at high tide to the shipyard above the third bridge, and 4½ feet can be taken at any time to Sulphur Springs.

The average tide in the river at Tampa is 2.2 feet, but tides here are governed to a considerable extent by winds. Northerly winds

have lowered the water level 3 feet below mean low tide mark and southerly winds have raised it 4 feet above mean high tide; during a hurricane the river fell 6 feet below the plane of mean low water. Storm-warning signals are made from a tower at the mouth of the river.

SAILING DIRECTIONS FOR HILLSBORO BAY.

From black buoy No. 3F, on Cut F range in Tampa Bay, steer 65° true (NE by E $\frac{5}{8}$ E mag.) for 4 miles, leaving red buoy No. 10 about 50 yards on the starboard hand, red beacon (red light) No. 2 nearly 50 yards on the starboard hand, and two black buoys on the port hand. Or, if drawing only 12 feet, steer 44° true (NE $\frac{1}{4}$ N mag.) from the intersection of Cut E and Cut F ranges for a distance of $3\frac{1}{4}$ miles, leave red buoy No. 10 about 50 yards on the starboard hand, and then steer 65° true (NE by E $\frac{5}{8}$ E mag.). Leave red beacon (red light) No. 4 nearly 50 yards on the starboard hand and steer to leave red beacon No. 6 the same. From beacon No. 6 steer 5° true (N $\frac{1}{4}$ E mag.) for $5\frac{1}{4}$ miles so as to leave five black beacons (white lights) nearly 50 yards on the port hand and the red buoys on the starboard hand. Small vessels sometimes pass a little westward of all of these beacons but never eastward of the red beacons and buoys, as the material dredged from these cuts was dumped within 800 feet of the eastern side of the cuts and the depths there are only a foot or two in places. Leave the last black beacon (No. 9) on the port hand and steer to pass westward of a red unlighted beacon and to bring the Hillsboro River range beacons in line astern. They are single, slatted, white piles, the front showing a red light, and the rear a white light. Steer this range, about 333° true (NNW $\frac{1}{2}$ W mag.), to the turning basin in the mouth of Hillsboro River. The tall stack of the Tampa Electric Co., on the west bank of the river at Tampa, should be right ahead when on this course and range. If bound upriver favor the eastern side to the first bridge.

OLD TAMPA BAY

is the northwest arm of Tampa Bay; it is about 12 miles long and 6 miles wide, except at the junction of the two bays, where it is $2\frac{1}{2}$ miles wide. About three-fourths of the area of the bay has a depth ranging from 1 to $2\frac{1}{2}$ fathoms and the remainder, along the shores, depths under 1 fathom. The entrance is partly closed by shoals, through which there is a dredged channel 300 feet wide and 25 feet deep from Tampa Bay to a deep anchorage of small area off the wharves at Port Tampa.

Port Tampa is a shipping port on the east shore of Old Tampa Bay near its mouth. It has docks to which the largest vessels can go, and

most of the foreign shipping is from here. The steamships from Key West and Habana dock here. A railroad and an electric car line connect with Tampa. Yachts may land at the outer end of the southern dock but are not permitted to enter the long slip between the docks. There is no safe anchorage for small craft.

SAILING DIRECTIONS FOR OLD TAMPA BAY.

Leave Cut F in Tampa Bay after passing black buoy No. 3F and steer 281° true (**W** $\frac{3}{4}$ **N** mag.) on Cut G range (two single, slatted, white piles, close to the shore north of St. Petersburg), leaving a red and black striped buoy on the port hand and two red buoys on the starboard hand. At the second red buoy (No. 4G) haul slowly to 359° true (**N** $\frac{1}{4}$ **W** mag.) to bring the beacons of Cut J range in line astern—they are pyramidal white structures, showing flashing white lights, on the middle ground southward of St. Petersburg—and to leave the lighted red buoy and red beacon No. 8 (red light) on the starboard hand. When the beacons of Cut K range (piles with black and white striped daymarks, a little westward of beacon No. 8) are in line, steer 23° true (**N** by **E** $\frac{1}{8}$ **E** mag.) with these beacons over the stern. Leave two red buoys on the starboard hand and from the latter steer 13° true (**N** by **E** mag.) to the anchorage off the docks at Port Tampa.

SARASOTA PASS AND SARASOTA BAY

are connecting bodies of water extending southeastward from the lower part of Tampa Bay for a distance of 17 miles and are separated from the Gulf by a line of narrow keys. These waters vary in width from $\frac{1}{2}$ mile to 3 miles and are very shallow, except in the widest part of Sarasota Bay and there the depth does not exceed 12 feet. Cuts, 50 feet wide and 5 feet deep, have been dredged through the shoals to give a navigable depth of 5 feet at mean low tide to the town of Sarasota, at the lower end of the bay. The channel is well marked by beacons and is easily followed. Big Sarasota Pass gives access to the Gulf from the lower end of the bay.

Sarasota is a small town on the east shore at the southern end of Sarasota Bay. It is connected by railroad and by steamboat with Tampa. Fresh water, gasoline, and some supplies can be obtained there. A draft of 5 feet can be taken to the wharf. There is a repair shop for small boats and a marine railway of 50 tons capacity, limited to a length of 80 feet.

Little Sarasota Bay is a narrow and shallow lagoon, extending 11 miles southeastward of Sarasota Bay to Casey Pass. It has been improved by dredging to give a navigable depth of 3 feet at mean low tide from Sarasota Bay to Casey Pass and to the town of Venice, 1 mile eastward of the pass.

SAILING DIRECTIONS FOR SARASOTA PASS AND SARASOTA BAY.

Having entered the bay through Big Sarasota Pass (see p. 35 for description of Big Sarasota Pass and directions for entering), follow the shore of Sarasota Key, keeping about 100 yards off until up to the north end where there are several buildings. Leave the pile north of this point well on the starboard hand and steer about northeast by north to leave a pile on the shoal south of Bird Island about 100 yards on the port hand. Then haul northward and leave a pile east of Bird Island 100 yards on the starboard hand. To go to Sarasota, round this pile, 100 yards on the starboard hand, and head for the northern wharf. To go through Sarasota Bay, steer 334° true (**NNW $\frac{1}{2}$ W** mag.) for a distance of $1\frac{1}{2}$ miles from a position 100 yards westward of the last pile. Then, New Pass having opened, steer 320° true (**NW $\frac{1}{4}$ N** mag.) for $4\frac{1}{2}$ miles with a beacon a little on the port bow and Cedar Point, west of Sarasota, right astern. This beacon, like those north of it, consists of three piles drawn together at the top, to which is fastened a white board pointing to the side to which it must be passed. Leave this beacon at least 100 yards on the port hand and steer 267° true (**W $\frac{1}{2}$ S** mag.). When the second beacon is nearly abeam change course gradually to north, making a wide turn and leaving this beacon 50 yards on the starboard hand. Leave the third, fourth, and fifth beacons 30 feet on the port hand, steering 327° true (**NW $\frac{1}{8}$ N** mag.). Then steer 295° true (**WNW** mag.) for the sixth beacon and leave it and the seventh beacon, which is near the channel to Longboat Inlet, 30 feet on the starboard hand. The spoil bank from this cut shows along its northeastern side. Hold the course maintained through this cut until $\frac{1}{4}$ mile past the seventh beacon, and then haul northward a little so as to leave the eighth beacon, which is south of the village of Cortez, 20 feet on the starboard hand, and look out for rocks west of the channel at this beacon. Give the point at Cortez a berth of 100 yards and steer so as to pass 50 yards off the wharf on the other side and the same distance west of the beacon just north of this wharf. Then steer 25° true (**NNE** mag.) for the next beacon; leave it 30 feet on the starboard hand and the next two beacons 30 feet on the port hand. The spoil bank on the eastern side of the cut between the last two of these beacons shows clearly. After leaving the cut, haul a little northward so as to leave the next, the last beacon, 100 yards on the port hand, and then haul westward to leave the buoy (No. 1) on the starboard hand.

MANATEE RIVER

empties into the lower part of Tampa Bay on its south side just east of Sarasota Pass. It varies in width from $\frac{1}{2}$ to nearly 1 mile for a distance of 10 miles from the mouth and then from 80 to 600 feet for

about 8 miles to Rye. A draft of 9 feet can be carried to Rocky Bluff, 8 miles above the mouth, and 3 feet to Rye. The channel as far as Rocky Bluff is well marked by beacons (some lighted) and buoys. No directions are necessary other than to leave black beacons, white lights, and black buoys on the port hand and red beacons, red lights, and red buoys on the starboard hand when bound upriver. A railroad and an highway drawbridge cross the river above Braidentown.

The largest towns on Manatee River are situated as follows: Braidentown, on the south bank, $4\frac{1}{2}$ miles above the mouth; Palmetto, on the north bank opposite Braidentown; and Manatee, on the south bank, $5\frac{1}{2}$ miles above the mouth. A steamboat connects these towns with Tampa; and Braidentown and Manatee also have railroad connections with Tampa. Fresh water, gasoline, and some supplies can be had at Braidentown.

TERRACEIA BAY

lies just north of Manatee River, with which it is connected by a dredged channel 6 feet deep. The entrance to Terraceia Bay from Tampa Bay is just north of the mouth of Manatee River and is marked by a lighted beacon (white light). This channel is good for about $3\frac{1}{2}$ feet and is marked by beacons. Lighted beacons mark the inner end of this channel and both ends of the cut from Manatee River. There are no towns on this bay.

BOCA CEIGA BAY

extends 13 miles northwestward from the lower part of Tampa Bay to The Narrows, a narrow passage connecting with Clearwater Harbor. They both lie very close to the Gulf, from which they are separated by a line of narrow keys. The bay varies in width from $\frac{1}{2}$ mile to 2 miles and in depth from a few inches to 10 feet. A channel 100 feet wide and 7 feet deep has been dredged through the shoals at the junction with Tampa Bay and in the lower part of Boca Ceiga Bay. This connects with a dredged channel 50 feet wide by 5 feet deep through the shoals in the upper part of Boca Ceiga Bay, through The Narrows, and to the deep water of Clearwater Harbor. These cuts have been marked from time to time by small stakes with pointers indicating the side on which they should be passed.

Pass a Grille is the name of the passage that leads from the Gulf to the lower part of Boca Ceiga Bay, between Pine and Long Keys. It is also the name of a pleasure resort and beach on the south end of Long Key. The channel inside the bar is deep and is clearly defined by visible shoals on each side, but across the crest of the bar

it is not easily traced, and from the Gulf it is very difficult to find. In 1913 the depth on the bar at mean low tide was 5 feet. No directions that would be of use to a stranger can be given, and strangers are advised not to enter this pass from the Gulf. Pass a Grille has frequent communication by power boats with St. Petersburg and Tampa. The wharves are on the east side of Pine Key, on the pass, and have sufficient depth alongside. Gasoline and some supplies can be had here.

Gulfport is a small place on the north shore, nearly north of Pass a Grille, and is connected by electric car line with St. Petersburg. A power boat makes frequent trips between here and Pass a Grille.

Johns Pass leads from the Gulf to Boca Ceiga Bay, 4 miles below its head and 7 miles northward of Pass a Grille. A two-story white house on the north side of the pass is a conspicuous mark from a few miles offshore and serves as a guide to the pass. This pass is used much by small local boats and is not difficult when the sea is smooth. The channel follows close to the shore on the north side of the pass, thence turns southward outside the pass, and crosses the crest of the bar about $\frac{1}{2}$ mile southward of the pass and between $\frac{1}{4}$ and $\frac{1}{2}$ mile offshore. It has a depth of 7 feet on the bar and is quite narrow there. A black buoy marks the north side of the channel at the bar.

To enter the pass from the Gulf, stand down the coast ($\frac{3}{4}$ mile off when abreast the pass and gradually reduced to $\frac{1}{2}$ mile at the buoy) until the pass closes and the buoy is reached, or in the absence of the buoy, which may be displaced, until $\frac{1}{2}$ mile south of the pass. Then steer about north to leave the buoy (if in place) close-to on the port hand; go very slowly and sound continuously, as the channel is narrow. Haul slowly eastward, but keep the house on the starboard bow until past the point on the starboard hand. Then favor the northern shore through the pass.

Blind and *Indian Passes*, the former south of Johns Pass, and the latter at the north end of Boca Ceiga Bay, are very shallow and are not used.

SAILING DIRECTIONS FOR BOCA CEIGA BAY.

The directions given here were obtained in the spring of 1913 (before the project had been completed) and therefore can not be depended upon where subsequent improvements have been made. The latest information regarding this project can be obtained at the office of the United States engineer in the post-office building at Tampa.

From Point Pinelos beacon in Tampa Bay, 2 miles east of Point Pinelos, the northern side of the entrance to Boca Ceiga Bay, steer 264° true ($W \frac{3}{4} S$ mag.) for a small red beacon. Leave this beacon, another red beacon westward of it, and a third southeastward of the

latter, all from 20 to 30 feet on the port hand. From the third beacon steer 297° true (NW by W $\frac{3}{4}$ W mag.) for the north end of Bird Key. When between 300 and 400 yards from Bird Key steer for the middle of Pine Key (about SW by W), leave a beacon 200 yards on the starboard hand and haul slowly westward, and then follow the north side of Pine Key at a distance of 200 yards. When Pass a Grille opens steer northward, leaving a stake well on the starboard hand and the first point 100 yards on the port hand. Keep off nearly 200 yards at the next point, and look for stakes and for spoil banks on the western sides of two cuts. The first cut is about 300 yards eastward of a small island, on the east side of which is a house, and the second cut bears about north-northwest from a prominent point on the eastern shore. After leaving the second cut, haul slowly westward and pass between a small islet and the western shore. Follow this shore (close-to) to its end and then turn northeastward, passing a dry sand bank on the starboard hand and several small islands on the port hand. Leave a stake on the port hand, about 200 yards northeast of the south end of the easternmost island, and steer 340° true (NNW mag.) for the east side of Turtle Crawl Point, which separates the bay into two arms. When $\frac{1}{2}$ mile distant from this point, steer about 283° true (W by N mag.) into a cut, and hold this direction until the west side of the point is abeam. Then haul northward and be guided by stakes and the color of the water, favoring in general the northern side of the bay until The Narrows are reached. Stakes and the evidences of dredging will indicate the channel through The Narrows and through the southern part of Clearwater Harbor.

To leave Boca Ceiga Bay via Johns Pass.—When $\frac{5}{8}$ mile from Turtle Crawl Point and the north end of the islet east of Johns Pass bears 250° true (WSW mag.), steer for it and go very slowly. There are several small detached shoals, between which the channel (at least 5 feet deep) winds. The shoals are dark in color and can usually be seen in time to sheer off, if moving slowly. Leave the islet 100 yards on the port hand and favor the northern side of the pass. (See description of Johns Pass and directions on p. 44.)

COAST FROM TAMPA BAY TO ANCLOTE RIVER.

The coast northward of the entrance to Tampa Bay for a distance of 35 miles to Anclote River is bordered by a line of long, narrow islands that, with one exception, overlap at their ends or at most are separated by gaps of but a few hundred yards in width. The exception is just south of Anclote Keys, which lie west of Anclote River, where there is a gap of 5 miles between these islands and the next island to the south of them. Between this line of islands and the mainland is a continuous waterway of shallow bays and passages,

the southern part of which has been described already under the heading of Boca Ceiga Bay. The northern section of this waterway is known as Clearwater Harbor, St. Josephs Sound, and Anclote Anchorage. The Gulf sides of these islands are straight or gently curving sand beaches backed by dense growths of small pines and semitropical timber. At the entrance to Tampa Bay shallow depths extend over 4 miles offshore, but northward of Pass a Grille, until the gap south of Anclote Keys is reached, no depth of less than 2 fathoms is found within 1 mile of the shore, and between the inlets deeper water is found at half that distance from the beach. The marks that can be seen and identified from offshore are: Anclote Keys lighthouse, a brown skeleton tower, showing a flashing white light, on the south end of the largest and most southerly of these keys; a tall water tower at the town of Clearwater, and a large yellow hotel and tall chimney at Belleair, south of Clearwater. The objects at Clearwater and Belleair are on the mainland and can be seen through gaps between the islands.

CLEARWATER HARBOR AND ST. JOSEPHS SOUND.

The line of bordering islands, described above, approaches within 100 yards of the mainland at the north end of "The Narrows," at a place known as Indian Rock, 16 miles above the entrance to Boca Ceiga Bay from Tampa Bay, and then gradually diverges from the mainland until at the north end of Hog Island, which is 13 miles north of Indian Rock and is the northern limit of the continuous line of islands, the distance from the mainland is $2\frac{1}{4}$ miles. The body of water contained between this strip of islands and the mainland, along the coast northward of Hog Island as far as Anclote Keys, is known as Clearwater Harbor and St. Josephs Sound. Clearwater Harbor, which is the southern part of this waterway and extends as far north as Big Pass, is mostly filled with flats and shoals, but it has narrow natural channels varying in depth from 6 to 20 feet, from both Big Pass and Little Pass to within 200 yards of the eastern shore, and a basin 6 feet deep south of Little Pass. Channels, 50 to 100 feet wide and 5 feet deep, have been cut through the shoals from this basin to The Narrows. St. Josephs Sound varies in depth from 1 to 7 feet over a large part of its area and has no well-defined channel, at least south of the north end of Hog Island. A draft of 6 to 8 feet can be taken into Clearwater Harbor, and a draft of 4 feet can be taken on a favorable tide through St. Josephs Sound to Anclote Anchorage.

Clearwater is a town on the east shore of Clearwater Harbor opposite Little Pass. It is connected by railroad with St. Petersburg and the towns northward. A draft of 8 feet can be taken to the public wharf, from which a road leads to the center of the town. Gasoline, provisions, and some yacht supplies can be obtained there

Dunedin is also to the east shore, 3 miles north of Clearwater and about opposite Big Pass; it is on the railroad. A draft of about 3 feet can be taken to the wharves.

Big Pass and *Little Pass* lead into Clearwater Harbor from the Gulf, Little Pass 12 miles northward of Johns Pass, and Big Pass 3 miles northward of Little Pass. The approaches to both passes are across shifting bars on which both the depths and directions of the channels shift frequently. In the spring of 1913, Big Pass had a channel depth across the bar of $9\frac{1}{2}$ feet and Little Pass 9 feet, both at mean low tide. However, one can not be certain of finding these depths, and the directions for entering (given hereafter) must, in view of probable changes, be followed cautiously. Usually when the sea is smooth, which is the only time when a stranger can enter safely, the channel can be recognized by the color of the water. Big Pass was marked by a red buoy, to be left on the starboard hand in entering, but it was not in correct position to mark the best water; neither channel was correctly shown on the chart.

SAILING DIRECTIONS FOR CLEARWATER HARBOR AND ST. JOSEPHS SOUND.

To enter Clearwater Harbor by Little Pass.—Keep at least 1 mile offshore until a little pavilion on the beach north of the inlet is in line with the water tower at Clearwater. Stand in on this range until about $\frac{1}{2}$ mile from the shore and the grassy point on the north side of the entrance is in line with the tall chimney near the large hotel south of Clearwater. Then steer about south-southeast, changing course gradually to southeast as the shoal on the starboard hand is approached, and pass about 100 yards off the point on the north side of the entrance. Turn south when inside the entrance, leave a stake close-to on the port hand and the west shore at the entrance about 600 yards on the starboard hand, and continue south until $\frac{3}{4}$ mile south of the inlet and abreast the hotel pier. Then turn northeastward and head for the wharves at Clearwater, giving the ends of the wharves a berth of not over 100 yards. A draft of 6 feet can be carried through the harbor.

To enter Clearwater Harbor by Big Pass.—Bring the water tower at Clearwater to bear a little east of 148° true (*SE* by *S* mag.) when yet 1 mile or more offshore. Steer this course with the water tower a little on the port bow, but keep a sharp lookout for shoals on each side. As the entrance is approached the channel bends a little to starboard and then curves to port, around the point on the south side of the entrance. Give this point, on which there is a small pavilion, a berth of 100 yards and turn southward inside the pass, following the west shore for a distance of $\frac{1}{4}$ mile. Leave a stake, just inside the pass, well on the port hand, the next stake 150 yards on the starboard hand, and, passing close to the southwest side of a

small island southeast of the first stake, head about for Clearwater. Leave all islands, after the first, on the starboard hand; leave a stake, just east of a little islet, 50 yards on the starboard hand and the next stake 100 yards on the port hand. Then haul slowly for the eastern shore north of the water tower and, when $\frac{1}{4}$ mile from this shore, steer to give the wharves a berth of not over 100 yards. This channel is good for 8 feet unless the channel across the bar has shoaled recently.

Through Clearwater Harbor and St. Josephs Sounds.—Strangers should attempt this passage only on a rising tide and should navigate cautiously, as there are few marks, and several very shallow places are not marked. Probably a little over 4 feet can be taken through, but in its present condition 4 feet is all that a stranger should attempt to carry. From the wharves at Clearwater follow the east shore at a distance of about $\frac{1}{4}$ mile until Dunedin is reached. There are no stakes and the only guide is the lead. From a position $\frac{1}{8}$ mile off the wharves at Dunedin, steer 343° true (**N** by **W** $\frac{3}{4}$ **W** mag.) for Anclothe Keys lighthouse. Leave the first stake on the port hand and the second and third on the starboard. When $1\frac{1}{2}$ miles southward of the north end of Hog Island, steer north until abreast the end of the island, and then steer for the lighthouse again.

ANCLOTE ANCHORAGE AND RIVER.

Anclothe Keys lie $2\frac{1}{2}$ miles off the mainland, about 35 miles northward of Egmont Key and 57 miles southward of Cedar Keys. The keys extend $2\frac{3}{4}$ miles in a north and south direction and are marked by a lighthouse, a brown, skeleton tower, showing a flashing white light, on the south end of southernmost key. The water shoals gradually as the keys are approached from westward and at a distance of 1 mile west of the longest key a depth of 12 feet is found.

Anclothe anchorage is between Anclothe Keys and the mainland and is well protected from westerly gales. The anchorage can be used by vessels drawing 7 feet or less and can be reached by passing either north or south of the keys. Both passages are marked by buoys and beacons.

To enter to the anchorage from south of the keys.—When 2 miles or more westward of the keys, steer 56° true (**NE** $\frac{3}{4}$ **E** mag.), so as to pass $\frac{1}{4}$ mile south of a small, black beacon $\frac{3}{4}$ mile south of the lighthouse and to leave two red buoys close-to on the starboard hand. When the beacon is abeam, steer 28° true (**NNE** $\frac{1}{4}$ **E** mag.), and when the light bears west, steer north 1 mile to the anchorage.

To enter to the anchorage from north of the keys.—When 5 miles northward and 2 miles westward of the lighthouse, steer 92° true (**E** mag.) to leave two red buoys close-to on either side. From the second buoy steer 132° true (**SE** $\frac{1}{2}$ **E** mag.) for a small, black beacon.

When $\frac{1}{2}$ mile distant from this beacon and a red, pyramidal beacon and a similar black beacon (white light on the latter) are in line, steer for them, 185° true (**S** $\frac{1}{4}$ **W** mag.), until a red beacon on the starboard hand is abeam. Then steer about southwest by south to an anchorage.

Anclote River discharges over a broad shoal east of Anclote Keys and a little northward of the lighthouse. A channel, 100 feet wide and 6 feet deep, has been dredged from Anclote Anchorage, into the river and up to Anclote post office, a distance of $2\frac{1}{4}$ miles, and a channel 4 feet deep from there to the county bridge at Tarpon Springs, $1\frac{1}{2}$ miles farther upriver; but the sides of some of the cuts have caved, leaving a clear channel not over 50 feet wide at several places. The river, outside of the channel, is but a foot or two deep, and above the bridge it is navigable only for very small boats. The channel is well marked by lights and beacons as far as Tarpon Springs. A bayou extends southward from the river, from an opening $\frac{1}{2}$ mile above the island that is opposite Anclote post office, and on the eastern arm of this bayou is a little concrete-faced basin containing a spring more than 120 feet deep. A draft of 4 feet can be taken into this basin to the public wharf at its head, but a favorable tide is necessary.

Tarpon Springs is a winter resort and town on the south bank of Anclote River; it is the headquarters for the sponge-fishing fleet of this section of the coast and is often visited by small yachts. A railroad connects with the towns southward along the coast to St. Petersburg and with the interior of the State. A draft of 6 feet can be taken at high tide to the Sponge Exchange, just below the county bridge, but the depth at the dock there is less than 3 feet. The most convenient approach to the town for small boats is through the bayou and basin described above. Fresh water, gasoline, provisions, and boat supplies can be had at Tarpon Springs. There are facilities for making repairs to launches and there are marine railways of about 40 tons capacity. The limits of length and draft that can be hauled out here are 85 feet and 6 feet, respectively. Storm-warning signals are displayed from a tower at the Sponge Exchange.

SAILING DIRECTIONS FOR ANCLOTE RIVER.

The dredged channel through the shoals to the mouth of the river is marked by a large black beacon (white light) near the western end of the cut and by a range of lights, the front a white light over a black diamond-shaped day mark and the rear a red light over a white circular day mark, on single piles near the mainland. A second range, consisting of the same front light together with another red light and white target westward of the front light, marks a turn in the channel.

The large red beacon without light which is north of the large black lighted beacon marks an old channel that should not be used by strangers.

Having reached Anclote Anchorage, directions for which are given on page 48, and when about on line between Anclote lighthouse and the large black, lighted beacon $1\frac{1}{2}$ miles eastward of it, bring the lights of the first range in line, bearing 71° true (*ENE* $\frac{1}{8}$ *E* mag.), and steer for them with Anclote lighthouse right astern. Leave the entrance beacon about 50 feet on the port hand, leave the front range light close-to on the port hand, and then steer 108° true (**ESE** $\frac{5}{8}$ **E** mag.) with this light and the second red light on range astern. This range leads into the mouth of the river, and above there the channel is marked by lights and beacons on both sides of the cuts. Leave the red lights and red triangular day marks on the starboard hand and the white lights and black square day marks on the port hand. The channel is said to have shoaled to a depth of $2\frac{1}{2}$ feet at low tide in the cut east of the island at the mouth of Kramers Bayou, and strangers are advised to navigate cautiously after leaving Anclote post office.

To go to the basin in the eastern part of Tarpon Springs, leave the river at Kramers Bayou, the first opening on the south side, about $1\frac{1}{4}$ miles above Anclote post office, and follow the marked channel past a marine railway.

From the marine railway, favor the eastern and northern banks, passing a small bayou on the port hand, and turn into the second passage on the north side. Keep about in the middle of this passage and look out for submerged rocks. The public landing is on the north side, nearly at the head of this arm.

COAST FROM ANCLOTE KEYS TO CEDAR KEYS.

Northward of Anclote Keys the character of the coast undergoes a marked change. The shore, low and marshy, is broken by innumerable small creeks and bayous and is flanked by many small keys and islets. Shoals reach far into the gulf, depths of 5 feet being found over 7 miles offshore at some places and depths of 18 feet at a distance of 15 miles. As a general rule the depths decrease gradually and fairly uniformly as the coast is approached, but there are many shallow spots outside of deeper water. St. Martins Reef is a shoal area extending along the coast for a distance of 40 miles northward of Anclote Keys and 7 miles offshore. On this shoal are many detached rocks, bare or covered to a depth of a foot or two. The outer limit of shallow water and detached shoals is marked by a red second-class nun buoy (St. Martins 22), in a depth of 13 feet, at a position 16 miles 343° true (*N* by *W* $\frac{3}{4}$ *W* mag.) from Anclote Keys

lighthouse and 12 miles offshore. The distance from Anclote Keys light to Cedar Keys light is 57 miles, and the direction from the former is 348° true (*N* by *W* $\frac{1}{4}$ *W* mag.). This line passes $1\frac{3}{8}$ miles inside of St. Martins buoy, where a depth of $5\frac{1}{2}$ feet may be found, but everywhere else is over depths ranging from 9 to 30 feet, except of course in the immediate vicinities of the keys, and abreast Crystal and Withlacoochee Rivers it lies 15 miles offshore. Small vessels of 3 or 4 feet draft usually follow the coast more closely, especially during windy weather, and, keeping about 7 miles off, find comparatively smooth water. This may be done with reasonable safety if soundings are taken frequently and a sharp lookout for shoals is kept.

Port Richie, *Hudson*, and *Bayport* are villages on the coast, $6\frac{1}{2}$ miles, 12 miles, and 23 miles, respectively, northward of the mouth of Anclote River. A draft of 4 feet can be taken to all, but only on a favorable tide and with good local knowledge. Strangers should not attempt to enter with a draft of more than 3 feet and must exercise the greatest caution to avoid reefs.

CRYSTAL RIVER

enters the gulf 46 miles northward of Anclote River and 22 miles east-southeastward of Cedar Keys light. The river is navigable at mean low tide for a draft of 6 feet to the town of Crystal River, 6 miles above its mouth. The approach to the river is across a shoal and several reefs, through which a channel has been dredged to a depth of 6 feet and a width of 60 feet. The channel is easily followed after the passage through the outer reef, 3 miles offshore, has been found. A white tripod marks this passage, and several stakes mark the channel inside.

The town of Crystal River is connected by railroad with the interior of the State.

SAILING DIRECTIONS FOR CRYSTAL RIVER.

Keep at least 5 miles offshore until the white tripod bears east and then steer for it. Leave this mark 20 to 30 feet on the port hand and steer 56° true (*NE* $\frac{3}{4}$ *E* mag.) for nearly $\frac{5}{8}$ mile, so as to leave a stake 50 feet on the port hand. Then steer 41° true (*NE* $\frac{1}{2}$ *N* mag.) for about $\frac{1}{2}$ mile so as to leave a cluster of piles 30 feet on the starboard hand, and from there steer 86° true (*E* $\frac{1}{2}$ *N* mag.) into the dredged channel. Steer the last course for a distance of $1\frac{3}{4}$ miles to the mouth of the river, leaving spoil banks and small stakes on each side. No directions for the river can be given other than to keep about in midstream.

WITHLACOOCHEE RIVER

rises in the interior of the State and discharges into the Gulf, 5½ miles north of Crystal River and 17 miles east-southeast of Cedar Keys light. The river is navigable at normal low water for a draft of 7 feet to Inglis, 7½ miles above the mouth, and for a draft of 4 feet for a distance of about 13 miles. The approach to the river is by a dredged channel, which in 1913 had a navigable depth at mean low tide of 8 feet to Port Inglis, just inside the mouth. This channel is well marked by pointer stakes on each side of the cut (these are maintained by private interests) and by a white beacon, showing a flashing white light, near the outer end of the cut.

Withlacoochee Anchorage is a basin between the shoals, 7½ miles off the mouth of the river. It is reached by a buoyed channel from the deep water of the Gulf, and is used by ocean-going vessels while lightering cargoes for Port Inglis. Vessels load to a depth of 22½ feet at the anchorage and to a greater depth at the outer buoy. Pilots are stationed at Port Inglis and will come out to the outer buoy for a vessel.

Port Inglis, on the south bank of Withlacoochee River at its mouth, is largely the plant of the Port Inglis Terminal Co., in addition to which there is a post office, a branch customhouse, and a general store. The terminal company maintains a small but well-equipped shipyard for repairing its own vessels and a marine railway of 700 tons capacity. Vessels drawing up to 7 feet forward and 10½ feet aft can be hauled on this railway, and while the company does not solicit outside work, it will, if practicable, accommodate vessels in need of minor repairs. Coal in small quantities, gasoline, fresh water, and some provisions can be had here.

SAILING DIRECTIONS FOR WITHLACOOCHEE RIVER.

Coming from the deep water of the Gulf, it is advisable to make the sea buoy and then follow the buoyed channel to the anchorage, from which a 53° true (**NE ½ E** mag.) course with the entrance beacon right ahead will lead through the best water until within ½ mile of the beacon. Then bring the beacon to bear 46° true (**NE ½ N** mag.) and steer for it, leaving the rock pile, the outer end of which is 700 yards southwestward of the beacon, 50 feet on the port hand. Small vessels coming from southward and following the coast at a distance of about 7 miles will be inshore of the inner buoy and if drawing less than 5 feet may steer for the beacon when it bears east of 25° true (**NNE** mag.).

Leave the beacon 125 feet on the port hand and steer to keep the rock pile 50 feet on the port hand until nearly ¾ mile past the beacon (the spoil banks from this part of the cut are wholly on the north

side). Then be guided by the channel stakes and spoil banks, which will be found on both sides of the channel. Go slowly when approaching the bends and until certain on which side to leave a stake or bank. The sides of the cuts are frequently of hard rock.

CEDAR KEYS

are 57 miles northward of Anclote Keys and 83 miles southeastward of St. Marks River, at the head of Apalachee Bay. Cedar Keys lighthouse, on the south side of Seahorse Key, one of the southern islands of this group, is the most prominent object from offshore. The lighthouse is a white tower on a white dwelling; the light will be discontinued about January 1, 1915. A shoal, known as Seahorse Reef, extends $10\frac{1}{2}$ miles southwest by south from Seahorse Key and is marked by a beacon near its outer end and by a bell buoy at the end.

Cedar Keys Harbor is protected on all sides by keys and shoals, and has safe anchorages for small vessels. It can be entered with a draft of 10 feet by the main ship channel, a buoyed passage east of Seahorse Key. East Channel, north of Depot Key, has a least depth of 5 feet but is not marked. It is used only by local boats. Northwest Channel, north of North and Middle Keys, has a least depth of 5 feet and is marked by a few piles, but careful navigation is necessary to carry this depth through. Small vessels bound up the coast should, if the draft will permit, enter by the main ship channel and leave by the northwest channel, rather than to cross Seahorse Reef.

Cedar Keys is a small town at the head of the harbor. It is the terminus of a railroad that runs to the interior of the State, but the place is of little commercial importance now. A draft of 10 feet can be taken to the railroad wharf, where stores can be loaded conveniently. Coal, fresh water, gasoline, and some provisions and boat supplies can be had here. There are practically no facilities for making repairs. Storm-warning signals are displayed here.

SAILING DIRECTIONS FOR CEDAR KEYS.

To enter by the Main Ship Channel.—Steer for Cedar Keys lighthouse when it bears between 351° true (*N* by *W* mag.) and 25° true (*NNE* mag.), and when 4 miles distant bring the lighthouse to bear 13° true (*N* by *E* mag.) until the entrance buoy is picked up. Or, if coming from southward and following the coast by soundings, keep outside the 12-foot contour and steer to pass 4 miles south of the lighthouse. When it bears 13° true (*N* by *E* mag.) steer for it until the buoy is picked up.

Leave the outer buoy (black, No. 1) 30 yards on the port hand and steer 19° true (*N* by *E* $\frac{1}{2}$ *E* mag.) to leave the second and third black buoys the same. Then steer 42° true (*NE* $\frac{1}{2}$ *N* mag.) to leave red buoy No. 2 about 100 yards on the starboard hand. Haul northward

from there, leaving red buoys Nos. 4 and 6 about 75 yards on the starboard hand and the beacon 20 yards on the same side. From the beacon steer about 55° true (**NE** $\frac{3}{4}$ **E** mag.) so as to leave black buoy No. 9, 50 yards on the port hand and red buoy No. 10 the same distance on the starboard hand. Haul slowly northward at the latter buoy, taking care to keep off the shoal east of Grassy Key on the port hand (this key is nearly submerged at high tide) and the shoal that extends 300 yards west of Depot Key on the starboard hand. Leave black buoy No. 11 about 30 yards on the port hand and haul a little south of west, heading about 75 yards south of red buoy No. 12.

To go to the town turn northward, leaving the red buoy 30 yards on the starboard hand, and when well north of it steer about northeast for the railroad wharf, giving the red beacon a berth of over 100 yards.

To leave by the Northwest Channel.—Make red buoy No. 12 and then haul slowly westward and a little north of west so as to leave a stake, which is about 300 yards west of the buoy, at least 50 yards on the starboard hand and another stake, $\frac{1}{2}$ mile westward of the former, at least 75 yards on the starboard hand. After passing the first stake, keep about 200 yards south of an imaginary line joining the two stakes and navigate cautiously until past the second. Then steer northwestward, passing close westward of a small key, and then more northward so as to leave a stake, which is northeast of Middle Key, about 50 yards on the port hand. From there steer about 286° true (**WNW** $\frac{3}{4}$ **W** mag.) until north of North Key, distant $\frac{1}{4}$ mile from it, and then about 275° true (**W** $\frac{1}{4}$ **N** mag.) until past a cluster of piles on the starboard hand, giving them a berth of about 100 yards. These piles mark the west end of this channel on its north side, and will be replaced by a lighted beacon (flashing white light, white skeleton tower) about January 1, 1915.

COAST FROM CEDAR KEYS TO APALACHEE BAY.

What has been said regarding the coast between Cedar Keys and Anclote Keys applies almost as well to the section northward of Cedar Keys, at least as far as Pepperfish Keys, a distance of 28 miles. Northward of these keys, depths of 6 feet or less are confined to a coastal strip nowhere more than 4 miles wide; and the slope westward of this strip is quite uniform and gradual. The coast has a northwest trend for 75 miles and then west 10 miles to St. Marks River, which is the first port that a stranger can enter easily. This wide expanse of gradually shoaling water affords a considerable measure of protection from southwesterly weather, and by working carefully inshore to a suitable depth, fair anchorages can be had. Pepperfish Keys are the only objects between Cedar Keys and St. Marks light that a stranger

can recognize. They lie from $\frac{1}{4}$ to nearly 1 mile off the mainland and, on account of their separation from the general coast line, can be made out at a distance of 5 or 6 miles.

Suwanee River discharges through two mouths, known as East and West Passes, 11 miles and $12\frac{1}{2}$ miles, respectively, northward of Cedar Keys light. A narrow line of reefs, known as Suwanee Reef, extends northwest from a position 4 miles northwest of Cedar Keys to a position northward of West Pass, and between the reefs and the mainland is a shallow bay, known as Suwanee Sound. Channels, dredged to a depth of 5 feet and a width of 50 feet, lead around the southern end of Suwanee Reef, at a place known as Derrick Key Gap, to Suwanee Sound and from Suwanee Sound to East Pass. A few piles mark these cuts. A draft of 5 feet can be taken up Suwanee River for a distance of about 70 miles and a draft of 4 feet for a distance of over 100 miles. Persons acquainted with the river can be found at Cedar Keys, and strangers desiring to enter the river are advised to take a pilot from there.

Steinhatchee River discharges into Deadmans Bay, 39 miles northward of Cedar Keys light. A draft of 4 feet can be taken into the river on a favorable tide and there is good water inside, but the approach is obstructed by shoals and oyster bars. There are no marks that could be recognized by a stranger.

Fenholloway River, 65 miles northward of Cedar Keys light, can be entered with a draft of 4 feet on a favorable tide but here, too, local knowledge is necessary.

Aucilla River is at the bend in the coast line 10 miles east of St. Marks light. A draft of 5 feet can be taken into the river on a favorable tide, but the approach for a distance of 3 miles is a narrow winding channel, unmarked and difficult for a stranger.

SAILING DIRECTIONS FROM CEDAR KEYS TO ST. MARKS RIVER.

For a draft of 5 feet or less, leaving Cedar Keys Harbor by the Northwest Channel, hold the course 275° true ($W \frac{1}{4} N$ mag.) until $2\frac{3}{4}$ miles past the cluster of piles on the north side of the channel, and then steer 318° true (NW mag.) for $24\frac{1}{2}$ miles until the westernmost of the Pepperfish Keys is abeam, distant 5 miles. Then steer 329° true (NW by N mag.) for $29\frac{1}{2}$ miles to a position 5 miles offshore and a depth of 10 to 12 feet. And then steer 293° true ($WNW \frac{1}{8} W$ mag.) for $23\frac{1}{2}$ miles to the buoys at the entrance to St. Marks River. St. Marks lighthouse, a white tower, showing a fixed white light, on the south side of the river entrance, should be picked up about one point on the starboard bow when about 10 miles distant from it and about $8\frac{1}{2}$ miles distant from the buoys.

ST. MARKS RIVER

empties into the head of Apalachee Bay 83 miles northwestward of Cedar Keys and 54 miles northeastward of Cape St. George. A narrow channel marked by buoys leads between shoals to an anchorage in the mouth of the river. Vessels of 7 feet draft can enter to the anchorage and can continue upriver for a distance of about 5 miles to the village of St. Marks, but for a distance of 3 miles above the anchorage the channel is so narrow and crooked that a stranger will have much difficulty in getting through with even half that draft. The anchorage is easily reached during daylight and is well protected on all sides.

St. Marks is a small village on the north bank, $\frac{1}{2}$ mile from the junction of a narrow stream which empties into St. Marks River from northeastward at a point 5 miles above the lighthouse. Supplies, if required, must be shipped from Tallahassee, which is 21 miles inland from St. Marks and is connected therewith by railroad; there are no facilities for filling fuel or water tanks at St. Marks.

Directions to the anchorage.—Pass midway between the entrance black and red buoys, which are $2\frac{1}{2}$ and $2\frac{3}{4}$ miles, respectively, 176° true (*S* $\frac{1}{2}$ *E* mag.) from the lighthouse, and steer 346° true (*N* by *W* $\frac{1}{2}$ *W* mag.) until 1 mile past the red buoy. Then haul westward a point so as to leave the second red buoy 75 yards on the starboard hand. Leave the third red buoy 100 yards on the starboard hand, steering about 351° true (*N* by *W* mag.), and then steer north-northeastward to the anchorage, keeping a sharp lookout for shoals. The anchorage is about northwest from the lighthouse, between oyster bars, and should be approached cautiously after rounding the inner buoy. Depths of from 8 to 19 feet are found in the channel and at the anchorage, with very shallow water (1 foot or less) close-to on all sides.

COAST FROM APALACHEE BAY TO CAPE SAN BLAS.

The general trend of the coast from St. Marks River is about southwest by west for a distance of 54 miles to Cape St. George and thence about west by north for a distance of 17 miles to Cape San Blas, but the coast line is very irregular and is broken by several bays. The outer coast line is formed by several islands, of which the most important are St. James, St. George, St. Vincents, and Dog Islands. Cape St. George is the southern end of St. George Island. Between St. George and Dog Islands and the mainland are two important bodies of water, known as Apalachicola Bay and St. George Sound. Shoals extend 6 miles southward from the east end of St. James Island, from Cape St. George, and from Cape San Blas. Ocklockonee Shoal

extends $8\frac{1}{2}$ miles eastward of St. James Island, and, although separated from the island by lanes of moderate depths, there is no safe passage inside of this shoal.

OCKLOCKONEE BAY, OCKLOCKONEE RIVER, AND CROOKED RIVER.

St. James Island extends westward from Apalachee Bay for a distance of 20 miles and is separated from the mainland by Ocklockonee Bay and by three narrow, connecting streams, known as Ocklockonee River, Crooked River, and Carrabelle River. These waters form an inside passage, about 38 miles long and 3 feet deep at low tide, between Apalachee Bay and St. George Sound. A draft of $4\frac{1}{2}$ feet can be taken through on a favorable tide, but passage for all but open boats is obstructed by a railroad bridge of fixed spans. This bridge has a clear span of 32 feet with headroom of 6 feet 4 inches at low tide, but bolts spaced 9 feet apart project 8 inches below the girder.

Ocklockonee Bay is 5 miles long in an east and west direction and 1 mile wide. It is very shallow and the mouth is nearly closed by oyster bars, but there is a narrow channel into the bay and to its head, good for about 4 feet at low tide.

Ocklockonee River empties into the head of Ocklockonee Bay. It trends westward for a distance of 7 miles to Crooked River and then turns northward and finally eastward. It has a low-water depth of 5 feet or more for a distance of 38 miles and at least 3 feet for a distance of 100 miles. The railroad bridge referred to above crosses this river, just below the junction with Crooked River, at a place known as McIntyre.

Crooked River is a narrow, crooked, tidal stream 22 miles long between Ocklockonee and Carrabelle Rivers. It is from 5 to 20 feet deep, except in a few short stretches, where the depth is but 3 feet at low water.

DIRECTIONS FOR THE INSIDE PASSAGE FROM APALACHEE BAY TO ST. GEORGE SOUND.

The approach to Ocklockonee Bay is obstructed by shoals that probably shift from time to time, and the passage between them is quite narrow. The southern half of the mouth of the bay is entirely closed by oyster bars; the channel is north of them and close to Ocklockonee Point, the northern side of the entrance. There is a small house on the south side of this point, just inside the bay, and the land eastward of it is low and covered with grass.

From black buoy at the entrance to St. Marks River steer 233° true (SW $\frac{1}{2}$ W mag.) for a distance of $7\frac{1}{2}$ miles and then steer 287° true (WNW $\frac{3}{4}$ W mag.), heading for the south side of Ocklockonee Point. This last course will pass very close to shoals on each

side and may have to be modified somewhat to avoid them. Go slowly and sound continuously until past the point. Then keep about 150 yards offshore for a distance of $\frac{3}{4}$ mile and from there haul out into the middle of the bay. When 2 miles above Ocklockonee Point and nearly abreast a point on the south side, run in close to the south shore, feeling the way carefully into a narrow channel that lies close to that shore. Keep close to this shore until nearly up with the turpentine still (large buildings on the south shore) and then steer so as to leave stakes as follows: a brush stake on the port hand, a stake with target on the port hand, a stake on the starboard hand, and the last stake on the port hand. After rounding this stake steer about 250° true (**WSW** mag.) into Ocklockonee River, favoring the north side in entering. Turn southward at the first bend, $\frac{1}{2}$ mile above the mouth, and keep about in mid-river, passing either side of the island which is $3\frac{1}{2}$ miles above the mouth. Leave Ocklockonee River just above the bridge and turn westward into Crooked River; Ocklockonee here bends northward. Crooked River is at least 5 feet deep for a distance of 17 miles and is easily navigated to there, but from that point to its western mouth there are a few places that should be approached carefully. When approaching a house in a clearing on the west bank, keep to the west side, passing north and west of an islet. At the junction of Crooked with Carrabelle River leave the small islet close to on the port hand to avoid a shoal where the two channels meet. Coming down Carrabelle River, pass northward of the island in the reach above the town.

ST. GEORGE SOUND

lies southwestward of Apalachee Bay, from which it is separated by the east end of St. James Island. It is about 26 miles long and from 3 to 4 miles wide, and is protected from southwesterly weather by St. George and Dog Islands and by reefs. Much of the sound is very shallow, but there are good depths in the vicinity of East Pass, which is the only safe entrance from the Gulf. East Pass has a depth of $20\frac{1}{2}$ feet in a dredged channel 150 feet wide; this channel is marked by range lights and by buoys. A channel, with a least depth of 8 feet, leads through St. George Sound and into Apalachicola Bay. It is well marked by buoys and beacons and presents no difficulties to a stranger. Small vessels bound along the coast may enter St. George Sound through East Pass, go through the sound to Apalachicola Bay, and thence out by West Pass, or go through a canal from Apalachicola River to St. Andrews Bay and thence out into the Gulf of Mexico.

Carrabelle is a small town on the east bank of Carrabelle River, which empties into St. George Sound north of East Pass. It is the terminus of a railroad to the interior and is a lumber-shipping port

of some importance. Steamers connect with Apalachicola. The town is $\frac{1}{2}$ mile above the mouth of the river and is easily reached by a dredged channel, 10 feet deep to the wharves. Quays extend along the river bank at the town and afford ample berthing space for vessels. Gasoline, fresh water, and some supplies can be had here. Storm-warning signals are displayed where they can be seen from the shipping. There are some facilities for making repairs to small craft, and there are several small marine railways, at the largest of which a vessel of about 40 tons and a draft of 6 feet can be hauled.

SAILING DIRECTIONS FROM ST. MARKS RIVER TO EAST PASS, AND THROUGH EAST PASS AND ST. GEORGE SOUND TO APALACHICOLA BAY.

From the outer buoys off St. Marks River entrance steer 179° true (**S $\frac{3}{8}$ E mag.**) for a distance of 10 miles to Ocklockonee Shoal red buoy No. 24, taking care not to get anything westward of this course. Then steer 248° true (**SW by W $\frac{3}{4}$ W mag.**) for $9\frac{3}{4}$ miles to South Shoal red whistle buoy No. 26. Then steer 259° true (**WSW $\frac{3}{4}$ W mag.**) for $16\frac{3}{4}$ miles to the black bell buoy at the entrance to East Pass.

Leave the bell buoy on the port hand and steer 332° true (**NNW $\frac{3}{4}$ W mag.**) for the lighthouse on the north shore in range with a white beacon. The lighthouse is a pyramidal, skeleton tower, painted white below and red above, and showing a fixed white light and white flashes. The beacon, which is near the shore in front of the lighthouse, shows a fixed red light. Steer this range, leaving five black buoys about 50 yards on the port hand, and when the west end of Dog Island (on the starboard hand) is abeam, follow the directions on page 60 if bound for Carrabelle, but if bound through to Apalachicola Bay, follow the directions given below.

From the last black buoy (No. 9), steer 245° true (**SW by W $\frac{1}{2}$ W mag.**), leaving a red buoy close-to on either side and heading for a red, pyramidal-shaped beacon (white light), distant $7\frac{3}{4}$ miles. Leave this beacon close-to on the starboard hand and steer 203° true (**S by W $\frac{3}{4}$ W mag.**) so as to leave a red lighted beacon 100 yards and a red day mark close-to, on the starboard hand; a black day mark will be left well on the port hand soon after leaving the first beacon. Round the red beacon and steer 268° true (**W $\frac{1}{2}$ S mag.**) until on Bulkhead Shoal Channel range, when red buoy No. 4 will be nearly abeam on the starboard hand. The beacons of this range are pyramidal-shaped structures, the front red, surmounted by a red light, and the rear white, surmounted by a white light. Steer this range, 294° true (**WNW $\frac{1}{8}$ W mag.**), leaving red buoys Nos. 4 and 6 about 50 feet on the starboard hand, and when

halfway between buoy No. 6 and the front beacon, steer 239° true (**SW** by **W** mag.) to the upper anchorage in Apalachicola Bay, leaving red buoy No. 8 about $\frac{1}{4}$ mile on the starboard hand. To go to the town of Apalachicola, follow the directions on page 61 after arriving at the anchorage, which is nearly south of the east end of the town.

Directions to Carrabelle.—After entering St. George Sound by East Pass and when past the west end of Dog Island, steer 31° true (**NNE** $\frac{1}{2}$ **E** mag.) so as to pass 350 yards westward of the island and to leave black buoy No. 11 on the port hand. Then steer 14° true (**N** by **E** mag.) to leave black buoy No. 13 on the same side. When nearly up to the red beacon (red light), the Carrabelle River range, two lighted beacons in the mouth of the river, the front a black structure showing a red light and the rear a white structure showing a white light, will close, bearing about 330° true (**NNW** $\frac{7}{8}$ **W** mag.) Steer this range, passing about midway between the black buoy and the red beacon; the cut here is only 100 feet wide. Leave the front range beacon 50 feet on the port hand and follow the trend of the east bank, keeping in mid river to the first wharves and then less than 100 feet off the wharves.

APALACHICOLA BAY

is a continuation of St. George Sound to southwestward. It is a landlocked bay 12 miles long by 6 miles wide and of an average depth of 10 or 12 feet, but in places it is very shallow. The main entrance to this bay is by West Pass, which in June, 1913, had a least depth of 12 feet. This channel is well marked by range lights and by buoys and presents no difficulties when the bar is smooth. Entrance from St. George Sound is by way of a dredged channel, 100 feet wide and 8 feet deep, through Bulkhead Shoal, which separates the two waters. St. Vincent Sound extends 8 miles westward from Apalachicola Bay to Indian Pass. Small vessels may use this pass on a smooth sea, but the sound is so shallow (3 feet) and difficult as to offer no advantages over the easier route.

Apalachicola River empties into the northern part of the bay, over a broad shoal through which a channel has been dredged to a depth of 10 feet and to a width of 100 feet. A draft of 10 feet can be taken into the mouth of the river, a draft of 4 feet can be taken upriver for a distance of about 119 miles to the junction of the *Chattahoochee* and *Flint Rivers*, and a draft of 6 feet over most of that distance. A draft of 3 feet can be taken 91 miles up Flint River to Albany, Ga., and a draft of $3\frac{1}{2}$ feet can be taken 194 miles up *Chattahoochee* River to Columbus, Ga. The distances given above are approximate, and the available drafts are at ordinary low water. A rail-

road bridge, having a draw opening of ample width, spans the river at about 3 miles above its mouth.

Apalachicola is a town on the north shore of the bay and west bank of the river of that name. It has connections by railroad with the interior and by steamboat with Carrabelle and with the river towns; it ships considerable lumber, fish, and oysters. The town is reached easily by the dredged channel to the mouth of the river. There is ample wharfage at the quays along the river bank, where coal, gasoline, fresh water, provisions, and some ship chandlery can be had. The facilities for making repairs to small vessels are good, and there is one marine railway that can take a vessel 150 feet long or a draft of 9 feet. Storm-warning signals are displayed where they can be seen from the anchorage.

**SAILING DIRECTIONS FOR WEST PASS, APALACHICOLA BAY,
AND APALACHICOLA RIVER TO THE TOWN OF APALACHICOLA.**

Approaching West Pass from the Gulf of Mexico, make the bell buoy off West Pass and from there steer 67° true (NE by E $\frac{3}{4}$ E mag.) on West Pass range. The lights for this range are on pyramidal structures just inside the entrance, the front a red light on a red daymark and the rear a white light on a white daymark. Leave two red buoys on the starboard hand and a black buoy on the port hand, taking care not to get anything south of the range when approaching the second red buoy. The crest of the bar is just inside the first red buoy; the second red buoy is close to the shoal on the south side of the channel. When up with a black buoy just inside the entrance, haul southward and bring the lights of Sand Island Cut range in line, bearing 130° true (SE $\frac{3}{4}$ E mag.). These lights are of the same type as those of the first range and are close inshore. Steer this range until nearly up with the front light and then steer so as to leave it 100 yards on the starboard hand and to leave the second white light (white beacon), which is eastward of the rear range light, about $\frac{1}{4}$ mile on the starboard hand. Bring this last light on range with Cape St. George lighthouse (showing over the trees) and steer 31° true (NNE $\frac{1}{2}$ E mag.). This range leads to the dredged channel into Apalachicola River.

Directions from Apalachicola Bay to Apalachicola.—From the upper anchorage, which is in the middle of the bay about south of the town, steer to leave red buoy No. 2 about 50 feet on the starboard hand, and from there steer 351° true (N by W mag.) to leave a red beacon (white light) 75 feet on the starboard hand and to keep the training well, marked by clusters of piles at each end, about 50 feet on the starboard side. The channel is marked by range lights, of which the front is a red light on a black structure on the east side of the

town and the rear is a white light on a white structure on the north bank of the river, but during daylight these beacons may not be seen until into the cut. Steer this range until nearly up to a small island on the starboard hand and then open the range to eastward and steer to leave the front range light 100 feet on the port hand. The channel that extends along the wharves is less than 100 yards wide and is separated from the main river channel by a shoal that ends a short distance above the lower wharves. To go to the wharves, to which a depth of 10 feet can be taken, follow the west bank closely after passing the front range light. To go upriver, haul out into midstream when up to the front light and then head for the rear range light.

INLAND WATERWAY BETWEEN APALACHICOLA BAY AND ST. ANDREWS BAY.

The completion of that section of the intracoastal waterway which lies between Apalachicola Bay and St. Andrews Bay has opened up a safe passage for small craft past Cape San Blas. This passage is partly through natural waterways, which have been improved by dredging, and partly by a canal having a least depth of 5 feet and width of 65 feet; it is everywhere good for at least 5 feet of low water. The canal is free of toll and has no locks. The distance from the town of Apalachicola to Panama City on St. Andrews Bay is about 53 miles by this passage, of which about 24 miles is through canal and improved creeks.

Sailing directions.—Follow directions given above for entering Apalachicola River and when abreast the front range light haul over for the north bank, taking care to avoid the mid-river shoal. Favor the northern side, pass northeastward of an island, and then head for the draw in the railroad bridge. Turn westward into Jackson River when $1\frac{3}{4}$ miles above the bridge and pass northward of the island in that river. Jackson River is about 4 miles long and connects Lake Wimico with Apalachicola River. From Jackson River steer 307° true (NW by W mag.) across Lake Wimico, leaving the stakes about 30 feet on the port hand. The channel across the lake is 6 feet deep, but outside of this cut the lake is shallow. The western end of the cut is marked by stakes on both sides. Entering Searcy Creek from the western end of Lake Wimico, keep in midstream and follow the natural channel until cut-offs are reached. These are recognized easily by the piles of dredged material on their banks. The western end of the canal connects with South Prong, which is a branch of Wetappo River, which empties into the east end of East Bay, an arm of St. Andrews Bay. The channel through Wetappo River and eastern part of East Bay has been dredged to a depth of 6 feet.

CAPE SAN BLAS,

11 miles westward of West Pass, is marked by a lighthouse, a pyramidal, skeleton tower, showing a flashing white light. Shoals having depths of 3 fathoms or less extend nearly 4 miles southward from the cape, while lumps of 4 to 5 fathoms in depth are found more than 10 miles off shore between south and southwest from the light. San Blas gas and bell buoy No. 30 lies about $6\frac{1}{2}$ miles 179° true ($S\ \frac{3}{8}\ E$ mag.) from the light in a depth of 23 feet. A swash channel about 8 feet deep crosses the shoals at a distance of about $1\frac{1}{4}$ miles from the light, and another swash channel, having a least depth of 5 feet, crosses within 300 yards of the shore and between it and the foundation of the old lighthouse which is barely visible at low tide. Both channels are made use of by small local boats when the sea is smooth, but they are not recommended to strangers. With a fresh breeze from any quarter south of east or northwest, rough water may be expected at the cape and a breaking sea may extend far offshore. Small boats should not attempt to pass the cape then, but should wait either in Apalachicola Bay or in St. Josephs Bay for favorable weather.

ST. JOSEPHS BAY

is just north of Cape San Blas and is formed by a narrow strip of land which extends $12\frac{1}{2}$ miles northward from the cape and ends in a sand spit known as St. Josephs Point. It is one of the best harbors on the coast and is easily entered at any time during clear weather. The entire bay, except for the southern third and a narrow shelf along the sides, is free from shoals and is from 4 to 6 fathoms deep. The entrance is across a bar which extends northwestward from St. Josephs Point to the mainland and varies in depth from 15 to 19 feet. A channel has been dredged to a depth of 24 feet and width of 300 feet across the bar, and this depth can be taken into the bay. The channel is well marked by range lights and buoys. A swash channel, having a depth of 14 feet, follows the shore of St. Josephs Point at a distance of $\frac{1}{4}$ mile from it and passes between the shore and a shoal of about 8 feet depth. In Eagle Harbor, a small bight in the west shore 6 miles south of St. Josephs Point, and in the narrow sloughs in the south end of the bay, protected anchorages for small craft can be found.

Port St. Joe is a small town on the east shore of the bay 5 miles in from St. Josephs Point. It is a lumber-shipping port and is connected by railroad with Apalachicola. The wharf at Port St. Joe has a depth of 22 feet along its outer section and has fresh water piped throughout. The water is taken from deep wells and is charged with minerals that render it unpleasant for drinking.

ST. ANDREWS BAY

is a narrow, irregularly shaped, landlocked harbor of moderate depth throughout a large part of its area, and of many perfectly protected anchorages. With its tributaries, East, North, and West Bays, it parallels the coast for a distance of nearly 30 miles and reaches inland 13 miles. The entrance, which is 27 miles northwestward of Cape San Blas, has been dredged to a least depth of 22 feet in cuts 160 feet wide (projected width 200 feet) and has been well marked by range lights and by buoys. During ebb tide a strong current sets outward through the dredged cuts and causes heavy tide rips in the exposed part of the channel if the wind is southerly or westerly and of moderate strength. Small vessels bound in or out with more than a moderate southerly or westerly breeze should endeavor to reach the bar while the tide is at flood or slack. A licensed pilot is usually stationed just inside the bar during the hours of daylight, and will come out in answer to a signal. The shoals in St. Andrews Bay are marked at their outer extremities by lighted beacons and by buoys, which are, except as noted in the sailing directions, left on the side of the nearer shore. In East, North, and West Bays the deepest water is found generally in the middle of the bays, and in the absence of marks or definite information strangers should keep about midway between shores. The inland waterway from Apalachicola Bay reaches St. Andrews Bay by way of Wetappo River and East Bay; see description on page 62. Watsons Bayou and Smack Bayou, the former on the same side of the bay as Panama City and 2 miles southwestward from it, and the latter due south on the other side of the bay, are excellent harbors for small craft. They are at least 9 feet deep, are well protected from all winds, and are easily entered, the channels being indicated clearly by the color of the water.

Towns on St. Andrews Bay.—The three largest and most important towns (1,000 to 2,000 population each) are Panama City, St. Andrews, and Millville, all situated on the north side of St. Andrews Bay within a distance of 4 miles or less of each other. Several small villages and settlements are located on the shores of the various tributaries, mostly on East Bay. Panama City is the terminus of a railroad and is in monthly communication by steamboat with New York. The weekly steamboat between Pensacola and Apalachicola touches at the three largest towns in this bay. Coal in small quantities, gasoline, fresh water, provisions, and some ship chandlery can be had at Panama City. Minor repairs to small vessels can be made at St. Andrews, where there is a marine railway of about 100 tons' capacity, on which vessels of a draft of 8 feet can be hauled. A draft of 9 feet can be taken to the outer end of the public wharf and to the railroad wharf at Panama City, the same draft can be taken

to the wharf at St. Andrews, and at least that amount can be taken to the wharf at Millville, which is near the head of Watsons Bayou. Southport, on Fanning Bayou, a tributary of North Bay, is a railroad terminus and a sawmill town. It is reached by an improved channel marked by private range beacons and has a depth of 9 feet or more to the mill wharf, 5 feet to the wharves at the head of the bayou. Lynn Haven, on the south shore of North Bay opposite Fanning Bayou, is a winter resort. A depth of 14 feet can be taken to the wharf there. A depth of 5 feet can be taken to Bayhead, at the head of North Bay, and to Westbay, at the head of West Bay, both small post villages and the latter a turpentine works. Cromanton, San Blas, Belleisle, and Farmdale are small post villages on the south shore of East Bay. Depths of from 5 to 9 feet can be taken to the principal landing at these places.

SAILING DIRECTIONS FROM APALACHICOLA BAY TO ST. JOSEPHS SOUND AND ST. ANDREWS BAY.

For St. Josephs Sound.—From the bell buoy off West Pass steer 262° true (**W** by **S** mag.) for a distance of 11 miles to a position 5 miles 184° true (**S** mag.) from Cape San Blas lighthouse, leaving San Blas buoy $1\frac{1}{4}$ miles on the port hand. Then steer 341° true (**NNW** mag.) until the light is abeam. If intending to enter by the swash channel (depth 14 feet), haul in gradually for the shore after passing the lighthouse and follow it at a distance of about $\frac{1}{2}$ mile until it turns northeastward. Then close in to a distance of $\frac{1}{4}$ mile offshore, and at that distance follow the shore around St. Josephs Point.

But if intending to enter by the main channel, continue on the 341° true (**NNW** mag.) course for a distance of $13\frac{1}{2}$ miles to the entrance whistle buoy. Then steer 62° true (**NE** by **E** $\frac{1}{8}$ **E** mag.) for St. Josephs Point light, a fixed white light shown from a white tower on a dwelling, on range with a fixed white light on a black beacon in front of and below the former. Leave three black buoys on the port hand and three red buoys on the starboard hand. From the fourth black buoy (No. 7, northwest of St. Josephs Point) steer 116° true (**ESE** mag.), leave a red buoy $\frac{1}{4}$ mile on the starboard hand, and from there steer southeastward into the bay, hauling southward when past the point.

For St. Andrews Bay.—Follow the directions given above until 5 miles south of Cape San Blas light, and then steer 334° true (**NNW** $\frac{5}{8}$ **W** mag.) for a distance of 31 miles to St. Andrews Bay entrance bell buoy, taking care not to get too close to the shoals on the starboard hand at the entrance to the bay. The channel across the bar, while maintaining a consistent depth of 22 feet, is moving eastward, and the ranges can not be depended upon. Strangers should not

attempt to enter with a draft of much over 10 feet, but should signal for a pilot. These directions were correct for February, 1914, but on account of probable changes should be followed cautiously.

From the bell buoy steer about 10° true (**N $\frac{5}{8}$ E mag.**) on St. Andrews Bar range, sounding carefully as the bar is approached. The front range is a red light on a red structure and the rear is a white light on a white structure. Leave the red buoy 70 yards on the starboard hand and when 300 yards from the black buoy open the range eastward so as to pass nearly 100 yards east of that buoy. When 100 yards distant from the second red buoy, steer 327° true (**NW $\frac{3}{4}$ N mag.**) on St. Andrews Bay range. The front light of this range is the second red light and red beacon westward of the first range and the rear is a white light on a white beacon. Steer this range, taking care not to open it southward when approaching the island. Leave a black buoy on the port hand, and when up with a red buoy on the starboard hand, steer 301° true (**NW by W $\frac{1}{2}$ W mag.**) with the rear light of the first range and the first red light (red beacon) westward of it on range astern. Leave four black buoys on the port hand, leave a red buoy on the starboard hand and then change course gradually to 5° true (**N $\frac{1}{8}$ E mag.**) so as to pass 200 yards eastward of Port Shoal light, a white light on a black beacon.

When up with the light, if bound for Panama City, steer 37° true (**NE by N mag.**), keeping $\frac{3}{8}$ mile off the eastern shore. And when the light at the north end of this shore is abeam, steer for the public wharf (the most eastern) or come to anchor.

If bound for St. Andrews, hold the course 5° true (**N $\frac{1}{8}$ E mag.**) until past Courtney Point Shoal light (similar to the former), leaving it at least 200 yards on the port hand. And when 200 yards past this beacon, steer about 307° true (**NW by W mag.**) so as to leave a red buoy on the starboard hand. Round this buoy and haul in for the wharf or anchor in the bight westward of the wharf.

COAST FROM ST. ANDREWS BAY TO MOBILE BAY.

The shore westward of St. Andrews Bay is a gently curving and nearly unbroken sand beach for a distance of 130 miles to Mobile Bay. Beginning with a trend of about northwest by west from St. Andrews Bay, the coast line curves southward very gradually to a direction nearly west-southwest and then back to nearly west, nowhere varying much over three points and rarely over one point from its general east and west direction. It is broken at but three places, viz, the entrances to Choctawhatchee, Pensacola, and Perdido Bays, the first and last narrow inlets, barely visible from a few miles offshore. Except at the entrances to these bays, where shoals extend from 1 mile to 4 miles offshore, deep water is found close in to the beach and depths of less than 3 fathoms rarely over $\frac{1}{4}$ mile

off. For this reason the sea rolls in with undiminished strength and breaks heavily on the shore when driven by southerly winds. Small craft bound westward from St. Andrews Bay should wait for favorable weather and should not put out until there are strong indications of light air or moderate northerly breezes for a period long enough to make the next port. The distance to the first port, East Pass, is 50 miles, but the distance to the nearest that a stranger may hope to enter successfully after the sea has risen is 44 miles farther, 94 miles from St. Andrews.

CHOCTAWHATCHEE BAY, EAST PASS, AND SANTA ROSA SOUND.

Choctawhatchee Bay, 25 miles long and of an average width of about 3 miles, lies 15 miles westward of St. Andrews Bay, nearly parallel to the coast line and separated from the Gulf by land varying in width from $\frac{3}{4}$ mile to about 4 miles. The depth of water in the bay decreases gradually from west to east, there being from 3 to 6 fathoms over the western two-thirds, except near the shores, and a depth of 6 feet at the eastern limit of the bay. *Choctawhatchee River*, which empties into the east end of the bay, has a depth at ordinary low water of 4 feet for a distance of 24 miles to *Holmes River*: a white light marks the east side of the river entrance. *Holmes River* has been improved by snagging in the channel and is navigable for a draft of 2 feet at low water to the town of Vernon, 24 miles above the mouth.

East Pass is a narrow passage from the Gulf to the western part of Choctawhatchee Bay; it is 50 miles westward of St. Andrews Bay entrance, and 44 miles eastward of Pensacola Bay entrance. The pass is obstructed by a shifting bar on which the depth is said to vary from 4 to 10 feet; the least depth occurs after a southerly storm. A range of two lights has been placed to indicate the channel across the bar, but on account of frequent changes no dependence can be placed on this aid. The best time for entering is during flood tide, and it should never be attempted when the sea is rough and the tide is ebbing. There is a fishing station on the north shore just inside, and if the bar is passable someone acquainted with the channel will usually come out in answer to a signal.

Santa Rosa Sound and its eastern continuation, known as "The Narrows," together constitute a connecting waterway between Choctawhatchee Bay and Pensacola Bay. They lie parallel to the coast, just back of a narrow strip of beach known as Santa Rosa Island, and have a combined length of 33 miles. The width varies from $1\frac{3}{4}$ miles in the widest part of the sound to 250 yards in the narrowest part of "The Narrows." The western part of the sound, including the entrance from Pensacola Bay, has a depth of 15 feet or more in a narrow channel; the eastern half of the sound, "The

Narrows," and the approach from Choctawhatchee Bay have been dredged where necessary to give a least depth of 6 feet in the channel. This channel is very narrow, but with the aid of the ranges that mark the most difficult crossings and by careful attention to the sailing directions and a sharp lookout for indications of shoals, a stranger should be able to take through a draft of 5 feet.

PENSACOLA BAY

is one of the most important harbors on the Gulf coast. Its entrance, 106 miles west-northwestward from Cape San Blas, 88 miles westward from St. Andrews Bay entrance, and 40 miles east-northeastward from Mobile Bay entrance, is $\frac{3}{4}$ mile wide but is partly obstructed by shoals. The channel across the bar is 500 feet wide by 30 feet deep and is maintained by dredging. It is marked by range lights and by buoys and is easily entered at any time. The lower part of the bay is free from shoals, except close to the shores, and has depths ranging from 3 to 6 fathoms; a depth of 30 feet can be taken to the city of Pensacola. A steam pilot boat is usually stationed at the bar.

Pensacola is an important commercial city on the north shore of the bay $7\frac{1}{2}$ miles above the entrance. It has railroad connections with Gulf points and with the north and steamboat connections with Mobile, St. Andrews Bay, and Apalachicola. The depths at the wharves range from 13 to 28 feet, and there are protected berths for small craft. Coal and fresh water can be taken conveniently at the wharves or from lighters and water boats in the bay. Gasoline is delivered by tank wagons on the wharves. Provisions and ship chandler's stores can be obtained. The facilities for making repairs to vessels are good, and there are several small marine railways, the largest of about 300 tons capacity and limited to a draft of 14 feet.

Warrington is a small town on the north shore just inside the entrance to the bay. East of the town, on the point, is the United States navy yard.

Escambia Bay extends 9 miles northward from Pensacola Bay. Its depth shoals gradually from 15 feet at the mouth to 7 feet at a distance of $1\frac{1}{2}$ miles from its head. A little over 5 miles above its entrance the bay is crossed by a railroad bridge with a draw opening 80 feet wide. *Escambia River* empties into the bay on its western side $1\frac{1}{2}$ miles above the bridge. This river is navigable at low water for a draft of 6 feet for a distance of 18 miles and for a draft of 3 feet to the Alabama State line, a distance of 55 miles. Above that point it is known as *Conecuh River*, and the ruling depth is $2\frac{1}{2}$ feet for a distance of about 70 miles.

East Bay is an eastward extension of Pensacola Bay, with which it is connected by a passage $\frac{3}{4}$ mile wide between shoals. It varies in

depth from 8 to 12 feet, but there are several small shoals of less than 5 feet depth scattered over the bay. *Blackwater River* empties into *Blackwater Bay*, which is the northern arm of East Bay. A draft of $8\frac{1}{2}$ feet can be taken from Pensacola Bay, through East and Blackwater Bays and up Blackwater River to the town of Milton, 4 miles above the river mouth and 15 miles from Pensacola Bay. The channel through the bays is marked by beacons (lighted), but requires local knowledge for drafts of over 5 feet. A railroad bridge, having a draw opening 80 feet wide, spans the river at the town of Milton. Milton and Bagdad, 1 mile below the former, are important towns. There is a marine railway at Milton, and a dry dock at Bagdad.

SAILING DIRECTIONS FROM ST. ANDREWS BAY TO PENSACOLA.

Outside to Pensacola Bay.—From the bell buoy off St. Andrews Bay, steer 279° true (**W** $\frac{3}{8}$ **N** mag.) for a distance of 88 miles to the whistle buoy off Pensacola Bay entrance. Or steer 302° true (**NW** by **W** $\frac{1}{2}$ **W** mag.) until 5 miles past the bell buoy and then follow the coast at a distance of about $\frac{1}{2}$ mile until abreast the life-saving station, 2 miles distant from the entrance to Pensacola Bay. From there a least depth of 10 feet can be carried into the bay by following the shore of Santa Rosa Island and gradually reducing the distance offshore to $\frac{1}{4}$ mile when nearly to the entrance, then to $\frac{1}{8}$ mile when rounding the point, and then increasing to nearly $\frac{1}{4}$ mile when past red buoy No. 12. But if the sea is rough, it is safer to make the whistle buoy or at least the second black buoy (No. 3) in from it, and then follow the dredged channel. From the whistle buoy, steer 342° true (**NNW** mag.) on Caucus Cut range, marked by a red beacon (red light) on the outer end of the breakwater on the west side of the entrance and by a rear white beacon (white light) in the extreme western part of the bay. Leave seven black buoys on the port hand and two red buoys on the starboard hand, and when up with the eighth black buoy (No. 15) and the third red buoy (No. 8), steer 11° true (**N** $\frac{5}{8}$ **E** mag.) on Fort Barrancas range. The beacons for this range are on the north shore east of Pensacola lighthouse—the front, a red light, and the rear, a white light. Leave two red buoys on the starboard hand and hold to the range until the front beacon of the Caucus Cut range closes on a white beacon (white light) southwestward of it. Then steer 57° true (**NE** $\frac{3}{4}$ **E** mag.)—Fort McRee Cutoff range—with these beacons in line astern. When a white beacon (white light) closes on Caucus Cut range rear beacon, steer 103° true (**E** $\frac{3}{4}$ **S** mag.) on this range (Pensacola Bay range), taking care not to let the range open to southward. Steer the range for a distance of $1\frac{1}{2}$ miles to a black buoy and then steer 42° true (**NE** $\frac{5}{8}$ **N** mag.) for 4 miles and then 16° true (**N** by **E** mag.) to the wharves at Pensacola.

Through East Pass and Santa Rosa Sound.—Follow the coast as directed above for a distance of 50 miles to East Pass. This pass shifts so frequently that directions for entering it can not be depended upon, but generally the channel favors the east side at the entrance and trends about northeast across the bar. The safest plan is to stop outside the bar and signal for a pilot, but if the bar is not breaking, one can usually enter without great difficulty, provided his draft will permit. If intending to enter without assistance, stand in to a distance of about $\frac{1}{4}$ mile from the shore and examine the entrance carefully, pay no attention to the range lights, but determine by inspection how the channel lies. If in doubt, pass the entrance once or twice as close to the shoals as is prudent, and wait until a few large swells have passed, that their behavior in the entrance may be noted. If the tide is flooding, a little oil thrown overboard just outside the bar may help some. The only guides for entering the pass will be the breakers on the shoals on each side of the channel and the color of the water—darkest where the water is deepest. This will be quite marked during flood tide unless obscured by spume from off the breaking shoals on each side. The channel usually lies close to the north shore from the range lights to the point on the south side (Santa Rosa Island) and thence nearer to the south shore until nearly up to the fishing village.

Leave the fishing village close-to and then follow the south shore nearly to the east beacon, keeping about 100 yards from the beach. Pass about halfway between the east beacon and the shore and then steer northwestward so as to leave the east beacon on the starboard hand, distant about $\frac{1}{3}$ the distance between beacons. Continue in this direction until Santa Rosa Sound range beacons are in line, and then steer 269° true (**W** $\frac{1}{2}$ **S** mag.) on this range, giving west beacon a berth of at least 100 yards.

The front beacon of this range is painted white and shows a red light; the rear beacon, red with a white light, is visible over the trees when nearly on the range. After entering "The Narrows," favor the north shore for about $1\frac{1}{2}$ miles, and when about $\frac{1}{4}$ mile past a small settlement (Camp Walton) look for range marks on the north shore—triangular white targets nailed to trees. Cross "The Narrows" on this range, about 234° true (**SW** $\frac{1}{2}$ **W** mag.), and then follow closely the south shore for $1\frac{1}{2}$ miles to a cut. Leave the spoil bank here on the starboard hand and cross to the north side, leaving the eastern side of the point, on which are several tall pine trees, close-to but avoiding the north side of the point. Favor the north shore until two range targets on that shore (similar to the last) close, bearing about 283° true (**WNW** $\frac{3}{4}$ **W** mag.), steer this range until nearly 50 yards from the shore, and then keep about that distance off until on Circle Crossing range. Steer 270° true (**W** $\frac{3}{8}$ **S** mag.)

with the lights (front light red, on a black pile, and rear light white, on a white pile) in range astern. When $1\frac{3}{4}$ miles past the front light, steer 291° true (**WNW** $\frac{1}{2}$ **W** mag.) for a white house on the north shore, go slowly, and feel the way carefully between shoals on each side.

When about 200 yards from the north shore, steer about southwest to the south side of "The Narrows." Then favor the south shore for 3 miles, giving the points on that side a berth of between 50 and 100 yards; give Pritchard Long Point, the first long point on the north side (a small pine near its end), a berth of $\frac{1}{4}$ mile; and when well clear of the shoal on its west side, steer to keep midway between shores until past the next long point on the north side. This point terminates in a long sand spit and has a single tall, scraggy tree near its end. Turn northward when past this point, passing between a shoal which extends $\frac{1}{4}$ mile off the point and a middleground on the port hand, and follow the north shore at a distance of $\frac{1}{4}$ mile for about $2\frac{1}{2}$ miles to Bunch Timber range. The lights for this range are on the south shore, the front light, red, and the rear, white; and the range crosses the middle ground on a 223° true (**SW** $\frac{1}{2}$ **S** mag.) course. Steer this range until a little more than half way across the sound, then haul westward to avoid a shoal on the southern part of the range, and when west of the front light, close in to a little under $\frac{1}{4}$ mile from the south shore. Keep a little less than $\frac{1}{4}$ mile from the south shore until $2\frac{1}{2}$ miles past the front light, and then work over to the north shore, and keep between $\frac{1}{4}$ and $\frac{1}{2}$ mile off that shore until up with the light at the west end of the sound. Leave Deer Point light (white), at the west end of the sound, 200 yards on the starboard hand and steer west-northwestward into Pensacola Bay.

PERDIDO BAY

is an irregularly shaped body of water of from 7 to 12 feet in depth, lying about midway between Pensacola and Mobile Bays. It is connected with the Gulf of Mexico by a narrow inlet which is $11\frac{1}{2}$ miles westward of Pensacola entrance and about double that distance eastward of Mobile entrance. At a distance of 1 mile from the shore, the entrance is not easily distinguished, and there are no marks that a stranger would recognize. The depth that can be taken into the bay from the gulf is $4\frac{1}{2}$ feet at mean low tide; the channel is narrow and tortuous and is subject to frequent changes. The only regular communication with Perdido Bay is by a log road (railroad) and by highway from Pensacola to Millview, a small sawmill settlement and post office on the northeast end of the bay. A power boat operates between Millview and the post villages on the bay, carrying passengers, mail, and freight. Perdido Beach, on the bay shore northward of the inlet, is a summer resort.

MOBILE BAY

is about 27 miles long in a north and south direction and about 8 miles wide, exclusive of the southeast part known as Bon Secours Bay; its entrance from the Gulf of Mexico is about 39 miles westward of Pensacola entrance and 91 miles northeastward of the South Pass of the Mississippi River. The bay has a natural depth of 12 to 14 feet over a wide area extending from its mouth, along its longitudinal axis, to within 7 miles of its head, and depths of 8 feet or more to within a short distance of the shores, except on the sides of the dredged channel to Mobile. It is one of the easiest harbors on the Gulf coast to enter. The Main Ship Channel is deep, nearly straight, and from $\frac{3}{8}$ to $\frac{1}{2}$ mile wide. Its natural depth of 23 feet on the bar has been increased by dredging to $28\frac{1}{2}$ feet (projected depth 30 feet) in a cut 300 feet wide. Inside the bay, a channel 26 feet deep and 200 feet wide leads from the entrance to the city of Mobile at the head of the bay. Both channels are well marked. A swash channel, having a depth of 7 feet, leads from eastward into the Main Ship Channel close inshore. Pilots will be found cruising outside the bar or at anchor near the whistle buoy. The southwest corner of Mobile Bay is separated from Mississippi Sound by a shoal 1 mile wide between the 6-foot contours in each, and through this shoal are two passages known as Pass aux Herons and Grants Pass, respectively.

Pass aux Herons has been dredged recently and now has a depth of 10 feet in a cut 100 feet wide between the 10-foot contours in Mobile Bay and in Mississippi Sound. It is marked by lights and beacons.

Grants Pass, about $\frac{1}{4}$ mile north of Pass aux Herons, is owned by private parties; it has a depth of 7 feet and is marked by piles along its northern side.

Mobile and *Apalachee Rivers*, crooked streams but nearly parallel in their general direction, flow southward from the junction of *Alabama* and *Tombigbee Rivers*, at about 30 miles northward of Mobile Bay (measured in a straight line), and empty into the head of this bay through several mouths. Mobile River, the deeper and more important of the two, flows into the west corner of the bay at the city of Mobile. It also empties through Spanish River, a narrow stream 5 miles long whose mouth is $1\frac{1}{2}$ miles eastward of the mouth of the former and close to the mouth of *Tensaw River*. Tensaw River is one of the mouths of Apalachee River and is about 6 miles long. Apalachee River flows southward past the head of Tensaw River and discharges into the bay through two other mouths, the eastern one, called *Blakely River*, along the east shore of the bay, and the other, which bears the name of the main river, $1\frac{3}{4}$ miles west of the former.

Mobile River has a depth of 27 feet to the wharves at Mobile, 23 feet to Chickasaw Creek, $3\frac{1}{2}$ miles above the mouth, and 14 feet to the mouth of Alabama River, a distance of 38 miles. A depth of $4\frac{1}{2}$ feet can be taken into Apalachee River directly from the bay, but by a roundabout route leading up Mobile River, down Spanish River, up Tensaw River, and then into Apalachee River, a depth of $10\frac{1}{2}$ feet can be taken to the town of Stockton. A drawbridge (110-foot opening) crosses Mobile River at 15 miles above the city of Mobile.

Alabama River is formed by the junction of *Coosa River* and *Tallahpoosa River* and is a navigable stream throughout its length of 270 miles. A draft of $2\frac{3}{4}$ feet can be carried at low water to the city of Montgomery, 254 miles above Mobile River, and greater drafts depending upon the stage of the river. A draft of 2 feet can be carried at low water to the head of this river and to Wetumpka on Coosa River, 10 miles above its mouth, and this is the head of navigation at low water. On completion of the approved project the least depth at low water will be 4 feet. Three drawbridges with 110-foot openings cross the river, the first at Selma, 183 miles above the mouth, the second at 9 miles below Montgomery, and the third at 6 miles above that city.

Tombigbee River is navigable at ordinary low water for a draft of 6 feet for a distance of 126 miles from its mouth and for a draft of 3 feet (projected depth 6 feet) to Demopolis, 35 miles farther. It is a navigable stream as far as Aberdeen, Miss., except during the period of extreme low water. *Warrior River* empties into the Tombigbee at Demopolis and extends 114 miles northward to Tuscaloosa, beyond which point the same river is known as the *Black Warrior*. A draft of 5 feet can be taken up Warrior and Black Warrior Rivers from the mouth of the former to a point 22 miles above Tuscaloosa. The available depth will be 6 feet on completion of the project, and this depth will then be possible throughout the entire system from Mobile Bay to the head of the Black Warrior.

Mobile is one of the largest cities on the Gulf coast and is an important commercial center. It has regular steamship connections with coast and foreign ports and a large fleet of bay and river steamboats. The depth of water ranges from 12 to 23 feet alongside the quays and in the slips; all the berths are sheltered from rough weather. Fuel and supplies of all kinds and in any quantity can be obtained here. Gasoline can be taken at the wharves or from an oil barge in the river. The facilities for making repairs to vessels are good, and there are several marine railways and floating docks of various capacities up to 3,000 tons. Storm-warning signals are displayed at Mobile and also at Fort Morgan, on the east side of the entrance to the bay.

SAILING DIRECTIONS FROM PENSACOLA TO MOBILE.

For directions from Pensacola to the whistle buoy off Pensacola Bay entrance, see page 69. From the whistle buoy off Pensacola Bay steer 258° true (**WSW** $\frac{1}{2}$ **W** mag.) for $40\frac{1}{2}$ miles to the whistle buoy off Mobile Bay entrance. Or, with a draft of 5 feet and a smooth sea, steer westward from the second black buoy (No. 3) inshore from the whistle and follow the coast at a distance of $\frac{1}{2}$ mile nearly to Mobile Point, the entrance to Mobile Bay. Then enter by the Swash Channel, giving the shore at Mobile Point a berth of $\frac{1}{4}$ mile until up with red buoy No. 4.

From the whistle buoy steer about 355° true (**N** $\frac{3}{8}$ **W** mag.) for Sand Island Lighthouse and so as to leave a red gas buoy 50 yards on the starboard hand and a red bell buoy, if in place, on the same side. From the gas buoy steer 11° true (**N** $\frac{1}{2}$ **E** mag.), leaving two black buoys well on the port hand and two red buoys (the first a gas buoy) well on the starboard hand.

When Mobile Point light, a skeleton tower on Fort Morgan (red light), is abeam steer 351° true (**N** by **W** $\frac{1}{4}$ **W** mag.) to leave Middle Ground beacon (white light) 50 yards on the starboard hand. If bound into Mississippi Sound, see directions on page 77. From this beacon steer 7° true (**N** $\frac{1}{4}$ **E** mag.) for $10\frac{1}{2}$ miles, leaving the red beacons (red lights) about 50 yards on the starboard hand. When abreast beacon 8A (two lights, one red and one white) steer 1° true (**N** $\frac{3}{8}$ **W** mag.) for 1 mile to a position 50 yards west of beacon MBA (same lights as 8A), leaving Mobile Bay light (two red lights) well on the starboard hand. This last course is marked by a range of two red day marks south of beacon No. 8A. Then steer about 355° true (**N** $\frac{3}{8}$ **W** mag.) for nearly $10\frac{1}{2}$ miles, leaving the beacons as before. From beacon No. 16 steer 2° true (**N** $\frac{1}{4}$ **W** mag.) for 3 miles on Cutoff Channel range (white lights, the front on a white structure and the rear on a black), leaving the beacons as before. Hold this range until about 200 yards from the front range light and then steer so as to give the wharves at Mobile a berth of 75 yards.

MISSISSIPPI SOUND

lies westward of Mobile Bay between the mainland and a chain of long, narrow islands. It is about 70 miles long and from 5 to 10 miles wide. Its eastern end connects with Mobile Bay and its western end with Lake Borgne and Lake Pontchartrain, the former leading to the Mississippi River and the latter to the city of New Orleans. The sound is comparatively shallow, except in the vicinities of some of the passages leading in from the Gulf, but is good for a draft of 10 from Mobile Bay nearly to its western end. It is protected from Gulf seas and is safe for small craft except during the

most severe weather; and there are snug harbors within easy reach from all parts of the sound. Light draft vessels (5 to 6 feet) bound to New Orleans or to the Mississippi invariably go through the sound rather than by an outside route to the mouth of the Mississippi and thence up river. The principal towns on the sound are Pascagoula, Biloxi, Gulfport, Pass Christian, and Bay St. Louis, and these are described farther on, with directions for reaching each.

Horn Island Pass, between Petit Bois and Horn Islands, 25 miles west of Mobile Bay entrance, leads from the Gulf of Mexico into Mississippi Sound, and is the entrance from the Gulf to the Port of Pascagoula. It has a depth of 21 feet in a dredged channel to the anchorage in the lee of these islands and is well marked by buoys. A depth of 17 feet can be taken from the anchorage to the dredged channel to Pascagoula.

Dog Keys Pass, between Horn and Ship Islands, has a depth of about 12 feet. It is marked by two buoys and is used to some extent by local boats.

Ship Island Pass, between Ship and Cat Islands, 48 miles west of Mobile Bay entrance, is the entrance to Gulfport. A draft of 23 feet can be carried over Ship Island Bar to the lower anchorage and 20 feet from there to the town of Gulfport. The channel throughout is marked by buoys and lights.

Cat Island Channel is the most westerly connection between the Gulf of Mexico and Mississippi Sound. It is a buoyed passage 14 feet deep, south of Cat Island, leading to the western part of the sound, where the ruling depth is between 7 and 8 feet.

Pascagoula is a town on the east bank of *Pascagoula River* about 23 miles west of Mobile Bay. It is reached by a dredged channel, 17 feet deep, through the shoals in Mississippi Sound to and up Pascagoula River. This depth can also be carried up Pascagoula River and its tributary Dog River for a distance of 7 miles above the town. A draft of 7 feet at mean low water can be carried 34 miles up Pascagoula River to *Dead Lake* and 3 feet to the head of the river, 43 miles farther. *Leaf River*, which unites with *Chickasahay River* to form the Pascagoula, is navigable for a draft of 2 feet at mean low water for a distance of 67 miles above the head of Pascagoula River. Chickasahay River is navigable only at high water.

Pascagoula is connected by railroad with Mobile and New Orleans. A depth of 12 feet can be taken to the public landing just below the railroad bridge, where fresh water can be taken. Coal, gasoline, provisions, and some ship chandlery can be obtained here. There are facilities for making minor repairs to vessels at the shipyard above the bridge. Vessels of about 300 tons and a draft of 9 feet

can be hauled out here. Storm-warning signals are displayed where they can be seen from the sound.

Directions to Pascagoula.—Make Pascagoula River entrance light A, a red light on a red daymark. Leave it about 75 yards on the starboard hand and steer 320° true (NW mag.) on Pascagoula River range, leaving five red beacons (one lighted) about 75 yards on the starboard hand. The range beacons are the most westerly of the group and are black structures, the front showing a white light and the rear a red light. When abreast beacon C (red light), haul gradually northward so as to leave beacons D and E (also red lights) about 75 yards on the starboard hand. From the last beacon steer mid-river courses.

Biloxi is a small city on the north shore of Mississippi Sound about 40 miles west of Mobile Bay. It is on the railroad which lies close to the north shore of the sound and connects Mobile with New Orleans. A dredged channel 8 feet deep, marked by lighted beacons, leads through the shoals in the sound to the wharves at Biloxi. A draft of 6 feet can be taken into Biloxi Bay, east and north of the city, by entering eastward of Deer Island, about midway between the island and the mainland; but there are no marks for this entrance, and local knowledge is required after passing the south end of Deer Island. The most prominent mark from the sound is a tall water tower at Biloxi; the lighthouse there, a white masonry tower, is not readily picked up during daylight unless the light is favorable. There is good anchorage for small vessels close to the city in depths ranging from 6 to 12 feet. Fresh water, gasoline, provisions, and some ship chandlery can be obtained. There are several marine railways of about 30 tons capacity, limited to drafts of about 5 feet. Storm-warning signals are displayed from a tower near the yacht club.

Directions to Biloxi.—Bring the water tank at Biloxi or Biloxi lighthouse (fixed white light on a white tower, about $\frac{3}{4}$ mile westward of the tank) to bear about north and steer for it until within 2 miles of the shore. Then bring the lighthouse to bear 2° true (N $\frac{1}{4}$ W mag.) and steer for it, leaving two red beacons (red lights) about 20 yards on the starboard hand. When abreast the second beacon, haul gradually eastward to leave two more similar beacons about the same distance on the starboard hand. From the last beacon, steer eastward, keeping about 200 yards off the wharves until $\frac{1}{2}$ mile east of the lighthouse and then about 100 yards off until the desired anchorage is reached.

Gulfport is an important shipping port on the north shore of Mississippi Sound, 10 miles west of Biloxi. It is a small but thriving

city with good railroad connections and a large foreign commerce. The harbor is a dredged, rectangular-shaped basin, $\frac{1}{4}$ mile by $\frac{1}{2}$ mile and 22 feet deep, inclosed on three sides by piling and on the fourth by a long pier. It is connected with the deep water of the sound by a dredged channel 300 feet wide by 19 feet deep, marked along its northeast side by lights and buoys. Coal, gasoline, fresh water, provisions, and some ship chandlery can be obtained here. Because of the congested condition of this port and the frequent moving of large vessels, lighters, and rafts of timber, small craft will not find this a convenient place for taking on stores. Storm-warning signals are displayed from the end of the long pier.

Directions to Gulfport.—Leave Gulfport Channel beacon No. 2 (red structure, red light) about 60 yards on the starboard hand and steer 323° true (NW $\frac{1}{4}$ N mag.) for the left side of the long pier at Gulfport, leaving lighted beacons and buoys about 60 yards on the starboard hand. Leave the pier on the starboard hand and enter the basin.

Pass Christian is a town and railroad station on the north shore of the sound, 8 miles west of Gulfport. A depth of $4\frac{1}{2}$ feet can be taken to the wharf, but there are no marks, and local knowledge is required.

St. Louis Bay is an indentation in the north shore of Mississippi Sound, 11 miles west of Gulfport. It is 4 miles long and from $1\frac{1}{2}$ miles at the entrance to nearly 3 miles wide. The depth varies from 4 to 7 feet and decreases gradually toward the shore; the bottom is soft. A railroad bridge crosses the mouth of the bay. Wolf River and Jordan River empty into this bay, the former into the northeast corner and the latter into the west side; both have dredged approaches 100 feet wide by 7 feet deep, marked by beacons. A draft of 7 feet can be taken into Jordan River and for a distance of 14 miles up river. Wolf River is navigable for a draft of 7 feet for a distance of 17 miles, but only 6 feet can enter at low tide. The beacons which mark the channels to these rivers are left close-to on the port hand in entering.

Bay St. Louis is a summer resort on the north shore of Mississippi Sound on the west side of the entrance to St. Louis Bay. A draft of 6 feet can be taken to within $\frac{1}{4}$ mile of the shore at the town, but the depth at the wharves is under 4 feet. The cannery wharf north of the bridge has a depth of about 5 feet.

SAILING DIRECTIONS FROM MOBILE BAY, THROUGH MISSISSIPPI SOUND, TO LAKE BORGNE.

From Middle Ground light MG (white light) in Mobile Bay steer 301° true (NW by W $\frac{5}{8}$ W mag.) for a distance of 5 miles, or from light No. 2 steer 280° true (W $\frac{1}{2}$ N mag.) for $4\frac{1}{2}$ miles, heading for Pass aux Herons light No. 2, the most northerly of the red lights.

The channel through Pass aux Herons is marked by four red lights on red structures and by three red slatted piles, all on the northerly side and about 35 yards northward of the cut. Leave the first light 50 yards on the starboard hand and steer 235° true (**SW** $\frac{1}{2}$ **W** mag.) to the second, and then 249° true (**SW** by **W** $\frac{3}{4}$ **W** mag.) to the west end of the cut, leaving all aids about 50 yards on the starboard hand.

From light No. 8 at the west end of Pass aux Herons Channel, steer 266° true (**W** $\frac{3}{4}$ **S** mag.) for a distance of 13 miles to a position $\frac{5}{8}$ mile south of a small red day mark.

Then, if bound for Pascagoula, or if intending to take the passage north of Round Island (good for 7 feet), steer 295° true (**WNW** $\frac{1}{4}$ **W** mag.) for $4\frac{1}{4}$ miles to Pascagoula River entrance light A (red light). See directions on page 76 if bound into Pascagoula, but if passing, leave this light 75 yards on the starboard hand and steer 294° true (**WNW** $\frac{1}{4}$ **W** mag.) for 5 miles and then 277° true (**W** $\frac{1}{4}$ **N** mag.) for $1\frac{3}{4}$ miles so as to leave a black buoy 300 yards on the port hand and Round Island Spit light (red light, red daymark) 100 yards on the starboard hand. From the light steer 253° true (**WSW** mag.) for $9\frac{3}{4}$ miles and then 267° true (**W** $\frac{3}{4}$ **S** mag.) for $10\frac{3}{4}$ miles to Gulfport Channel light No. 2.

But for the deeper passage (14 feet or more) south of Round Island hold the 266° true (**W** $\frac{3}{4}$ **S** mag.) course for $3\frac{3}{4}$ miles past the small red day mark referred to above and until up with a black and white PS buoy. Then steer 208° true (**SSW** mag.) for $1\frac{1}{2}$ miles to a position 200 yards south of a second black and white PS buoy, and from there steer westward for 7 miles, following the north shore of Horn Island and leaving red buoys on the starboard hand and black buoys on the port hand. Pass the last red buoy (No. 10) and steer 334° true (**NNW** $\frac{3}{4}$ **W** mag.) for 2 miles to a black and white PS buoy. From there steer 270° true (**W** $\frac{1}{2}$ **S** mag.) for 18 miles to Gulfport Channel light No. 2.

Directions for entering Biloxi and Gulfport are given on pages 76 and 77.

Leave Gulfport Channel light No. 2 about 200 yards on the starboard hand and steer 267° true (**W** $\frac{3}{4}$ **S** mag.) for $8\frac{3}{4}$ miles so as to pass 200 yards north of Cat Island Shoal black buoy. When $\frac{1}{4}$ mile past the buoy, steer 247° true (**SW** by **W** $\frac{1}{2}$ **W** mag.) for $3\frac{3}{4}$ miles, leaving Merrill Shell Bank lighthouse $\frac{1}{4}$ mile on the starboard hand; and from a position a little more than $\frac{1}{4}$ mile south of the light, steer 264° true (**W** by **S** mag.) for $2\frac{1}{2}$ miles to leave a black buoy on the port hand. From this buoy, steer 244° true (**SW** by **W** $\frac{1}{4}$ **W** mag.) for 9 miles, keeping Lake Borgne lighthouse (white light) well on the starboard bow and leaving a red day mark $\frac{3}{8}$ mile on the starboard hand.

(Continued on p. 80.)

LAKE BORGNE, LAKE PONTCHARTRAIN, AND LAKE MAUREPAS

lie west of Mississippi Sound and east and north of the Mississippi River. They are connected one with the other and with the river; they are navigable throughout for light-draft vessels and, with the exception of the one connection with the river from Lake Borgne, are the western limit of inside navigation.

LAKE BORGNE

is properly a western extension of Mississippi Sound and has the same general trend and characteristics as that body. They are partly separated by three islands, of which the largest is Grand Island, and by several shoals, between which are navigable passages. Grand Island Pass, north of all the islands and close to the north shore of the sound and lake, is a deep, buoyed, and lighted channel and is the only one that is used. Lake Borgne is about 23 miles long and varies from 5 to 10 miles in width; its general depth is from 7 to 9 feet. There are no towns on the lake, and it is of importance only as a connecting link between the sound and Lake Pontchartrain and Mississippi River. The lake is tidal, but the tides are small except the wind tides, and the tidal currents through Grand Island Pass have considerable velocity at times.

The Rigolets is a deep passage, $7\frac{1}{2}$ miles long by $\frac{1}{4}$ mile wide, between Lake Borgne and Lake Ponchartrain; its entrance is $8\frac{1}{2}$ miles west of Lake Borgne light at Grand Island Pass. A drawbridge (60-foot opening) crosses The Rigolets close to its Lake Borgne entrance. Tidal currents, which are very irregular and are influenced greatly by winds, set with great velocity through The Rigolets at times and especially through the draw of this bridge.

Pearl River has two principal mouths, known as East Pearl River and West Pearl River, and a secondary, shallow mouth, between these two, known as East Pass. East Pearl River, the largest and deepest of the three, empties into Lake Borgne $3\frac{1}{4}$ miles west of Lake Borgne light. At mean low tide a draft of $7\frac{3}{4}$ feet can be taken across the bar at this mouth and upriver for a distance of 15 miles to Gainesville. A drawbridge (60-foot opening) crosses the river at 1 mile above its mouth. The entrance to this mouth is marked by a white light (black beacon) and by a black day mark northward of the light. West Pearl River empties into The Rigolets through West Mouth at 1 mile above the bridge and connects with East Pearl River by means of East Mouth, North Pass, and Little Lake Pass. About the same depth can be carried by this route. A draft of 3 feet can be carried up Pearl River at mean low water for a distance of 126 miles, and $1\frac{1}{2}$ feet to Columbia, 9 miles farther.

Chef Menteur Pass is also a connecting passage between Lake Borgne and Lake Pontchartrain, 6 to 9 miles southwestward of The Rigolets. It is 6 miles long, fully as deep as The Rigolets, but less than half as wide. It is used by small craft when going from Lake Pontchartrain to the Mississippi River and by small pleasure and fishing boats from New Orleans. A drawbridge (opening about 60 feet wide) crosses the pass 2 miles from the Lake Borgne entrance.

Lake Borgne Canal, also known locally as Ship Island Canal, connects the west end of Lake Borgne with the Mississippi River at a point about 10 miles below Canal Street, New Orleans. This canal is owned and operated by the Alabama & New Orleans Canal Co. (For canal regulations and toll rates, see p. 91.) The canal has one lock, which is at the river end and is 280 feet long. Vessels 240 feet in length, 36 feet in width, and 5½ to 6 feet in draft can make use of it. Its approaches, both from the lake and river, are marked by private lights, and its eastern approach by a red light (red beacon) in Lake Borgne. The canal, including the bayou which forms the eastern part of the connection, is about 6 miles long. At the river end of the canal is the village of Violet, a station on the railroad from New Orleans.

SAILING DIRECTIONS FOR LAKE BORGNE.

(Continued from p. 78.)

From Mississippi Sound to The Rigolets.—Steer 264° true (**W by S** mag.) through Grand Island Pass, leaving Lake Borgne lighthouse between ⅜ and ½ mile on the starboard hand and passing about midway between this lighthouse and the island southwestward from it. When 1 mile past the lighthouse, steer 239° true (**SW ¾ W** mag.) for 4½ miles with the light right astern; leave a small slatted pile ¼ mile on the starboard hand. Then steer 298° true (**WNW** mag.) for the draw in the railroad bridge over The Rigolets, and leave Long Point light ⅜ mile on the starboard hand. A strong current may be encountered in The Rigolets, and if so, the bridge should be approached cautiously. A westerly current will set in a west-southwest direction on to the fender on the south side of the draw, and an easterly current will set in an east by north direction on to the fender on the north side of the draw. Do not approach the bridge too closely until the draw has been opened. Keep in mid-stream after leaving the bridge, and when up with the lighthouse at the west end of The Rigolets turn to the directions on page 85.

From Mississippi Sound to Lake Borgne Canal.—Steer 264° true (**W by S** mag.) through Grand Island Pass, leaving Lake Borgne light between ⅜ and ½ mile on the starboard hand and passing about midway between this light and the island southwestward from it.

When $\frac{3}{4}$ mile past the light, steer 230° true (SW mag.) with the light right astern, taking care not to get too close to the island on the port hand. Hold this course for 13 miles and then steer 242° true (SW by W mag.) for $9\frac{1}{4}$ miles to Bayou du Pre light (red light, red day mark), at the entrance to the bayou of that name.

Leave this light about 50 yards on the starboard hand and steer southwestward into the bayou, the mouth of which is marked by white lights (private marks) on the north bank and by an old fort on the south bank. There is a wooden training wall along the southern side of the channel extending a short distance from the entrance. Having entered the bayou, keep in mid-channel and follow the telegraph line when in doubt as to which branch to take. Two drawbridges cross the canal just east of the lock.

LAKE PONTCHARTRAIN

lies 5 miles west of Lake Borgne and 4 miles north of the Mississippi River; its connections with the former have been described above. There is no direct connection between this lake and the river; but there are canals leading from the lake nearly to the river at New Orleans, descriptions of which are given under heading "New Orleans." Pontchartrain is a fresh-water lake, rather symmetrical in shape, 36 miles long, 22 miles wide at the widest part, and from 10 to 16 feet deep. A shoal, known as the Middle Ground, fills the east end of the lake and limits the draft that can be brought into it. The least depth over this shoal is less than 3 feet, but there are passages north and south of the shoalest part in which the ruling depths are 5.6 feet and 5 feet, respectively. Tide in the lake is governed almost entirely by winds and may have an extreme range of $3\frac{1}{2}$ to 4 feet. It is claimed that the surface of the lake is lowered at least 2 feet during the winter when northwest winds prevail. The greatest draft that can enter the lake is about $7\frac{1}{2}$ feet, and that only on a favorable tide, while the average draft is 5 to $5\frac{1}{2}$ feet. A railroad bridge crosses the neck of the eastern extremity of the lake $4\frac{1}{2}$ miles west of The Rigolets. It has two draws with double, clear openings of 106 feet at distances of 1 mile from each shore.

New Orleans.—The city limits extend from the Mississippi River to Lake Pontchartrain, but the business section and the greater part of the residential section are on or close to the river bank; the pleasure resorts and the suburbs are on the lake shore, about 20 miles from The Rigolets. Two canals, called variously Bayou St. John, Old Basin or Old Canal, and New Basin or New Canal, extend from the lake to the heart of the city and nearly to the Mississippi.

Fuel, provisions, and supplies of all kinds and in any quantities can be had at New Orleans by going to the wharves on the river

bank; but as these berths are exposed to the wash from passing steamers small craft rarely go to the river side of the city. Gasoline and drinking water (the lake water is good enough for other purposes) can be had at the mouths of both canals, and supplies can be brought down by railroad, or boats can go up the canals to the city. As a rule yachts rarely go above the third bridge of New Canal or Esplanade Street Bridge of Bayou St. John on account of delay in passing bridges and danger from scows and luggers which crowd the upper waters of both canals. Large vessels repair and dry-dock at Algiers, across the river from New Orleans, where there are facilities for making all repairs and dry docks of ample capacity. Vessels up to 6 feet in draft and 100 feet in length can be hauled out on marine railways in New Canal and smaller craft in Bayou St. John. Repairs can also be made at these places. Any vessel that can enter Lake Pontchartrain can be hauled out at Madisonville, on the north side of the lake.

Old Canal consists of Bayou St. John, originally a natural waterway about 3 miles long, and a canal about $1\frac{1}{2}$ miles long from the head of the bayou to a small basin situated about $\frac{1}{2}$ mile from the river. Bayou St. John has a depth of about 6 feet in the middle, but only about $4\frac{1}{2}$ feet a little off the center line, and is more or less obstructed by stumps on each side of the channel. Its mouth is $13\frac{3}{4}$ miles from the south draw of the railroad bridge which crosses Lake Pontchartrain and is marked by Bayou St. John light, a red light beside a white house on piles, and by a range of two red post lanterns. The channel at the entrance is protected by training walls on each side. Spanish Fort is a pleasure resort at the mouth of Bayou St. John and is connected with New Orleans by an electric car line. Lake steamers (6 feet draft) enter the mouth of the bayou and make fast to the bank at Spanish Fort. Small craft of all kinds use the bayou as far as Esplanade Street bridge, about $2\frac{3}{4}$ miles above the entrance, but pleasure boats rarely go above that point. A foot bridge and a railroad bridge (both with draws), are passed before reaching Esplanade Street.

New Canal is $1\frac{5}{8}$ miles west of Bayou St. John and is marked by New Canal lighthouse, a fixed white light and a fog bell on a house on the east side of the entrance, and by a red post lantern on the end of the west jetty. The canal is about $7\frac{1}{2}$ feet deep between perpendicular banks, which are protected by sheet piling, and extends in three straight courses for a distance of $5\frac{1}{2}$ miles to the business center of New Orleans. The approach to the canal is protected by jetties and the west jetty projects diagonally across the mouth, thus forming a breakwater. The Southern Yacht Club and a pleasure resort known as West End are at the mouth of this canal. The electric car line to Spanish Fort follows the east side of this canal nearly to the lake, and there is a branch line connecting with West End. There are 13 draw-

bridges over New Canal, and at the third, about $2\frac{3}{4}$ miles from the lake, pleasure boats are refused passage at certain hours unless provided with a pass.

Port Pontchartrain or *Milneburg* is a railroad terminus 1 mile east of Bayou St. John. The lighthouse at the end of the pier at this place is a white conical tower from which a fixed white light is shown. Sunken piles, the remains of an old breakwater, lie at a distance of $\frac{1}{2}$ mile off the end of this wharf.

Bayou Bonfuca empties into the north side of Lake Pontchartrain, 3 miles northwestward of the north draw in the railroad bridge which spans the eastern end of the lake. A white light on a black beacon marks the entrance; southwestward of the light is a club house on piles. The least channel depth on the bar at the mouth of the bayou is 5 feet; the bottom is hard sand. Towboats of about 6 feet draft enter on a favorable tide and go as far upstream as the town of Slidell, a distance of 5 or 6 miles. A drawbridge crosses the bayou at this point.

To enter Bayou Bonfuca, bring the south draw of the railroad bridge over the stern and steer about north so as to leave the light (beacon) 50 feet on the port hand.

Bayou Lacombe empties $4\frac{1}{2}$ miles westward of Bayou Bonfuca or nearly 7 miles west-northwest of the north draw in the railroad bridge. Its mouth is marked by a white light on a black beacon. The least channel depth on the bar at the mouth is 4 feet, over a hard sand bottom. Vessels of about $5\frac{1}{2}$ feet draft enter on a favorable tide and go about $7\frac{1}{2}$ miles upstream to sawmills. A drawbridge crosses the bayou at about 5 miles above its mouth, at the village of Bayou Lacombe.

To enter Bayou Lacombe, steer about north by west for a large tree on the west bank, leaving the light (beacon) about 100 yards on the port hand and passing close to the east side of the entrance.

Mandeville is a town on the north shore of Lake Pontchartrain, 15 miles westward of the place where the railroad bridge crosses the lake and 20 miles north of New Orleans. There is no harbor there, but during calm weather boats can lie at a long pier which extends from the shore to a depth of about 10 feet. About 1 mile west of this pier a canal 60 feet wide by 10 feet deep has been dug in, at right angles with the shore line, for a distance of about 100 yards to a sawmill. The approach to this canal is protected by sheet piling on each side for a distance of about 100 yards offshore; the outer end of the east piling is marked by a lantern.

Chefuncte River empties into the most northern part of Lake Pontchartrain about 5 miles west of Mandeville. The least depth in the dredged channel across the bar is 7 feet, and this depth can be carried up Chefuncte River and its tributary *Bogue Falia River* for a distance

of about 12 miles to the town of Covington. Bogue Falia River empties into Chefuncte River about 9 miles above the mouth of the latter. The entrance to Chefuncte River is marked by a range of white lights, the front on a black daymark and the rear on a white, conical tower; two small red daymarks indicate the east side of the dredged channel. A fog bell is sounded every 30 seconds during thick weather from the rear light. The town of Madisonville is on the west bank of Chefuncte River at 2 miles above its mouth. It is connected with New Orleans by steamboats which land at Bayou St. John and Milneburg. There are shipyards and marine railways at Madisonville which take the largest vessels that can enter the lake.

To enter Chefuncte River, steer 18° true (N by E $\frac{1}{8}$ E mag.) for the lights in range. Leave two small red daymarks on the starboard hand, and when up with the latter haul slowly eastward for the mouth of the river. Keep about in midstream, favoring if anything the upriver sides of the point at bends.

Pass Manchac is a passage, $5\frac{1}{2}$ miles long by 150 to 200 yards wide, between the northwest part of Lake Pontchartrain and Lake Maurepas. The passage is very deep but the approaches in both lakes are across long bars on which the channel depths are 7 feet. Three lights mark the approach from Lake Pontchartrain as follows: A white light on a white cylindrical tower attached to a building on the north side of the entrance, a red light on a red beacon south of the entrance, and a white light on a white beacon north of the entrance. The last two are on the east sides, respectively, of South Channel and East Channel and mark the entrances from the lake to these channels. The channels lie about parallel to the adjacent shores and between the lights and the shores; South Channel is good for 7 feet and East Channel for 6 feet. A fog bell is struck every 30 seconds, during thick weather, at the central light. A railroad bridge, which has a draw opening 60 feet wide, spans the west end of the pass.

Tangipahoa River is a very narrow but comparatively deep stream flowing into Lake Pontchartrain, $2\frac{3}{4}$ miles northward of Pass Manchac. Its approach is marked by a white light on a black and white striped beacon $1\frac{5}{8}$ miles northward of East Channel light. A draft of about 4 feet can be taken into this river.

LAKE MAUREPAS

lies just west of Lake Pontchartrain. It is $11\frac{1}{2}$ miles long in a northeast and southwest direction, from 4 to 8 miles wide, and about 10 feet deep. Winds may produce an extreme variation in the water level of 2 feet.

Tickfaw River flows into the north end of Lake Maurepas, over a bar having a least channel depth of $6\frac{1}{2}$ feet. The tributaries of this river, *Natalbany* and *Blood Rivers*, join it at $1\frac{1}{2}$ and 8 miles,

respectively, above its mouth. *Ponchatoula River* is a tributary of Natalbany River, $3\frac{1}{2}$ miles above its junction with the Tickfaw. All of these streams are navigable for any draft that can be taken across the outer bar and for distances above their respective mouths as follows: Tickfaw, 14 miles; Natalbany, $10\frac{1}{2}$ miles; Blood, $3\frac{1}{2}$ miles; and Ponchatoula, $4\frac{1}{2}$ miles. A white light on a white pile marks the west side of the river mouth at the shore of the lake. The town of Springfield is on Natalbany River, $8\frac{1}{2}$ miles above its mouth.

Amite River empties into Lake Maurepas due west from Pass Manchac. A depth of $6\frac{1}{2}$ feet can be taken across the bar at the entrance and for a distance of about 36 miles above the mouth. Its tributary Bayou Manchac joins it about 32 miles above the mouth and is navigable for the same draft for a distance of 8 miles to the town of Hope Villa. The entrance to Amite River is marked by a white light over a dwelling on the south side of the mouth and by a daymark on the south side of the channel over the bar. A fog bell is struck every 30 seconds at the light during thick weather.

SAILING DIRECTIONS FOR LAKE PONTCHARTRAIN AND LAKE MAUREPAS.

(Continued from p. 80.)

From The Rigolets to the north draw (depth 5.6 feet).—From a mid-channel position in the west entrance to The Rigolets turn northward, giving the point on the starboard hand a berth of 200 yards, and steer 320° true (**NW mag.**) for a distance of 1 mile until Salt Bayou is abeam, little more than $\frac{1}{4}$ mile distant. Then steer 287° true (**W by N mag.**) heading a little northward of the north draw in the railroad bridge. Hold this course for at least $1\frac{1}{2}$ miles and then head for the draw.

From The Rigolets to the south draw (depth 5 feet).—Turn southward on leaving The Rigolets and follow the shore, giving it a berth of over $\frac{1}{4}$ mile until past an old wharf which is $\frac{3}{4}$ mile south of the light and then a berth of $\frac{1}{4}$ mile. When the small red daymark (slatted pile) bears west, steer for it, leave it close-to on either side, and steer 315° true (**NW $\frac{1}{2}$ W mag.**) until the south draw of the railroad bridge is well open of the point east of it. Give this point, Point aux Herbes (lighthouse near its end), a berth of $\frac{1}{4}$ mile and steer for the draw.

To New Orleans.—From the north draw, steer 234° true (**SW $\frac{1}{4}$ W mag.**) for New Canal or 231° true (**SW mag.**) for Bayou St. John. From the south draw, follow the shore southward and westward, keeping at least $\frac{1}{2}$ mile off.

To enter New Canal, steer for the white light (New Canal lighthouse) until the red light is picked up; then steer so as to leave the red light close-to on the starboard hand and follow the west jetty.

To enter Bayou St. John, steer for the red light (Bayou St. John lighthouse) until the red range lights are picked up; then bring these lights in range, bearing 207° true (*SSW* mag.), and steer for them. Keep exactly in the middle of the entrance and look out for piles and stumps on each side.

From the north draw to Chefuncte River and intermediate points.—Steer 287° true (*W* by *N* mag.) for $8\frac{3}{4}$ miles until Ragged Point is abeam and not closer than $\frac{3}{4}$ mile, and then steer 304° true (*NW* by *W* $\frac{1}{2}$ *W* mag.) for $11\frac{3}{4}$ miles until on Chefuncte River range. Then see directions on page 84.

For Mandeville follow the directions given above to Ragged Point and then steer 321° true (*NW* mag.) until abreast the town.

For Bayou Lacombe, steer 292° true (*WNW* $\frac{1}{2}$ *W* mag.) until the directions on page 83 can be followed.

For Bayou Bonfuca, steer 304° true (*NW* by *W* $\frac{1}{2}$ *W* mag.) until the directions on page 83 can be followed.

From the North Draw to points in Lake Maurepas.—Steer 279° true (*W* $\frac{1}{4}$ *N* mag.) for 25 miles. Keep South Channel light (red) well on the starboard bow (all other lights are north of it); round this light passing about midway between it and the shore, and follow the shore northward, keeping 150 to 200 yards off at the point. Steer mid-channel courses through Pass Manchac, and on leaving the draw-bridge, follow the north shore at a distance of 200 to 300 yards to the turn in that shore $1\frac{1}{2}$ miles beyond the bridge.

To go to Tickfaw River, steer 310° true (*NW* by *W* mag.) for 3 miles until the light opens well clear of the east side of the entrance, and then steer about north for it. Give the east side of the entrance a berth of 100 yards.

To go to Amite River, steer 270° true (*W* $\frac{1}{2}$ *S* mag.) for 6 miles, keeping the light a little on the port bow. Leave the entrance beacon and the light on the port hand and take a mid-channel course into the river.

From New Orleans to points on Lake Pontchartrain.—The following courses and distances from the entrance to New Canal lead to the approaches to these places, and from there the directions given above or the directions given after the descriptions of the rivers, bayous, etc., can be followed:

Bayou Bonfuca, 45° true (*NE* $\frac{1}{2}$ *N* mag.), 18 miles.

Bayou Lacombe, 31° true (*NNE* $\frac{1}{4}$ *E* mag.), 16 miles.

Mandeville, 5° true (*N* mag.), $19\frac{1}{2}$ miles to wharf.

Chefuncte River, 351° true (*N* by *W* $\frac{1}{4}$ *W* mag.), 20 miles.

Pass Manchac, 325° true (*NW* $\frac{3}{8}$ *N* mag.), 18 miles.

From New Orleans to Lake Borgne Canal via Chef Menteur Pass.—This is the usual route for craft of 5 feet or less draft, and the dis-

tance from the place where the two routes separate, at the south draw of the railroad bridge, is about half as great by this as by the route through The Rigolets.

From the south draw of the railroad bridge which spans the east end of Lake Pontchartrain, steer so as to give Point aux Herbes a berth of $\frac{1}{4}$ mile. Turn southward when past this point and follow the shore at a distance of between $\frac{1}{4}$ and $\frac{1}{2}$ mile until Chef Menteur Pass opens, about 1 mile distant. Then keep close to the southern and western shore until into the pass. The pass is deep from shore to shore. On leaving the pass steer 152° true (**SE** by **S** mag.) for 1 mile and then 216° true (**SSW** $\frac{3}{4}$ **W** mag.) for $5\frac{1}{2}$ miles to Bayou du Pre light at the entrance to the canal. Then see directions on page 80.

CHANDELEUR AND BRETON SOUNDS

lie southward of Mississippi Sound and northward of the Mississippi River Delta, Chandeleur Sound to northward and Breton Sound to southward with no clearly defined line of demarcation between them. The eastern boundary of Chandeleur Sound is Chandeleur Islands, a narrow chain of low islands beginning 10 miles southward of Ship Island and extending in a general south by west direction for a distance of 23 miles. Southwestward from these islands are Errol Island, at a distance of 2 miles, and Breton Island, $8\frac{1}{2}$ miles beyond Errol Island; these mark the eastern limit of Breton Sound. The only prominent mark on any of these islands is Chandeleur lighthouse on the northern end of the most northerly of the Chandeleur Islands, a skeleton tower, black above and brown below, showing a flashing red light visible for a distance of 16 miles. The western shore of both sounds is a network of marshy islands separated by shallow bayous and bays; the land is all low and is submerged on extremely high tides nearly and in some places quite to the banks of the Mississippi River. Several shallow canals lead from the southern part of Breton Sound to the river bank, but only one of them (described under heading "Mississippi River") leads into the river. These are used by the oyster boats, of which there is a large fleet operating in the sound, to deliver their catch at the canneries and packing houses on the river bank. Vessels of less than 11 feet draft bound from Mississippi Sound to Mississippi River can pass through these sounds and have smoother water than if passing eastward of the islands.

SAILING DIRECTIONS FOR CHANDELEUR AND BRETON SOUNDS.

With Chandeleur lighthouse bearing 84° true (*E* by *N* mag.), distant 3 miles, steer 204° true (**S** by **W** $\frac{5}{8}$ **W** mag.) for $17\frac{1}{4}$ miles. Or, bring the lighthouse to bear 32° true (*NNE* $\frac{3}{8}$ *E* mag.), distant

1½ miles, over the stern and steer 212° true (**SSW** ¾ **W** mag.) for 17½ miles. These courses lead to a black and white PS buoy which lies 1¼ miles westward of Old Harbor Island. Leave this buoy close-to and steer 193° true (**S** ¾ **W** mag.) for 17 miles to a PS buoy 1¼ miles east of the north end of Breton Island. Leave it close-to and steer 196° true (**S** by **W** mag.) for 5¼ miles, passing one PS buoy close-to when abreast the middle of the island and arriving at a second PS buoy south of the island. From the last buoy steer 141° true (**SE** mag.) for 15 miles to a position 3½ miles 58° true (**NE** ¾ **E** mag.) from Pass a Loutre lighthouse.

MISSISSIPPI RIVER BELOW NEW ORLEANS.

The lower reaches of this river lie within a marshy peninsula which is from 8 to 15 miles wide and extends about 40 miles southeastward from the general coast line. Near the lower end of the peninsula the river divides and from there flows to the Gulf of Mexico through several branches which radiate from the main stream in a fan-shaped formation. These branches, or passes as they are called, are Pass a Loutre, South Pass, and Southwest Pass, and the place where they unite is called Head of the Passes.

Pass a Loutre divides at 4½ miles below Head of the Passes and flows onward in two streams of about the same width, the northern one still bearing the same name, while the southern is called Southeast Pass. Pass a Loutre divides again when nearly to the Gulf and discharges through two mouths, of which the southern this time is called Pass a Loutre and the northern, North Pass. Southeast Pass also branches when near the Gulf, and its northern branch is named Northeast Pass. These passes are deep from the Head of the Passes to within a short distance of the Gulf, but the mouths of all of them are obstructed by bars on which the water is so shallow and the bottom so lumpy that vessels can not safely cross. Pass a Loutre bar, the deepest of the four, has a depth of about 7 feet, but is not buoyed. This pass is used occasionally by small local craft, but should not be attempted by a stranger. Pass a Loutre lighthouse, a black, conical tower showing a fixed red light visible 14 miles, stands on the north side of the pass on the land which separates this pass from North Pass.

South Pass has a depth of 28 feet over the bar and much deeper water inside; it is about 100 yards wide and 12 miles long to the Head of the Passes. It is well marked by lights. Port Eads is a post office on the east bank 2 miles from the entrance.

Southwest Pass has a depth of 31 feet and is well marked by lights and lighted buoys. The approach is further marked by a light vessel except during August, September, and half of October. This pass is about 330 yards wide and 17½ miles long from the end of the jetties

to the Head of the Passes. Burwood is a post office on the southeast bank $4\frac{1}{4}$ miles from the entrance.

The river from the Head of the Passes to the city of New Orleans, a distance of 81 miles, has a least width of 600 yards and a clear unobstructed channel from 6 to 39 fathoms deep. The banks are mostly steep-to and at no place does shallow water extend far from the bank. At Cubits Gap, in the east bank, 3 miles above the Head of the Passes, several passes meet and connect with the river. These are navigable for small vessels and lead to a section of the Mississippi Delta that is frequented by gunners during the shooting season, but there is no navigable connection between these passes and the Gulf. A sill of willow boughs, weighted down by rocks, has been laid across the entrances to these passes; it can be crossed at certain places with a draft of 7 feet, but a local knowledge is necessary. The Jump is the name of an opening in the west bank, 9 miles above the Head of the Passes, where Grand Pass and several small streams connect with the river. A draft of 11 feet can be taken for a distance of 9 miles down Grand Pass, but there is very little depth beyond that point. Above these passes the banks on both sides of the river have been raised to prevent overflow, and these banks or levees completely cut off all natural connection between the river and the bayous and waterways on each side.

Two canals connect the river with the waters eastward of it, the first at $21\frac{1}{2}$ miles above the Head of the Passes and the second about 10 miles below New Orleans. The lower canal is at the village of Ostrica and is known locally as Ostrica Canal; it is the property of the Louisiana Navigation Co. It has one lock, which is in the river embankment and will accommodate a vessel 60 feet long, 18 feet wide, and 4 feet draft at low water (6 feet at high water). At high water a draft of 6 feet can be taken through this canal to Bayou Tourtillon and thence through Quarantine Bay to Breton Sound, but on account of numerous oyster bars in these waters eastward of the canal the route is not recommended to strangers. Toll charges are at the rate of 50 cents per gross ton, with a minimum charge of \$1.75 for all classes of vessels. The canal is just below a large cannery and about 125 yards below a white light on the river bank. The upper canal, leading into Lake Borgne, has been described on page 80.

There are numerous villages on both banks of the river and these are connected with New Orleans by power boats and by railroads which extend down the west bank to Buras, opposite Ostrica, and down the east bank to Belair, about 25 miles below New Orleans. Gasoline and some supplies can be had at these villages.

There are two classes of pilots on the river—bar pilots and river pilots. The former are stationed near the mouths of South and Southwest Passes and come out to vessels when off the jetties. They

are relieved by the river pilots when up to Pilottown, 2 miles above the Head of the Passes.

Currents vary greatly with the different stages of the river, as shown in the table on page 13. At places there are countercurrents or eddies which if taken advantage of can greatly assist a small vessel in getting up river.

Vessels anchor anywhere in the river between the Head of the Passes and New Orleans where the depth will permit, but very small craft should not anchor in the stream if it can be avoided, as the wash from passing vessels is often very heavy. In the lower part of the river small craft can anchor in Cubits Gap or in The Jump with perfect safety, but there is no protected anchorage above the latter.

APPENDIX.

LAKE BORGNE CANAL.

REGULATIONS AND CANAL TOLLS.

Enrolled vessels, under their own power, 30 cents per gross registered ton for passage through canal and lockage.

Noncargo carrying craft, such as dredges, etc., will be charged on outside measurement of hull, at rate of 30 cents per ton of 100 cubic feet.

Barges loaded with brick will be charged at the rate of 30 cents per 1,000 bricks.

Barges loaded¹ with forest products will be towed through canal, and when empty, returned to lake entrance of canal. The rates for this service will be as follows:

	Per 1,000 feet.
Pine or cypress lumber.....	² \$0.65
Pine or cypress logs.....	1.00
Hardwood logs.....	1.25
Crossties, 3¼ cents per standard tie.	

Barges loaded with material other than mentioned above, will be charged 30 cents per gross registered ton. If not registered, 30 cents per ton of 100 cubic feet outside measurement.

Barges when empty will be charged 15 cents per gross registered ton. If not registered, 15 cents per ton of 100 cubic feet outside measurement.

Luggers, pleasure yachts, and launches under 30 feet, passage through canal and locks, under their own power, one way \$3. Above 30 feet in length, 10 cents per running foot, or at option of canal company, 30 cents per gross ton.

Skiffs, rowboats, and canoes, passage through canal and locks during regular locking, 50 cents each. Special locking, \$3.

Timber in cribs, 65 cents per 1,000 superficial feet.

Craft not to be loaded to exceed a maximum draft of 6 feet (and should be at least 6 inches by the stern) nor to a width over all of more than 36 feet, and during the low-water season the draft is not to exceed 5½ feet. Any delay or expense occasioned through non-

¹ In no case will the charges on a loaded barge be less than the charges would have been had the barge been empty.

² This rate will apply to lumber on schooners, provided not less than 70,000 feet is in tow.

compliance with these instructions will be at the risk and expense of shipper.

No outside tugboats will be permitted to pass through canal locks with barges or other craft in tow, without paying full tolls, unless special arrangements are made.

The company promises to use the utmost dispatch in passing all craft through the canal, but will not assume responsibility for delays caused by accidents or low water.

When the tolls amount to less than \$25, towage on craft underloads requiring the services of tug will be charged at the rate of \$7 one way, or \$12 round trip.

Charges must be paid either at the canal or at the company's office.

The above regulations and toll rates have been published by the Alabama & New Orleans Canal Co., the owner and operator of the Lake Borgne Canal.

LIST OF CHARTS AND OTHER PUBLICATIONS COVERING THE COAST FROM KEY WEST TO NEW ORLEANS.

Florida:	Price.
Chart 169, Newfound Harbor Key to Boca Grande Key (scale 1:100,000).....	\$0. 50
Chart 168, Long Key to Newfound Harbor Key (scale 1:100,000).....	. 50
Chart 584, Key West Harbor and approaches (scale 1:100,000).....	. 50
Chart 172, Cape Sable to Seminole Point (scale 1:100,000).....	. 50
Chart 173, Seminole Point to Big Marco Pass (scale 1:100,000).....	. 50
Chart 174, Big Marco Pass to San Carlos Bay (scale 1:100,000).....	. 50
Chart 175, San Carlos Bay to Lemon Bay, including Charlotte Harbor (scale 1:100,000).....	. 50
Chart 473, San Carlos Bay and Caloosahatchee River (scale 1:100,000).....	. 25
Chart 474, Main entrance to Charlotte Harbor (scale 1:100,000).....	. 25
Chart 176, Lemon Bay to Tampa Bay (scale 1:100,000).....	. 50
Chart 477, Entrance to Tampa Bay (scale 1:100,000).....	. 25
Chart 177, Tampa Bay (scale 1:100,000).....	. 50
Chart 178, Hog Island to Wall Creek, including Anclote Anchorage (scale 1:100,000).....	. 50
Chart 179, Wall Creek to Cedar Keys (scale 1:100,000).....	. 50
Chart 480, Cedar Keys (scale 1:100,000).....	. 20
Chart 180, Cedar Keys to Deadmans Bay (scale 1:100,000).....	. 50
Chart 181, Apalachee Bay (scale 1:100,000).....	. 50
Chart 182, Apalachee Bay and St. George Sound (scale 1:100,000).....	. 50
Chart 183, Apalachicola Bay to Cape San Blas (scale 1:100,000).....	. 50
Chart 184, St. Josephs and St. Andrews Bays (scale 1:100,000).....	. 50
Chart 185, Choctawhatchee Bay (scale 1:100,000).....	. 50
Chart 186, Choctawhatchee Inlet to Pensacola entrance (scale 1:100,000).....	. 50
Chart 490, Pensacola Bay (scale 1:100,000).....	. 25
Chart 413, Pensacola Bay entrance (scale 1:100,000).....	. 25
Florida and Alabama: Chart 187, Pensacola Bay to Mobile Bay (scale 1:100,000)...	. 50
Alabama: Chart 188, Mobile Bay and entrance (scale 1:100,000).....	. 50
Alabama and Mississippi: Chart 189, Mobile entrance and eastern part of Mississippi Sound (scale 1:100,000).....	. 50
Mississippi and Louisiana: Chart 190, Round Island to St. Josephs Island (scale 1:100,000).....	. 50

Louisiana:	Price.
Chart 191, Lakes Borgne and Pontchartrain (scale $\frac{1}{800000}$)	\$0. 50
Chart 192, Chandeleur and Breton Sounds (scale $\frac{1}{800000}$).....	. 50
Chart 193, Lakes Pontchartrain and Maurepas (scale $\frac{1}{800000}$).....	. 50
Chart 194, Mississippi River, from the passes to Grand Prairie (scale $\frac{1}{800000}$) ..	. 50
Chart 195, Mississippi River, Grand Prairie to New Orleans (scale $\frac{1}{800000}$) ..	. 50
General Chart 16, Key West to Tampa Bay ¹ (scale $\frac{1}{400000}$).....	. 50
General Chart 17, Tampa Bay to Cape San Blas ¹ (scale $\frac{1}{400000}$).....	. 50
General Chart 1115, Cape St. George to Mississippi Passes ¹ (scale $\frac{1}{400000}$).....	. 50
General Chart 19, Mobile Bay to Atchafalaya Bay ¹ (scale $\frac{1}{400000}$).....	. 50
United States Pilot, Atlantic Coast, Part VIII, Gulf of Mexico, from Key West to the Rio Grande.....	. 50
Tide Tables, Atlantic coast ports of the United States.....	. 15
Tide Tables, United States and foreign ports.....	. 50
Table of Depths for channels and harbors, coasts of the United States.....	Free.
Catalogue of Charts, Coast Pilots and Tide Tables.....	Free.

Charts, Coast Pilots, Tide Tables, and Catalogue of Charts, etc., can be had at the office of the Coast and Geodetic Survey, Washington, D. C., or at any of the agencies for the sale of charts. If ordering by mail from the Office at Washington, prepayment is obligatory; remittance should be by postal money order, express order, or certified check payable to the "Assistant in Charge of the Office," and not to any individual by name; postage stamps can not be accepted; the sending of money in an unregistered letter is unsafe; only catalogue numbers of charts need be mentioned; publications will be mailed free of postage. A list of agencies for the sale of charts is given in the catalogue and also in the first number each month of the Notices to Mariners, published jointly by the Coast and Geodetic Survey and the Bureau of Lighthouses. Table of Depths for channels and harbors, coasts of the United States, can be had free of charge on application to the Chief of the Division of Publications, Department of Commerce, Washington, D. C.

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

Light List, Atlantic and Gulf Coasts of the United States.

Buoy List, Florida Reefs and Gulf Coast to Cedar Keys.

Buoy List, Cedar Keys to the Rio Grande.

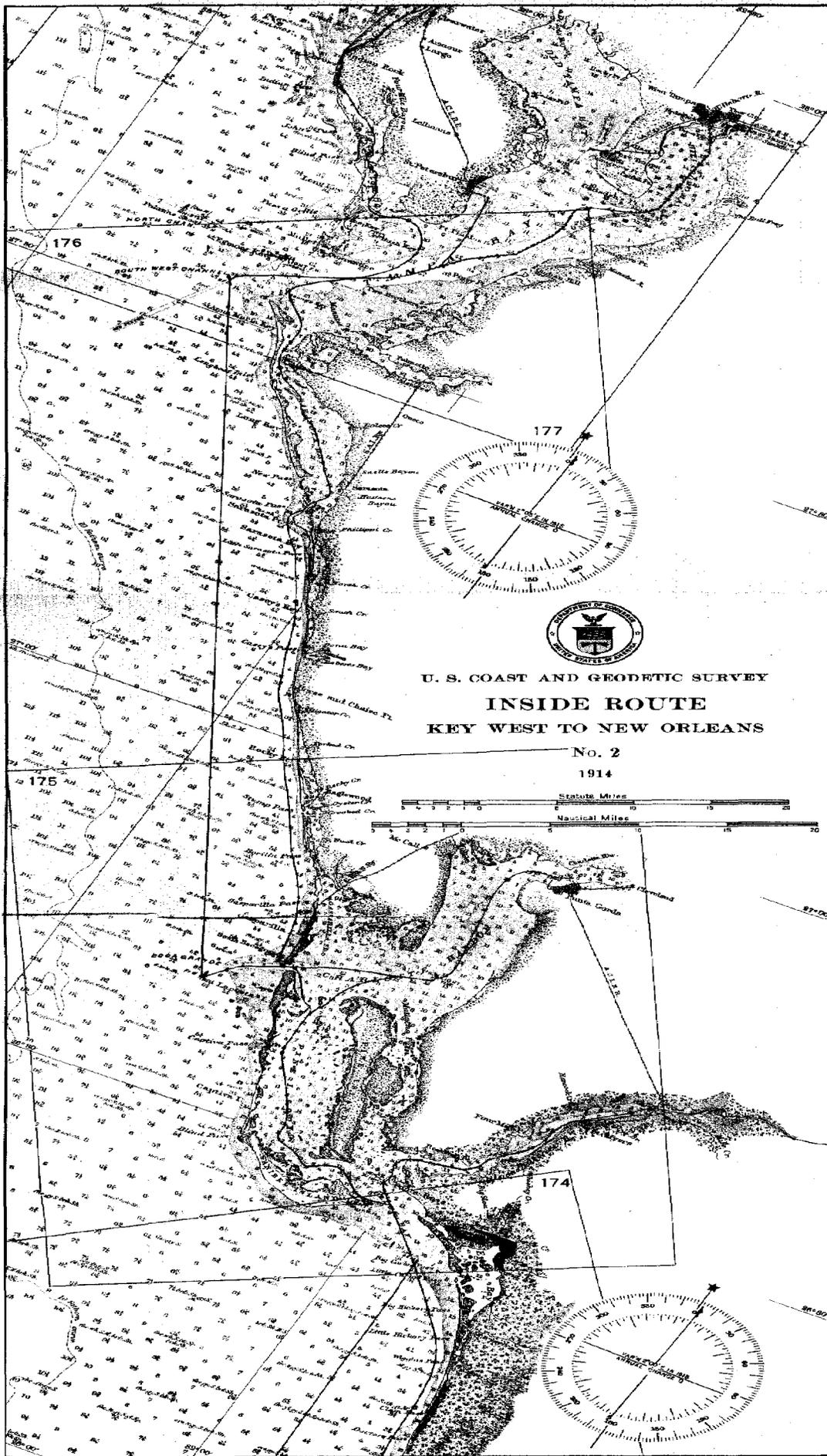
Notices to Mariners are published weekly and contain information regarding changes in aids to navigation, corrections to be applied to charts to keep them up to date, announcements of new charts and of various new publications of the Coast and Geodetic Survey. They can be obtained free of charge on application to the Division of Publications, Department of Commerce, Washington, D. C., United States customhouses or consulates, chart agencies, branch hydrographic offices, or offices of the various lighthouse districts.

¹ These charts are of the same scale as the charts which are included with this publication and are useful only for offshore navigation.

INDEX.

	Page.		Page.
Alabama River.....	72, 73	Clearwater Harbor.....	46, 47, 48
Alva.....	25	Coast from—	
Amite River.....	85	Key West to San Carlos Bay.....	15
Anclote Anchorage.....	48	Charlotte Harbor to Tampa Bay.....	35
Anclote Keys.....	50	Tampa Bay to Anclote River.....	45
Anclote River.....	45, 48, 49	Anclote Keys to Cedar Keys.....	50
Apalachee Bay.....	54, 56, 57, 72	Cedar Keys to Apalachee Bay.....	54
Apalachicola.....	61	Apalachee Bay to Cape San Blas.....	56
Apalachicola Bay.....	54, 56, 57, 69, 60, 61, 62, 65	St. Andrews Bay to Mobile Bay.....	68
Apalachee River.....	72	Conecuh River.....	68
Apalachicola River.....	60	Coosa River.....	73
Aucilla River.....	55	Coon Key.....	19
Bagdad.....	69	Crooked River.....	57
Bayport.....	51	Crystal River.....	51
Bay St. Louis.....	77	Cubits Gap.....	89, 90
Bayou Boniaca.....	83	Denaud, Fort.....	25, 29
Bayou Lacombe.....	83	Dog Keys Pass.....	75
Bayou Manchac.....	85	Dunedin.....	47
Biloxi.....	76	Eads, Fort.....	68
Big Carlos Pass.....	19	East Bay.....	68
Big Hickory Pass.....	19	East Pass (Choctawatchee Bay).....	59, 67
Big Marco Pass.....	18, 23	East Pass (St. George Sound).....	58
Big Marco River.....	18, 21	Egmont Key.....	36, 37
Big Pass (Clearwater Bay).....	47	Escambia Bay.....	68
Big Sarasota Pass.....	35, 36	Escambia River.....	68
Black Warrior River.....	73	Fenholloway River.....	55
Blackwater Bay.....	69, 70	Fishermans Key Anchorage.....	24
Blackwater River.....	69	Flint River.....	60
Blakely River.....	72	Fort Denaud.....	29
Blind Pass.....	44	Fort Lauderdale.....	25, 26
Blood River.....	84	Fort Myers.....	25, 28
Boca Ceiga Bay.....	43, 44, 45	Fort Thompson.....	25, 29
Bocagrande.....	32, 33	Gasparilla Pass.....	34
Boca Grande.....	32, 33	Gasparilla Sound.....	34
Bogue Falia River.....	83	Gordon Pass.....	19
Bonfuca, Bayou.....	83	Grand Island Pass.....	79, 80
Borgne, Lake.....	77, 79, 80	Grants Pass.....	72
Borgne Canal, Lake.....	80, 86, 91	Gulfport (Florida).....	44
Braidentown.....	43	Gulfport (Mississippi).....	76, 77
Breton Sound.....	87	Hawke Channel.....	21
Burwood.....	89	Head of the Passes.....	69
Caloosahatchee River.....	24, 25, 26, 27	Hickory Pass, Big.....	19
Canal:		Hypochee, Lake.....	26
Apalachicola River to St. Andrew Bay.....	62	Hillsboro Bay.....	39, 40
Lake Borgne.....	80, 86, 91	Hillsboro River.....	39
Miami.....	27	Holmes River.....	67
New (New Orleans).....	81, 82	Horn Island Pass.....	75
North New River.....	25	Hudson.....	51
Old (Bayou St. John).....	81, 82	Indian Key Anchorage.....	17, 18
Ostrica.....	89	Indian Pass.....	44
South New River.....	27	Inglis, Port.....	52
Cape Romano Shoals.....	15, 20	Inland waterway across South Florida.....	26
Cape San Blas.....	58, 62	Inland waterway from Apalachicola River to	
Captiva Pass.....	30, 31	St. Andrews Bay.....	62
Captiva Pass Anchorage.....	30	Inland waterway from Apalachee Bay to St.	
Carlos Pass, Big.....	19	George Sound.....	57
Carrabelle.....	58, 60	Johns Pass.....	44, 45
Casey Pass.....	36	Key West.....	11, 15, 16, 20
Cat Island Channel.....	75	Labelle.....	25
Cedar Keys.....	50, 52, 53	Lacombe, Bayou.....	83
Cedar Keys Harbor.....	53	Lake Borgne.....	77, 79, 80
Cedar Keys (town).....	53, 54	Lake Borgne Canal.....	80, 86, 91
Chandeleur Sound.....	87	Lake Hypochee.....	26
Charlotte Har' or.....	32, 33, 35	Lake Maurepas.....	79, 84, 85, 86
Charts and Publications.....	92	Lake Okechobee.....	29, 29
Chattahoochee River.....	60	Lake Pontchartrain.....	79, 81, 85, 86
Chef Menteur Pass.....	80, 86	Lauderdale, Fort.....	28
Chefuncte River.....	81, 84, 86	Leaf River.....	75
Chickasaw River.....	75	Little Pass (Clearwater).....	47
Choctawhatchee Bay.....	67	Little Sarasota Bay.....	41
Choctawhatchee River.....	67	Little Sarasota Pass.....	41
Clearwater.....	48		

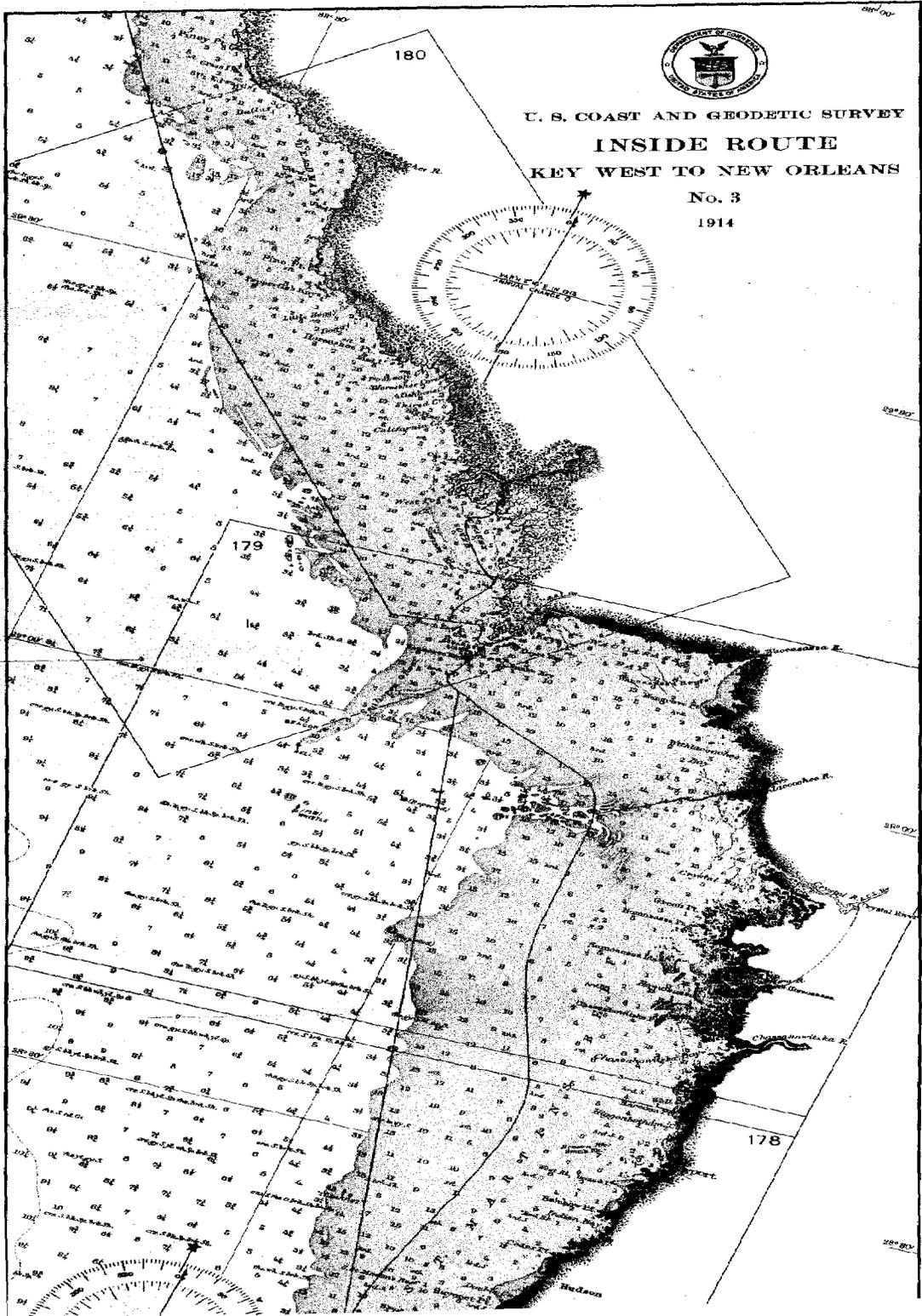
	Page.	Sailing directions—Continued.	Page.
Longboat Inlet.....	36, 37	Boca Ceiga Bay.....	44
Lynn Haven.....	65	Clearwater Harbor and St. Josephs Sound.....	46
Madisonville.....	82, 84	Anclote River.....	46
Manatee.....	43	Crystal River.....	57
Manatee River.....	42	Withlacoochee River.....	52
Manchac, Bayou.....	85	Cedar Keys.....	53
Mandeville.....	83	Cedar Keys to St. Marks River.....	55
Marco.....	19	Inside Passage from Apalachee Bay to St. George Sound.....	57
Marco Pass, Big.....	21	St. Marks River to East Pass and through East Pass and St. George Sound to Apalachicola Bay.....	59
Marco River, Big.....	21	Carrabelle.....	60
Matanzas Pass.....	19	West Pass, Apalachicola Bay and Apalachicola River.....	61
Matlacha Pass.....	30	Apalachicola Bay to St. Josephs Sound and St. Andrews Bay.....	65
Maurepas, Lake.....	84, 85, 86	St. Andrews Bay to Pensacola.....	69
Miami Canal.....	27	Pensacola to Mobile.....	74
Millview.....	71	Mobile Bay, through Mississippi Sound, to Lake Borgne.....	77
Millville.....	64, 65	Lake Borgne.....	80
Mitneburg.....	83	Lake Pontchartrain.....	85
Milton.....	69	Lake Maurepas.....	85
Mississippi River.....	88	Chandeleur and Breton Sounds.....	87
Mississippi Sound.....	74, 77, 80	St. Andrews.....	84
Mobile.....	73, 74	St. Andrews Bay.....	62, 64, 65, 66, 69
Mobile Bay.....	66, 72, 77	St. George Sound.....	57, 58, 59
Mobile River.....	72	St. James City.....	31
Myers, Fort.....	25, 28	St. James Island.....	57
Natalbany River.....	84	St. Joe, Port.....	63
New Orleans.....	81, 85, 86, 88	St. Josephs Sound.....	46, 47, 48, 65
New Orleans Canals.....	81, 82	St. Josephs Bay.....	63
Northeast Pass.....	88	St. Louis Bay.....	77
North New River Canal.....	26	St. Marks.....	56
North Pass.....	68	St. Marks River.....	55, 56, 59
Ocklockonee Bay.....	57	St. Petersburg.....	37, 38
Ocklockonee River.....	57	San Blas, Cape.....	56, 63
Okechobee, Lake.....	26, 29	San Carlos Bay.....	15, 20, 23
Old Tampa Bay.....	40, 41	Santa Rosa Sound.....	67, 70
Ostrica Canal.....	89	Sarasota.....	41
Palmetto.....	43	Sarasota Bay.....	38, 41, 42
Panama City.....	64	Sarasota Bay, Little.....	41
Pascagoula.....	75, 76	Sarasota Pass.....	41, 42
Pascagoula River.....	75	Sarasota Pass, Big.....	36, 41
Pass a Grille.....	43	Sarasota Pass, Little.....	36, 41
Pass a Loutre.....	88	Seminole Point.....	17
Pass aux Herons.....	72	Shark River.....	16
Pass Christian.....	77	Ship Island Pass.....	75
Pass Manchac.....	84, 86	South Boca Grande.....	33
Pavilion Key.....	17	Southeast Pass.....	88
Pearl River.....	79	South New River Canal.....	27
Pensacola.....	68, 69, 74	South Pass.....	88
Pensacola Bay.....	68, 69, 74	Southport.....	65
Perdido Bay.....	71	Southwest Pass.....	88
Pine Island Sound.....	24, 30	Steinhatchee River.....	55
Ponce de Leon Bay.....	16, 17	Stump Pass.....	36
Ponchatoula River.....	85	Suwanee River.....	55
Pontchartrain, Lake.....	81, 85, 86	Tallahassee River.....	73
Port Eads.....	88	Tampa.....	39
Port Inglis.....	52	Tampa Bay.....	35, 36, 37, 38, 45
Port Pontchartrain.....	83	Tangipahoa River.....	84
Port Richie.....	51	Tarpon Springs.....	49
Port St. Joe.....	63	Tensaw River.....	72
Port Tampa.....	38, 40	Terracela Bay.....	43
Punta Gorda.....	33, 34	The Jump.....	89, 90
Richie, Port.....	51	The Rigolots.....	79, 80, 85
Rigolets, The.....	79, 80, 85	Thompson, Fort.....	25, 29
Ritta Island.....	29	Tickfaw River.....	84
Romano Shoals, Cape.....	15, 20	Tombigbee River.....	72, 73
Route across South Florida.....	26	Venice.....	41
Sailing Directions:		Warrington.....	68
Key West to San Carlos Bay.....	20	Warrior River.....	73
San Carlos Bay.....	23	Withlacoochee Anchorage.....	52
Caloosahatchee River.....	27	Withlacoochee River.....	52
Pine Island Sound.....	30		
Charlotte Harbor.....	33		
Tampa Bay.....	37		
Hillsboro Bay.....	40		
Old Tampa Bay.....	41		
Sarasota Pass and Bay.....	42		

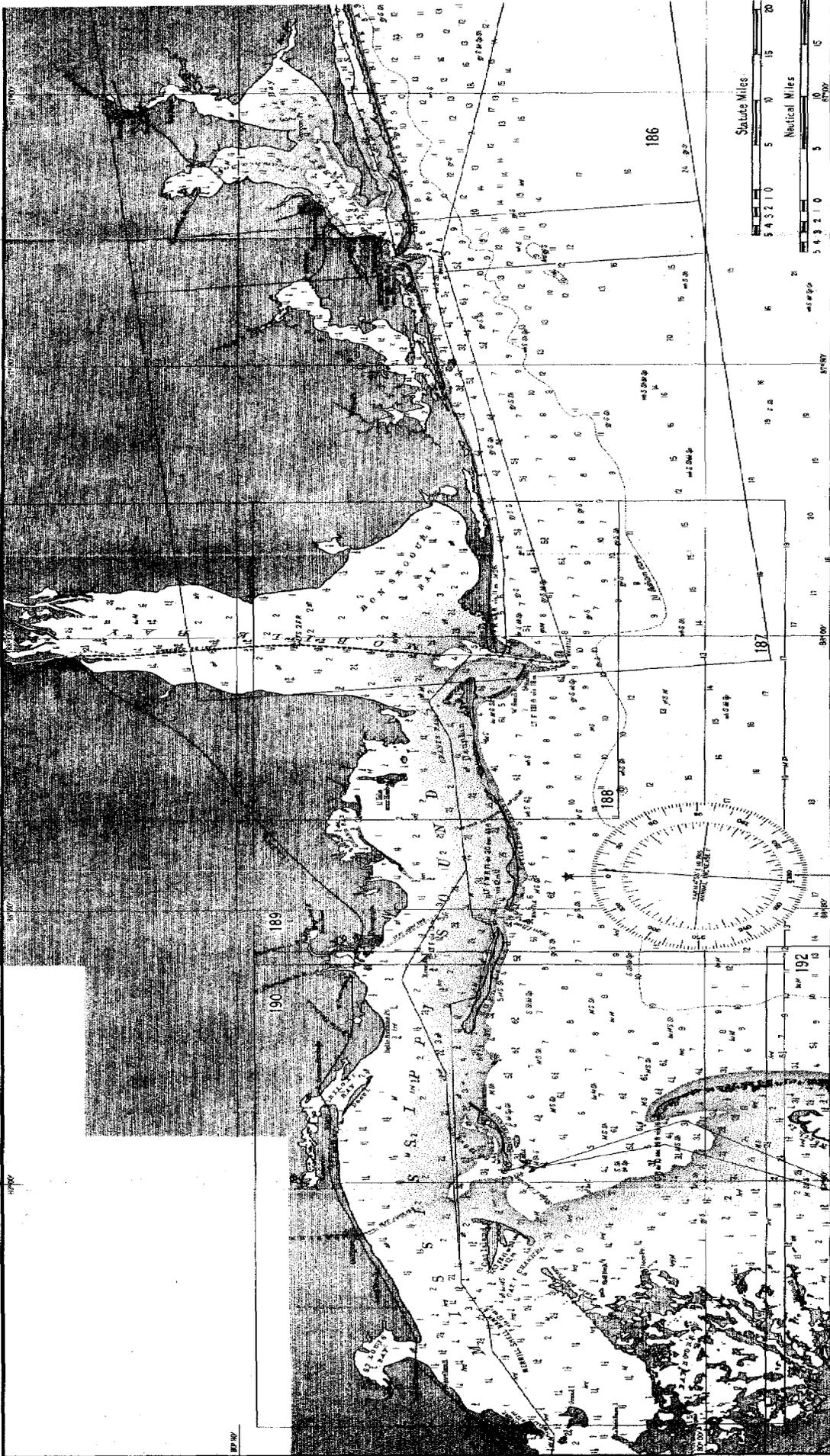


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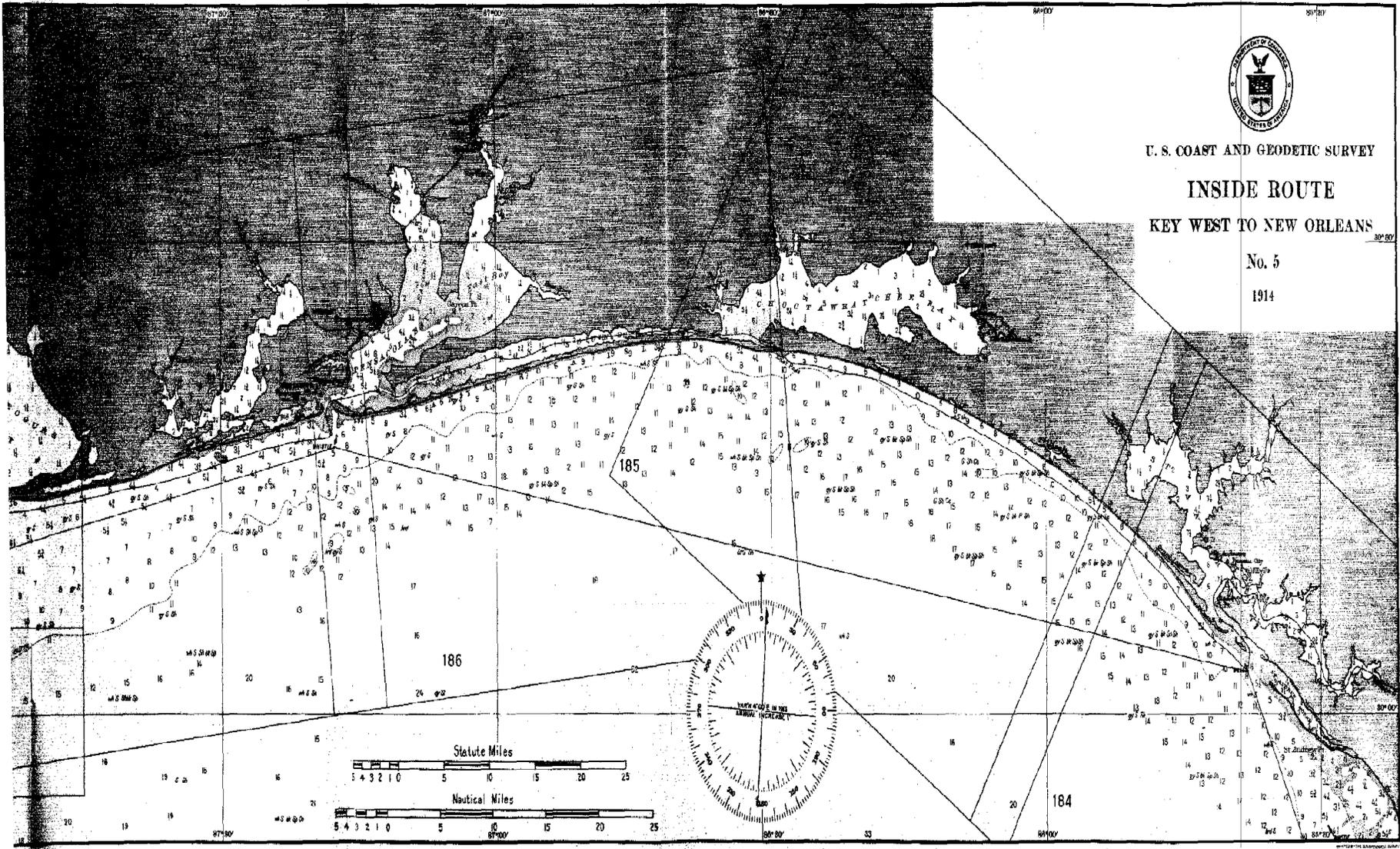
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