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Notes on the Coast of the United States

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Section VIII. { Mobile Bay / Mississippi Sound

(With the Maps)

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Note — This Memoir was chiefly prepared by Prof. W. P. Trowbridge, Assist. U.S.C. Survey — — The Hydrography was revised by Capt. C. P. Patterson, Hydrog. Inspector. —

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National Oceanic and Atmospheric Administration

Notes on the Coast of the United States

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Mobile Bay

Mobile Bay forms the eastern division of that large body of water which bounds the States of Alabama and Mississippi on the South, and which is separated from the Gulf of Mexico by a chain of low, narrow, sand islands and peninsulas, running parallel to the Coast, and distant about ten miles from the main land. Mississippi Sound may be regarded as the middle and Lake Borgne as the western division of this enclosed body of salt water.

Mobile bay has a circumference of about seventy five miles, and covers an area of about three hundred and fifty nautical miles. Its greatest axis lies in a North and South direction, and is about thirty miles in length. It is seven miles broad at its head, where the principal rivers empty into it, and about ten miles in its central part. An extension of the bay to the eastward in its Southern part makes it there about twenty miles wide. The entire bay is comprised between latitudes 30° 15' N and 30° 45' N, and between longitudes 87.° 45' W. and 88.° 05' W.

Depth.

The basin of Mobile bay is navigable through out for small vessels, and the soundings are

~~are~~ regular. The one fathom, two fathoms, and three fathoms curves run nearly parallel with the outlines of the bay. The one fathom curve runs around the whole bay, within an average distance of half a mile from shore.

The two fathom curve encloses the central part of the bay, at an average distance of three miles from the shore. From the extremities of the bay on the North, and east, this curve extends further from land, reaching a distance of eight and ten miles.

The three fathom curve encloses only a small oval shaped space north of the main Channel, to the distance of about six miles.

Character of Shores.

The country around the bay is generally low. The eastern shore appears to be somewhat more elevated than the western. The South shore of the bay is formed by a long, low, and narrow peninsula which makes out from the main land and runs directly west, and Dauphine island which extends still further to the westward. Between the peninsula and Dauphine island lies the main entrance of the bay, in Latitude 30° 13'

N, and Longitude 88°. 03'. W.

The distance between the principal entrance points - the east end of Dauphine island and the west end of the peninsula (called Mobile Pt.) is three miles. Extensive shoals and sand banks project out into the Gulf from the line joining these points, to the distance of four miles from Mobile Point and five or six miles from the east end of Dauphine island. These banks and shoals are the principal dangers which obstruct the entrance to the bay. The general shape of this accumulation of shoals is triangular, the base of the triangle stretching across from Mobile Point to Dauphine island, and the vertex or projecting angle lying a little west of South from Mobile Pt., and four miles from it. The Main Channel enters at the outer angle, where is found the outer bar, and runs with but one slight change of direction directly under Mobile Pt.

Outer Bar.
(Mobile Bay)

The outer bar, like the delta of sand banks and shoals connected with it, is surrounded by deep water, reaching to seven and ten fathoms,

at a distance of three miles around. These sound-ings diminish to five and four fathoms close to the bar and the banks. On the shoals the depth decreases rapidly to three and two fathoms, and in some places to a few feet. The bar itself has twenty feet of water upon it, and is less than a mile broad. After pass-ing the outer bar, the water deepens to four and a half and five fathoms.

Banks and Islands.

The Channel of Mobile Bay divides the banks and islands into two parts. On the east side lies the South Shoal which stretches off to the north east towards Mobile Point, with a spit running out to a point southward, to the outer bar. On this shoal the sea breaks. The point of least depth (five and four feet) is called the South East breaker-head.

At a distance of one mile and a quarter within the outer bar, on the east of the Channel, is found the Knoll, upon which there are three and a quarter fathoms, and a little further on, Revenue Point, which has four and a half fathoms, These are connected with the South East Shoal. From Revenue Point to

Mobile Point extends the East Bank.

There is a Swash Channel for small fishing vessels across this bank, just outside of Mobile Point, to the Southward and Eastward.

To the West of the Channel the banks rise above the surface in many places, forming sand islands, - West Sand Island, Little Pelican Island, and Pelican Island. -

The South West Spit forms the salient point of the West Bank towards the bar. This Spit extends one mile and three quarters out from Sand island in a South east direction. On its extreme point it has seventeen and eighteen feet, with five and six fathoms just outside of it. It extends down to Sand Island, and thence the line of banks follows the direction of the sand islands northward and westward to Dauphine island.

Sand, West, Little Pelican and Pelican islands form a chain of low, narrow, sand islands, commencing a mile and three quarters within the outer bar, and running North West to Dauphine island. At the distance of three quarters of a mile outside of this chain of islands the uniform depth is four and a quarter fathoms.

The islands are surrounded by shoals, however,

both within and outside of the Bay, and between the islands three inferior Channels are found viz -

Little Pelican Channel, between Sand island and Little Pelican bank.

Middle Channel, between Little Pelican bank and Pelican island.

Pelican Channel, close in along the shore of Dauphine island, between it and Pelican island.

These Channels are useful only for vessels of small draught, and cannot well be used without a minute local knowledge of their changes and directions.

Mobile Point.

Mobile Point is the west end of the peninsula which forms the southern shore of the eastern part of the bay. It is low and rounded in its outline, and is marked by trees which have always been mentioned in sailing directions (but which may have been cut down) The Channel runs quite near the Point and is commanded by Fort Morgan —

West end of Dauphine Island. The west

end of Dauphine Island, opposite to Mobile Point, is not so well marked as the latter. It lies more within the Bay, and being surrounded by Mud banks and shoals, cannot be approached easily.

— Middle Ground. After passing Mobile Point the principal feature along the Channel is the Middle Ground, a shoal which projects into the channel from the N.W., about a mile and a half from the Point. This bank has in some places but 12 and 13 feet of water upon it and contracts the channel, throwing it to the West. After passing the Middle Ground the soundings of the Bay are reached.

— South Shore of the Peninsula.

The South Shore of the Peninsula is bold — 3 and 4 fathoms can be carried to within half a mile of shore.

North Shore of the Peninsula and East Shore of the Bay. As usual with the islands and peninsulas of the Gulf, the North Shore of the Peninsula is broken, low, and swampy. The various small bays and points along this shore are not of much importance. Little Point Clear is the principal projecting point.

- Bon Secours Bay. Bon Secours Bay forms the Eastern part of Mobile Bay. It has a triangular shape and may be considered as limited by Little Point Clear on the South, and Mobile Bay on the North. The whole of the Bay comprised between the Shore and a line joining these two points has a depth of less than two fathoms.

- Oyster Bay. lies at the extreme S. E. angle of Bon Secours Bay, into which emptying a considerable stream, this little bay affords a safe harbor for fishermen.

- Fish River and Weeks Bay. Fish River is the outlet of a small bay called Weeks bay, between Oyster bay and Mullet Point.

- Mullet Point. At Mullet Point the east shore of the Bay turns from N. W. to a general North direction. The shore above Mullet Point presents several points of local importance but nothing of general interest. Of these may be named Great Point Clear, Alabama City, Red Bluffs &c.

- The River Delta at the head of Mobile Bay. The great river system which empties into Mobile Bay and which has so decided an influence upon its physical character,

as well as upon its commercial importance, is formed by the branches of the Tombigbee River and Alabama River. These two Rivers unite at a point 30 miles from the Bay, but at their junction they begin to branch out into several branches, of which the most important are the Mobile River and the Tensaw River, the western and eastern branches respectively. They are again connected with many side branches, and form, with the islands between them, what may be called the upper delta.

— City of Mobile on Mobile River. The City of Mobile is built upon a high bank on the west shore of the Bay, about 30 miles from the entrance and in the region of the delta. The site is dry and commanding, but the approach to it through the Bay is circuitous and difficult. Vessels of less than 8 feet draught only, can reach the city. It has a large trade in cotton, lumber &c.

— West Shore. The west shore of the Bay is quite straight and of uniform features for 25 miles. Some of the most marked are as follows.

— Choctaw Point. Choctaw Point is a headland immediately south of Mobile City.

— Dog River. — Deer River. — Fowl River.

- Alabama Port and Alabama Point.
- Cedar Point is the most southern headland of the West Shore of the Bay. It is the extremity of a little peninsula which has to the west of it a small bay called Heron Bay.
- North Point forms the most northern extremity of Dauphine Island, or Little Dauphine Island.
- Grant's Pass. Between Cedar and North points, lies the passage from Mobile Bay to Mississippi Sound, called ~~the~~ Grant's Pass. It is two miles broad, but is filled with sand and oyster banks, and is not navigable for large vessels. There are three narrow passes between these banks.
- Pass aux Huitres near Cedar Point,
The Little Pass near Little Dauphine Island and Grand Pass, or Heron Island Pass, in the middle near which stands a small island called Heron Island. These passes are only 3 and 4 feet deep - Grand Pass 6 feet - and are only used for small craft.

Tides and Currents.

The tides and currents of Mobile Bay are of the diurnal class, that is, the duration of floods and ebbs are respectively three hours.

At the time of the moon's greatest declination

the single day tides are very regular, but at the periods of zero of declination great irregularities present themselves for a few days.

The same is true of the currents, which in quiet weather follow the change of the tide wave, so as to admit of classification even when the tidal range becomes very small.

The average range of the tide at Fort Morgan is one foot, and the average rate of the currents at Dog River Bar and the mouth of Choctaw Pass, at the surface during the winter regimen of the rivers are about 0.9. and 0.4 of a mile per hour respectively. The flood current may entirely disappear when the tides are at neaps or when freshets occur in the river

Following the surface tidal current from the river to the entrance of the Bay, we find the flood almost nothing off the City of Mobile, reaching a maximum of but half a mile per hour in Choctaw Pass, less than four tenths in the Bay off the mouth of Spanish river, three tenths of a mile per hour on Dog river bar and the upper fleet, six tenths in the lower fleet, and rising as high as two miles per hour off Fort Morgan.

The ebb is nearly half a mile an hour in velocity off the City, a mile in Choctaw Pass, one mile at the mouth of Spanish river, four tenths on Dog river bar,

three tenths off the upper fleet, six tenths off the lower, and one mile and three quarters off Fort Morgan.

General conclusions.

The general conclusions from the foregoing details may be summed up nearly and briefly as follows.

The tidal currents are feeble in the upper portion of the Bay.

The river currents are felt with gradually diminishing velocity until the upper fleet is reached where their effects become very feeble, here tidal currents of the Bay are felt as the downward current of the river becomes exhausted.

In the Lower Fleet the currents of both flood and ebb are powerful.

Outside of the mouth of the Bay there appears to be a prevailing easterly current, and here the maximum ebb at the surface has a velocity of over two miles per hour, and the direction of flood and ebb are inclined to each other at an angle of 100°. Both flood and ebb are deflected to the eastward.

The commencement of the local flood current in Mobile Bay is from 2h. 14m. to 3h. 15m.

after local low water, when the moon's declination is large, beginning later in the lower stratum than at the surface.

The ebb begins at from 1h. 20m. to 1h. 50m. after local low water, and in the upper part of the Bay the different strata begin to move almost simultaneously. Off Fort Morgan the movement of of the lower stratum takes place nearly two hours after that at the surface.

Sailing Directions.

For sailing directions see Large Charts.

The dangers outside of Mobile Point are S. E. Shoal, Revenue Point, The Knoll, S. W. Spit, East Bank, Sand Island Bank, West Bank, Little Pelican Bank, Dauphine Id. Spit

See large Charts

The dangers inside of Mobile Point are the Middle Ground, N. E. edge of West Bank and Cedar Point Shoal. — See Sailing directions

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Vessels entering the Channel must run within one mile of Fort Morgan.

Mississippi Sound.

In many respects Mississippi Sound is one of the most important bodies of water upon the Gulf coast of the United States.

It is secure from the heavy seas of the Gulf of Mexico and has depth of water throughout its length to afford a safe transit for Steamers carrying the mails between Mobile and New Orleans. It has two excellent and secure harbors for the larger class of vessels, and an abundance of places of refuge for coasters, and vessels of larger size. Through one of its entrances is the only approach directly from the Gulf to New Orleans, and it was in this direction and thence through Lakes Borgne and Pontchartrain, that the English approached to attack that city in 1815, while their fleets were anchored off Cat Island. It is the outlet to an extensive trade in lumber, which is constantly increasing, the shores of the sound affording inexhaustible supplies of the finest southern timber.

Situated upon the borders of the Gulf, the coast is healthy, offering during the prevalence of epidemics in the neighboring cities salubrious and pleasant retreats for the inhabitants, while the waters afford an abundant supply of the finest fish and oysters, and the soil yields readily to judicious cultivation, varieties of vegetables of excellent qualities. Fruits abound, figs, grapes, oranges and lemons growing luxuriently in the

gardens along the shores.

Mississippi Sound is situated between Longitudes 88° 07' and 89° 25', and Latitude 30° 15' and 30° 25'.

The general direction of its greatest axis is East and West, and is about seventy nautical miles long and ten and a half miles wide in its widest, and five and a quarter in its narrowest part. It extends from Mobile Bay, Alabama, on the east (from which it is separated by a range of shoals and islets of sand and shells) westwardly as far as St. Louis Bay and Cat Island, and then bends in a west south west direction to its western extremity at the entrance to Lake Borgne in Louisiana, from the waters of which it is divided by the Malheureuse islands, a group of few scattered marshy islets, extending from Louisiana across five miles and a half to Mississippi, with a shore line of thirteen and a half miles. These belong to Louisiana.

A small portion of its northern shore is formed by the State of Alabama, extending from Mobile Bay to Grand Bay, and the rest by the State of Mississippi, the only sea coast of that state being that bordering upon the Sound.

The total extent of shore line of Mississippi Sound on the north is about ninety two miles exclusive of the indentations, bays, and islands which are found near them, twenty miles of the shore line belonging to Alabama.

It is enclosed on the South from the waters of the Gulf of Mexico by a chain of islands extending irregularly from Mobile Point, westwardly, as far as Cat Island, and the remainder is formed of a small part of the marshy coast of Louisiana. These islands are five in number and generally alike in character and formation. They are named respectively, Dauphine Petit Bois, Horn, Ship, and Cat Islands.

About half way below Horn Island and the main shore is a small island called Round Isl'd, upon which is located a Light House, and which became famous as a rendezvous of one of the expeditions to Cuba.

This little island, together with Horn and Ship islands belong to the State of Mississippi, Dauphin Island and Petit Bois belong to Alabama, and Cat Island to Louisiana.

A Light House is erected upon the western spit of Ship island and also upon the western spit of Cat Island, but the lights are not probably kept up.

The boundary line dividing the State of Mississippi from Alabama, strikes the Sound near the middle of Grand Bay. This is a broad shallow bay, into which vessels can enter drawing six feet. Immediately west of it is Pte Aux Chênes Bay, into which also six feet can be carried. The shores of these bays, and the coast, nearly to East Pascagoula are flat and marshy,

with an occasional hummock of fast land, the marsh being cut in all directions by creeks, bayous and sloughs running in every direction. The marsh is backed by land, for the most part barren and uncultivated, covered principally with a growth of pine.

Hundreds of little streams, twisting and turning in every conceivable direction, run from the flat country into the Sound at Grand and Pte Aux Chênes Bay

At low tide large flats of unctuous mud are laid bare, filled with oyster beds.

Pascagoula River. This is a river of considerable importance. It rises in the central part of the State, one hundred and twenty miles from the shores of the Gulf, and runs with a general southern course to Mississippi Sound, it forms at its mouth a little Bay called Pascagoula Bay.

This river was discovered by Bienville in 1699, its name was derived from the Indian tribes in that vicinity.

Pascagoula is a village much renowned as a watering place for the inhabitants of Mobile and New Orleans.

The soil is good for the cultivation of vegetables, and fruit trees of various kinds, furnishing oranges, figs and other fruits in great abundance. On account of its salubrity this place was selected by a commission of Medical officers for the site of a U. S. Hospital for invalid

soldiers at the close of the Mexican war, and extensive buildings were erected and occupied for that purpose, immediately east of the village.

Mills have been in operation for some years up the river, and quite a quantity of lumber is sent to Mobile.

The delta of the river is almost three miles wide, and the subdivisions and branches of the main stream cut the marsh into many irregular islands. West Pascagoula is pleasantly located upon rising land on the west bank of the delta, and is a small settlement. It is a delightful situation for summer residence.

The Shores of the Sound extending from West Pascagoula to Biloxi Bay are densely wooded down to the water. The growth is principally pine, but it is interspersed with magnolia, hummocks of live oak, and a variety of undergrowth.

Skirting the shore there is an occasional settlement with small spots of cultivated ground, where the settler is enabled to raise the vegetables necessary for the consumption of his family. For miles back in the interior extends a thick forest, apparently in its wild uncultivated state.

Biloxi Bay, about fifteen miles west of Pascagoula, is a considerable sheet of water, into which six feet can be carried. On its eastern shore the banks are

abrupt, being from twenty five to thirty feet in height, of a reddish clayey soil. The Shores are quite thickly settled, and improvements are constantly going on, giving it, as they proceed, increased importance.

Along the shores of the Back Bay, the upper part of Biloxi Bay and on the banks of the bayous emptying into it were, in 1851, in successful operation many mills, foundries &c, and from these and other resources, trade between Biloxi and New Orleans is kept up, amounting to about three hundred and ninety thousand dollars at that time. Opposite the mouth of Biloxi Bay is Deer Island, a wooded island about five miles long, opposite its western extremity is the village of Biloxi mostly the residence of fishermen a Light house is located here.

Mississippi City about eight miles west of Biloxi, situated upon the open sound, is a small village and somewhat resorted to in summer.

Pass Christian is about twenty miles west of Biloxi. The intermediate country is very much of the same character as that between Pascagoula and Biloxi Bay. A Light house is located here. It is situated upon a ridge of land about twenty feet above high water mark, on the east entrance to the Bay of St Louis. Around it and back in the interior

the same thick forests of pine are found as are seen along the whole coast.

The entrance to the Bay of St Louis is about a mile and three quarters wide, and on the western shore of the entrance is located the considerable town of Shieldsboro', containing in 1852 about four thousand inhabitants, greatly augmented by the influx of visitors during the summer months, from Mobile and New Orleans.

The Bay then expands into a considerable sheet of water extending inland about five miles and then widening also to five miles. Into it empty many streams.

Exports from this Bay in lumber wood, and charcoal, in 1852 amounted to one hundred thousand dollars. Within a small circuit of this Bay in 1852 there were in successful operation seven mills, from which more than a million feet of lumber are shipped annually. This with other articles of export keeps in constant employment thirty or forty vessels of various sizes with an aggregate of eleven hundred tons. The timber of this region is inexhaustible, and the facilities for getting it to market very great.

Contracts were made with the French Government through an agency established at Mobile for that purpose, by which thousands of spars of all dimensions have been shipped from this point to France,

for the ships of the French Navy. No section of our coast presents greater advantages for trade in lumber than Mississippi Sound. The lumber is inexhaustible, readily obtained, and of the best quality. The bayous and streams extending into the very heart of the forests present facilities for getting it to the mills, and the Sound affords a safe channel for towing the rafts to Mobile or to the shipping.

The remainder of the northern shore of the Sound from Shieldsboro' to the Malheureux, or to the entrance to Lake Borgne, consists of extensive marshes, cut up in all directions by lakes, bayous, lagoons, ponds and sloughs, turning and twisting in every conceivable direction, in one place an area nine square miles affording a shore line of eighty seven miles. This is also the character of that portion of the Southern shore of Mississippi Sound extending from Cat Island to Lake Borgne, a part of Louisiana. The western boundary of the State of Mississippi is formed by Pearl River, which empties into Lake Borgne, and is about seven miles and a half from the west end of Mississippi Sound.

It may be considered as marking the Eastern extent of the Delta of the Mississippi river along the main shore.

<u>Pearl River</u> is the largest of the rivers which empty into Mississippi Sound. It rises in the central part of the State, and has a length of about two hundred and forty miles, with a general direction from North to South. At its mouth its waters mingle with the waters of the Mississippi and it here

widens into a shallow Bay.

The mouth of this river was no doubt discovered by Iberville in 1699, who was the first to make a detailed exploration of the shores of Mississippi Sound.

A rail road from Mobile to New Orleans has been projected, skirting the Sound, which when carried out will greatly facilitate the developement of the resources of this portion of the State.

The Islands forming the southern boundary of Mississippi Sound appear to be very much alike in their general characteristics. They are mostly low and sandy, interspersed with patches of marsh and pine woods. They are desolate, and made up of sand knolls, as though the winds had blown them together.

Their configuration, however, is constantly changing by the action of the sea. A severe gale in August 1852 swept over the Gulf from N.E. by E., in some places making complete breaches through some of the islands, and otherwise changing their shape.

Dauphine Island previous to this gale was about nine and a quarter miles long; it is now formed of two islands, one about five miles, and the other three and a quarter miles in length.

Upon this island was measured in 1845 by the Superintendent a base line some seven miles long, on which the work of the Coast Survey in this region was founded. The Sea, in the gale just mentioned, broke through the base, carrying away some of the monuments, but fortunately leaving undisturbed the initial points.

Petit Bois is about ten miles long and does not differ materially from the rest, except perhaps that the sand hills are more undulating.

Between Petit Bois and Horn island once existed a small islet called Massacre island – now every vestige of it is gone.

Horn is about eleven miles long, and less than a mile across at its widest part.

Between Horn island and Ship island, within a few years, was a small island called Dog island, This too has entirely disappeared.

Ship Island, also somewhat undulating, extends in a slight curve about seven miles E.N.E. and W.S.W. – it has a Light House on its western end.

Cat Island is differently shaped from the rest, having two arms at right angles to each other, the one, extending in a N.E. and S.W. direction is four miles long, and the other extending from the middle of this, in a nearly Western direction, is five miles long. This island has upon it quite an elevated hill of white sand and a forest of pines and other growth. On its western extremity is a Light House.

It is somewhat singular that upon these islands fresh water can be obtained at a short distance from the surface by digging close to the shore. Upon this island many of the dead, killed in the battle of New Orleans are said to have been buried. On some of the islands of the Sound

are small Lagoons in which alligators and fish are sometimes found.

The Entrance into Mississippi Sound on the East from Mobile Bay is through Grant's Pass. This is the pass used by mail steamers between Mobile and New Orleans, and by vessels trading in the Sound. The severe gale of August 1852 from the E.N.E. cut through the eastern spit of Petit Bois and formed a channel into the Sound from the Gulf of Mexico, having in it from twelve to eighteen feet of water.

There is a passage for vessels between Horn island and Petit Bois, called Horn Island Pass, through which sixteen feet of water can be carried. Also a large Channel for vessels between Ship and Cat island.

There is besides, a channel south of Cat island, through which a considerable portion of the smaller coasting trade to and from New Orleans must pass. The passages are plainly defined and the anchorage inside safe for all winds.

There is also sounded out a Channel from Ship island to Dauphine island, inside of the Sound, for large class vessels, (Merchant) and it is important, as by it access can be had at all times to excellent anchorage East of Round island for vessels of considerable size. Defences will render this Channel a safe rendezvous for any number of vessels.

For vessels of the larger class there are two excellent harbors in Mississippi Sound viz.

Cat Island Harbor situated N.E. of the island. Seventeen feet can be carried in at near low water. It is safe, secure, and easy of access.

Ship Island Harbor, into which nineteen feet can be carried at ordinary low water, is situated north of the West end of Ship Island. The anchorage, with water equal to the depth on the bar, is five miles long and averages three and a quarter miles wide.

The importance of this harbor cannot be overrated, and it will be important as a place of refuge as trade in this region increases.

South of the entrance to these harbors is a harbor under the North point of Chandeleur Island, in the State of Louisiana. In 1846 Lieut Comdg. C. P. Patterson, U.S.N., writing of Ship island inlet and that under the North point of Chandeleur, remarks:

"Two such harbors of refuge, to say nothing of their importance in other points, are scarcely equalled upon our Coast. They are perfectly safe for the most dangerous storms in the Gulf - those from the Eastward, Southward and Eastward, and Southward, and could be entered with ease during these storms without a pilot, if proper Light houses are placed in proper places. In the want of these many vessels are lost."

"To show the security of Chandeleur Harbor a small Coast Survey vessel (of Sixty five tons) rode out in that anchorage with perfect ease during one of the most severe gales known upon the Gulf coast for twenty years.

In the same gale the Revenue Cutter in the harbor of Pensacola cut away her masts to prevent going ashore.

Ship Island Inlet is still more secure than Chandeleur anchorage."

Tides Along the Mississippi Sound the single day tides are very regular, and the small and irregular double tides appear only for two or three days (and frequently even not at all) about the time of zero declination of the Moon. The stand at high and low water is comparatively short, seldom exceeding an hour. The rise and fall being so small, the times and heights are both much influenced by the winds, and are thus rendered quite irregular.

Mean Rise and Fall at Cat Island.

Mean 1ft. 3. At moon's greatest declination 1ft. 9.
At moon's least declination 0ft. 6.