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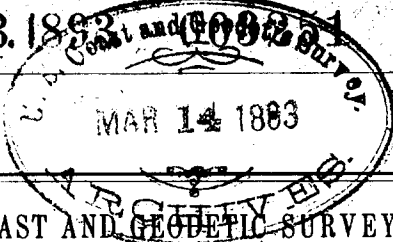
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Assistant in Charge

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MAR 13 1893

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1266



U. S. COAST AND GEODETIC SURVEY.

T. C. Mendenhall, Superintendent.

State: Alabama

DESCRIPTIVE REPORT.

Hydrographic Sheets No. 2124,  
2128

LOCALITY:

Lower Mobile Bay and En-  
trance, and Dredged  
Channel leading to Mobile.

1892.

CHIEF OF PARTY:

Edward M. Hughes, Lieut. U.S.N.

also see  
T-2157

2124 2128

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2128  
1892

2128

COAST AND GEODETIC SURVEY  
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Department of Commerce and Labor

COAST AND GEODETIC SURVEY

J. C. Mendenhall

Superintendent.

State: Alabama

DESCRIPTIVE REPORT.

Hyd C Sheet No. 2128

LOCALITY:

Lower Mobile Bay & En-  
trance, and Dredged  
Channel leading to Mobile

See S.H.A. 2124

1892  
190

CHIEF OF PARTY:

E. M. Hughes

2128

U. S. Coast and Geodetic Survey,  
J. C. Mendenhall, Supt.

State: Alabama.

Descriptive Report.

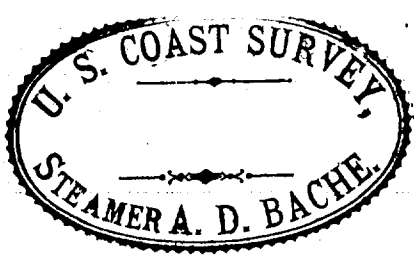
Hydrographic Sheet no.

Locality:

Lower Mobile Bay and Entrances  
and  
Dredged Channel leading to Mobile.

1892

Chief of Party:  
Edward M. Hughes, Lieutenant U.S. Navy.



2

Navy Yard, New York,  
March 10th., 1893.

Dr. E. C. Mendenhall,

Superintendent U. S. Coast and Geodetic Survey.

Sir:

I have the honor to submit herewith the following Descriptive Report, to be filed with Hydrographic Sheets nos. , a re-survey of Lower Mobile Bay and Entrances, and the dredged channel leading to the city of Mobile, Alabama, executed between March 5th. and May 21st., 1892, by the hydrographic party under my command.

My full report of this work was submitted under date of August 1st., 1892.

Appended herewith are the following statistics:-

- A. General Field work, Bache's party (Form 11.)
- B. Daily " " , Bache's 1st. whaleboat.
- C. " " " " , " 2d. " "
- D. " " " " , Str. Bache - and Recapitulation.
- E. No. of days on station, etc.

## Tides.

In The prosecution of The work one principal and Three auxiliary tide-gauges were employed, as follows:-

Gauges	Location	Remarks.
No. 1	Fort Morgan Wharf	Principal gauge
" 2	Grant's Pass	Auxiliary "
" 3	Sand Island	" "
" 4	Mobile Bay Light-house	" "

At gauge no. 1 observations were carried on, during The day only, from March 5th. to May 20th., 1892.

The mean of 58 high waters (not consecutive) is 5.06 ft.

The mean of 51 low waters (not consecutive) is 3.90 "

Mean rise of tide 1.16 "

At gauge no. 2.

Mean of 8 high waters read on no. 2 gauge, 1.8 ft.

Mean of 9 low waters read on no. 2 gauge, 6 "

Mean rise of tide in Grant's Pass, 1.2 "

Simultaneous readings of gauges nos. 1 and 2 place The zero of The Grant's Pass gauge 3.3 feet above The zero of The Fort Morgan gauge. The times of high and low water are affected more or less by wind, etc., but do not

differ materially from those of high and low water at Fort Morgan.

Simultaneous observations at gauges nos 1 and 3 place the zero of the Sand Island gauge 3.42 feet above that of the gauge at Fort Morgan; these observations were made at a time when small tides prevailed, and the comparison was not of the greatest value. — The results obtained, however, indicate that the times of high and low water, and the amount of rise, agree closely with those at Fort Morgan.

Six days' simultaneous observations at gauges nos 1 and 4 gave the following results:—

M.l.w., Fort Morgan wharf, 4.10 feet.

M.l.w., Mobile Bay Lighthouse, 1.00 " .

M.h.w., Fort Morgan wharf, 5.60 " .

M.h.w., Mobile Bay Lighthouse, 2.90 " .

Mean rise at Mobile Bay Lighthouse, 1.90 " .

As compared with Fort Morgan gauge, the time and height of tides at Mobile Bay Lighthouse are as follows:—

High water averages 0<sup>h</sup>. 50<sup>m</sup>. later.

Low water averages 1<sup>h</sup>. 55<sup>m</sup>. later.

Range of tide is  $\frac{4}{10}$  of a foot greater.

The reductions for all soundings taken during the survey of Mobile Bay and its entrances (except the ship's work inside the Bay, and the soundings in the dredged channel) were obtained directly from the readings of the gauge at Fort Morgan wharf.

The soundings taken in the dredged channel, with the exception of those taken between clusters 38 and 50, were reduced directly from readings of the gauge at Mobile Bay Lighthouse. For the soundings between clusters 38 and 50, made on May 5th., 1892, corrections were obtained from a tidal curve constructed from later comparisons of corresponding readings of the gauges at Fort Morgan and Mobile Bay Lighthouse.

## Dredged Channel.

The lane in which this channel is cut, is about 300 feet wide, being plainly marked by two parallel lines of piles. The channel itself is much narrower, varying in width from 67.5 feet to 130 feet. Zigzag lines were run entirely across this lane, from one line of piles to the other, in number 60 to each geographical mile, giving one cross-section for each 101 feet of the channel's length. Alternate cross-sections are normal to the axis of the channel, and, between the Lower Channel Beacon and Mobile Bay Lighthouse, the positions of the ends of each cross-section were accurately fixed. Above Mobile Bay Lighthouse the ends of cross-sections were not fixed by angles, the lines of soundings simply being carried across the channel from one line of piles to the other, each turn being numbered and recorded as a position, and the cross-sections being separated by an average distance of about 100 feet; this spacing was verified as successive clusters of piles were reached.

The deepest water is (generally) about



100 feet from the eastern line of piles. The average width of the dredged channel proper varies as follows:-

From lower entrance to Mobile Bay Lighthouse, 67.5 ft.

From Mobile Bay Lighthouse to Upper Channel Beacon, 72.0 "

From Upper Channel Beacon to City 100 to 125.0 "

At the ends of channel the width of same is increased to about 150 feet.

For portions of the channel extending from one cluster to another in regular succession, the following table exhibits the mean width of the channel, the number of contained cross-sections, the average maximum depth at mean low water, and the maximum depth of the shoalest cross-section.

Table follows on pages 8, 9 and 10.

Col. 1.	Col. 2.	Col. 3.	Col. 4.	Col. 5.	Col. 6.	Col. 7.	Col. 8.
From Cluster	To Cluster	Average width of Channel.	Number of Cross-sections Sounded.	Average max. depth at m.l.w.	Shoalest cross-sections.		
					Between positions	Boat Day	Max. depth at m.l.w.
Mobile Wharves	(New) no. 1	120 ft.	22	23.6 ft.	19 and 20	b'	21.6 ft.
	no. 2	125 "	33	22.9 "	31 " 32	b'	22.3 "
	" 3	110 "	59	21.8 "	49 " 50	b'	21.4 "
	" 4	110 "	32	22.8 "	27 " 28	b'	21.3 "
	" 5	110 "	38	23.5 "	54 " 55	b'	22.7 "
	" 6	150 "	10	23.7 "	36 " 37	c'	22.9 "
	" 7	110 "	27	22.1 "	66 " 67	c'	21.3 "
	" 8	90 "	24	22.3 "	79 " 80	c'	22.1 "
	" 9	90 "	26	22.1 "	117 " 118	c'	21.6 "
	" 10	80 "	26	22.5 "	123 " 124	c'	22.3 "
	" 11	75 "	24	22.7 "	151 " 152	c'	22.0 "
	" 12	70 "	22	22.1 "	174 " 175	c'	21.7 "
	" 13	60 "	29	22.2 "	10 " 11	c'	21.4 "
	" 14	65 "	28	22.6 "	24 " 25	c'	21.7 "
	" 15	70 "	24	23.3 "	61 " 62	c'	22.8 "
	" 16	60 "	28	22.5 "	77 " 78	c'	22.5 "
	" 17	60 "	24	22.5 "	119 " 120	c'	21.5 "
	" 18	60 "	26	22.3 "	143 " 144	c'	22.1 "
	" 19	65 "	28	22.4 "	153 " 154	c'	21.4 "

Col. 1.	Col. 2.	Col. 3.	Col. 4.	Col. 5.	Col. 6.	Col. 7.	Col. 8.
no. 19	no. 20	80 ft.	26	21.8 ft.	9 and 10	d'	20.2 ft.
" 20	" 21	70 "	28	21.5 "	33 " 34	d'	20.6 "
" 21	" 22	80 "	24	21.7 "	76 " 77	d'	21.0 "
" 22	" 23	65 "	30	22.5 "	99 " 100	d'	22.4 "
" 23	" 24	65 "	26	21.8 "	18 " 19	d'	20.6 "
" 24	" 25	70 "	28	22.6 "	36 " 37	d'	22.2 "
" 25	" 26	65 "	26	21.6 "	81 " 82	d'	20.8 "
" 26	" 27	70 "	30	19.3 "	91 " 92	d'	19.3 "
" 27	" 28	60 "	28	18.7 "	198 " 199	a'	18.0 "
" 28	" 29	65 "	30	20.3 "	179 " 180	a'	20.3 "
" 29	" 30	85 "	28	20.2 "	156 " 157	a'	19.7 "
" 30	" 31	80 "	26	23.7 "	124 " 125	a'	19.9 "
" 31	" 32	80 "	36	23.0 "	71 " 72	a'	19.6 "
" 32	" 33	70 "	36	19.4 "	45 " 46	a'	19.1 "
" 33	" 34	90 "	32	20.9 "	5 " 6	a'	19.2 "
" 34	" 35	55 "	26	19.0 "	144 " 145	a'	18.6 "
" 35	" 36	55 "	30	18.7 "	118 " 119	a'	18.5 "
" 36	" 37	65 "	30	18.8 "	79 " 80	a'	18.6 "
" 37	" 38	70 "	30	20.9 "	70 " 71	a'	20.4 "
" 38	" 39	65 "	32	23.7 "	173 " 174	w	21.5 "
" 39	" 40	75 "	28	22.2 "	148 " 149	w	22.0 "

Col. 1.	Col. 2.	Col. 3.	Col. 4.	Col. 5.	Col. 6.	Col. 7.	Col. 8.
no. 40	no. 41	65 ft.	20	21.6 ft.	122 to 123	W	19.1 ft.
" 41	" 42	80 "	30	18.5 "	118 " 119	W	17.7 "
" 42	" 43	65 "	30	22.8 "	91 " 92	W	20.3 "
" 43	" 44	70 "	26	21.0 "	35 " 36	W	17.7 "
" 44	" 45	65 "	34	18.5 "	31 " 32	W	17.8 "
" 45	" 46	60 "	24	17.7 "	18 " 19	V	17.3 "
" 46	" 47	65 "	29	17.5 "	42 " 43	V	17.4 "
" 47	" 48	65 "	30	21.6 "	60 " 61	V	18.6 "
" 48	" 49	65 "	30	20.8 "	103 " 104	V	20.8 "
" 49	" 50	70 "	32	21.4 "	114 " 115	V	20.7 "
" 50	" 51	55 "	23	22.9 "	18 " 19	α	22.8 "

In view of the narrowness of the channel, and the liability to miss the deepest water in crossing it, the maximum depth of choalest cross-section as recorded in the preceding table, is in reality the mean of the maximum depth of such cross-section and the maximum depth of the nearest cross-section on each side of it.

Masters of tugs engaged in towing sea-going vessels to and from Mobile state that within six or eight months of the time of dredging the channel to a depth of 20 feet it shoals to so little as 16 feet in places between its lower entrance and Mobile Bay Lighthouse (clusters nos. 51 to 31). From the mouth of the Mobile river (Beacon no. 2.) to Mobile Bay Lighthouse the channel remains pretty well open, and a depth of 19 feet or more is maintained at all seasons and all stages of water.

• Upon the arrival of the *Bache* in Mobile Bay, several floating pile-drivers and dredging-machines were found engaged in the work of renewing worn and rotten piles, establishing entirely new clusters, and deepening the channel, under the direction of the U.S. engineer officer

in charge of the harbor improvements, etc., in the Mobile district: This work was completed early in May, 1892, just previous to the examination of the channel by the Bach's party, and this examination consequently took cognizance of a number of changes recently made, among which the following are noteworthy:—

From the upper to the lower channel beacons the clusters of piles on the eastern side of the channel are numbered in regular order from 5 to 51, the groups being separated by an average distance of one half of a statute mile. Abreast each third cluster of this line, beginning with no. 6 and ending with no. 51 (and, in addition, abreast cluster no. 32), a new cluster has been planted on the western side of the channel—The new line thus formed being distant from the old one about 300 feet.

Between the Upper Channel Beacon and the city five new clusters have been added, all on the right hand, going up—And, off Choctaw Point, a little above New Cluster no. 1, and well to the southward of the channel,

Six piles have been driven, forming a row about 25 feet in length. On the plan of this part of the channel, submitted with report dated August 1st, 1892, - These clusters are provisionally marked X, Y, Z, 'new cluster no. 2', 'new cluster no. 1' and "Row," respectively.

A comparison of Coast Survey chart no. 188 with the two sheets which exhibit the greater part of the Bache's survey of the dredged channel, reveals the following inaccuracies in the published chart:-

	Bache's Survey.	Chart no. 188.
Lower Channel Beacon	Lat. $30^{\circ} 17' 23''$ , N. Long. $88^{\circ} 01' 56''$ , W.	Lat. $30^{\circ} 17' 39''$ , N. Long. $88^{\circ} 01' 43''$ , W.
Mobile Bay Light-ho.	Lat. $30^{\circ} 26' 19''$ , N. Long. $88^{\circ} 00' 40''$ , W.	Lat. $30^{\circ} 26' 22''$ , N. Long. $88^{\circ} 00' 43''$ , W.
Direction of Channel (Cluster 51 to 31)	N. $7^{\circ} 00'$ E. (True)	N. $6^{\circ} 51'$ E. (True).
Direction of Channel (Cluster 31 to 6)	N. $5^{\circ} 57'$ W. (True).	N. $6^{\circ} 07'$ W. (True).

While Mobile Bay Lighthouse is, in effect, correctly placed on the chart, the position of the Lower Channel Beacon is 'out' by nearly one third of

a geographical mile, and not only is the direction of the line of piles between the two points affected, but the positions of the clusters are correspondingly in error by amounts gradually lessening as the lighthouse is approached. The direction of the channel from cluster no. 31 to cluster no. 6 would also appear to be wrong by one tenth of a degree.

The bend in the channel at Dog River bar is not abreast cluster no. 5 (Upper Channel Beacon), but is made about midway between clusters nos. 5 and 6.

The positions of both clusters nos. 3 and 4 are too far to the southward.

The position of Beacon no. 3 is too far to the eastward. It should be on range with Beacon no. 1 and the Upper Channel Beacon.

The two cribs on eastern side of channel (designated in the records as N. and S. cribs, respectively), between Beacons nos. 1 and 2, do not appear on the chart. They are prominent marks and are apt to be misleading to strangers. If they are to remain in their present



positions, they should be shown on the chart and referred to in the buoy-list of the 8th. U. H. District.

To the Sd. and Hd. of that part of the channel extending from Beacon no. 1 to the City, a number of snags, old piles and other obstructions appear, many of which were planted during the war of the rebellion; some of these are confusing to strangers, and reference to them should be made in the sailing-directions for the dredged channel.

About midway between the clusters of piles on the eastern side of the channel, single piles appear to have been placed. A few of these still remain, but many of them have entirely disappeared, while others have rotted off just below or at the surface of the water - These latter are dangerous, and vessels should not be permitted to approach too closely the visible line of clusters.

At the date of the Bach's examination of the dredged channel none of the clusters of piles was painted.

Of the various clusters, etc., positions of which appear on the plan of Dog River Bar and Choctaw Pass Channels, "S. Crib," "N. Crib," "Old Beacon" and "Old Cluster" are not of recent date, and, not being of prime importance, it may be the intention of the officer in charge of the Mobile Harbor improvements to remove them; in view of this possibility, it is recommended that information be obtained from the U.S. Engineers regarding the permanence of the marks mentioned. At the same time inquiry should be made as to the scheme, if any, for re-numbering the clusters of piles (which probably will be rendered necessary by the insertion in the line of "new cluster no. 2"), and as to whether the row of piling (O Row) at Choctaw Point is to be extended.

## Changes.

The principal changes observed while making the survey of Lower Mobile Bay and its approaches (exclusive of those noted in the examination of the dredged Channel, which are considered separately), are the following:-

The best (m. l. w.) depth over the outer bar was, at the date of completion of hydrographic work, late in May, 1892, twenty-three feet, and this was found somewhat further to the westward than is shown on Coast Survey chart no. 188. At present the pilots do not rely on the range formed by Sand Island Lighthouse and the light on the keeper's dwelling, but, instead, cross the bar with two prominent trees (O. Tree) near Fort Gaines on range with an obscure depression between two dunes on Sand Island. About April 1st., 1892, pilots found best water on outer bar (at something better than half tide) to be 23 ft. - They obtained but two casts of 23 feet, the remainder being  $23\frac{1}{2}$  ft. or more. This agrees fairly with the actual depths existing. On April 23rd., 1892, two vessels were carried out, at high water, each drawing  $22\frac{1}{2}$  ft.

West Sand Island is now well above water, and is separated from Sand Island by deep water in the Gut.

Pelican, Little Pelican and Coffa islands have disappeared.

Decided changes in shore-line are apparent at S. W. extremity of Mobile Point.

The southern shore of Dauphin Island Bay has washed away somewhat, as indicated by the positions of ends of lines of soundings.

A rocky patch, called for convenience of reference, The Ballast Dump, lies north of Mobile Point and east of The Middle Ground. In March, 1892, it covered an area of about 20 ft. by 75 ft. (its length extending (nearly) in a N. E. and S. W. direction) with about  $4\frac{1}{2}$  ft. of water on its shallowest part. The ballast here dumped consisted of rock only, and parts of the heap formerly appeared above the surface of the water, having been confined by two rows of piling which supported a small house — The original intention having been to form a sort of breakwater for the protection of timber rafts. The house and piling disappeared about ten years ago, and the rocks have sunk below the surface of the water.

The following is a resume of some of the more important corrections and changes recommended for Coast Survey Chart no. 188, and The List of Buoys, etc., in The Eighth Lighthouse District.

Item.	On chart.	In buoy list.
W. Sand Island	Should be shown.	
Pelican Island	Has disappeared.	
Little Pelican Island	Should be expunged from list of dangers.	
Shoals on S.W. side of Pelican Bay.	Outlines, etc., should be corrected.	
Coffa Island	Has disappeared.	
Outer bar, entrance to Mobile Bay.	Sailing directions should note change.	Sailing directions should note change.
"Ballast Dump"	Should be shown.	
Lower Channel Beacon	Position should be corrected.	
Dredged Channel, from Lower Channel Beacon to Mobile Bay Lighthouse.	General direction should be corrected.	
Clusters of piles on E. side of channel	Positions should be corrected and (probably) re-numbered.	

Item	On Chart	In buoy-list
Line of clusters of piles on W. side of channel	Should be shown	Should be mentioned in sailing directions.
New cluster of piles on E. and N. side of channel	Should be shown	
Bend in channel at Dog River Bar	Position should be corrected.	
N. and S. Cribs	Should be shown.	Should be mentioned in sailing directions.
Beacon no. 3.	Position should be corrected.	
Hidden piles between clusters on E. side of channel.		Should be mentioned in sailing directions.

## Anchorage.

A good anchorage for vessels of light draught may be found to the westward of the main ship-channel, just north of Sand Island; this is a safe anchorage, but more or less swell heaves in from the Gulf in southerly weather.

To the northward of Mobile Point, if a berth is selected too close to the beach, the current in the 'ditch' will swing the vessel across wind and sea, in a norther, causing her to lie uncomfortably.

Very respectfully,

Edw. M. Hughes

Lieut. U.S.N., Asst. C. & G. Survey,  
Comdg. Bache.

A.

Statistics of Field Work executed by *Lieut. Edward M. Hughes, U.S. Army.*

Date of beginning field work .....  
Date of closing field work .....  
*1892.*  
*March 2nd.*  
*May 21st.*

RECONNAISSANCE:

Area of, in square statute miles .....  
Lines of intervisibility determined as per sketch submitted .....  
Number of points selected for scheme .....

BASE LINES:

Primary, length of .....  
Secondary, length of .....  
Beach measurements, length of .....  
Number of days employed in measurements of base .....  
Number of days employed in re-measurements .....

TRIANGULATION:

Area of, in square statute miles .....  
Signal poles erected, number of .....  
Observing tripods and scaffolds built, number of .....  
Observing tripods and scaffolds built, heights of .....  
Days occupied in opening and verifying lines of sight, number of .....  
Stations occupied for horizontal measures, number of .....  
Stations occupied for vertical measures, number of .....  
Geographical positions determined, number of .....  
Elevations determined trigonometrically, number of .....

GEODESIC LEVELING:

Elevations determined by spirit-leveling of precision, number of .....  
Lines of geodesic leveling, length of .....

LATITUDE, LONGITUDE, AND AZIMUTH WORK:

Latitude stations occupied, number of .....  
Pairs of stars observed for latitude, number of .....  
Average number of observations on a pair .....  
Longitude stations, telegraphic, number of .....  
Longitude stations, telegraphic, number of nights on which signals were exchanged .....  
Longitude stations, chronometric, etc., number of .....  
Azimuth stations, number of .....  
Number of nights of observations for azimuth .....  
Number of stars observed for azimuth .....



GRAVITY DETERMINATIONS:

Number of pendulum stations occupied.....

MAGNETIC WORK:

Stations occupied for observations of the magnetic declination, number of.....

Stations occupied for observations of the magnetic dip, number of.....

Stations occupied for observations of the magnetic intensity, number of.....

TOPOGRAPHY:

Area surveyed in square statute miles.....

Length of general coast-line in statute miles.....

Length of shore-line of rivers in statute miles.....

Length of shore-line of creeks in statute miles.....

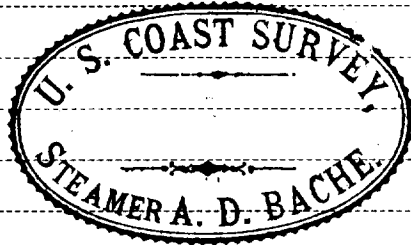
Length of shore-line of ponds in statute miles.....

Length of roads in statute miles.....

Topographic sheets finished, number of.....

Topographic sheets, scales of.....

Topographic sheets, limits and localities of:



HYDROGRAPHY:

Area sounded in square geographical miles.....

Number of miles (geographical) run while sounding.....

Number of angles measured.....

Number of soundings.....

Number of tidal stations established.....

Number of specimens of bottom preserved.....

Current stations, number of.....

Hydrographic sheets finished, number of.....

Hydrographic sheets, scales of.....

Hydrographic sheets, limits and localities of:

97 1/2
943.39
12,298.
63,358.
4.
2
1 - 20,000

Entrance to Mobile Bay, Ala., 30° 08' N. 30° 19' N. 87° 59' 30" W. 88° 09' W.  
and examination of Mobile Bay dredged channel.

*John M. Hughes, Lt. USN*

1st. Whale-boat.

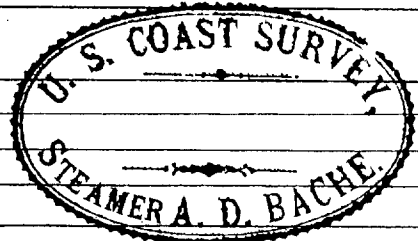
B.

Hydrography :- Entrance to Mobile Bay, Ala., Season 1891-92.

U. S. Coast and Geodetic Survey Str. A. D. Bache,

Lieut. Edward M. Hughes, U.S.N., Asst. C. & G. Survey, Comdg.

1892. Date.	Day Letter.	Book.	Naut. miles.	Soundgs	Angles.	Vessel.	Observers:-
March 5	a	1	8.50	769	140	1st. W. b.	Ensign Rodman & Mr. J. L. Dunn.
" 7	b	1	2.10	169	34	"	do.
" 9	c	1-2	16.70	1581	237	"	do.
" 10	d	2	9.20	933	130	"	do.
" 12	e	2	14.75	1025	182	"	do.
" 15	f	3	6.20	555	112	"	do.
" 19	g	3	16.20	1122	248	"	do.
" 21	h	3	8.50	689	140	"	do.
" 29	i	4	12.50	1005	204	"	do.
" 30	k	4	15.80	1235	238	"	Lieut. Burdick & Ensign Rodman.
" 31	l	5	8.10	646	126	"	do.
Totals for March			118.55	9729	1791	"	
April 8	m	5	16.50	1456	220	"	do.
" 11	n	6	14.70	1354	253	"	Ensign Rodman & Mr. J. L. Dunn.
" 14	o	6	7.50	607	112	"	do.
" 20	p	7	1.13	118	30	"	do.
" 22	q	7	10.60	900	185	"	do.
" 26	r	7-8	14.30	1466	281	"	Lieut. Burdick & Mr. Dunn.
" 30	s	8	6.00	496	138	"	Ensign Kline & Mr. J. L. Dunn.
Totals for April			70.73	6397	1219	"	
May 3	t	8	.75	188	28	"	do.
" 4	u	8	6.00	562	112	"	do.
* " 5	v	9	8.50	1360	274	"	do.
" 6	w	8-10	16.50	1177	302	"	do.
" 7	x	10	13.60	893	274	"	do.
" 12	y	10-11	18.50	1564	338	"	do.
" 13	z	11	12.30	1058	200	"	do.
* " 14	a'	9-12	10.20	1638	305	"	do.
* " 16	b'	12	7.30	928	14	"	do.
* " 19	c'	12-13	10.50	1598	—	"	Ensign Kline.
* " 20	d'	13-14	5.40	1067	—	"	do.
Totals for May			109.55	12,033	1847	"	
Recapitulation.							
March			118.55	9729	1791	"	
April			70.73	6,397	1219	"	
May			109.55	12,033	1847	"	
Season, 1st. W. b.			298.83	28,159	4,857	"	



\* Dredged Channel.

# 2nd. Whale-boat.

C.

Hydrography:- Entrance to Mobile Bay, Ala., Season 1891-92.

U.S. Coast and Geodetic Survey, Ste. A. D. Bache,

Lieut. Edw. M. Hughes, U.S.N., Ass't. C. & G. Survey, Comdg.

1892 Date.	Day Letter.	Book.	Naut. miles.	Soundgs	Angles.	Vessel.	Observers:-
March 5	a	1	11.00	688	168	2nd. w. b.	Ensigns Buchanan & Oman.
" 7	b	1	.50	61	14	"	do.
" 9	c	1	11.00	981	234	"	do.
" 10	d	2	11.50	905	226	"	do.
" 12	e	2	15.00	987	266	"	do.
" 15	f	3	4.50	294	88	"	do.
" 17	g	3	7.50	555	188	"	do.
" 19	h	3	15.50	1028	290	"	do.
" 21	i	4	12.50	963	272	"	do.
" 22	k	4	1.38	178	22	"	Ensign Buchanan.
" 29	l	4-5	15.00	1518	274	"	Ensigns Buchanan & Oman.
" 30	m	5	18.37	1260	354	"	do.
" 31	n	5-6	15.13	1072	274	"	do.
Totals for March			138.88	10,490	2670	"	
April 8	o	6	17.00	1240	224	"	do.
" 11	p	6	13.50	1067	194	"	do.
" 14	q	7	6.50	592	118	"	do.
" 20	r	7	5.00	542	114	"	do.
" 22	s	7	5.87	443	126	"	do.
" 26	t	7	5.75	537	130	"	do.
" 30	u	7-8	12.25	904	240	"	do.
Totals for April			65.87	5,325	1,146	"	
May 2	v	8	6.33	530	108	"	do.
* " 5	w	9	10.75	2364	313	"	do.
" 6	x	8	21.25	1270	326	"	do.
" 7	y	10	19.00	1064	308	"	do.
" 12	z	10	4.50	270	82	"	do.
* " 14	a'	11	11.63	2388	334	"	do.
* " 16	b'	12	2.75	549	---	"	Ensigns Buchanan.
* " 19	c'	12	9.00	2088	---	"	Mor. J. I. Dunn.
* " 20	d'	13	5.25	1135	---	"	Ensign Oman.
* " 21	e'	10	8.00	467	126	"	Ensigns Buchanan & Oman.
Totals for May			98.46	12,125	1,597	"	
Recapitulation							
March			138.88	10,490	2670	"	
April			65.87	5,325	1,146	"	
May			98.46	12,125	1,597	"	
Season, 2d. w. b.			303.21	27,940	5,413	"	



\* Dredged Channel.

*Ship work, and Recapitulation.*

D.

*Hydrography :- Entrance to Mobile Bay, Ala., Season 1891-92.*

*U. S. Coast and Geodetic Survey Str. A. D. Bache,  
Lieut. Edward M. Hughes, U. S. N. Asst. C. and G. Survey, Comdg.*

<i>1892</i>	<i>Day</i>		<i>Naut.</i>			<i>Vessel.</i>	<i>Observers :-</i>
<i>Date.</i>	<i>Letter.</i>	<i>Book.</i>	<i>miles.</i>	<i>Soundgs</i>	<i>Angles</i>		
<i>April 23</i>	<i>A</i>	<i>1</i>	<i>3.50</i>	<i>116</i>	<i>22</i>	<i>A. D. Bache</i>	<i>Lt. Burdick &amp; Mr. J. L. Dunn.</i>
<i>" 25</i>	<i>B</i>	<i>1</i>	<i>12.50</i>	<i>352</i>	<i>82</i>	<i>"</i>	<i>Lt. Burdick, Ensign Buchanan &amp; Oman, &amp; Mr. Dunn</i>
<i>" 29</i>	<i>C</i>	<i>1</i>	<i>79.50</i>	<i>1887</i>	<i>450</i>	<i>"</i>	<i>do.</i>
<i>" 30</i>	<i>D</i>	<i>2</i>	<i>5.10</i>	<i>141</i>	<i>34</i>	<i>"</i>	<i>Lt. Burdick &amp; Mr. Dunn.</i>
<i>Totals for April</i>			<i>100.60</i>	<i>2,496</i>	<i>588</i>	<i>"</i>	
<i>May</i>							
<i>" 2</i>	<i>E</i>	<i>2</i>	<i>45.25</i>	<i>1093</i>	<i>302</i>	<i>"</i>	<i>Lt. Burdick, Ensign Kline &amp; Oman &amp; Mr. Dunn</i>
<i>" 11</i>	<i>F</i>	<i>3</i>	<i>55.00</i>	<i>1206</i>	<i>356</i>	<i>"</i>	<i>do.</i>
<i>" 12</i>	<i>G</i>	<i>3</i>	<i>54.50</i>	<i>984</i>	<i>278</i>	<i>"</i>	<i>Lt. Burdick, Ensign Buchanan, Oman &amp; Rodman.</i>
<i>" 13</i>	<i>H</i>	<i>4</i>	<i>59.00</i>	<i>1013</i>	<i>322</i>	<i>"</i>	<i>do.</i>
<i>" 21</i>	<i>I</i>	<i>4</i>	<i>27.00</i>	<i>467</i>	<i>182</i>	<i>"</i>	<i>Lt. Burdick, Ensign Kline, Rodman, Mr. Dunn</i>
<i>Totals for May</i>			<i>240.75</i>	<i>4,763</i>	<i>1,440</i>	<i>"</i>	

*Recapitulation of Ship work.*

<i>April</i>	<i>100.60</i>	<i>2,496</i>	<i>588</i>	<i>"</i>
<i>May</i>	<i>240.75</i>	<i>4,763</i>	<i>1,440</i>	<i>"</i>
<i>Total Ship work</i>	<i>341.35</i>	<i>7,259</i>	<i>2,028</i>	<i>"</i>

*Recapitulation of Totals.*

<i>Ship</i>	<i>341.35</i>	<i>7,259</i>	<i>2,028</i>	<i>Ship</i>
<i>1st. Whale-boat</i>	<i>298.83</i>	<i>28,159</i>	<i>4,857</i>	<i>1st. w. b.</i>
<i>2nd. do.</i>	<i>303.21</i>	<i>27,940</i>	<i>5,413</i>	<i>2d. w. b.</i>
<i>Total season</i>	<i>943.39</i>	<i>63,358</i>	<i>12,298</i>	<i>All</i>



*Note.. Of the above grand total 81.28 miles of soundgs were run, 15,115 casts of the lead taken and 1,240 angles measured in making examination of dredged channel leading from lower Mobile Bay to the City of Mobile, Ala.*

*Signals.*

*Erected 29 - Occupied 63 - Determined 62 - Used 70.*

1892.

E.

Mobile Bay, Ala. Coast and Geodetic Survey Ste. Bache,  
 Lieut. Edward M. Hughes, U.S.N., Chief of party.

Number of days on station, and how employed :-

Number of days on station	92
" " " " which hydrographic work was done.	37
" " " " " signals were built	6
" " " " " hydro. work was prevented by bad weather	21
" " " " " " " " " " " other causes	28

Signals.

Erected	Occupied	Determined	Used.	Angles measured from:
29	63	62	70	648.

