

2484

Diag. Cht. No. 1240-2

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey *Hydrographic*
Field No. _____ Office No. *2484*

LOCALITY

State *South Carolina*
General locality *South Coast*
Locality *Chamell over Ocean
bar off port Royal*

~~191~~
1900
CHIEF OF PARTY

Charles C. Gates.

LIBRARY & ARCHIVES

DATE _____

2484

FORM 187.

Treasury Department,
COAST AND GEODETIC SURVEY,

Washington, D. C., Jan. 22, 1901

Respectfully { ~~referred~~
forwarded } to Superintendent.

for transmittal to Archives.
attention is called to note at
bottom of Title Page of report
attached.

Very Respectfully,
C. C. Yates
Assist.

Library and Archives.

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U. S. C. & G. SURVEY
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TREASURY DEPARTMENT
U. S. COAST AND GEODETIC SURVEY
O. H. TITTMANN
Superintendent.

DESCRIPTIVE REPORT
accompanying
HYDROGRAPHIC SHEET #2484
of
SOUTH EAST CHANNEL OVER OCEAN BAR
off
PORT ROYAL SOUND
SOUTH CAROLINA.

Chief of Hydrographic Party:
ASSISTANT CHARLES C. YATES, U. S. C. & G. S.

December 4th to 28th, 1900.

Note:- Pages 10(b); 10(c) 13 to 16, added to this report on January 22, 1901, and are not included in the original Descriptive Report transmitted to the Navy Department on January 5, 1901. — Charles C. Yates.

INSTRUCTIONS.

TREASURY DEPARTMENT,
Office of the Coast and Geodetic Survey,
WASHINGTON, D.C., November 30, 1900.

Mr. Charles C. Yates,
Assistant, Coast and Geodetic Survey.

Sir:

As soon as practicable after the receipt of these instructions, you will please proceed to Port Royal, S.C., and take up a hydrographic examination of the ocean bar off that point. This survey should be sufficient to meet the requests of the Navy Department, as indicated in the accompanying papers.

The Commanding Officer of the ENDEAVOR has been instructed that Deck Officer Roeth, and Carpenter's Mate Anderson will be temporarily detached from that vessel and detailed for duty in your party, and that you will let him know at what date you will desire their services. Mr. William Sanger, Captain's Clerk, has also been ordered to report to you in person for duty in your party.

Arrangements have been made with the Revenue Cutter Service to furnish a vessel for this work.

Assistant Fairfield is now in the vicinity of Port Royal and will furnish you with the geographical positions of such hydrographic signals as you may desire to use.

You will please submit the usual estimates and make requisition upon the Office for such instruments and data as may be required.

Upon completion of the work you will please return to Washington with your party, and report to the Office in person.

The necessary expenses incurred in the execution of these instructions are hereby authorized.

Respectfully,

O.H. TITTMANN,

Acting Superintendent.

EXTRACTS from letter of Admiral Rodgers, President of Board on removal of Port Royal Naval Station. Accompanying Assistant Yates' instructions of November 30, 1900.

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"Referring to these communications and to my letter to the Secretary of the Navy, of July 17th, I have the honor to state that the surveys of the several localities in question, made in 1894, 1895 and 1896, appear to be complete and satisfactory; but referring to pilots' affidavits herewith enclosed, the Board deems it advisable to have made a sufficient re-examination of the Port Royal bar to meet the disputed point."

"Referring to the request of the Superintendent of the Coast and Geodetic Survey for additional information as to the grounds for impeachment by the pilots of Port Royal and Savannah of the results of the last survey of Port Royal bar, copies of affidavits presented by the pilots are herewith enclosed. The Board does not attach particular importance to the results of the examinations made by these pilots and set forth in these affidavits, since it appeared upon examining into the circumstances that the positions of the soundings were not accurately plotted, and that there were no accurate reductions to low water; but, since these allegations have been presented in a specific manner, it is the opinion of the Board that they should be met by new soundings. In addition to these affidavits, certain pilots appeared before the Board at Port Royal, and stated that the seventeen and eighteen foot lumps shown on the latest charts did not exist. The Board, of course, does not join in any criticism of the Coast Survey, but simply refers to it the statements which have been received."

(COPY - HYD)

State of Georgia,)
(-
Chatham County.)

Personally appeared W.J. THOMPSON, W.H.A.N.P.
C.C. Ga., and ANDREW ARUNBURN, who being duly sworn,
say that they are by profession and occupation pilots,
and are members of the Savannah Pilot Association; that
having been assigned as representatives of said association
to examine and take soundings of the bar of Port Royal,
S.C., on the 28th day of June, 1900, they proceeded to
the said Port Royal bar and examined and sounded the same
as follows:

The tide was an unusually low one, and the soundings
are given as, and were taken at, low water, with two tested
lines and two leadsmen, (the leads being thrown alternately)
the results being carefully noted, and the calls of the
leadsmen verified.

Starting outside of the bar about one-quarter (1/4)
of the distance from the bar buoy to the sea buoy, and
following the main ship channel, being a straight course,
to the red bell buoy, -- the soundings began in 23 feet
of water and the least depth found was twenty feet and six
inches (20' 6"), which depth was found at the bar buoy,

being on what was apparently a small shoal, to the eastward of this shoal the depth increased from 21 ft. to 22 ft. to 23 ft. and more, to the westward of this shoal, the depth found was 21 ft. up to half the distance to the bell buoy and from thence increasing to 24 ft. at the bell buoy.

Making the bell buoy turn and still following the main ship channel, (the Paris Island front range light being opened to the eastward about fifty -- 50 -- feet), the least depth found was twenty-one -- 21 -- feet, (increasing to twenty-three -- 23 -- feet), over the first half of the distance from the bell buoy to the junction buoy.

During these soundings the lead was cast twice over every distance equal to the tug's length.

On a course south-west by south from the bar buoy, about 900 feet from said bar buoy, I got two casts of lead, (about fifty feet apart), of 19-1/2 feet, -- at a distance of 400 feet on the same course, a depth of 21 feet, -- and at a distance of 350 feet, a depth of 21 feet.

On a course between the bell buoy and the junction with Paris Island range lights in one, over a distance extending from one-quarter to one-half way to the junction buoy, the least depth found was nineteen (19) feet.

(Signed) W.S. THOMPSON.
ANDREW ARUNBURN.

Sworn to and subscribed before
me this 29th day of June, 1900.

W.H. ADAMS,
(SEAL). Notary Public, Chatham Co., Ga.

(COPY)

TREASURY DEPARTMENT,

OFFICE OF THE SECRETARY,

Washington, November 28-1900.

Captain J.C.Mitchell, R.C.S.,

Commanding U.S.Steamer FORWARD,

Charleston, South Carolina.

Sir:

Referring to Department letter of the 24th instant, you are informed that Mr. Charles Colt Yates, of the U.S. Coast and Geodetic Survey, with a party, will be at Port Royal, South Carolina on Wednesday, December 5th, and you are directed to have your command at the place designated prior to that date and await the arrival of the party.

You will afford Mr. Yates and those associated with him every possible assistance in the prosecution of the work which they have in hand.

Respectfully,

(sgd) O.L.SPAULDING,

Assistant Secretary.

NOTE:- For personnel and equipment of party; sounding, tidal and current notes; and for description of the meaning of the symbols used on the sheet; ^{statistics, etc.} see written title attached to the face of the sheet. Note

See type written title attached to the end of this report - copy

TRIANGULATION.

The location of nearly all the signals used in connection with this work, including the location of the lines of Hilton Head Range Lights, and of Paris Island Range Lights, as shown on the sheet, are all based on accurate theodolite observations from the shore by Assistant W.B. Fairfield.

The location of the other signals, (not determined from shore), are based on sextant triangulation, using the trigonometrically determined points "Dun" and "In".

In general, the location of the signals used is considered accurate and reliable, although to accomplish this was perhaps the most difficult part of the work, both on account of the great distance of the bar off shore and the storms which carried away two sets of signals on the bar before they could be located.

TIDES.

Tidal observations were carried on at both Port Royal Naval Station and on the bar during all the time soundings were being taken.

The observations at the Naval Station were made by the watchmen of the yard, and were checked by comparison with the record of the automatic tide gauge located at the station. The observations at the bar were obtained from the readings of a staff fastened to an iron rudder post of an old wreck. This old wreck was located about 3 miles inside of the bell buoy, and was used in preference to a signal near the bell buoy on account of its known stability.

The plane of reference used for the reduction of soundings, (i.e., the plane of mean low water), and the time correction for the distance of the outer tide staff from the bar, were determined from the simultaneous tidal observations between the outer tide staff and Port Royal Naval Station.

As computed by the Tidal Division of the Survey, the plane of reference on the outer staff reads 3.6 feet, and the time correction at the bell buoy is 5 minutes.

The plane of mean low water at the Naval Station, on which is based the determination of the plane of reference on the bar, was determined from a year's record of a Coast and Geodetic Survey automatic tide gauge. The plane of mean low water, as determined by a similar series of observations carried on by the Navy Department at the Naval Station, seems to be about $1/4$ of a foot higher than the one used, which would make the water over the bar correspondingly deeper.

SOUNDINGS.

All soundings were obtained with a well seasoned lead line, which was carefully tested in length before and after soundings, under a tension of 6 lbs., as measured by a spring balance.

The leadsman was an expert of many years standing, and read his line to the nearest $1/4$ foot.

Soundings were not taken at any time when the water was not smooth. Especial care was taken to determine the height of long ground swells, by measuring their actual rise and fall on the lead line while at anchor. On one occasion a very long swell from the northeast was found to have a gradual rise and fall of nearly 2 feet, although to the eye the level of sea was apparently nearly at rest.

Note: - Pages 10(b) and 10(c) written and added to this report by Captain's Clerk Wm Sanger on January 22, 1901. and are not included in original Descriptive Report transmitted to Navy Department on January 5, 1901. - C. E. Yates
PLOTTING.

The positions of hydrographic signals used in this work were plotted from ^{sextant} angles observed by ^{hydrographic} party ^{and are} based on the Geographical positions of signals Barn, Hilton, Hilton Rear Range Beacon, In, Dun and Boilers, which were trigonometrically determined by Assistant, W. B. Fairfield.

The positions of the steamer while engaged in sounding, ~~which were~~ obtained by using any of the following signals viz: which are not included in the area covered by the 1/5000 sheet Barn, Hilton, H.R.R., Boilers, Start, or Watch were plotted upon a projection scale 1:20,000. This work was enlarged by photography to a scale of 1:5,000 and transferred to a projection scale 1:5000 upon which most of the work had previously been plotted. (Sheet #2484)

The soundings were all plotted on the 1:5,000 projection which as completed contains all of the work executed by the party. (Sheet #2484)

The 1:20,000 projection being a duplicate of the work was considered of no value so was destroyed.

Positions of the points (P)19(P)22 on the Paris Island Range 19,000 & 22,000 meters respectively from Paris Island Front Range Beacon and points (H)14, (H)19 on Hilton Head Range 14,000 & 19,000 meters respectively from Hilton Head Rear Range Beacon were plotted from data furnished by the Computing Division. (See Miscellany - Asst C. E. Yates. Port Royal Entrance, S. C. - December, 1900 - Archives)

The relative positions of the range lines as determined

by computation and the plotted course as followed by the steamer while sounding on these range lines, tend to show the general accuracy of the work.

RESULTS.

The hydrographic examination of the bar was undertaken at the request of the Navy Department. This request called for a resurvey of the South East Channel, sufficient to meet the criticisms of certain pilots and citizens of Beaufort, S.C., that a greater depth could be carried over the bar than indicated by the Coast and Geodetic Survey latest chart of the entrance to Port Royal Sound.

Therefore, as is indicated by the distribution of the soundings on the sheet, no attempt was made to develop anything but the best practicable channel over the bar, and the relation of this channel to the present location of the buoys, and the lines of Hilton Head and Paris Island ranges.

At the very beginning of the work it was found that the present location of the ranges no longer indicate the best water over the bar. This is very clearly shown on the sheet.

It was therefore decided to adopt the channel used by the pilots as an axis for the development of the best water.

The location of the pilots' channel was determined by having a pilot, who was selected for that purpose by the local Pilot Association, take the sounding vessel four times across the bar, through what he considered the best water.

The position of the vessel at every minute, and soundings at every 20 seconds were taken while these lines were run.

The least reduced depth on the 1st of these lines was 21.4 ft.

The least reduced depth on the 2nd of these lines was 21.4 ft.

The least reduced depth on the 3rd of these lines was 21.8 ft.

The least reduced depth on the 4th of these lines was 21.8 ft.

The further development of this channel added nothing to these results in the way of greater or less depth over the bar, and it is believed that it can be stated that 21 feet water can be ^{safely} carried over the bar at mean low water.

Pilot J.O'Brien, who located this channel for us, originally claimed 20 feet 6 inches for the least depth, which agrees remarkably well with the result obtained.

Attention is called to the very narrow 22-foot shoal, which obstructs the channel northwest of the bell buoy just after the turn is made.

Further comment is considered unnecessary, as the results of the survey can best be studied from the sheet.

2484

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Title, Statistics, etc.

U. S. C. & G. SURVEY.
P. 8127
JAN 19 1901
Acc. No.

TREASURY DEPARTMENT,

U. S. COAST AND GEODETIC SURVEY,
O. H. TITTMANN, SUPERINTENDENT.

~~Hydrographic Examination~~
of the
South East Channel over the Ocean Bar
off
Port Royal Sound
South Carolina

Chief of Hydrographic Party
Assistant Charles C. Yates, U.S.C. and G. S.

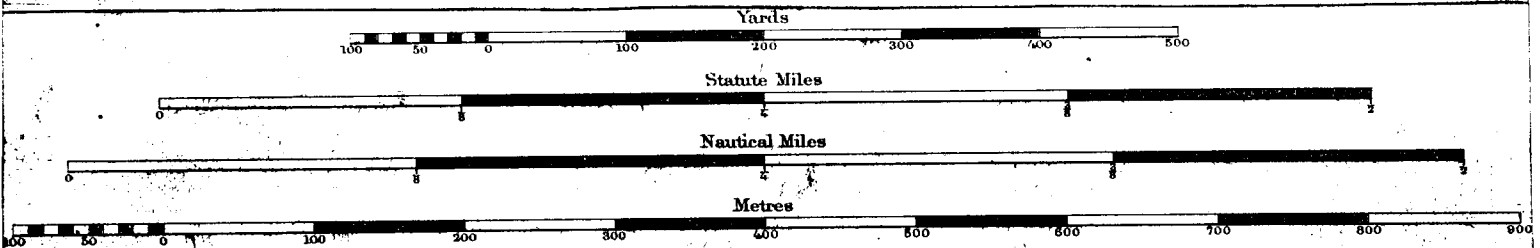
Survey executed between December 4th and 28th, 1900.

V E S S E L

U. S. Revenue Cutter Service Ship FORWARD
Captain J. C. Mitchell, U.S.R.S., Commanding

Scale $\frac{1}{5000}$

Note Pages 13 to 16 were added to this report on January 22, 1901
and are not included in original Descriptive Report forms -
mitted to Navy Department on Jan. 8, 1901. - C. Yates.



Note. One kilometre or 1000 metres = 3280.83 ft. = $\frac{5}{8}$ of a statute mile nearly. One statute mile = 1609.35 metres.

OCCUPATION OF MEMBERS OF HYDROGRAPHIC PARTY

Assistant C. C. Yates, U.S.C. and G.S.		OBSERVER
Captain's clerk Wm.Sanger	" "	"
Deck officer A.C.L.Roeth	" "	Recorder
Carp mate O.F.Anderson	" "	Leadsman
Mr J. O'Brien		Pilot
Master at Arms E.Halversen, U.S.R.C.S.		Tide Observer

Note:- By courtesy of Rear Admiral Sumner, Commandant of the Port Royal Naval Station, tidal observations at the Naval Station were furnished for the entire period of the work.

Officers of the U. S. S. Forward assisting in the Survey

CAPTAIN J. C. Mitchell, U. S. R. C. S.
 1st Lieutenant F.M.Dunwoody
 2d " F.S.Van Boskerck, Jr.
 Chief Engineer H.C.Barrows

NOTES

SIGNALS, etc. Range Light Lines are shown thus - - - - (black)
 Triangulation Points " " Δ
 Hydrographic Points " " \odot

SOUNDINGS:- The soundings are expressed in feet and fractions and show the depth below the plane of Mean Low Water at the Bell Buoy on the Bar.

TIDES:- Mean range of tide at Bell Buoy	- - - - -	6.4/feet/
Mean range of spring tide at Bell Buoy	- - - - -	7.5 ✓ "
Mean range of neap tide	" " "	5.2 ✓ "
Mean range of tide	at Naval Station - - - - -	7.2 ✓ "
Mean range of spring tide	" " - - - - -	8.4 ✓ "
Mean range of Neap tide	" " - - - - -	5.8 ✓ "

TIDES at Bell Buoy are 1 hour earlier than at Naval Station.

CURRENTS:- The Currents follow the general direction of the channel over the Bar and are estimated to have a mean velocity of 1 1/2 knots.

CONTOURS:- Contours or Curves are drawn at the respective depths of 18, 21, 22, 23, and 24 feet and are shown as follows:

- 18 feet _____ (blue)
- 21 " _____ (red)
- 22 " _____ (yellow)
- 23 " _____ (green)
- 24 " _____ (purple)

STATISTICS.

Date 1900	Let- ter	Vel.	Angles	Sound.	Miles.	Vessel.
December, 18	A	1	120	205	3.0	USS "Forward"
" 19	B	1	552	1015	15.9	" "
" 22	C	2	218	398	6.5	" "
" 25	D	2	402	660	8.7	" "
Total	4	2	1302	2278	34.1	

Sheets, Records, etc. in Archives relating to this Descriptive Report

- 1 - Hydrographic Sheet - Scale $\frac{1}{5000}$ - # 2484 -
- 2 Vols. - Original Soundings - Port Royal Entrance
- 2 " - Fair Journal " " " "
- 1 " Hydrographic Angles - " " "
- 1 " Tides - Station "Boilers" " " "
- 1 " " - Naval Station " " "
- 1 Calc. - Computations - Location of Range Lines on Hydro. Sheet.
entitled. - Miscellany.

End