64.

U. S. COAST AND GEODETIC SURVEY.

F. M. Thorn, Superintendent.

State: Maryland.

DESCRIPTIVE REPORT. "A"

Hydrographic Sheet No. 1842.

LOCALITY:

Annapolis Harbor.

See also Report B page -

1888.

CHIEF OF PARTY:

Lieut. M. L. Wood, U.S.N.

H01842 **H01873**

H01874 **H01875** **H01876**

Words Report A. 65
Annapolis Harbor

(8 pages)

U.S.Coast and Geodetic Survey Office,

Washington, D.C., 16 Feb. 1889.

Mr, F. M. Thorn,

Superintendent.

Sir:-

In accordance with the published instructions, I submit "Descriptive Report A", to accompany Projection No. 1, Annapolis Harbor, Md.,- executed by the hydrographic party under my charge on board the steamer "Endeavor", during the summer season of 1888, under your instructions dated July 24th., 1888.

Very respectfully,

W. D. Thorn

Lieutenant, U.S.N.

U.S. COAST & GEODETIC SURVEY OFFICE OF HYDROGRAPHIC INSPECTION FEB 16 1889

L. Swain, U.S.N.,

Hydrographic Inspector C. & G. Survey.

I. Report A. Projection 1.

United States Coast & Geodetic Survey.

F. W. Thorn. Supt.

Projection No. I. Annapolis Harbor.
Maryland.

Begun August 17 1888.
Ended Sept. 1 1888.

Scale 1/10.000

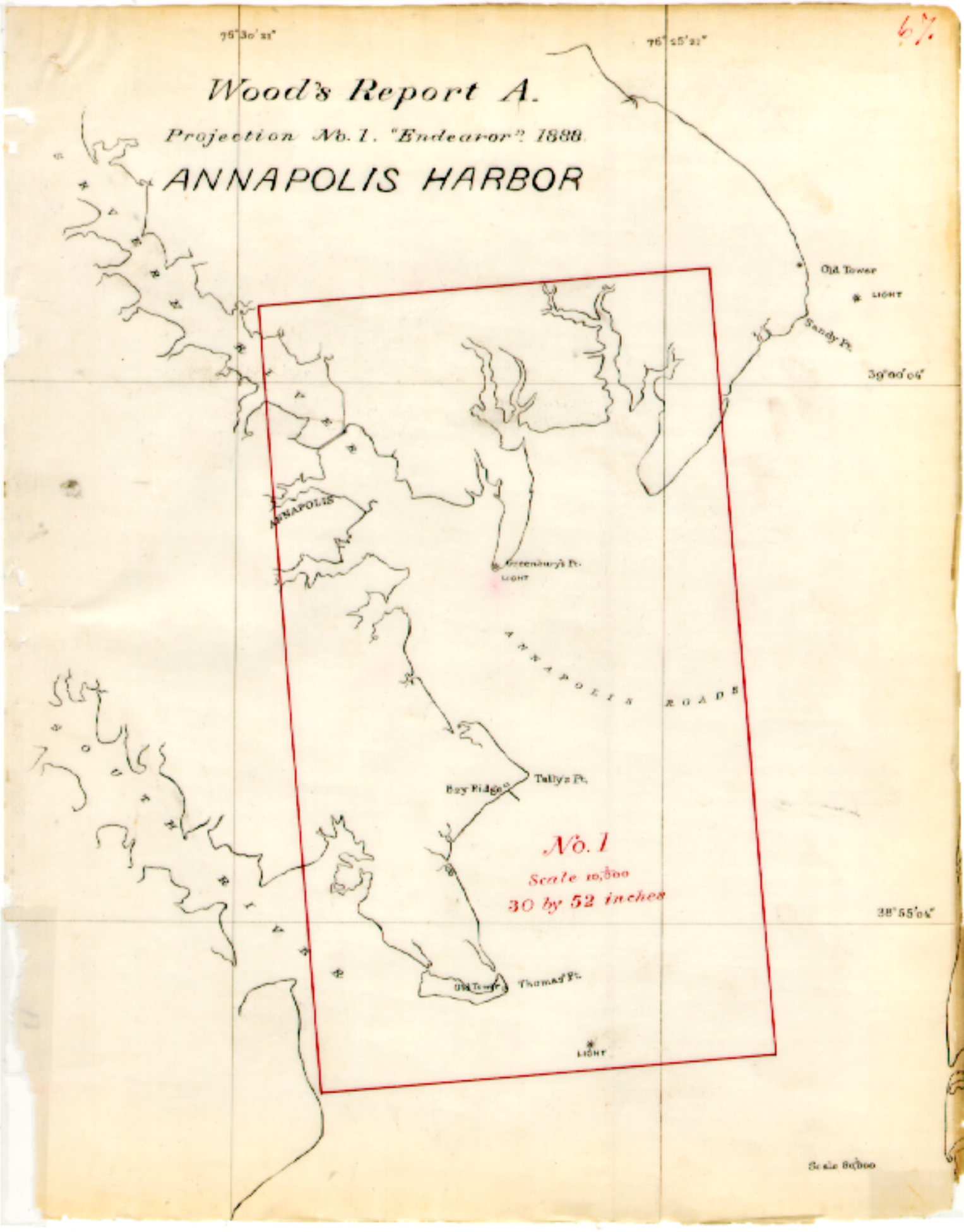
Lieut. W. L. Wood. U.S.N.
Comdg.

Observers.
Lieut. W. L. Wood. U.S.N.
Ensign Edward Lloyd. U.S.N.
C. A. Anderson
Wm. H. C. Hilleubucher.

Recorders.
Roger J. Brooke.
W. F. de Vice.

Leadsmen.
E. Jackson
John Fennell.
Carl Lindstrom
Lars Larsen.

Tide Observer.
Thomas Jones.


Wood's Report A.
Projection No. 1. "Endeavor" 1888.
ANNAPOLIS HARBOR
76° 30' 21"
76° 25' 21"
Old Tower
LIGHT
Sandy Pt.
38° 59' 04"
ANNAPOLIS
Greenbury's Pt.
LIGHT
ANNAPOLIS ROADS
Bay Ridge
Tally's Pt.
No. 1
Scale 10,000
30 by 52 inches
38° 55' 04"
Old Tower
Thomas Pt.
LIGHT
Scale 80,000

II — Splinter — Work Register
Annapolis Harbor

Projection No. I
Annapolis Harbor and approaches.

Date	Letters	Angles. from	Angles. to	Number of Sounding Book.	Number of Fair Journal	Number of Soundings	Number of Angles	Miles.	Vessels.	In charge.	Observers.
Aug 17	a	1	37	1	1	438	72	3.2	Launch	M.L.W.	M.L.W. & E.L.
" 18	b	1	34	1	1	440	68	3.5	"	E.L.	E.L. & W.C.W.
"	a	1	27	1	1	410	52	4.2	" 3	M.L.W.	M.L.W. & E.A.A.
" 20	c	1	46	1	1	794	92	6.1	"	E.L.	E.L. W.C.W.
" 20	b	1	120	1	1	1310	240	16.7	" 3	M.L.W.	M.L.W. & E.A.A.
" 21	d	1	49	2	1	637	82	6.1	"	E.L.	E.L. & W.C.W.
" 21	c	1	56	2	1	704	112	6.7	" 3	M.L.W.	M.L.W. & E.A.A.
" 22	d	1	56	2	1	700	111	10.2	" 3	"	" " "
" 22	e	1	118	2	1.2	1693	236	14.8	"	E.L.	E.L. & W.C.W.
" 23	f	1	120	3	2	1272	218	13.9	"	"	" " "
" 23	e	1	93	3	1	1274	181	13.5	" 3	M.L.W.	M.L.W. & E.A.A.
" 24	g	1	148	4	3	1781	190	18.8	"	E.L.	E.L. & W.C.W.
" 24	f	1	84	3	2	1230	168	13.	" 3	M.L.W.	M.L.W. & E.A.A.
" 24	f	85	168	4	2	1366	168	15.	" 3	"	" " "
" 25	g	1	58	4	2	887	112	10½	" 3	"	" " "
" 25	g	59	123	5	2	1007	130	11.2	" 3	M.L.W.	M.L.W. & W.C.W.
" 27	h	1	91	5	3	1353	182	15.2	" 3	"	" E.L.
" 27	h	1	116	5	3	1630	232	18.2	"	E.L.	E.L. & W.C.W.
" 28	i	1	119	6	3	1553	234	9.5	" 3	M.L.W.	M.L.W. & E.A.A.
" 28	i	1	45	5	3	720	87	7.7	"	E.L.	E.L. & W.C.W.
" 28	i	46	83	6	3	591	74	6.4	"	"	" " "
" 29	j	1	68	6	3	1034	136	8.5	"	"	" " "
" 29	j	1	36	7	3	400	72	9.2	" 3	M.L.W.	M.L.W. E.A.A.
" 30	k	1	77	7	3	715	154	6.5	"	E.L.	E.L. & W.C.W.
" 31	l	1	16	7	3	101	36	.5	"	M.L.W.	M.L.W. & W.C.W.
Sep. 1	m	1	6	8	4				" 3.6	E.L.	E.L. E.A.A.

Ward's Report A 69,4
Annapolis Harbor

II. Tidal Data.

Projection No. 1. Annapolis. Md.

(1)	Mean low water.	3.18
(2)	Lowest tide observed.	2.1
(3)	Highest tide observed.	5.0
(4)	Mean rise and fall.	1.78

Name of observer. Thomas Jones. (Asst)

ON ORIGINAL DOCUMENT

A

A Projection No 1

Mem. Report A 35
Annapolis Harbor.
70.

III. The main channel into Annapolis Harbor has a least depth of 18.7 feet at mean low water in two places,- one off Greenbury Point and the other farther in. The bottom is very soft mud however, so that a vessel drawing a foot more water than this, can be forced over the bar with little difficulty.

Side-wheel steamers drawing from 8 to 10 feet, and naval vessels drawing from 17 to 21 feet use the channel during the day time. There is but little night navigation at present owing to the entire lack of range lights.

The depth of water alongside the wharves in the harbor, is from 8 to 13 feet, and at the U.S. naval Academy wharves , from 14 to 21 feet.

IV. The bottom being mud, the rise and fall of the tide less than one foot, and the tidal currents very gentle,- there is but little change in the bottom or in the position of the channels. It is probable that the differencies found between the resurvey and the survey of thirty-five years ago , are due more to the greater closeness of the recent work than to actual changes in the hydrography.

V. Several years ago some dredging was done off the U.S. Naval Academy, the results of which are still apparent in the abrupt changes of direction in the curves of depths off the "Santee" wharf and the "Phlox" wharf. A dredged 30 foot channel is contemplated, but no steps have as yet been taken.

Woods Report A. 2 6.
Annapolis Harbor 71,

VI. Small vessels anchor almost anywhere. Larger craft use one of two anchorages,- Annapolis Roads, off Greenbury Point in f from 22 to 36 feet of water, good holding ground,-or the "Inner Anchorage" off the Naval Academy in 27 feet of water, marked by a large mooring buoy locally known as the "Constellation" buoy.

There are also two mooring buoys off the "Phlox" wharf in 16 feet of water to which the Monitor "Passaic" moors head and sten

VII. there are no special dangers apart from the shoal points on both sides of the channel.

VIII. The tidal currents are weak and are largely affected by the wind. The tidal "set" is seldom greater than 0.5 knot and the direction follows the curves of the channel.

IX . The following I give as leading in the best water,-

In entering,- Get an iron tripod on Horn Point in range with St. Johns College (bearing)and stand in on this range until the end of the boat-house on the "gunners" wharf at the Naval Ordnance Proving Groundcomes on with the edge of the "Red Bluff" when change course to this range, and follow until the corner of the Proving Ground landing wharf is in range with the "red spot" on bank, then follow this range until the "Constel-lation" mooring buoy is between the draw and the keepers house of the county bridge,- when head for the buoy and anchor just above it.

X

X. The bottom is hard sand on only a few small shoal places, but the channel is soft mud.

XI. There is some doubt as to whether the proper name of a small creek is "Spa" or "Spaw" Creek.

XII. Many new features in the hydrography have been developed by the resurvey, but at the same time it cannot be taken for granted that the differences are due to actual changes in the curves of depths. The differences noted may result from the greater number of soundings allowing greater definiteness in the curves of depths.

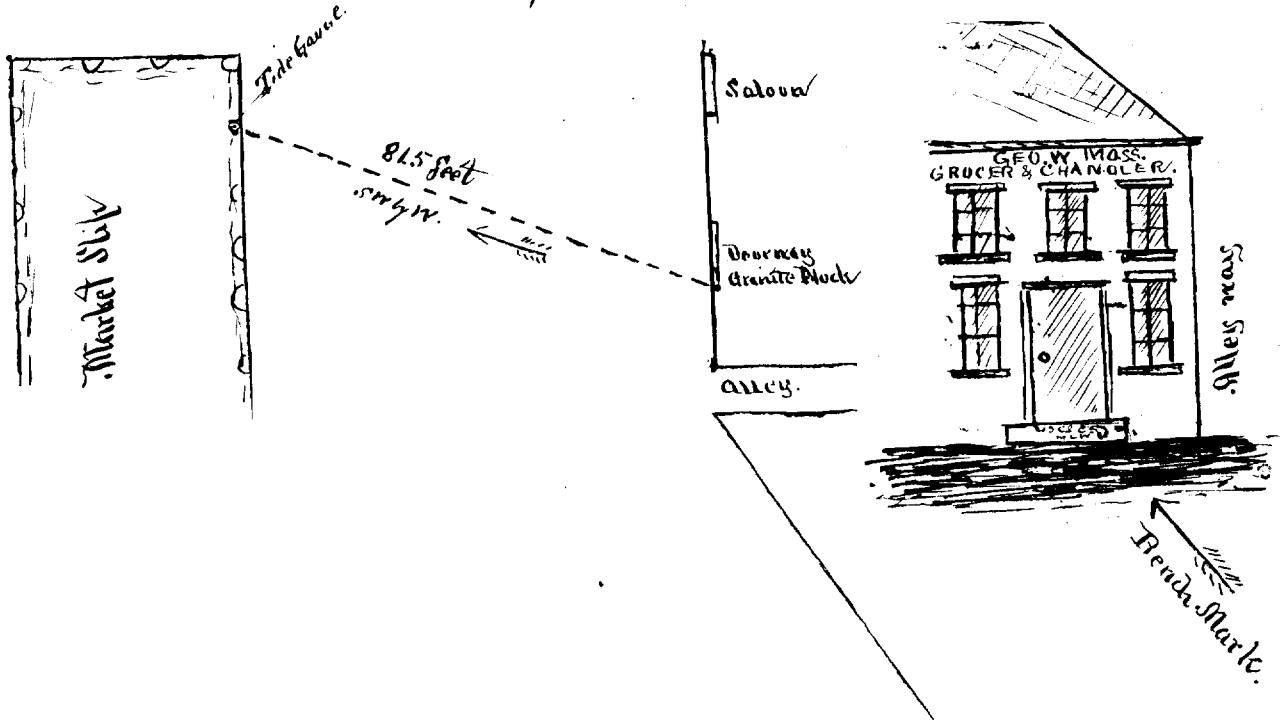
Navy Report A 738.
Annapolis Harbor.

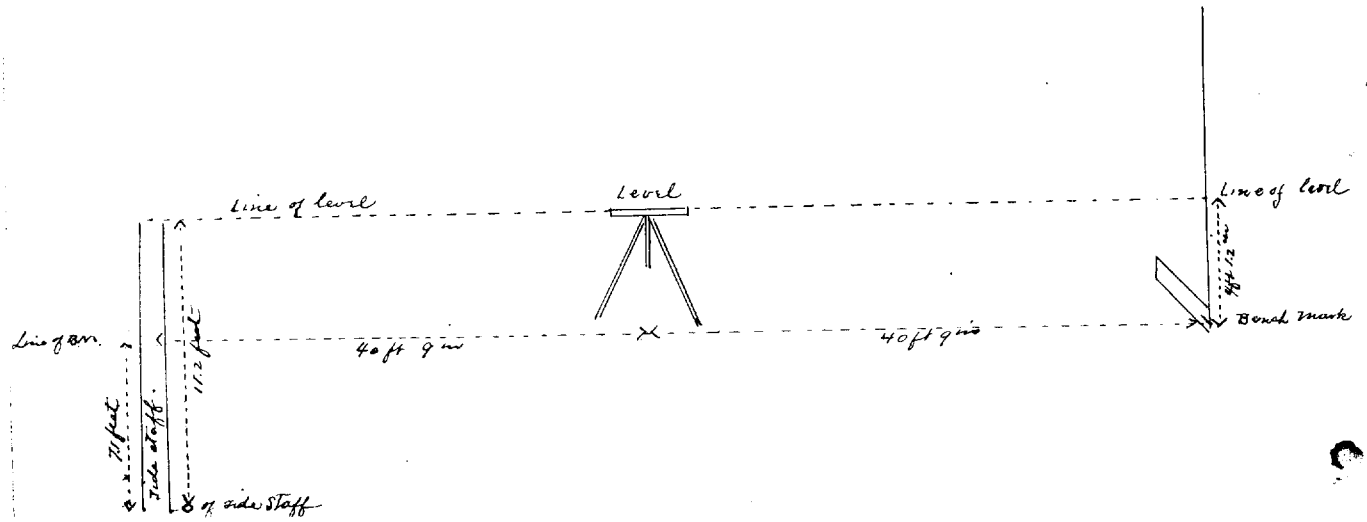
Annapolis. Md.

M. L. Wood. Chief of Party

Observations from Aug 16th to Sept 18th 1888.

Sketch of locality





. Description.

Annapolis, Md. A plain wooden staff gauge numbers increasing each rise of tide. The electric to a post 26 ft 10 in from the N.W. end of Market Square Basin, and 81.5 feet in a S.W. by W. direction from Bench Mark. Obs gauge 7.1 feet below Bench Mark.

Bench Mark is a horizontal line 2 inches in length and 1/8 in deep cut in the S.W. end of granite dock sill of store owned by G.W. Moss, Brooks and Chandler. One inch from pavement. It is marked by the letters U.S. C. & G.S. - M.L.W. 88.

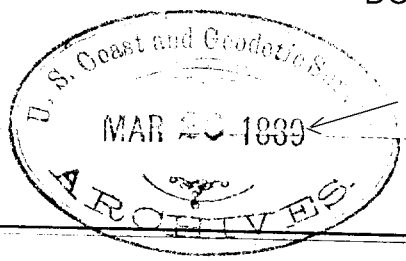
It is in a horizontal line with bottom of vertical scratch representing Bench Mark established by F. Bailey Perkins in Dec 17, 1875.

Mean high water	= 3.961	B.M. above zero on gauge	7.1
" low "	= 3.182	M.L.W. " " "	3.182
" range	.779	B. Mark above M.L.W	3.918

Woods Reports A. 9
Annapolis Harbor
74

ON ORIGINAL
DOCUMENT

139.



MAR 26 1889

U. S. COAST AND GEODETIC SURVEY.

F. M. Thorn, Superintendent.

States: Va + Md.

DESCRIPTIVE REPORT. B

Hydrographic Sheets Nos. 1842, 1873, 1874, 1875, 1876.

LOCALITY:

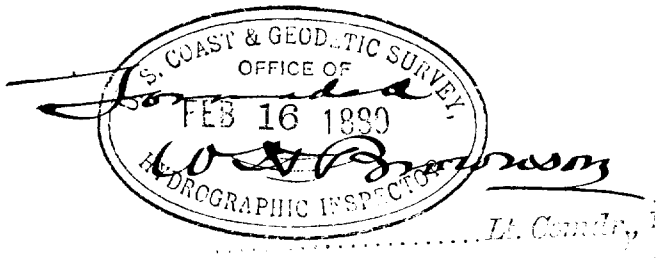
Cape Charles, Va. and Vicinity, and Annapolis Harbor, Md.

1888.

CHIEF OF PARTY:

Lieut. M. L. Wood, U.S.N.

140.



Lt. Comdr.,
Hydrographic Inspector C. & G. S.

Lieutenant M. L. Wood, U.S.N.

Descriptive Report B. Hydrography,

Cape Charles, Va, and Vicinity

and

Annapolis Harbor, Md,

executed by party on board

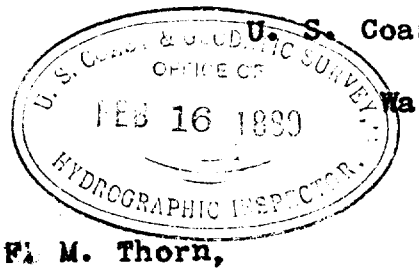
C. & G. S. Str. "Endeavor";

during Summer Season

1888.

(Wood's Report "B", Season 1888, Endeavor.)

(42 sheets)



U. S. Coast and Geodetic Survey Office,

Washington, D. C., 16 Feb. 1889.

Mr. F. M. Thorn,

Superintendent C.and G. Survey,

Washington, D. C.

Sir:-

In accordance with routine, I submit the following "Descriptive Report B" of the hydrography executed by the party on board the C. and G. S. Str. "Endeavor", under my charge during the summer season of 1888:—

Under your instructions dated April 17th, I proceeded to New York, and assumed command of the Str. "Endeavor" on the 18th April. On the21st , I started with the "Endeavor" from New York for Hampton Roads, and on the 3rd of May, I had signals erected and commenced sounding.

On August 7th , in accordance with your instructions dated July 24th. , I closed work, having finished the hydrography in the vicinity of Cape Charles, and the Examination of Horse Shoe Shoal, Va., and proceeded with the "Endeavor", to Annapolis, Md., and commenced the hydrography of the resurvey of Annapolis Harbor and Roads.

On August 16th, I had signals erected, and commenced sounding. On September 1st., I finished the resurvey of Annapolis Harbor, and, in obedience to your instructions of Aug. 21, I closed work and proceeded with the "Endeavor" to New York secured the vessel in "Whitney" Basin, at the Navy Yard, and reduced the crew. On October 2nd., as directed in your instructions dated Sept. 26th., I turned over the records of work to Ensign E. A. Anderson, U.S.N., and resumed my duties at the Office in Washington D.C.

During the work in the vicinity of Cape Charles, Ensigns W. M. Constant, Edward Lloyd, and E. A. Anderson, USN, have assisted me as observers, to the best of their ability, Pay Yeoman R. T. Clover, and Seaman W. H. De Luce, as recorders, and Machinist A. J. Miskimon has had charge of machinery.

During the work in the vicinity of Annapolis, Ensigns Edward Lloyd, and E. A. Anderson, U.S.N., and Mr. W.C. Willenbucher, have assisted me as observers, Pay Yeoman R.T. Clover and Seaman Recorder W.H. DeLuce, as recorders; and Machinist A.J. Miskimon as engineer in charge of the machinery of the "E ndeavor" and also of three steam launches used for sounding, belonging to the U.S. Naval Academy.

All these have assisted me with marked skill and energy, and I desire to call attention to the large amount of work

finished in a short space of time, owing to the necessity for closing field work,- by the very small party under my charge.

Draughtsman W.C .Willenbucher from the Office in Washington, was attached as an observer at my request while we were running sounding lines in Annapolis Harbor, From Aug. 16th. to Aug.31st;- and the progress of the work was materially assisted by his skill and experience as an observer, as I was enabled to use two launches, in sounding, instead of one.

Ensign W.M.Constant was detached July 21st., Ensign Edward Lloyd Sept. 6th . Ensign E.A.Anderson will finish plotting the smooth sheets and getting the records in a shape for transmittal to the Office.

The resurvey of Cape Charles and Vicinity has developed several features which will prove of interest.

Smith Island on the East side, is being cut away very rapidly as shown by comparing the results of the two last surveys. Cape Charles Light-house on Smith Island, was originally built nearly a quarter of a mile from high-water mark on the eastern side of the island: but it is now at high water mark, and , if it were not protected by stone dikes, would soon be undermined by the waves.

Fisherman's Island changes its shape with every gale, and the change depends for character and extent, upon the force

and the direction of the wind. These changes, are, however, of small importance, since the shoals in the vicinity will prevent vessels approaching the island intentionally, and the scarcity of tillable soil and fresh water, will prevent attempts at agriculture.

Fish weirs are built of stakes driven in the sand with nets stretched along, during the during the fishing season, from May to September; and there is a brisk trade in fish with Norfolk and Cape Charles City.

A wharf for the Quarantine Station will probably be built as there is a large appropriation of money by Congress, for that purpose.

The Quarantine Station is on Fisherman's Island, but there is no Medical Officer excepting on board the Quarantine Tug, which usually stays near Old Point Comfort.

The Quarantine Anchorage is just inside Fisherman's Island and is marked by a yellow spar buoy. Vessels are seldom anchored there on account of the lack of familiarity with the channel, on the part of all the pilots. There is a good channel developed by this last survey, but it has not yet been buoyed, and its location prevents much use being made of landmarks or natural ranges.

Since the survey of 1854, as indicated on the charts, the channel across the shoals, south-west of Cape Charles, opening into the "North Channel" of the chart, - has widened greatly and

increased in depth. It has encroached upon "Nautilus Shoal" very much, so that where the old survey gave a depth of only 14 feet of water, I found 22 feet and a well marked channel.

This depth can be carried up the "North Channel" of the chart, by keeping on either side of a newly developed shoal in the center, having only 14 feet over it where the chart gives over 18 feet.

The "Inner Middle Ground" has changed greatly in shape and also in the depth of water over it. Although the chart gives several spots with only 3feet of water, I found that I could run over it everywhere with the "Endeavor" at high water, drawing 7 feet. The "axis" of the shoal has shifted in a marked degree, from N.N.W. on the chart, to about N.W.byW. from the re-survey of 1888.

The "Outer Middle Ground" has changed somewhat in the outline of the 18 foot curve, and also in the depth of water over the shoalest part. In addition to the regular sounding lines, the shoalest spots indicated on the chart were gone over carefully in order to find a place shoal enough to plant a tripod water-signal, without success. Instead of 11 feet the least water found was 15 feet.

The materiel of which these shoals are composed, is an extremely fine sand approaching "quicksand" in its characteristics and it is within the limits of possibility, for a heavy southwest gale to pile the sand up during certain stages of the

tidal currents, so as to form a serious obstacle to a vessel crossing the shoals before the effect of such a gale has been counteracted by the normal conditions of tide and currents.

The chart represents the configuration of the bottom under normal conditions, and at a certain time. Abnormal conditions may occur, when the information imparted graphically by the chart, should be supplemented by additional data in the shape of a correction to be applied.

Fisherman's Inlet is a narrow crooked channel between Fisherman's Island and the main land of Cape Charles peninsula, opening into Chesapeake Bay. Its upper end shoals to less than a foot of water on the mud flats between Fisherman's Inlet and Smith's Island Inlet, and the narrow channel near the sharp poin at the extremity of Cape Charles, is used as an anchorage during the fishing season by the many small vessels collecting fish. There is but little room to swing, and only a 7 1/4 foot channel, so only small vessels use this inlet. The tidal current runs with great force, from one hour before high-water to one hour or two hours afterwards: at springs, it runs 3 1/2 knots an hour to the westward.

After considerable effort on my part, to find an anchorage elsewhere, without success: and after dodging with great personal discomfort to every one in the party, — from one side of Cape Charles to the other to escape a lee shore, —I obtained some young pines about 10" in diameter, ran into Fisherman's

Inlet with the "Endeavor", after first planting some buoys to mark the channel,- and "pumped down" in the sand enough piles to make a light wharf or dock, alongside which the "Endeavor rode out some bad weather in comparative comfort. The berth was a good one when it was once reached, but it is a mean place to enter. I could get no local pilot to take the responsibility of showing me the way, but had to sound out and buoy the channel myself, finding it narrow crooked, and with only 7 1/4 feet at low water, when the shoals were most plainly visible.

Owing to the fineness of the sand of which these shoals are composed, its formations cannot be otherwise than unstable and in fact I believe that I noticed appreciable changes after every spring-tide.

Fisherman's Island Inlet, owing to constant alterations, is not recommended as safe for a stranger. For a draught of over 5 feet, the channel should be buoyed and used only near low water. The bottom is hard fine sand, which cuts rapidly under weight in a current.

Quarantine Station. On Fisherman's Island is the U.S.Marine Hospital Quarantine Station for the entrance to Chesapeake Bay. The two small buildings- dwelling-house and hospital-, are prominent land marks. They will, however, probably be changed completely within a short time, as there is an appropriation available for a larger building and a new wharf.

The Bench-mark for the hydrography in the vicinity of Cape

Charles, is on the corner of the Hospital building (see Description of Bench-mark and Tidal Data in Report "A", Projection No.1). If this Tidal Station be of any importance, I recommend that an additional mark on something that will be permanent and readily identified, be established. At present there is nothing on the island that is not liable to be disturbed by either strong winds or high water, and although the bench-mark was placed on the most substantial locality that could be found I do not think it is certain to remain .

The Tide-Gauge was placed on the Inlet side of Fisherman's Island in a depression having at low water, a free communication with the water in the inlet.

A Second Tide-Gauge was put at the wharf built as a landing place on the Cape Charles side of Fisherman's Inlet, to know the state of the tide for purposes of navigation, but no record was kept and no bench-mark established. The Cape Charles gauge read 0.8 foot, when the Fisherman's Island gauge read 1.ft. Both gauges were left in position and will remain for a year or more unless removed by violence.

Cape Charles City- is the terminus of the N.Y.P.and N.R.R. from which passengers are transfered by steamer, and freight cars ferried by barges, -to Norfolk, Va.

A Basin and Channel have been dredged out by the railroad company to a depth of 11 feet. Wharves have been built on the

north and south sides, and part of the east end ,-of the basin, and piles driven to mark both sides of the channel. A pile beacon on each side indicates the entrance A white lantern is placed on the north side of the entrance at night, to indicate the turning point.

Wharves. On the north side of the basin is the freight depot and wharf of the railroad: on the east end is the passenger depot and the slip for putting freight cars on board the barges to be ferried across Chesapeake Bay and up the Elizabeth River.

On the south side of the basin is a wharf controlled by the manager of the property belonging to Mr. W.C.Scott and used as a fish wharf, from which during the season, large quantities of fresh fish are sent on ice directly to the Fulton Market, New York.

Harbor-master. The resident agent of the Railroad company has charge of the basin, and of the railroad wharves on the north and east sides. For the Fish Wharf, the manager of the property of Mr. W.C.Scott acts as Harbor Master, and arranges berths at the south side.

Harbor of Refuge. While the basin is a private affair intend- only for the interests of the Railroad Company, it is used very extensively as a harbor of refuge for small vessels in westerly gales. There seems to be no restriction to its use by the public, except that of keeping out of the way of the passenger steamers, tugs, and barges, belonging to the railroad.

Efforts are being made to have an appropriation made by Congress to increase the size and capacity of the artificial basin, in which case it will become extremely useful to small vessels as a harbor of refuge during sudden westerly gales.

Supplies can be procured to a limited extent, from shops in Cape Charles City.

Fresh Water can be obtained in limited quantities from the railroad tanks, and from the Fish Wharf tank. The price varying with the season and with the supply on hand. It is put on board by hose from plugs on wharves.

Coal can be obtained by the car load from the railroad company by special arrangement in case of necessity; but it is better to get it from Norfolk, Lambert's Point, or Newport News, as the supply is both limited and uncertain at Cape Charles City.

Range Lights have been established just south of Cape Charles City, to guide vessels across Old Plantation Flats. The front range light is a white lantern on a post 6 feet from the ground, close to the waters edge: the rear range-light is shown from a framework about 25 feet high, and is also a white lantern. In day time as both range marks are unpainted, the range is obscure.

Sailing Directions. To enter the basin at Cape Charles City at nightwith a vessel drawing 10 feet of water:-

Steer for a position about one half a mile west from Old Plantation Light,- get the Cape Charles City range lights bearing

N. E. 1/2 N., in range(rear light highest),and steer for them making allowance for the tide which sets across the channel with considerable force at times. The least water on the range across Old Plantation Flats is about 13 feet. When Cherry Stone Light bears North, it will begin to show white, and a black buoy should be in sight on the port bow. As soon as the white stake-light on pile beacon at north side of the entrance of the dredged channel to Cape Charles City bears N.1/2 E head for it, and keep in not less than 10 feet of water, on the west side of the channel, passing not more than 75 yards from the black buoy. Stand up for the white stake-light at the entrance, keeping on the west side of the channel to allow room for turning, and enter the channel between the piles, leaving the light on the port hand and making allowance for the tide. Run in slowly as there is usually a number of small vessels in the basin, especially in bad weather. Arrange for a berth on the south side of the basin ,to be out of the way of the rai road barges. If prefered, there is a good anchorage just north of the entrance, in 18 feet of water good holding ground.

Horse Shoe Shoal. The examination of this shoal has shown that the changes reported, have not taken place to the extent expected: and that while the hydrography will be slight ly different in its appearence, particularly on the eastern end of the shoal,- the differences are not sufficiently great to

make any practical alteration so far as navigation is concerned though the new work should be indicated on the charts to show the new outline of the shoal.

Fish Weirs have been built out from the beach to nearly half a mile from shore, about every hundred meters, making it difficult to carry in the lines of soundings without delaying the progress of the examination. These fish-weir stakes are stout, and are left in the water from season to season, and I recommend that their position be indicated on the charts in such a manner as to warn small vessels away from the danger of being "staked"

Aids to Navigation. The buoys within the limits of the sheets, were located during the progress of the work, as indicated in red ink on the copy of chart No. 131 accompanying this report. The H.S. buoy placed to mark a wreck $4\frac{7}{10}$ miles N. from Cape Henry, is very much out of position. A careful search in the "Endeavor", with the assistance of three pilots, failed to discover any indication of a danger to navigation.

In my opinion this H.S. buoy should be removed as it indicates no danger, and there is some chance of its being confused with another H.S. buoy.

Black buoy No.1, east of the "Tail of the Horse Shoe Shoal", is out of position and nearly useless for a vessel standing up the bay: while for a Hampton Roads channel buoy, its color should be red instead of black, as it must be left on the

starboard hand in entering the Roads. Tradition ststes that it was originally about two miles N.E. of its present location, to which it was shifted by a heavy N.E.gale. Pilots told me that it was of no service in its present position, except to those acquainted with the channel sufficiently well to disregard its indication of the channel. I suggest that it beremoved altogether, moved across the channel and painted red, or moved about two miles North East, so as to be of some asistance to a stranger in bad weather when the pilots are inside Hampton Bar.

Additional Buoys might be placed to advantage, in my opinion as follows:-

A Lighted buoy on the south end of Cherry Stone Flat, would be of great assistance in changing course after crossing Old Plantation Flat, entering Cape Charles City: and another small lighted buoy on the West side of the channel East of Cherry Stone Light.

A P.S. buoy to mark the entrance to the new channel near the south west limit of "Nautilus Shoal" as shown on the chart, and 3 spar P.S. buoys to mark the new "North Westchannel".

Two additional Black Buoys to mark the eastern ege of the "Inner Middle Ground", and one Red spar buoy to mark the western edge of the new shoal in "North Channel"

A Black Buoy (spar), on the north side of the "Lower Middle Ground", would be of assistance to vessels wishing to save distance.

Owing to the strong currents, I do not recommrnd vessels of a draught of more than 11 feet of water, attempting to "beat to windward" over these shoals, or through the new channels.

With a leading wind, vessels drawing 22 feet can save a great deal of time by making use of the new channels when the buoys can be seen,

Stake Lights should be established where private lights are now placed, to indicate the range over Old Plantation Flats, and the entrance to the dredged channel to Cape Charles City.

Winds Off Cape Charles. There is a curious feature that I noticed during this work, which may repay further examination:- I noticed several times that when forced to quit work by the sea from a fresh breeze down the coast on the side I was at work, on going for a lee to the other side of Cape Charles, I have found the direction of the wind to shift so that it was blowing down parallel to that coast also. In other words, on the eastern side of Cape Charles the wind would be fresh from NEbyN, and on the other side of Cape Charles, where one would have a right to expect a weather shore and smooth water, the wind would be NNW, and the water just as rough. Owing to lack of time, no observations were made to determine how far from Cape Charles this condition existed.

Tidal Data, Old Point Comfort. Difficulty was found in identifying the marks on the base of Old Point Comfort Light-house, by the descriptions of Bench-marks furnished from the Office. The wrong mark was taken at first, giving an erroneous plane of reference; and that something was wrong was noticed from the fact that the soundings on Horse Shoe Shoal differed nearly a foot from what they should have been.

As comparison showed that the fault lay in the assumed plane of reference, a further examination, and additional information from the office, located the proper bench mark, and eliminated the discrepancy.

New Bench-Mark. To assist in distinguishing the standard bench mark on the base of Old Point Comfort Light-house, connected with a series of 30 years observations of a self registering tide gauge,– I placed on the same level a mark ("△ WOOD '88 "), derived from two months continuous tidal observations.

Tide Gauge. A staff tide gauge, reading directly, placed against a pile at the north east corner of the Light-house wharf and observed for two months with sufficient closeness for hydrographic work.

(For tidal data and description of Bench-mark at Old Point Comfort, see Report "A" Projection No. 5).

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Pilots. Chesapeake Bay and Norfolk pilots are generally obtained from pilot boats anchored, in good weather, in the vicinity of the Lower Middle Ground between the Capes of the Chesapeake. There are several schooners and one steam pilot-boat.

In bad weather pilots are hard to find, as the pilot-boats come into Hampton Roads and anchor inside Hampton Bar.

Pilots are entirely unnecessary for ordinary navigation anywhere in Chesapeake Bay, and are avoided whenever it is practicable. The laws of the state of Virginia allow coasting schooners to be exempt from pilotage, and to be run by their masters, if they hold a license good for one year and which costs Five Dollars(5.00). The fee for this license is paidto the pilots for the privilege of doing without them.

I have seen a boat from a pilot schooner, go from one vessel of a wind-bound fleet of coasting schooners to another, collecting this "tax", and threatening full pilotage the next time the license was not obtained promptly, from the "Office" of the pilots in Norfolk.

When it is considered that the coasting vessels taking these licenses ~~get no good~~ never receive no return from Virginia pilots whatever, and pay to the "Virginia Pilots Association" between thirty and forty thousand dollars annually, -the magnitude of the tax that this state law puts on "Inter-State Commerce" carried on by coasting vessels, becomes more appreciable.

All the information that the master of a schooner needs for entering any port on the coast of the United States, and most certainly any place in Chesapeake Bay, is furnished by the charts published by the United States government. The aids to navigation, light-houses, buoys, and beacons, - are established and kept in position also by the government. In addition to all this, the masters of coasting schooners are as well acquainted with the ports they frequent, as the pilots are themselves, and there is no reason why they should take a pilot exccept for the purpose of making time in bad weather, - and then the pilots are snug in port waiting for them to come in and pay their "licence fee" of five dollars a year each, for the privilege of piloting themselves.

As a matter of fact, the masters of coasting vessels do not want a pilot on board, have no use for pilots, hate the sight of a pilot-boat, and evade the payment of all pilotage dues as long as possible, or as long as they dare.

If a man believes that he knows enough to run a vessel by his own information derived from experience, by charts which the government says are reliable, and by aids to navigation which the government endorses as sufficient, -common justice would seem to demand that he have the free right to make the attempt as long as he will be the principal sufferer, if he fail:

I believe that compulsory local pilotage, and its licence

system by which a yearly tax is laid upon vessels not using and not needing pilots,–to be a serious barrier to interstate commerce and hence liable to attack on that score.

Another possibly practicable method of breaking up compulsory pilotage in certain ports, so as to let masters of vessels make full use of their charts, would be that of stopping government aid for harbor improvement at all ports at which there is compulsory pilotage. At present, every harbor improvement, every additional aid to navigation, and every published survey, that is made by the United States government for the benefit of mariners and the interests of commerce,– assists the pilots more than the people for whom it is intended. The pilots' labors are lessened, but there is seldom a corresponding decrease in the compulsory pilotage of that port.

No one can blame the pilots for doing the best in their power for themselves, but there seems to be no just reason why they should flourish at the expense of the coastwise and foreign trade which is confessedly at a low ebb.

It may be asked why the masters of vessels engaged in the coastwise trade do not combine and effect a change in the present laws of Virginia. Many attempts have been made but they have all been unsuccessful. Masters of coasting schooners, the class of vessels principally affected by the so-called "licence to pilot" law, live hard and work hard, and all they

have, is invested in shares in their vessels: they have no time and no money to spend in unsuccessful efforts to influence legislation.

On the other hand, to defeat any disultory attempt that may be made to induce a legislature to change existing pilotage laws,- is the well organized "Atlantic Pilots Association" with a large reserve fund and a large steady income from "licence fees",- both of which can be diverted for the purpose of warding off any impending danger of legislation antagonistic to compulsory pilotage.

Those interested in the coasting trade have tried time and again, to have the Virginia Legislature repeal the unjust compulsory pilotage laws by which they are oppressed for the direct benefit of thirty or forty men who have selected piloting as a business, and who have squeezed a living out of giving "licences to go without a pilot" so long that they have convinced themselves that they have a right to keep it up forever.

As soon as there is an attempt made in the legislature of a state to change the laws affecting pilots, the Pilots Association of the state sends representatives to the state capital, and makes use of the personal influence of prominent pilots and of the reserve fund of the association,-to defeat any chance of changing existing statutes.

So far as preying upon commerce is concerned, the term of "Pirates" as used by those on board coasting schooners, when re-

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ferring to Norfolk pilots,- is a mis-nomer in degree but not in kind.

Quarantine Station is on Fisherman's Island, near Cape Charles, but it is kept up principally as a "pest house" for infectious or epidemic cases, and no physician stays there regularly.

Quarantine Boarding Station is off Thimble Light-house and is indicated by a yellow flag on the south side of the light-house, and no vessel from a "dangerous port" can go beyond this point without having received "pratique" from the U.S.Marine Hospital surgeon on board the quarantine steamer. This is the boarding station for all ports in Chesapeake Bay excepting Baltimore at present: and there is a chance of its including Baltimore within a year or so.

The Penalty for a vessel from a "dangerous port" passing the boarding station without pratique, is a fine of 300 dollars.

Dangerous Ports are all foreign ports and all United States ports where epidemic or infectious diseases are decided to exist to a dangerous extent by the Surgeon General of the Marine Hospital Service. The list of "dangerous ports" is, therefore, an arbitrary one, and varies from day to day.

Quarantine Tug when not in use, lies generally alongside the "coal wharf" at Fort Monroe, inside Hampton Bar,- and goes out to board vessels when signaled to do so from Thimble Light-house during daylight.

Quarantine Regulations are not yet embodied in a codified form

and are not printed, so that it was impossible to send a complete set with this report. A Passed-Assistant-Surgeon of the U.S.Marine Hospital Service, has charge of the steamer, and carries out the instructions of the Surgeon-General in Washington, D.C., for each special case. Arrangements have been made with the pilots to stop vessels requiring pratique, off the boarding station, but the arrangements do not seem to cover the cases of vessels without pilots, or coming in at night.

Quarantine Anchorage is west of Fisherman's Inlet, and is indicated by a Yellow Spar Buoy. This anchorage is not much used owing to the lack of familiarity with the channels, on the part of the pilots, and is intended for infected vessels only.

Tow Boats are not usually found in good weather, in the vicinity of either Cape Charles or Old Point Comfort, as they wait a little farther up the bay. In bad weather one or more, can generally be found inside Hampton Bar. Towage charges depend on the emergency, and are matters of personal agreement.

Wharves in the vicinity of Hampton Roads belong to the government. There are three of them, the light-house wharf, the Main wharf, and the coal wharf, the latter inside Hampton Bar. All these are under the control of the U.S.Army officer commanding Fort Monroe. Wharfage permits are given, upon application, by the Adjutant of the post.

Improvements. The Light-house Wharf was built out and its capacity increased during the summer of 1888: and a large extension was commenced on the Main Wharf at government expense, for the convenience of the steamers carrying passengers for the Hygeia Hotel. The Plan of this improvement was altered during my stay, so that I was unable to procure a copy, and I suggest that plans of the new wharves be obtained from the U.S. Engineer in charge of the work, so the wharves can be indicated correctly on the charts,- as both are used for ranges in entering.

Land marks. The Hygeia Hotel and the large grain-elevator at Newport News, are both shown on the charts and are both very prominent day marks. A group of electric lights, just to the southward of the Newport News Elevator, is a good and well defined mark at night.

Anchorages. There is good holding ground wherever the chart shows enough water, with mud bottom. Care should be taken to keep out of the usual track of steamers. For small vessels drawing 12 feet or less, it is more convenient and much smoother to anchor inside Hampton Bar, close to the Coal Wharf: the bottom is sand and care must be taken that the anchor is not foul, as there is not much room.

Tidal Currents are strong and are affected by the winds: they are quite regular under normal conditions. The currents change alongshore at the wharves about one hour before they change in the channel. No steamer will go alongside her wharf, in Hamp-

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ton Roads, without learning the direction of the current by signal from the wharf: the end of the wharf from which the current sets toward the other end, or the end at which the bow of a steamer must make fast,- being denoted in daylight by a green flag, and at night by a green light.

Supplies at Old Point Comfort, are scarce, poor in quality, and extremely dear. At Hampton there is a better market, but still a very poor one.

Ship Chandlers Stores Same.

Fresh Water can be obtained at Hampton Roads from Norfolk, by telegraphing for a water-boat to come down with the quantity desired,- and a steam water-boat can be alongside in 2 hours. Price of water in tanks 1 cent per gallon. The quality is only fair, as it comes from the Norfolk water-works.

Coal. Bituminous coal can be obtained in any quantity desired, at Newport News, at Lamberts Point, or at Norfolk. It can be put on board by "chutes" very rapidly, in quantities larger than 50 tons. Less than 50 tons, by wheel-barrows from a wharf. Price of bituminous coal , delivered on board, about 3.50 per ton.

Anthracite coal can be procured in limited quantities : price 6.50.

Repairs can be made to any extent at Newport News, where a wooden Simpson Dry-Dock, can take in the largest vessels.

At Norfolk, the dry dock at the U.S.Navy Yard would be available in case of great emergency for larger vessels less than 360 feet in length, and there are several places where smaller vessels could be handled. For extensive repairs to large vesses requiring docking, Newport News is probably the best: while for minor repairs to machinery, boilers etc., Norfolk is most likely the cheapest on account of the numbers of foundries and machine shops.

Wrecks occur quite frequently in the vicinity of Cape Charles, as the bottom is a fine sand which seems to have the characteristic of keeping hold of every thing that touches. Wrecks also break up rapidly on that side of the entrance, and seldom outlast the first moderate gale of wind on shore.

On the Cape Henry side , vessels get off much more easily and hence wrecks are not so frequent. They also last longer without breaking up.

Time Ball. The U.S.Naval Observatory at Washington D.C., drops a Time Ball on a flag staff on the Hygeia Hotel, at Hampton Roads The ball is hoisted to the top of the flag staff five minutes before, and is dropped exactly at noon, of the 75th meridian, or at 5h. 0m. 00s., Greenwich Mean Time.

Weather Signals are shown from a flagstaff, using Signal Code, on the western end of the Hygeia Hotel, under instructions from Washington to the W.U. operator at the Telegraph Office in the Hotel. No other information than the direction for the signal

that is to be hoisted, is usually sent.

Annapolis Harbor and Roads.

On August 7th Work was closed on the hydrography of Cape Charles and Vicinity, and in accordance with your instructions of July 24th. , I procededwith the party under my charge on board the "Endeavor" to Annapolis , Maryland, and commenced the resurvey of the harbor and approaches.

As the harbor was narrow, and the water shoal in many places, it was not advisable to use the "Endeavor"for running lines of sounding. As the Endeavor had no steam launch, the crew was small and the time limited,—arrangements were made ,as directed by the Hydrographic Inspector, to obtain launches from the U.S.Naval Academy authorities, so as to push the work. From Commander W.T.Sampson, U.S.N., Superintendent of the Naval Academy, I received every assistance that could have been expected.

The progress of the work was expedited, and its completion within the available allotment assured,— by his putting at my disposal for the use of the survey, a number of steam launches made at the Academy, principally by the Cadets, and kept for tactical exercises.

The limited number of observers on board the "Endeavor", including myself, prevented the acceptance of more than three,— and this number was under my control until the completion of the work.

Triangulation Stations. Although supplied with the usual number of triangulation stations on the projection,- careful searches resulted in finding only that all marks had disappeared except "State House" and "St. Johns College". These were only 312 meters apart, and besides were eccentric enough to prevent the line joining them from being considered a satisfactory base for a resurvey. Several days were lost in trying to find the stations of the triangulation of forty years ago, and in attempting to get hold of sufficient data from the information furnished from the Office.

In connection with recovering old triangulation stations, I take occasion to offer the following :-

After the surface marks have been removed by accident, design, or decay, it becomes nearly impossible to determine, unless peculiarly situated, the location of the sub-surface mark by digging unless it be known within a few yards. "Probing" with metal rods is seldom practically successful, on account of the small size, and shape of the sub-surface marks in general use.

For rocky ground, the hole drilled in the rock at the surface, and filled with lead,- can hardly be improved upon. Except in New England and on the Pacific Coast, however, it is seldom possible to find a rock properly located, and when the station is on ordinary soil, or on sand,- objects of solid material on which to indicate the center of the station, have to be placed

in position. The objects and the substances, used as "subsurface marks in the survey,- have varied with the locality, the means available, and with the individual establishing the triangulation stations.

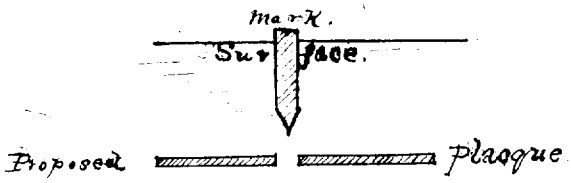
I have searched with more or less success, for stations marked with earthenware cones and iron screw-piles in Chesapeake Bay, granite monuments, fire-bricks, and bottles in Florida, stone jars (broken), in Louisiana,- and pieces of angle-iron in Texas:- and it has been my experience that after the surface and witness marks have both disappeared, it is the exception rather than the rule for any station to be recovered without a vexatious loss of time. At an important place it is sometimes worth while to erect a signal near the old station, locate it, and recover the old point by "differences". In this case it is a question whether it is better to lose the time necessary to repeat a portion of the triangulation, or run the risk of having the accuracy of the final results impaired by a scarcity of starting points.

It may be seen that any thing that adds to the permanent marking of a station of the Survey, so as to assist in its recovery, without unduly exciting the curiosity or the cupidity of uninformed persons,- serves a very important purpose, and one worthy of attention on the score of true economy, in preserving for future work a possibly important mark for reference.

It may also be seen how difficult it is to find a mean between marking stations too slightly for insuring their recognition, and marking them with objects that could be identified, but which are liable to be removed, for other uses than those for which they are intended.

As the result of some study, I suggest the following addition to the station marks now in use, believing that it will result in economy in labor and time, and will expedite the recovery after a lapse of time, of stations that may be established at considerable expense:—

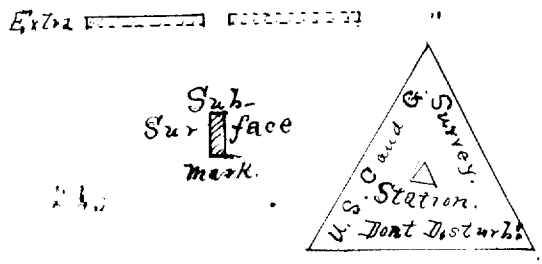
A "placque" of common white china-ware to be placed at important stations, between the surface and the sub-surface marks now in use in different parts of the country. This "placque" to be placed horizontally, in shape some simple geometrical figure (isosceles triangle, square, or diamond), with a hole in centre: size about 12" across: surfaces to be covered with a legend in raised letters so as to make them rough. Thickness about 1".



On upper side "U.S.C. and G. Survey Station, No. 2345. Don't disturb".

Under side, "If moved Express C.O.D. to Supt. Coast Survey, Washington, D.C."

Each placque to be numbered in making, so that the number will identify the station, if displaced.



Local Base Lines. There was a measured base of 1900 feetin length on the Naval Academy grounds, and anotherof 800 feet on the Naval Ordnance Proving Ground on the north side of the Severn River,- but both these bases were badly placed for the resurvey of Annapolis Harbor and Roads, and besides were too short for rapid hydrography, owing to the care that would have been necessary to prevent multiplication of any errors.

Determination of a Base. By making use of the system of triangulation that had been used at the Naval Ordnance Proving Ground, to establish a set of ranges for heavy guns,- it was ascertained that the Old Tower on Thomas Point, though not given as a triangulation point, was closely enough located to be utilized. The imaginary line joining Old Tower and State House, was taken as a base in default of a better, as its length would diminish any possible error; and by it the signals were cut in with sufficient accuracy. As the hydrography preceded the triangulation, and the topography, it was intended that the final location of the signals should be made afterwards.

Signals were built with more than usual care, and sub-surface and surface marks were placed to asist the topographic parties in their identification. They were then cut in, located on the sheet, and the sounding proceded with, as rapidly as possible.

Lines of Soundings. Two steam launches were fitted for sounding from forward, and one for sounding from aft. In all, the launches, the leadsman, the recorder, and the observers, were all

brought close together, and the accuracy of the records assured as far as practible. Two sets of lines were run,- one system of lines normal to the channel, from 50 meters to 400 meters apart depending upon the location: and the other set parallel to the general direction of the channel, from 100 meters to 500 meters apart. These two systems of lines developed so well the contours of the bottom, that no additional soundings were required, excepting a few to establish the fact that a mistake of a fathom had been made by a leadsman in giving the result of a cast in the inner harbor.

Closing work. As soon as a sufficient number of curves had been plotted to indicate good crossings at the intersections of the two systems of lines, - the launches were returned to the Academy and the "Endeavor" started for New York.

Bench Mark. Owing to the difficulty experienced in identifying the Annapolis bench-mark, there is an apparent discrepancy between the plane of "Mean Low Water" resulting from my observations, and that resulting from the observations of Assistant Pr Walley Perkins, U.S.C.and G.S., taken several years ago. This difference, I hope, can be adjusted in connection with the system of geodesic levelling now in progress. From the "Description of Bench-mark" furnished by the Office, I was unable to determine the exact line intended for a bench- mark by Mr. Perkins, so I

left a bench mark near the place where his should have been found, to identify my own plane of reference. Tidal observations were taken, for reducing soundings only, from August 16th to Sept. 18th.

(Description of Bench Mark and Tidal Data will be found in "Report A"; Projection No. 1, Annapolis Harbor and Roads.)

Tides. The rise and fall of the tide at Annapolis is only 8 / 10 foot. The height of the water is much influenced by the wind, A North-Wester may lower the water over a foot below ordinary low water, and a South Easter may raise it a foot above the level of the average high water.

Tidal Currents are weak, and generally run at a less rate than half a knot an hour, unless affected by the wind.

Aids to Navigation are generally sufficient for the present demands of commerce.

Buoys are susceptible of a better arrangement, and of being increased in number to advantage. (See copy of Chart 385).

Lights would have to be increased in number before vessels drawing over 10 feet could use the channel at night with safty.

Pilots are not found off Annapolis under ordinary circumstances, as the only vessels frequenting the harbor requiring pilots are those belonging to the U.S. navy or to a foreign government, and pilots for these are usually obtained from the Academy by

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signal, when wanted.

Tow Boats are scarce, and in an emergency, are usually obtained from the U.S.Naval Academy.

Time Ball -none.

Chronometer Comparisons can be obtained, upon application, from the U.S.S.Santee, alongside the Academy wharf.

Bay Ridge a summer resort, on Tally's Point on south side of Annapolis Roads, is a well defined landmark. The buildings by day, and the electric lights at night during the Summer,- are visible a long distance.

The statistics of work during the season are appended to this report.

Very respectfully,

W. D. Wood

Lieutenant, U.S.N.

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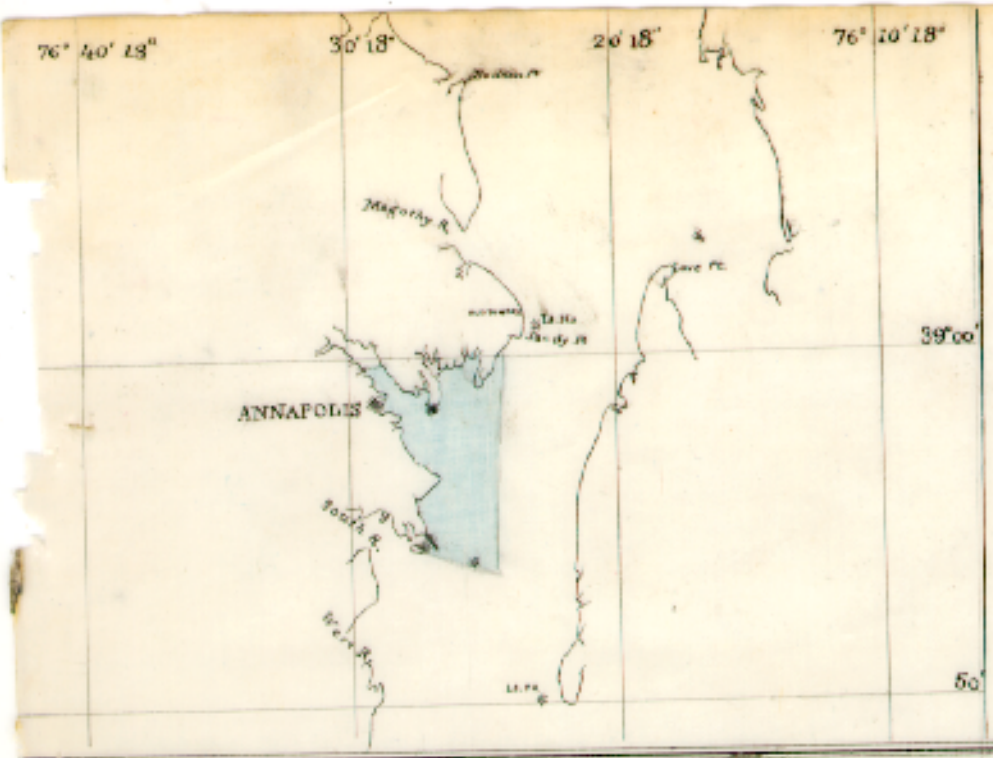
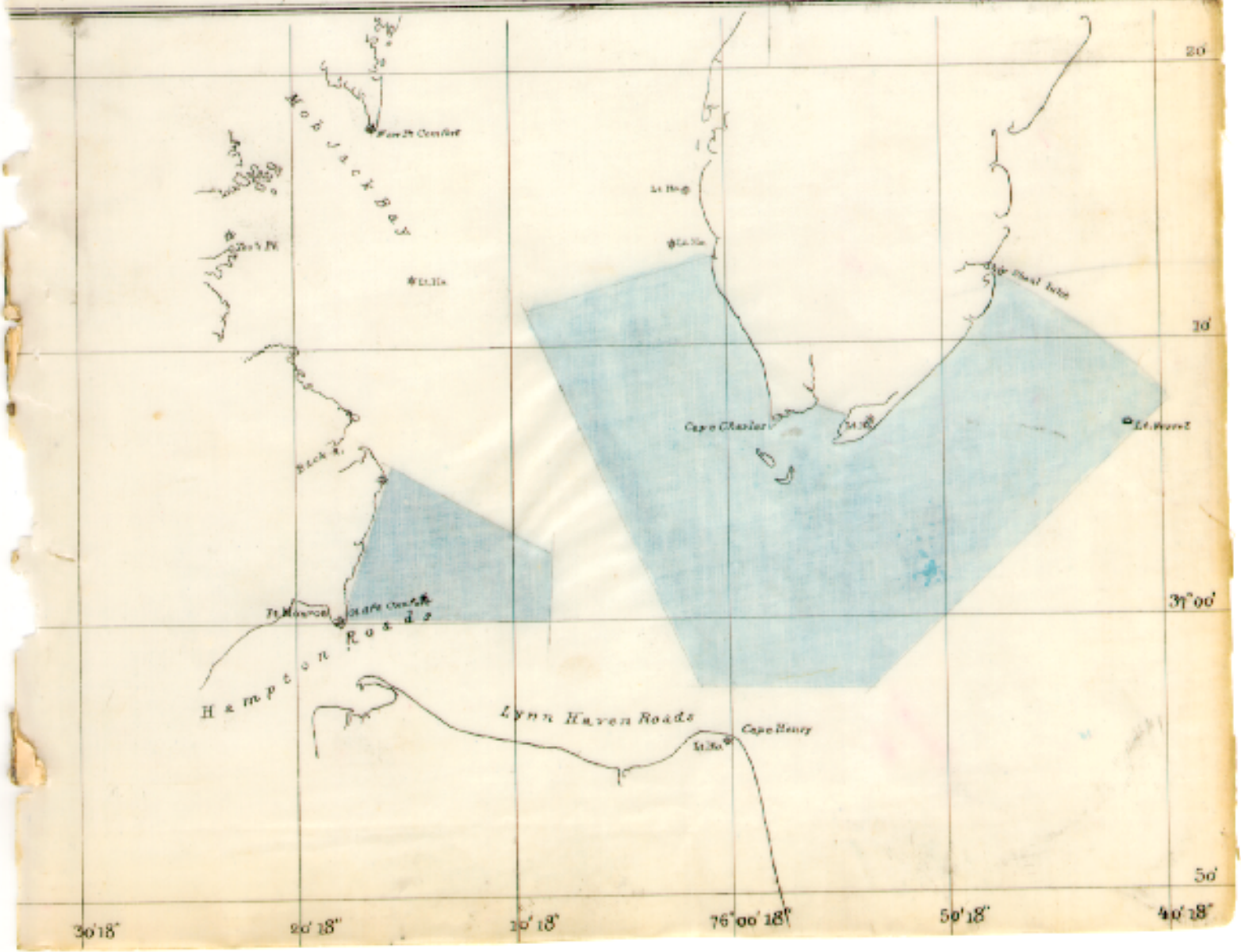
Hydrography.

Cape Charles & Vicinity and Annapolis Harbor.





Scale 1/400,000

Statement of Work done by U.S.C.S.S. Endeavor

Whaleboats & Launches. Lieut W. L. Wood U.S.N. Comdg.

Season of 1898

Locality	Vessel	Month	Working Days	No of Angles & Letters	Color	Angles	Soundings	Miles
Charles Ra & Ric	Steamer	May	10	1 to 6	A to T	Red	1847	7780	293.8
" " "	"	June	14	8 to 13	K to X	"	4713	14572	507.8
" " "	"	July	9	14 to 21	Y to G^2	"	4183	15221	332.1
" " "	"	August	1	22	H^2	"	494	1780	35.3
" " "	Fort Whaleb	May	6	1 2	a to g	Blue	611	3106	29.6
" " "	" " "	June	9	1 to 6	g to o	"	1384	7925	68.8
" " "	" " "	July	4	7 8	p to s	"	687	5445	38.8
" " "	Stark " "	June	2	1	a' & b'	Green	366	2216	15.9
" " "	" " "	July	1	2	c'	"	158	1016	8.1
Horse Shoe Shoal Fort Monroe. Va	Steamer	July	3	1 to 3	A^3 to C^3	Red	1016	5863	107.6
" "	"	August	2	1 to 5	D^3 & E^3	"	594	3430	43.9
Annapolis. Md	S. Launch 6	August	12	1 to 7	a to l	Blue	1677	11846	164.1
"	" " #3	"	10	1 to 7	a' to f'	Green	1762	12194	128.2
"	" " "	Sept	1	8	m'	"	12	76	2.0
"	Steamer	"	1	1	A	Red	38	166	3.4
Totals.			85	84			19472	92566	1759.2

Cape Charles Va and Vicinity

Str "Endeavor"

	Date	Day	Book	Angles	Soundings	Miles
May	3	A	1	94	449	16.5
	7	B	2	193	1162	43.
	8	C	1	129	864	15.
	9	D	2	171	779	22.
	10	E	1	134	763	21.
	19	F	3	92	295	12.
	26	G	3	44	143	6.5
	28	H	3	269	1166	54.
	29	I	4	478	1698	66.5
	30	J	5	276	981	37.5
May	Total			1877	7780	293.8
June	1	K	5	215	716	28.7
	2	L	6	286	1008	50.
	5	M	6	255	816	42.
	7	N	7	408	1352	51.
	9	O	8	404	1200	36.5
	12	P	8-9	490	1512	46.
	13	Q	9	492	1508	47.5
	14	R	10	162	509	14.
	18	S	10	319	921	26.4
	19	T	11	621	1836	69.4
	20	U	12	426	1388	43.3
	25	V	13	350	984	26.5
	26	W	13	32	125	4.5
	27	X	13	253	697	22.
June	Total			4713	14072	507.8
July	2	Y	14	496	1333	51.
	3	Z	15	584	1530	41.4
	9	A²	16	258	670	14.
	10	B²	16	216	763	21.
	11	C²	17	706	2572	65.
	12	D²	18	251	462	23.
	14	E²	18	368	1274	27.8
July	Forward			2879	8604	243.2

Cape Charles Va and Vicinity "continued"

S/R "Endeavor"

	Date	Day	Book	Angles	Soundings	Miles
		~~Brot~~ forward		2879	8604	243.2
July	14	F[12]	19.20	584	3060	35.8
	26	G[2]	21	720	3557	53.7
	27					
July	Total			4183	16221	332.7
August	2	J[2]	22	494	1780	35.3

[illegible] - Report B. 36.
[illegible] 177.

Cape Charles Va and vicinity

Whale-boat (Port)

	Date	Day	Book	Angles	Soundings	Miles
May	1	a	1	73	479	5.5
	8	b	2	90	473	7.
	9	c	1	64	370	3.2
	10	d	2	130	469	7.3
	17	e	1	12	56	1.
	18	f	2	142	959	5.6
May	Total			511	3106	29.6
June	8	g	1	128	558	4.8
	12	h	3	204	861	8.3
	13	i	3	160	806	7.5
	14	j	4	128	753	4.8
	15	k	4	190	1072	10.4
	16	l	5	77	457	5.1
	21	m	5	141	1190	9.6
	26	n	6	134	1092	7.7
	27	o	6	222	1136	10.6
June	Total			1384	7920	68.8
July	2	p	7	138	1201	9.3
	3	q	7-8	238	1570	13.8
	12	r	8	81	565	4.1
	18	s	8	230	2109	11.6
July	Total			687	5445	38.8

Cape Charles Va. and Vicinity — Hydr. Report B 37. Endeavor 1888. 178

Whale-boat (starboard)

	Date	Day	Book	Angles	Soundings	Miles
June	15	a'	1	148	887	6.7
	16	b'	1	218	1329	9.2
JUNE	TOTAL			366	2216	15.9
July	28	c'	2	158	1016	8.6
JULY	TOTAL			158	1016	8.6

ON ORIGINAL DOCUMENT

ON ORIGINAL DOCUMENT

Horse Shoe Shoal - Fort Monroe Va

Sh "Endeavor"

	Date	Day	Book	Angles	Soundings	Miles.
July	20	A[3]	1	104	5141	12.2
	23	B[3]	1	386	2460	42.6
	24	C[3]	2-3	526	2889	52.7
July	Total			1016	6863	107.5
Aug	2	D[3]	4	114	670	17.7
	6	E[3]	4-5	480	2760	56.2
Augt	Total			594	3430	73.9

Annapolis Har. Md
Steam Launch #6

Ann. Rept. A.B. 39
Endeavor 1899.
180.

	Date	Day	Book	Angles	Soundings	Miles
Aug	17	a	1	72	458	3.2
	18	b	1	68	440	3.5
	20	c	1	92	794	6.1
	21	d	2	82	657	6.1
	22	e	2	236	1693	14.8
	23	f	3	218	1272	13.9
	24	g	4	190	1781	18.8
	27	h	5	232	1630	18.2
	28	i	5-6	161	1311	14.1
	29	j	6	136	1034	8.5
	30	k	7	154	715	6.5
	31	l	7	36	101	.5
Aug	Total			1677	11846	114.2

Annapolis Harbor MD.

Steam Launch #3

	Date	Day	Book	Angles	Soundings	Miles
Aug	18	a'	1	52	410	4.2
	20	b'	1	240	1310	16.7
	21	c'	2	112	704	6.7
	22	d'	2	111	700	10.2
	23	e'	3	181	1274	13.5
	24	f'	3-4	336	2596	28.0
	25	g'	4-5	242	1894	21.2
	27	h'	5	182	1353	10.2
	28	i'	6	234	1553	9.5
	29	j'	7	72	400	5.2
				1752	14194	128.4
Sep	1	m'	8	12	6	.5

Ann's-Report B. 4 14
Endeavor 1888.
182.

Annapolis Harbor MD

Steamer "Endeavor"

	Date	Day	Book	Angles	Soundings	Miles
Sept	1	A	1	38	166	3.4

U.S.C.&G.S. Str "Endeavor" Rept. 42
183.

U. S. Coast and Geodetic Survey. [Form 11.—Statistics of Field Work.]

Statistics of Field Work executed by Lieut. M. L. Wood U.S.N.

Date of beginning field work	April 25 1888
Date of closing field work	Sept 1 "
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	230.0
Number of miles (geographical) run while sounding	1769.2
Number of angles measured	1947.2
Number of soundings	9286
Number of tidal stations established	3
Number of specimens of bottom preserved	4
Current stations, number of	0
Hydrographic sheets finished, number of	6
Hydrographic sheets, scales of	2 1:10,000 3 1:20,000

Hydrographic sheets, limits and localities of:

Sheet 1 Cape Charles Va & Vicinity Finished
" 2 " " " " Finished
" 3 " " " " Returned Blank
" 4 " " " " Finished
" 5 Horse Shoe Shoal. Va Finished
" 6 Annapolis Star. Md. Finished

Voss-Rep. B. 43.
Endeavr. 1888. 184.

PHYSICAL HYDROGRAPHY:

Number of soundings on cross-sections	
Current stations, number of	
Deep-sea current stations, number of	
Deep-sea surface current observations, number of	
Deep-sea sub-surface current observations, number of	
Number of observations of density of water	
Number of observations of temperature of water	
Tidal stations established, number of	
Miles (geographical) run in deep-sea sounding	
Number of deep-sea soundings	
Number of specimens of bottom preserved	

Locality of work; results, how shown, etc.:

Descr. Report A for 1888
Proj 2. Cape Charles 85.

(10 sheets)

U.S. Coast and Geodetic Survey Office,

Washington, D.C., 16 Feb. 1889.

Mr. F. M. Thorn,

Superintendent.

Sir:-

In accordance with the published instructions, I submit "Descriptive Report A," to accompany Projection No. 2 of the scheme for the resurvey of Cape Charles and Vicinity,- executed by the hydrographic party under my charge on board the steamer "Endeavor", during the summer season of 1888, under your instructions dated April 17th 1888.

Very respectfully,

W. M. Thorn

Lieutenant, U.S.N.

U.S. COAST & GEOD. SURVEY OFFICE OF FEB 16 1889 HYDROGRAPHIC INSPECTOR

O. H. Tittmann

O. H. Tittmann

Lt. Comdr., U.S.N.,

Hydrographic Inspector C. & G. Survey.

Projection No. 2 — May 3 — Aug. 2

I. Title. Report A. Projection No 2. Hist Report A. Proj'. 2. Cape Charles.

United States Coast & Geodetic Survey

J. W. Thom. Supt.

Cape Charles Va. & Vicinity (Projection No. 2)

Sheet No 2.

Began May 3" 1888.
Ended. August 2. "

W. L. Wood Asst. U. S. N.

Scale ~~20.000~~

Observers.

Asst. W. L. Wood U. S. N.
Assign H. M. Constant "
" E. Lloyd "
" E. A. Anderson "

Recorders.

Roger J. Clover.
William H. de Luce.

Leadsmen.

J. E. Jackson
John H. Howell.

Carl Lindstrom
Lars J. Larsen.

Tide Observer.

William Walker.

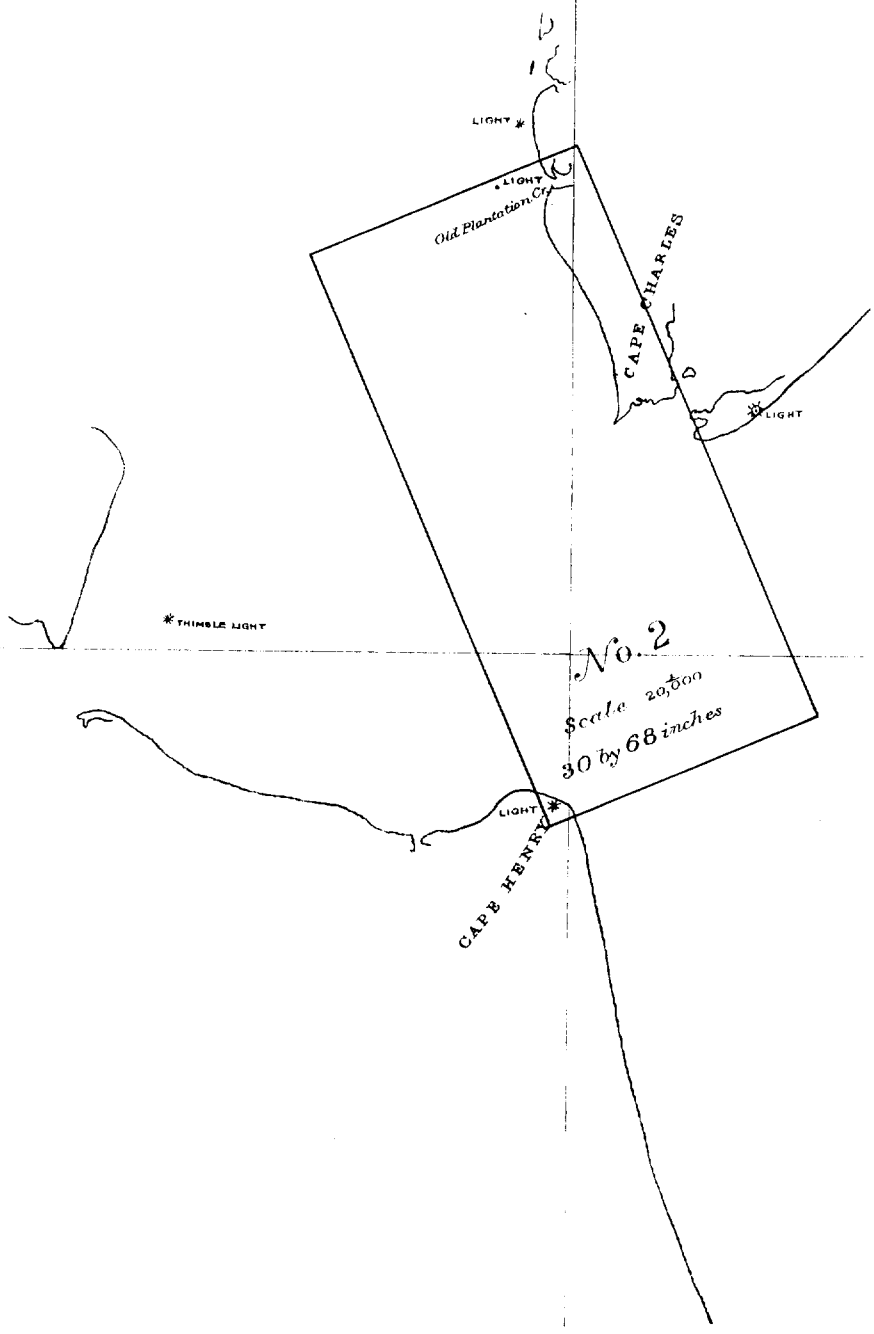
187

76°00'

37°30'

Wood's Report "A".

Projection No. 2. "Endeavor" 1888.
Cape Charles & Vicinity.



37°00'

Scale 400000

Projection No 2.
II. Statistics.

Rep't Rep't A. 1883.
Steamer.
Proj'. 2. Cape Charles.

Table of Reference.

Cape Charles, Virginia, & Vicinity

Steamer Endeavor. Lieut. M. L. Wood U.S.N. Comdg.

Date	Letter	Angles. From	Angles. to	Sounding Book.	Fair Journal	Soundings	Angles	Miles	Vessel.	In charge.	Observers.
May 3	A	1	147	1	1	429	94	16.5	Steamer	M.L.W.	M.L.W. W.M.C. & E.L.
" 7	B	1	101	2	1	1162	193	43.	"	M.L.W.	M.L.W. W.M.C. & E.A.A.
" 8	C	1	150	1	1	364	129	15.	"	M.L.W.	W.M.C. & E.L. & E.A.A.
" 9	D	1	183	2	2	779	171	22	"	M.L.W.	W.M.C. & E.A.A.
" 10	E	1	167	1	1.2	763	134	21	"	M.L.W.	M.L.W. & E.L.
" 19	F	1	143	3	2	295	92	12	"	M.L.W.	W.M.L.W. M.C. & E.L.
" 26	G	1	122	3	2	143	44	6.5	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 28	H	1	112	3	2	105	25	9	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 29	I	1207	1230	5	3	153	48	2.3	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 30	J	1	127	5	3	191	55	4.5	"	M.L.W.	M.L.W. E.L. & E.A.A.
June 2	L	1	1	6	4	1	1	0.0	"	M.L.W.	M.L.W. W.M.C. & E.L.
" 12	P	1	187	8	6	1140	374	40.4	"	M.L.W.	M.L.W. W.M.C. & E.L.
" 12	P	188	245	9	6	372	116	5.6	"	M.L.W.	M.L.W. W.M.C. & E.L.
" 14	Q	114	246	9	6.7	798	266	19.5	"	M.L.W.	M.L.W. & E.A.A.
" 25	V	1	138	13	8	135	56	3.0	"	M.L.W.	W.M.L.W. M.C. & E.L.
July 2	Y	1	248	14	9	1333	496	57.	"	M.L.W.	M.L.W. E.L.
" 9	A^2	1	292	16	10	670	258	14.	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 10	B^2	1	108	16	10	763	216	21	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 10	C^2	1	353	17	10.4	25-72	706	65	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 14	D^2	1	48	18	11	363	97	13.1	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 14	E^2	1	184	18	11	1274	368	27.8	"	M.L.W.	M.L.W. & E.L.
" 27	G^2	1	210	20	13	2126	420	27.2	"	M.L.W.	M.L.W. E.L. E.A.A.
Aug 2	H^2	1	3	22	12	78	6	2.8	"	M.L.W.	M.L.W. E.L. & E.A.A.

Projection. No. 2.

Work Report No. 11
Whale-boat — 189
Proj. 2. Cape Charles.

II (Contd.)

Table of Reference

Cape Charles, Virginia & vicinity

Steamer Endeavor.

Lieut. W.S. Wood, U.S.N. Comdg.

Date	Letter	Angles from	Angles to	Number of Sounding Book	Number of Fair Journal	Number of Soundings	Number of Angles	Number of Miles	Vessels	In charge	Observers.
May 8	b	1	42	2	1	473	90	7	Port W. Boat	W.M.C.	W.M.C. & E.A.A.
" 9	c	1	32	1	1	370	64	3.2	"	W.M.C.	W.M.C. & E.I.
" 10	d	1	64	2	1	769	130	7.3	"	W.M.C.	W.M.C. & E.A.A.
June 12	r	1	103	3	4	861	204	8.3	"	E.I.	E.I. & E.A.A.
" 13	i	1	180	3	2	806	160	7.5	"	W.M.C.	W.M.C. & E.E.
" 14	j	1	164	4	2	753	128	4.8	"	W.M.C.	W.M.C. & E.I.
" 15	k	1	190	4	2.3	1072	190	10.4	Port Whale Boat	W.M.C.	W.M.C. & E.I.
" 16	e	1	134	5	3	457	77	5.1	"	W.M.C.	W.M.C. & E.I.
" 21	m	1	168	5	3	1190	141	9.6	"	W.M.C.	W.M.C. & E.A.A.
July 2	p	1	169	7	4	1201	138	9.3	"	W.M.C.	W.M.C. & E.I.I.
July 3	q	1 12 101	110 87 119	7.8	4	1140	181	9.	"	W.M.C.	W.M.C. & E.I.

II (Contd)

Projection No. 2. Cape Charles Va. and vicinity.

Tidal Data.

Tidal Inlet Tide Gauge.

(1) Mean low water 1.039.
(2) Lowest tide observed. 1.0
(3) Highest tide observed. 5.2.
(4) Mean rise and fall. 2.694. Wm Walker.
(5) Name of observer. —

A Projection No 2

Rpt. Report A 98
Proj. 2. Cape Charles

III. The "North Channel" of the chart has a depth of 24 1/2 feet on either side of a new shoal with 14 feet of water over it that was developed by this last survey. (For the lower end of this "North Channel", see "Report A, Projection No. I).

Another channel west of the Inner Middle Ground has a least depth of 22 1/2 feet at its upper end. The pilots called this channel "False Channel" and said that there was a depth of only 17 feet, where I succeeded in finding 22 1/2 feet of water.

This channel is a continuation of the new channel on Sheet No. 1, for which I have suggested the name of "North West Channel" by which several miles of distance can be saved for vessels from the northward bound up the Bay, as soon as a proper buoyage is established.

The western part of the North channel of the chart, which follows the eastern edge of the Inner Middle Ground, will be a straight and practicable passage after it has been marked out by a few buoys. The upper end of the North Channel connects with a deep hole south of Old Plantation Light-house.

The eastern branch of the North Channel follows the general direction of the shoreline with a least depth of 24 1/2 feet, but owing to its changes in direction it would be hard to make any u use of unless well buoyed.

The new 14 foot shoal that I have mentioned as having been found in the North Channel, seems to have been unknown as a de-

Rec. Report 1/1927
Proj. 2. Cape Charles.

A Pappas ← 2

PROJECTION

tached shoal. As this was previously unknown, and is abreast the farm of a Mr. Latimer, I suggest that it be given the name of "Latimer's Shoal" in default of a better title.

Pilots are of no use for the navigation of these shoals, and they have not taken a vessel across them for years. The information given on the charts, while correct enough for practical purposes for entering Cape Charles City, is entirely eroneous so far as the shoals around Cape Charles is concerned, and only conveys information worse than useless, because it is misleading. Fisherman's Inlet moves bodily every year and although it preserves its general outlines, it changes so much with relation to the main-land, that new ranges for entering have to be picked out every season. It is between Fisherman's ~~Inlet~~ Island and the main land of Cape Charles and serves as an outlet into the Bay of the water of the sound lying between Smith Island and the main-land.

I should advise no one in a vessel drawing more than 5 feet of water, to attempt entering this inlet without first sounding out and buoying the channel,- and then making use of it only during slack water, or between 2 hours before low-water to 3 hours after.

IV. Changes that are quite important have taken place in the shoals to the southward and westward of Cape Charles. The most important being, the developement of a new passage across these

obstructions to navigation at the Entrance to Chesapeake Bay, to which I have suggested that the name of "North West Channel", be given on the next edition of chart No. 131. Also the formation of a new 14 foot shoal in the "North Channel" of the chart, and the change in the shape of the "Inner middle Ground" with the shifting in the direction of its axis from about NNW to NWbyW, (see copy of chart No. 131).

V. The only improvement within the limits of this sheet, have been the channel and basin at Cape Charles City dredged by the "New York, Philadelphia, and Norfolk Railroad" to facilitate the transfer of freight cars and passengers across Chesapeake Bay.

VI. There is no good anchorage on this sheet excepting inside Old Plantation Flat. A vessel anchoring to the northward of the pile beacon indicating the entrance to the dredged channel to Cape Charles City, will find good holding ground in 18 feet of water, well protected from winds from any direction. There is a depression on the shoal making out from the Cape Charles side, near "Butler" triangulation station, locally known as "Pigotts' Hole", in which small local craft can find shelter during westerly gales. The shelter is only partial at its best and the anchorage hard to find, so that it is not recommended for strangers.

VII. The only dangers to be avoided are those shown on the finished sheet.

VIII. See "Report A. Projection No. I."

Thos. Report A. 194,
Fig. 2. Cape Charles.

IX. There is a range for the use of the N.Y. P. and N. R.R., marking the channel over Old Plantation Flat; indicated at night by 2 white lanterns, and in daylight by the supports for the lights. These are unpainted and hence are very indistinct.

X. The bottom is hard sand excepting in the vicinity of Cape Charles City where it is soft black mud, and in the deep holes in the channels where it is blue mud, sand and broken shells.

Annual Report 1910.
Proj. 2. Cape Charles.

Tidal data. (See Report A. Appendix No 1 Cape Charles and Vicinity).

Wood - Report A. page 1.
Proj. No. 5. Horse Shoe. 196,

(7 sheets).

U.S.Coast and Geodetic Survey Office,

Washington, D.C., 16 Feb., 1889.

Mr. F. M. Thorn,

Superintendent.

Sir:-

In accordance with the published instructions, I submit "Descriptive Report A", to accompany Projection No. 5 (Horse Shoe Shoal), of the scheme for the resurvey of Cape Charles and Vicinity,- executed by the hydrographic party under my charge on board the steamer "Endeavor", during the summer season of 1888, under your instructions dated April 17th, 1888.

Very respectfully,

W. H. Wood

Lieutenant, U.S.N.

U.S. COAST & GEODETIC SURVEY, OFFICE OF HYDROGRAPHIC INSPECTION, FEB 16 1889

Inspected

W. H. Dennison

Capt. Comdr., U.S.N.,

Hydrographic Inspector C. & G. Survey.

I. Report A Projection No 5. Third Report 197
Proj. 5. Horse Shoe.

United States Coast & Geodetic Survey.

J. M. Thorn. Supt.

Horse Shoe Shoal. Virginia.

Sheet No. 5

Began July 20. 1888.
Ended August 6. "

W. L. Wood. Lieut. U.S.N.

Scale 20.000

Observers.

Lieut. W. L. Wood U.S.N.
Ensign. H. M. Constant "
" E. Lloyd "
" E. A. Anderson "

Recorders.

Roger J. Glover.
William H. deLuce.

Leadsmen.

J. E. Jackson. Carl Lindstrom.
Robert Fennell. Carl J. Larsen.

Tide Observer.

Thomas L. Jones.

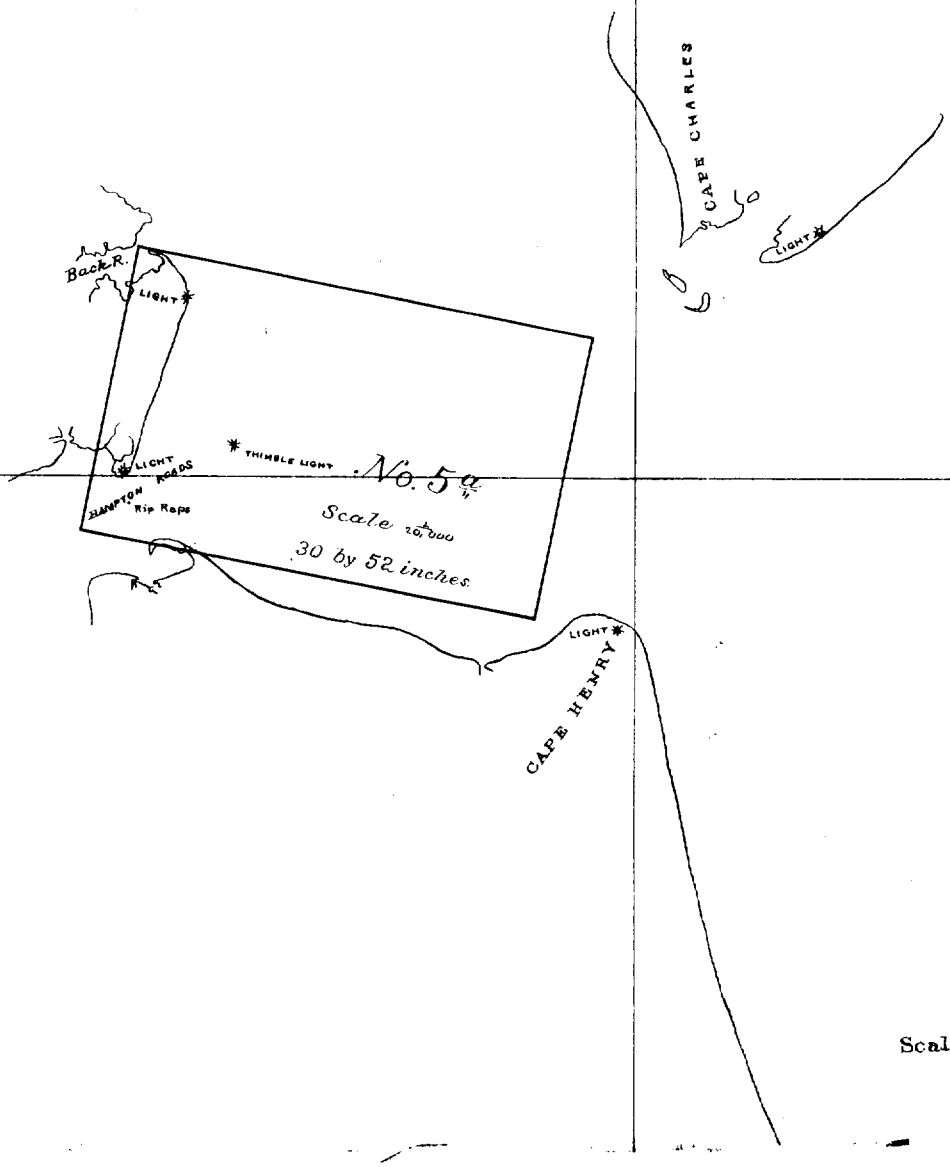
198.

76° 00'

37° 30

Wood's Report "A".

Projection No. 5.. "Endeavor" 1888.
Horse Shoe Shoal.



37° 00'

Scale 400,000

Wood — Report A. [illegible]3
Proj: 6: Horse Shoe.

II.

Table of Reference

Projection No. 5: Horse Shoe Shoal, Virginia.
Steamer Endeavor. Lieut. M. L. Wood, U. S. N. Comdg.

Date	Letter	Angles from	Angles to	Number of Sounding Book	Number of Fair Journal	Number of Sounding	Number of Angles	Number of Miles	Vessel	In charge	Observers
July 20	A^3	1	52	1	1	514	104	12.2	Steamer	M.L.W.	M.L.W. + M.C. + E.A.A.
" 23	B^3	1	191	1 & 2	1	2460	386	42.6	"	M.L.W.	" E.D. E.A.A.
" 24	C^3	1	204	2 & 3	1	2243	408	39.5	"	"	" " "
Aug 2	D^3	205	263	3	1.2	646	118	13.2	"	"	" " "
" 6	E^3	1	57	4	2	670	114	17.7	"	"	" E.L. "
" 6	E^3	1	174	4	2	1955	350	46.	"	"	" " "
		175	239	5	2	805	130	10.2	"	"	" " "

A Proj. 1125

Wood - Report A. 2004
Proj. 5. Horse Shoe

III. There is a 12 foot channel across Horse Shoe Shoal about halfway between Old Point Comfort and Thimble Light-house. The least water in this channel is found where it crosses the southern edge of Horse Shoe Shoal, along the main ship channel to Hampton Roads. Outside Thimble Light-house, a depth of 16 fee can be carried everywhere except over a spit making out about 200 meters east from the light.

IV. A comparison of the results of the resurvey with the old hydrography as shown on the charts, shows that changes have not taken place to the extent expected. The outer edges show some differences, but not enough to make any change in navigation, although sufficiently defined to be shown on the charts of the locality. The bottom is uniformly hard yellow sand within the 4 fathom curve .

V. The only harbor improvements are those made by the government to protect the Hygeia Hotel, and to increase the freight and passenger accomodation of the wharves. The Main Wharf, near the hotel is to be extended to deeper water, and the frontage increased to give greater facilities to the steamers carrying passengers to the Hygeia Hotel during its season as a pleasure resort. While the contractors have been at work on the Main Wharf, steamers land at the Light-house Wharf which has been enlarged and strengthened for the purpose. Owing to the changes in the plans necessitated by an increase in the amount

appropriated by congress for this purpose, it was not possible to obtain plans of the wharves as they will be after these improvements, and I suggest that steps be taken to obtain from Col. Hains, the U.S. Engineer in charge of the work, tracings showing the completed wharves at Fort Monroe.

VI. Vessels anchor in Hampton Roads and, if drawing less than 12 feet, inside Hampton Bar. In Hampton Roads vessels anchor anywhere the depth of water is over 5 fathoms, excepting over a telegraph cable connecting Fort Wool(RipRaps) with Fort Monroe. The depth of water is from 7 to 15 fathoms, with sticky mud bottom. The principal point to be observed in selecting a berth, is the necessity for keeping out of the way of the many steamers passing through the Roads, or stopping at Old Point Comfort. Inside Hampton Bar the anchorage is small, and th bottom is hard sand and hence bad holding ground.

VII. The beach is fringed with fish-weir poles, some of them broken off under water, extending out nearly half a mile from shore and constituting a danger to small vessels. A wreck drifted into the main channel off buoy No. 3, which was marked by an unpainted spar buoy(see copy of chart No. 131.)

VIII. No new features concerning the tides at Old Point Comfort. The tidal currents are strong and regular unless affected by fresh winds. On Horse Shoe Shoal, the tidal current are "circular" in their character, but no regular observations were taken owing to the lack of time.

Hood. — Report A2026.
Projection 5. Horse Shoe.

IX. The range used by vessels drawing less than 12 feet of water standing across Horse Shoe Shoal, is to keep the eastern edge of the Rip Raps in range with the end of the woods on Sewall's Point, to clear a shoal spit making out from Old Point Comfort.

X. The bottom on the shoal inside the 4 fathom curve, is hard yellow sand: in the channels in over 5 fathoms of water the bottom is sticky blue mud.

XI. Names on the chart seem well determined.

XII. The changes of the Horse Shoe Shoal are important only hydrographically, and not for purposes of navigation.

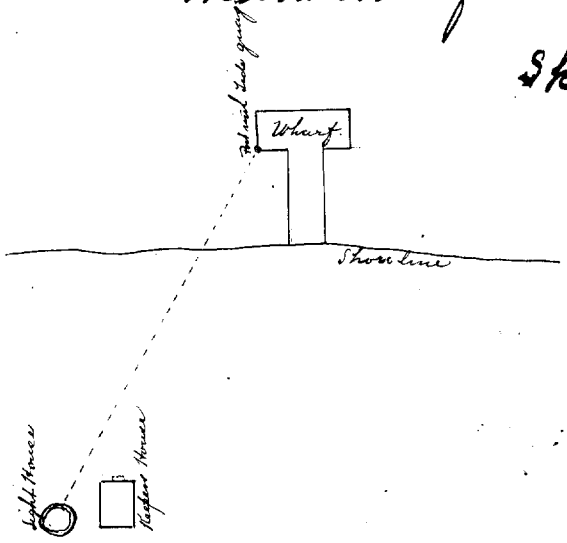
Wood — Report 1203, 7.
Propulsion 5. Horse Shoe.

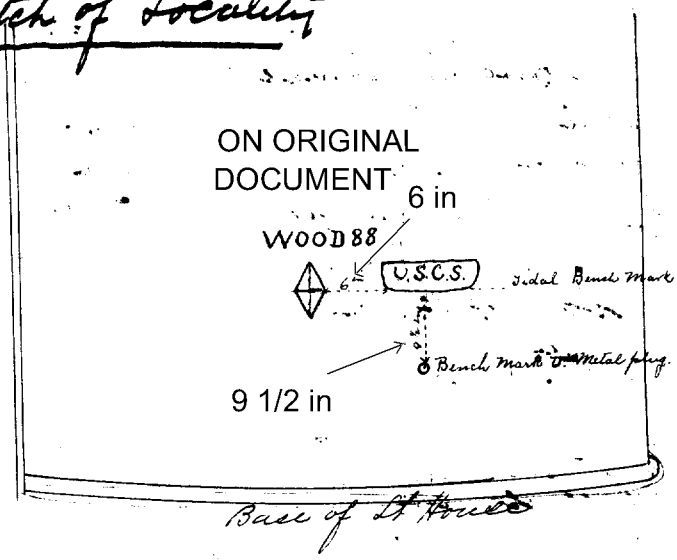
Old Point Comfort. Va.

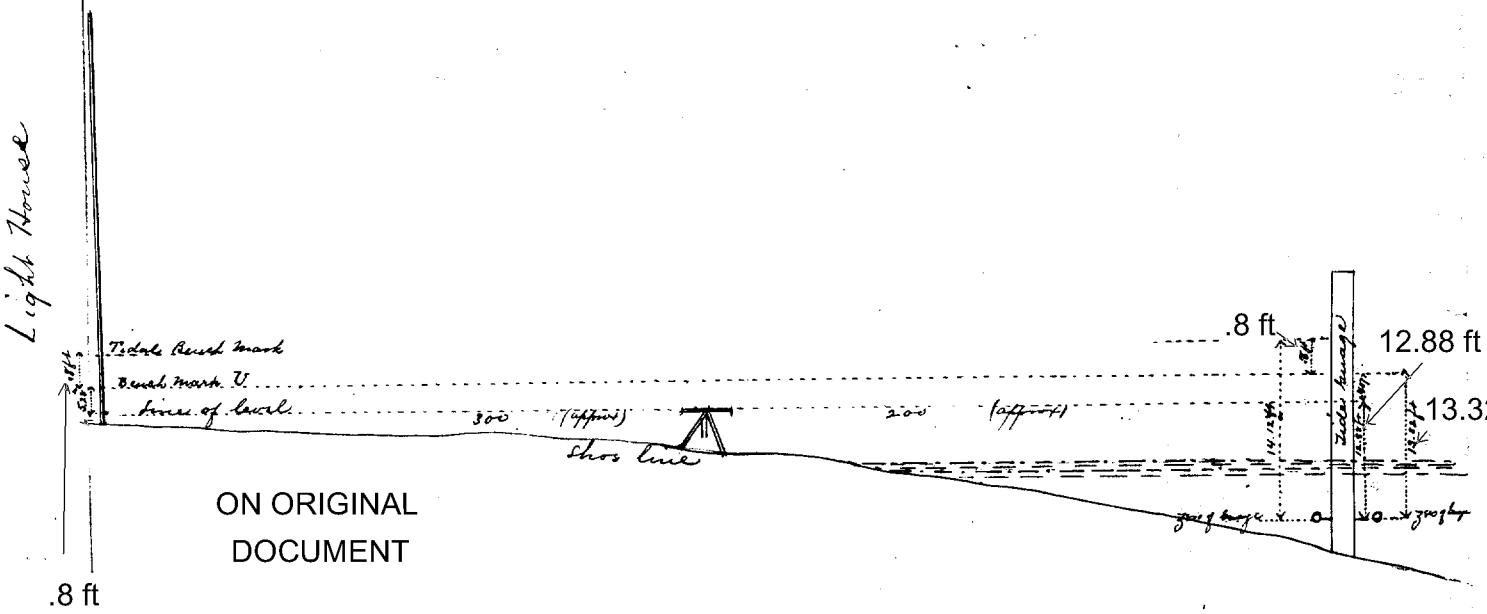
M. L. Wood. Chief of Party.

Observations from June 4th to Aug 7th 1888.

Sketch of Locality







Description of Tide Gauge and Bench Marks.
Old Point Comfort, Va.

A plain wooden staff gauge, numbers increasing with rise of tide, was secured to pile on the N.E. corner of Light House Wharf

There are three bench marks on the base of Light House. The tidal Bench mark is an irregular shaped cut about ¼ inch deep in the face of the light house about 18 inches from ground. It is marked by the letters U.S.C.S. thus - U.S.C.S. The centre of the horizontal portion of the bottom of the cut is the bench mark and is 14.12 feet above zero of gauge.

To the left and 6 in distant in a horizontal line is a bench mark cut by Lt. M.L. Ward, Chief of Party in Sept. 88. It is a diamond shaped cut set in the face of the lt. house, about ½ inch, and has a vertical and horizontal line from ends of diamond thus ◇. The horizontal line is cut in about ¼ inch, and is in the same horizontal plane as tidal bench mark previously referred to. It is marked W.O.D. 88.

Bench mark "V" is a copper bolt head about ½ inch in diameter 9½ inches vertically under centre of Tidal Bench mark. Centre of bolt head is 13.32 inches above zero of gauge.

Mean high water	6.116	Tidal B.M. above zero on gauge	14.12
" low "	3.343	M.L.W. " " " "	3.343
" range	2.773	" B.M. " M.L.W.	10.777

B.M. "V" above zero on gauge 13.32
M.L.W. " " " " 3.343
B.M. "V" " M.L.W. 9.977

Ward – Ripon A. Beck
Proj. 5, Horseshoe 204,

Hyde's Report A
Proj. 1. Cape Charles.

Page 1
205,

(11 Sheets).

U.S. Coast and Geodetic Survey Office,

Washington, D.C., 16 Feb 1889.

Mr. F. M. Thorn,

Superintendent.

Sir:-

In accordance with the published instructions, I submit "Descriptive Report A," to accompany Projection No. 1 of the scheme for the resurvey of Cape Charles and Vicinity, executed by the hydrographic party under my charge on board the steamer "Endeavor", during the summer season of 1888, under your instructions dated April 17th., 1888.

Very respectfully,

W. L. Hyde

Lieutenant, U.S.N.

U.S. COAST & GEODETIC SURVEY OFFICE OF HYDROGRAPHIC INSPECTOR
FEB 16 1889

Forwarded
O.N. Brownson
.....Lt. Comdr., U.S.N.,
Hydrographic Inspector C. & G. Survey.

Projection No. 1 — May 28 & 1888
Aug. 2

Title

I. United States Coast and Geodetic Survey

J. W. Thom. Supt.

Cape Charles (Va.) & Vicinity

Sheet No. 1

Began May 28. 1888

Ended. August. 2. "

W. L. Wood. Lieut. U.S.N.

Scale 20.000.

Observers.

Lieut. W. L. Wood. U.S.N.

Ensign W. W. Coxtant "

E. Lloyd. "

" E. E. Anderson. "

Recorders.

Roger J. Clover.

William H. de Luce.

Leadsmen.

J. E. Jackson

John Powell.

Carl Lindstrom

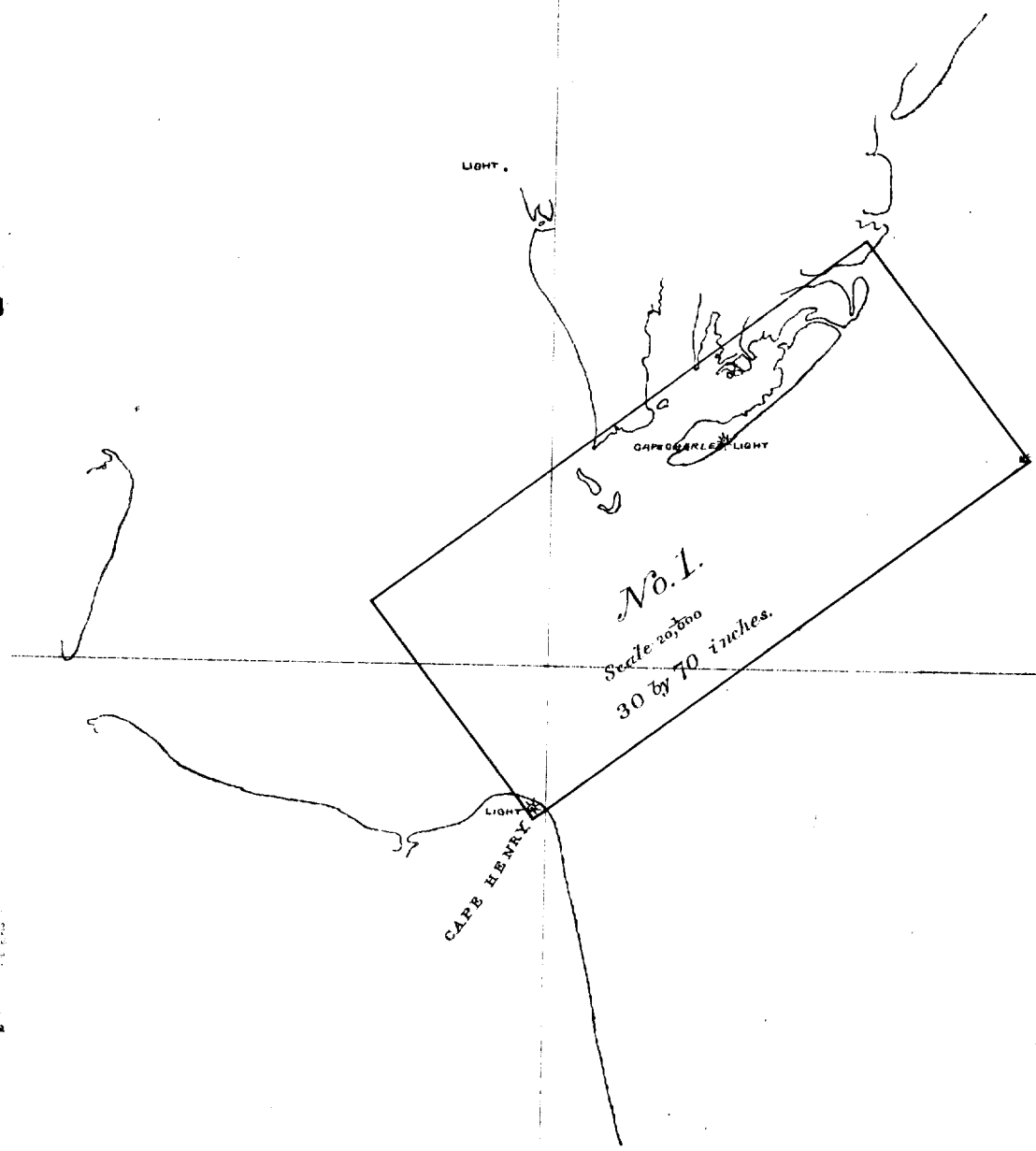
Lars J. Larsen.

Tide Observer

William Walker.

Wood's Report "A".

Projection No 1. "Endeavor" 1888.
Cape Charles & Vicinity.



Scale 400,000

Projection No. 7. Steamer. 3

Work Report A. 208.

Proj. 1. Cape Charles.

II

Statistics.

Table of Reference.

Cape Charles, Virginia and vicinity

Steamer Endeavor. Lieut W. L. Hood U.S.N. Comdg.

Date.	Letter.	Angles. from	Angles. to	Number of Sounding Book.	Number of Fair Journal.	Number of Soundings	Number of Angles	Miles.	Vessel.	In charge.	Observers.
May 28	H	13	23	3	2	1061	244	58.1	Steamer	M.L.W.	M.L.W. E.L. & E.A.A.
" 29	I	1	206	4	3	1545	430	64.	"	"	M.L.W. E.L. & E.A.A.
" 30	J	28	122	5	3	790	218	33.5	"	"	M.L.W. E.L. & E.A.A.
June 1	K	1	108	5	4	716	215	28.7	"	M.L.W.	M.L.W. E.L. & E.A.A.
June 2	L	2	145	6	4	1007	285	50.0.	"	M.L.W.	M.L.W.W.M.C. & E.L.
" 5	M	1	119	6	4	816	235	42.	"	M.L.W.	M.L.W.W.M.C. & E.L.
" 7	N	1	204	7	5	1352	408	57.	"	M.L.W.	M.L.W.W.M.C.E.L. & E.A.A.
" 9	O	1	181	8	5	1200	404	36.5	"	M.L.W.	M.L.W.W.M.C.E.L. E.A.A.
" 13	Q	1	113	9	6.7	710	226	28.	"	M.L.W.	M.L.W. & E.A.A.
" 14	R	1	81	10	7	509	162	14.	"	M.L.W.	M.L.W. & E.A.A.
" 18	S*	13	130	10	7	921	319	26.4	"	M.L.W.	M.L.W.W.M.C.E.L. E.A.A.
" 19	T	1	294	11	8	1836	621	69.4	"	M.L.W.	M.L.W.W.M.C.E.L. E.A.A.
" 20	U	1	213	12	8	1388	426	43.3	"	M.L.W.	W.M.L. & E.A.A.
" 25	V	30	176	13	8	849	294	23.5	"	M.L.W.	M.L.W.W.M.C.E.L.
" 26	W	1	16	13	8	125	32	4.5	"	M.L.W.	M.L.W. & E.L.
" 27	X	1	126	13	9	697	253	22.	"	M.L.W.	M.L.W. E.L.
July 3.	Z	1	292	15	9.10	1530	584	41.4	"	M.L.W.	M.L.W. & E.A.A.
" 12	D²	48	124	18	11	399	154	9.9	"	M.L.W.	M.L.W. E.L. & E.A.A.
" 26	F²	1	292	19.20	12	3060	584	36.5	"	M.L.W.	M.L.W. E.L. E.A.A.
" 27	G²	124	260	21	13	1431	300	26.5	"	M.L.W.	M.L.W. E.L. E.A.A.
Aug 2	H²	1	143	22	12	1707	488	32.5	"	M.L.W.	M.L.W. E.L. E.A.A.
	X	S	1	144	Plotted on Bay Proof						

ON ORIGINAL DOCUMENT

15

II Statistics (Contd).

Table of Reference.

Cape Charles. Virginia and vicinity

Steamer Endeavor. Lieut. M. L. Wood. U.S.N. Comdg.

Date	Letter	Angles. from	Angles. to	Number of Sounding Book.	Number of Fair Journal.	Number of Soundings	Number of Angles	Number of Miles	Vessels.	In charge.	Observers.
June 26	n n	1/1	1/67	6	3	1092	134	7.7	Port W. Boat	W.M.C.	W.M.C. & E.A.A.
" 27	o O	1/1	1/111	6	3.4	1136	222	10.6	Port W. Boat	W.M.C.	W.M.C. & E.A.A.
July 3	q q	11/88	26/100	7.8	4	430	57	4.8	Port W. Boat	W.M.C.	W.M.C. & E.L.
" 12	r r	1/1	140	8	4	565	81	4.1	Port W. Boat	W.M.C.	W.M.C. & E.L.

II. (cont'd)

Projection No 1 Cape Charles Va. and vicinity.

Tidal Data.

Fishermans Inlet Tide Gauge.

(1)	Mean low water	10.39.
(2)	Lowest tide observed.	.10
(3)	Highest tide observed.	5.2.
(4)	Mean rise and fall.	2.94.
(5)	Name of observer. —	Wm Walker.

III. The least depth in the channel across the shoals making out from Cape Charles, is about 23 feet at mean low water. This depth is found twice, at the southern end near where "Nautilus Shoal" is given on the charts, and also at the upper end where an arm makes out from the "Inner Middle Ground" forming what the pilots call the "False Channel". I believe this survey has found deeper water than was ever known to existin this locality.

The general opinion among the pilots is that there is a less depth than 17 feet, at the upper end of the "False Channel.

As no pilot has taken a vessel through these shoals for some years, it is difficult to ascertain the history of any changes that may have taken place.

For this new channel I suggest the name of "North West Channel" to distinguish it from the old "North Channel" of the charts.

Shoal spots. It is believed that the sheet shows the least water on all the shoals, as many additional soundin gs were takn which were not shown for lack of room, and not recorded because they gave no additional developements.

IV. The resurvey indicates considerable change in the hydrography in the vicinity of Cape Charles. Smith Island Shoal, and Shark Shoal, occupy some what different positions from these of the charts. The Cape Charles Light-Vessel was found to be nearly a mile from where it had been indicated on the charts, and from where it is now shown.

A. Projection No. 1.

Wood Report Ag 7
Proj. I Cape Charles
2/2,

The shape of the Inner Middle Ground has changed completely, and the direction of its axis has shifted from about NNW, to NWbyW, (see copy of chart No. 131 accompanying).

Some portion of these changes may be due to more accurate plotting of the lines of soundings, and I should recommend for close comparison, the replotting of the old survey of thirty-five years ago on this same sheet. The Old Tower on Smith Island has disappeared.

V. The only improvement within the limits of this sheet, has been the construction of a stone "dike" to protect Cape Charles Light-house from being undermined. The wooden tramway over which the materiel for the dike was carried, has been torn up in many places and practically destroyed.

The dike was built by contract, under direction of the Light house Board.

VI. There are no good anchorages within the limits of this sheet. (Projection No. 1.). Coasting vessels often anchor during northwesters, under Smith Island, but only as a makeshift. The bottom is hard sand, and the locality noted for the number of anchors lost by sudden shifts of wind to the northeast, necessitating slipping chain.

The pilots anchor on the Lower Middle Ground Shoal, but only in fair weather.

The number of vessels entering Chesapeake Bay is very large, but the statistics are not available. The only way to even

approximate to the number, would be to obtain data from Baltimore and from all other ports in the Bay, and then add to this number the vessels entering for a harbor.

A large proportion of coasting schooners would use the channels close to Cape Charles, if there were buoys enough to make them comparitively safe. As it is many schooners run across the Middle Grounds in what would be termed a reckless manner if the risks they run were appreciated. It will be a good thing for the coasting trade when these new channels are properly buoyed.

VII. The only dangers are shoal ridges parallel to the coast and having not less than about 11 feet of water over them. They can be best studied from the finished sheet. At present there are no marks, and the tide-rips and discolorations of the water are absolutely no guides.

VIII. The "Tidal Currents" are strong in the channels. at spring tides there are marked "overfalls" at the lower end of the new "Northwest Channel" near the Nautilus Shoal of the chart The general direction of the currents is parallel to the contours of the bottom: the greatest strength of current follows the line of greatest depth in the channels, and is about 3 1/2 knots per hour.

Flood-tide runs after high water, and ebb-tide after low water from 2 hours at neap tides to 3 1/2 hours at spring tides. I recommend a series of current observations in this locality.

A preliminary

Word-Report A. 9
Proj 1. Cape Charles. 2/14,

IX. There is but one range on this sheet in use by pilots, owing to the distance of the channels from shore, and the consequent lack of range marks.

Cape Henry Light-house in range with Cape Henry Old Tower, leads clear of the Lower Middle Ground:and when a depth of 10 fathoms is reached, course can be changed to enter Chesapeake Bay. At night, this range is indicated by the eastern edge of the red sector in Cape Henry light, and by the light vessel off Cape Charles.

A local range for running into the Quarantine Anchorage off Fisherman's Island, from Hampton roads,- is the clump of trees on Fisherman's Island in range with the edge of woods on the main-land. This leads clear of the lower end of the Inner Middle Ground, to the southward.

X. The general character of the bottom is hard, fine, white sand, with gray and black specks. In a very few deep holes, the bottom is soft blue mud with sand and black specks. Where the bottom is noted in the sounding books as "hard" it is uniformly "hard sand".

XI. No additio nal information obtainable regarding names.

XII. the changes since last survey and the important differencies, can be best studied fro m an accompanying copy of chart No. 131 on which are indicated both the results of the old sur-

vey, and also the approximate results of the last survey shown in colored inks.

All the shoal spots shown on the chart were looked for carefully during the search for a location for a tripod "water-signal", and at other times. The soundings on the sheet represent the least water found on the shoals.

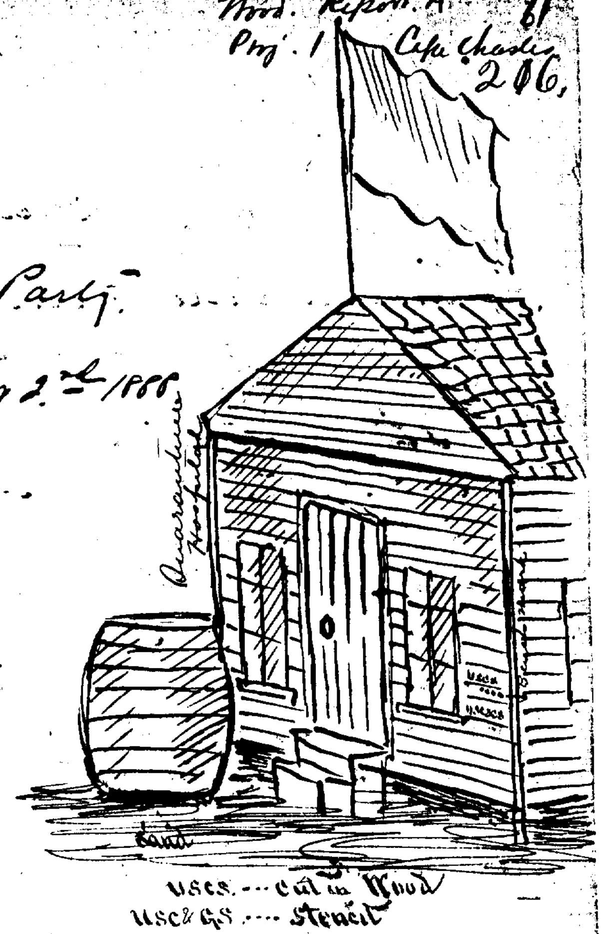
A tradition among the inhabitants says that the Lower Middle Ground at its lower end, over which I sounded in the "Endeavor",- has been seen out of water at low tide. This was not well authenticated , and I only give it for what it is worth: it is possible however , that as the material of which these shoals are composed is a fine sand approaching quick-sand in its characteristics, - that these shoals may be "piled" up during a heavy southwester under certain conditions of the tidal currents and remain so until they are reduced to their usual contours by the action of normal forces.

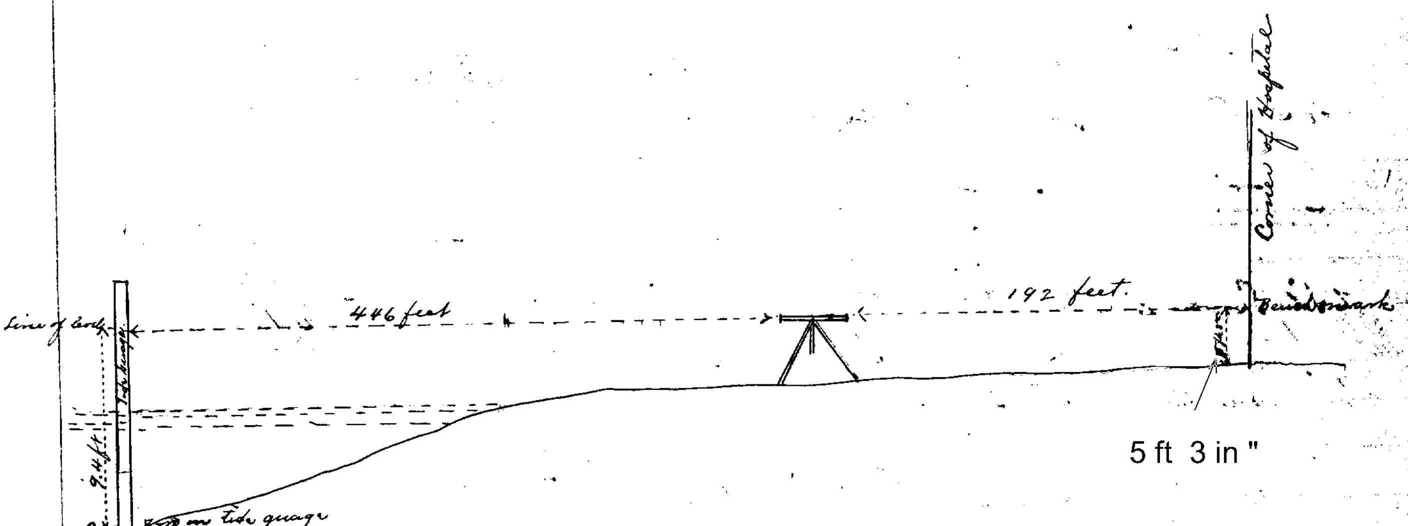
Fisherman's Inlet.

M. L. Wood. Chief of Party.

Observations from May 3rd to Aug 2nd 1888

Sketch of locality





Description

Fishermans Inlet, vicinity of Cape Charles, Va.

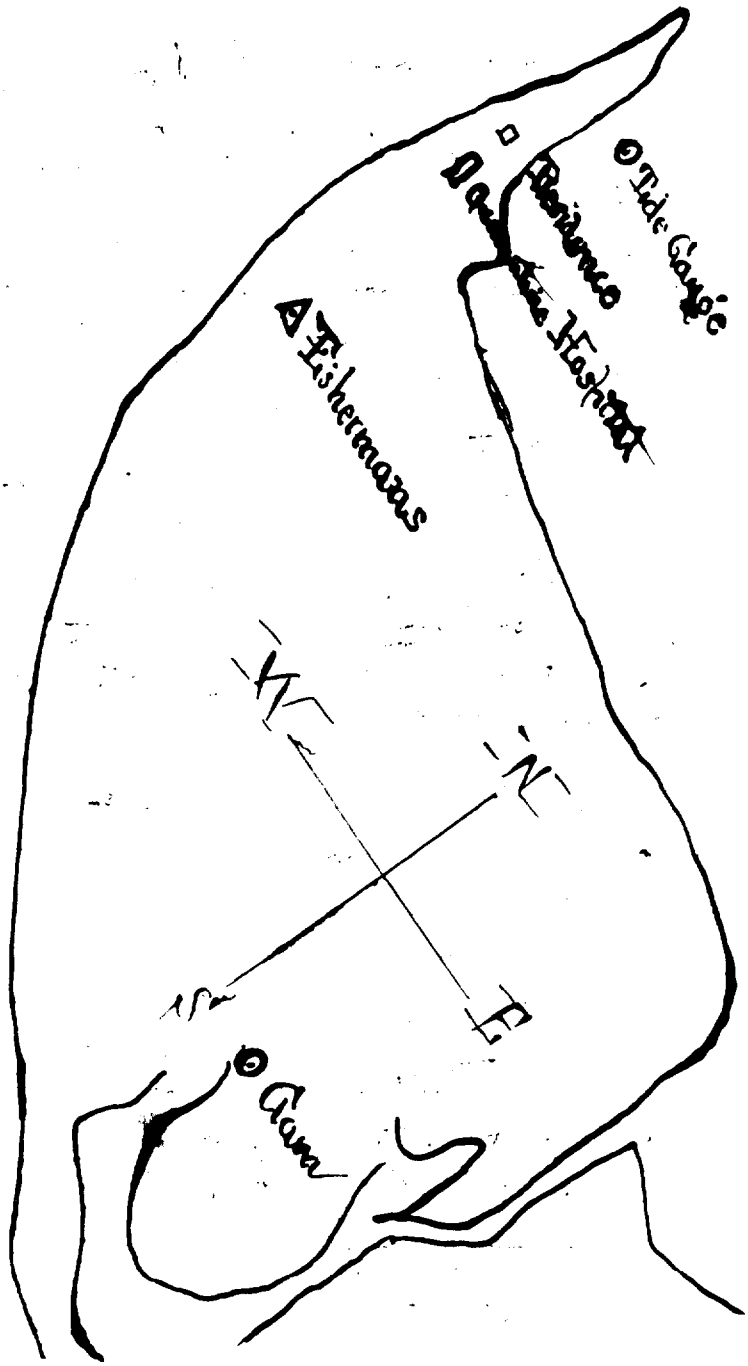
A plain wooden staff gauge, numbers increasing with rise of tide, was secured to a ~~post~~ for that purpose 638 feet in a N 46° E. direction from the N.W. corner of Quarantine Hospital. O of gauge 9.4 feet below bench mark.

Bench mark is 4 copper nails, in horizontal line, driven in the N.W corner of Quarantine Hospital building, about 5 ft 3 in from the ground and 2 in from the edge of building. It is marked with the letters U.S.C.S. cut in the wood just above the nails and the letters U.S.C. & G.S. with pencil and black ink just below.

The following angles are used to determine position of gauge:-

Station	Date	Observer	Instrument	Angle	O on Theod.
Fishermans △	May 4.	Ed Lloyd	Theod.	187. 42. 50	C. Charles Sk. No.
Shirt Tail South △	" 31.	M.L. Wood	"	36. 38. 30	O Half
Cape Charles △	June 1.	Ed Lloyd	"	107. 56. 00	C. Charles Sk. No.
Clam ○	" 8.	"	Sextant	Fish △ to Tide 17°. 58' Tide to Coating △ 9°. 16'	
Nut ○	" 26	M.L. Wood.	"	Charles △ to Tide 61. 34. 30 Tide to Fish △ 11. 45'	

Mean high water	3.733	B.M. above zero of gauge	9.4 ft
" low "	1.039	M.L.W. " " "	1.039
" range	2.694	B.M. above M.L.W	8.361


Tide Gauge
Residence
Fishermans
N
E
Gaza

Wood. Report A. Encl.
Proj. 1. Cape Charles.
217.

Wood-Report A Vol I
Projection No 4. Cape Charles.
218.

(8 sheets).

U.S.Coast and Geodetic Survey Office,

Washington, D.C., 16 Feb., 1889.

Mr. F. M. Thorn,

Superintendent.

Sir:-

In accordance with the published instrutions, I submit "Descriptive Report A", to accompany Projection No. 4 of the scheme for the resurvey of Cape Charles and Vicinity,- executed by the hydrographic party under my charge on board the steamer "Endeavor", during the summer season of 1888, under your instructions dated April 17th. 1888.

Very respectfully,

W. L. Wood

Lieutenant, U.S.N.

U.S. COAST & GEODETIC SURVEY
OFFICE OF
FEB 16 1889
HYDROGRAPHIC INSPECTION

J. E. Simmons

Lt. Comdr., U.S.N.,

Hydrographic Inspector C. & G. Survey.

Report A. Projection No. 4. Third Report A.
Proj. No 4. Cape Charles.
219.

I.

United States Coast and Geodetic Survey.

J. M. Thom. Superintendent

Cape Charles and vicinity. Projection No 4.

Virginia

(Fishermans and Smith Island Inlets.)

Began April 25th 1888
Ended August 2nd 1888.

M. L. Ward Lieutenant U. S. N.

Scale 1/10,000.

Observers.

Lt. M. L. Ward U. S. N. Assistant.
Ensign H. M. Constant.
" Edward Lloyd.
" E. A. Anderson.

Recorders.

R. A. Glover.
H. H. DeLuce

Leadsman.

E. Jarkson.
John Connell.
Carl Lindstrom
Lars J. Larsen.

Tide Observer.

Wm Walker.

220

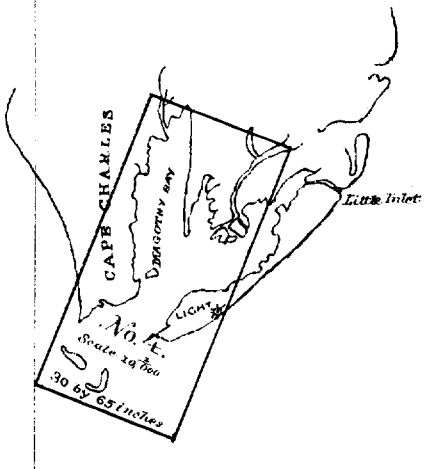
76° 00'

75° 30'

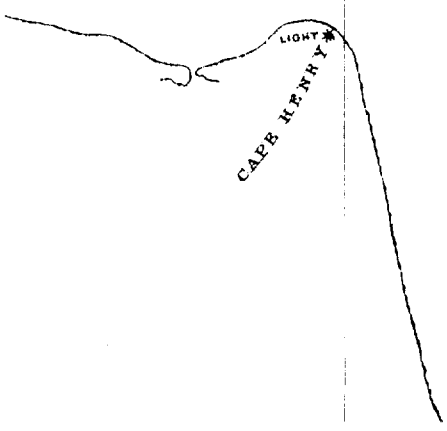
37° 30'

Wood's Report "A".

Projection No. 4. "Endeavor" 1888.
Cape Charles & Vicinity.



37° 00'



Scale 400000

Projection Notes

Reg. 4, Ch. Book 1

II.

Cape Charles

Table of Reference

Cape Charles Virginia & Vicinity

Steamer Endeavor. Lieut. M. L. Wood U.S.N. Comdg.

Date	Letter	Angles From	Angles to	Number of Sounding Book	Number of Fair Journal	Number of Soundings	Number of Angles	Number of Miles	Vessel	In charge	Observers
May 1	a	1	137	1		479	73	5.5	Port Launch	M.L.W.	M.L.W. & W.M.C.
June 15	a'	1	124	1		887	148	6.7	Star Launch	M.L.W.	M.L.W. & E.A.A.
" "	b'	1	111	1		329	220	9.2	"	M.L.W.	M.L.W. & E.A.A.
May 17	e	1	16	1		56	12	1	Port Launch	M.L.W.	M.L.W. & E.A.A.
" 18	f	1	173	2		959	142	5.6.	"	M.L.W.	M.L.W. & W.M.C.
June 8	g	1	164	1		558	128	8.3		W.M.C.	W.M.C. & E.T.
July 28	c'	1	180	2		1016	158	8.6	Star Launch	M.L.W.	M.L.W.
" 28	s	1	134	8.9		2109	230	11-6	Port Launch	E.T.	E.T. & E.A.A.
" 3	g.	127	187	4		1259	174	6.8	Port Launch	W.M.C.	W.M.C. & E.T.
			Total			8652	1285	63.3.			

II (Cont'd)

Projection No 4. Cape Charles Va. & Vicinity

Tidal Data.

Fishermans Inlet Tide Gauge.

(1)	Mean low water —	1.039
(2)	Lowest tide observed.	1.0
(3.)	Highest tide observed.	5.2
(4)	Mean rise and fall .	2.694
(5)	Name of observer.	Wm. Hunter.

Report A. Proj 4.

Ann. Report 1 2235
Proj. 4 Cape Charles.

III. Fisherman's Inlet has a narrow crooked channel, with a depth at mean low water of 7 1/4 feet. It changes with every gale, so that it was not thought worth while to put in very close work on this unfrequented place. Owing to these changes, I found it economical in labor to take a few soundings at short intervals, to prevent delay to the work by the vessel grounding on our way to the working ground.

The ranges are obscure, and, owing to the constant shifting of the channel, are not given.

The greatest draught of vessels frequenting the inlet is about 4.1/2 feet. The "Endeavor" ran in and out very often drawing 7.1/4 feet, but the channel is crooked and but little known.

Between Fisherman's Inlet and Smith Island Inlet, is a mud flat which is partly bare at half tide, and over which there is a channel with less than a foot of water at low water.

Smith island Inlet between Fisherman's Island and Smith Island, has a wide opening with a fan shaped bar and a shifting channel with a depth of about 7 feet at the shoalest part. There are shoal places on which the sea breaks in all weathers, and the constant changes at this inlet render buoys of no service, and condemn this inlet for purposes of navigation. For all vessels drawing over 6 feet, I recommend the use of Cobb's Island Inlet to communicate with the sound or bay between the islands and the main land of Cape Charles.

The trade of [redacted]th Island Inlet is small, and carried on only in small vessels.

IV. The channels at both inlets are over fine shifting sand, and are subject to change with every heavy gale from the southward or eastward. There seems also to be a bodily translation of material to the southward along both the seabeach and baybeach, which results in adding to the shoals about Fisherman's Island.

V. An improvement in the shape of a wharf at the Quarantine Station on Fisherman's Island is in contemplation, and funds for that purpose have been appropriated by Congress, but no definite plan had been made or a site selected, up to the time of my leaving the working ground.

VI. There are no good anchorages within the limits of this sheet. Wherever there is water enough to float anything, the bottom is hard sand and bad holding ground. To get a place where those on board the "Endeavor" could get a good nights rest I pumped down piles and built a light wharf on the Cape Charles side of Fisherman's Inlet. This will remain sometime and will be available for any vessel able to get in through the channel.

During the fishing season many small vessels frequent Fisherman's Inlet.

VII. The only dangers are shoals for which see finished sheet.

VIII. The tidal currents are strong, and at spring tides, run

Hyd - Report 2257.
Reg. 4 Cape Charles.

with a force of from 3 1/2 to 4 knots. In Smith Island Inlet, the change in the direction of the tidal current occurs shortly after the times of high and low waters, and the lines of direct follow the channel lines. In Fisherman's Inlet, the tide sets in (to the eastward) very slack from one hour after low water until about half-tide, then it is slack for an hour, when it commences to run out with great force. At high water springs, I have seen nearly a five knot tidal current setting through the channel to the westward. One hour after high water, the current slackens, and from half ebb to one hour after low water, there is no current at all.

IX. The ranges are obscure, and can only be identified by observation. I should advise no one to attempt entering either inlet with a draft of over five feet, without planting buoys.

X. The bottom is sand in the channels, and sand and mud, on the flats.

XI. No information obtained about local names.

XII. Changes since last survey are extensive, but seem to be no more than should be expected on this coast, where every heavy gale leaves its mark.

Misc. Report No. 2
Reg. 4 Cape Cha

Tidal Data. (See Report A. Projection No 1
Cape Charles and Vicinity).