2129-2133-2146-
2199 - 2200
2129B 2134

2129 2133-2146 2199 2200

Diag. Cht. No. 1207-1

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. 2129, 2133 Office No. 2146, 2199, 2200

LOCALITY

State Mass.

General locality Boston Bay.

Locality

1892-94

~~194~~

CHIEF OF PARTY

R. S. Peck

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B-1870-1 (1)++

U. S. COAST AND GEODETIC SURVEY.

T. C. Mendenhall,
Gen. W. W. Duffield, Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hydrographic Sheets Nos. 2129, 2133, 2146, 2199, 2200.

LOCALITY:

Boston Bay.

1892–94.

CHIEF OF PARTY:

Lt. R. G. Peck, U.S.N.

2129 - 2133 - 2146
2199 - 2200

me at:

Telegraph me at:

My Express Office is: Assistant in Charge

A B.

U. S. Coast and Geodetic Survey Stmr. "Bache,"

Navy Yard, New York,

December 28, 1894.

3—567

Gen. W. W. Duffield,
Superintendent,
U. S. Coast and Geodetic Survey,
Washington, D.C.

Sir:—

In accordance with paragraph 209 of the General Instructions for Hydrographic Parties, I have the honor to submit the following "Descriptive Report" relating to the work executed during the past season by the hydrographic party under my command, acting under instructions from the Superintendent dated June 12, and detailed instructions from the Hydrographic Inspector dated June 29, 1894. Accompanying my instructions, there was sent to me from the office one projection on a scale of 1:5000, covering the main portion of Lynn Harbor; three projections on a scale of 1:10,000, covering the waters outside the coast line from Nahant to Gloucester; and tracings of Sheets 2133 and 2129, Survey

of 1892, for special developments. Subsequently, a boat sheet taken from sheet 2146, survey of '92, was also sent me for special developments.

Sheet 2133 – Cohasset to Scituate.

As directed by the Hydrographic Inspector my first attention was devoted to the special developments of sheets 2133 and 2129, survey of 1892.

In conducting our search for shoal spots, it was our custom to locate a buoy exactly on the spot, and then run a series of lines radiating from the buoy, recording soundings and positions. The ground in the vicinity of the buoy was then covered by rapid casts of the lead without recording the soundings except where a less depth was obtained than on the radial lines. Any indication of a ledge was traced along by feeling with the lead, and in many cases it was in this manner that the shoal spot sought was finally reached.

In addition to the above, dragging was resorted to wherever the difference of depth was sufficient to make this method effective. Our drag consisted of a length of about forty feet of heavy iron pipe weighted at each end and in the center with heavy deep-sea leads.

By means of a piece of scantling across the after part of the boat, this pipe was suspended at a known depth, varying with the depth of water. While sweeping the bottom in this manner, two leads were kept constantly going, the soundings and positions of the boat being recorded and the lines of search afterwards plotted.

In addition to the lines required for developing curves, etc. there are on the sheet fifty-six shoal spots marked for search. For convenient reference, each of these spots is designated on the tracing by a letter, and the result of the search in each case is indicated in the following appended table which shows the number found within a fraction of a foot to be 34. In addition, several other shoal spots, consisting of pinnacle rocks in positions dangerous to navigation, were discovered and reported to the office.

Tide gauge for the Cohasset work

For the work on the original sheet 2133, the tide gauge was established at the Minott Ledge Light House. The gauge was secured to the vertical iron ladder, and for low water observations an outrigger and weighted line was used. The Light House Keeper in-

formed me that the gauge was frequently washed away by the heavy seas to which it was exposed. I regarded this arrangement and place for the gauge as so objectionable that I decided to select a different location, though much inclined to continue the work on the same lines as those adopted by the party of '92. An excellent location for the gauge was found among the rocky islets of the Sheppard Ledges off the entrance to Cohasset harbor, where it was well protected from the swell, while freely subject to the outside tidal influence. This location was also very convenient to the customary anchorage of the ship in the "Gangway Passage". The gauge was connected with the Boston Light gauge of Lieut. W. F. Low of the "Eagre", in use by him at that time, by the following simultaneous comparisons: (See table appended).

Anchorages.

A good anchorage for moderate weather was found in the "Gangway Passage" about midway between West Shag and the Jack Rock buoy. The holding ground is excellent and considerable shelter is afforded even from Easterly winds by the numerous outlying rocks and

Dunken Ledges. Two buoys mark the entrance to the "Gangway" and would make the anchorage easy of access were it not for the two rocks discovered in the channel by the "Bache", of which special reports were made, the one with a depth of 10 ft. lying about midway between the two entrance buoys (marking the "Grampuses" and West Hogshead Rock) and the other with a depth of 10.6 ft. about 350 metres S.E.×E. from West Shag. These rocks should by all means be buoyed if this "Gangway Passage" is to be buoyed or used at all. The range for clearing them is nothing to the westward of "South Entering Rock" (◎ Enter) and Tobias Rock Spindle (◎ Spin) ~~000~~. If bound for the "Bache's" anchorage, do not haul to westward until Barrel Rock Beacon bears to the W^d or N^d and W^d of W.S.W. 3/4 W.

This anchorage is quite convenient to the town of Cohasset, part of which is in sight beyond "White Head."

In the vicinity of buoy no. 1 (Marking Chittenden Rock) of the Brush Island Channel, the "Bache" was anchored on one occasion, but, although considerable shelter is obtained from Southerly or South-easterly winds, the bottom is foul and the anchorage not to be recommended.

Sheet 2129 - Broad Sound.

For the Broad Sound sheet the tide gauge was established at the wharf on western side of Georges Island in the same position as that of 1892 on which the work of the original sheet was made to depend.

Careful search by sounding and dragging for the 17-ft. spot off Bass Point failed to discover any such water. Inquiries were made of people acquainted with the locality, but none knew of such a shoal spot. The bottom is of a very regular character.

Sheet No. 1 - Lynn Harbor.

The ground was covered by a rectangular system of lines 80 metres apart and this distance was reduced in the channels for the east and west, or athwartship, lines to 40 metres.

There is no anchorage ground in the harbor, vessels going directly to the wharves, to each of which a channel is dredged.

Tide Gauge.

The tide gauge for this sheet was established at the north-west corner of wharf at Point of Pines, entrance to Saugus River. The same point was

used by the Army Engineers in their Surveys preliminary to improvement of the Harbor.

The zero of the gauge was connected with the bench mark at the Navy Yard, Charlestown, by the following careful simultaneous observations. An intermediate gauge was established at Point Shirley but found not to be necessary, and accordingly connection was made directly with the Navy Yard. (See table appended).

In the tide reductions of the Saugus River and Chelsea Creek there was used a time correction, computed from Airey's rule, of two minutes for each quarter mile of distance from the tide gauge at the Point of Pines wharf. The working ground was divided into quarter mile zones, the tide gauge being on the middle line of first zone, and the same correction was applied to all the soundings in the same zone. As far as the first bridge, that of the Revere Beach R.R. the correction was zero; for the space included between this bridge and that of the Eastern R.R. over Chelsea Creek and Saugus River respectively, the correction was four minutes; for the remainder of the Saugus River there were two zones with corrections of 6 and 8 minutes,

and for the remainder of Chelsea Creek, three Zones with corrections of 6, 8 and 10 minutes respectively.

Although the distance from the gauge to the upper limits of our work was only 1¼ miles, owing to the shallowness of the water I considered the time correction desirable.

Channels.

The channel into Lynn Harbor has been dredged several times by the U.S. Engineers, the last time in 1891, a mean low water depth of 10 feet having been obtained. At the present time the pilots give the Mean low water depth as 9 ft., with a 9 ft. rise of tide. The deepest draft taken in is about 18 ft.

The Channel to entrance of Saugus River was originally dredged to about 5 or 6 feet by a Steamboat Company to obtain landing at Point of Pines. In 1892 this Channel was dredged by the Army Engineers to 8 ft. at M.L.W. From entrance of Saugus to foundry works of General Electric Co., the Channel was dredged by said Company.

In addition to the buoys maintained by the Light House establishment to mark the Lynn Harbor Channel, there is also provided by private enterprise a system

of small piles or stakes, lighted at night, by which the channel is very clearly defined. In all there are eleven of these stakes, of which three are in the Black Rock Channel. They are placed in the spring and taken up in the fall.

Pilots.

There are four pilots for Lynn Harbor, two of whom, father and son named Berry, live at Bass Point, and the other two, the Alley brothers, live in Lynn.

Pilots are licensed by the Commissioners in Boston.

Pilotage is not compulsory, but pilots are always taken. The rates are from $5 to $15 per vessel inward bound, the average charge being about $8. Outward bound vessels pay about half the inward bound rate.

All vessels tow in and out. There is only one tow boat. The charge for towing is $20 in and $10 out.

Anchorage.

Excellent anchorage is found above Bass Point in the vicinity of buoy No. 2. The bottom shoals very gradually from 6 fms. to 2 fms., the lead

being a sufficient guide in seeking an anchorage. The holding ground is good, and, though the anchorage is open to the southward and eastward, vessels anchored here would probably have no trouble in riding out a moderate gale. It is very easy of access for sailing vessels, and is much frequented by fishing schooners for the purpose of obtaining bait which is caught in large fish weirs in the vicinity.

In what is called the Deep Hole, at the junction of Black Rock and Main Ship Channels there is room for a vessel to anchor with short scope, though this anchorage is rarely used, its area being so limited.

Tidal Currents.

The tidal currents set fair with the channels and are very moderate in strength. At the anchorage outside they are quite sluggish. In the Saugus River they have considerable strength.

Fresh water, Supplies and Coal.

These can be obtained at the wharves in the city. There seems to be no provision for delivery outside.

Steamers, Carrying trade, etc.

During the summer small passenger steamers make half-hourly trips between Lynn and Bass Point. There was

also a steamer running twice a day between Lynn and Boston, mostly for freight. Subsequent to our departure I have read that this line has failed. The carrying trade is done almost entirely by schooners, the freights being mostly coal and lumber. An estimate of one of the pilots places the number of vessels entering Lynn Harbor at more than 500 per annum. The coal dealer at the Fox Hill carriage and electric car bridge across the Saugus, which marks about the head of navigation, states that his receipts of coal from vessels is 8000 tons a year. The channel from Eastern R.R. bridge to his wharves is buoyed by this man in the spring and the buoys are taken up in the winter.

Sheet No. 2 - Nahant to Cat Island.

The ground was covered by a rectangular system of lines, in general 100 metres apart for the launch's work, and 150 metres for that of the ship.

In Marblehead harbor the lines were run 50 metres apart, and in the Marblehead Channel the intervals between the north and south lines were reduced to 75 metres. The special developments, of which a large amount will be required, were necessarily

deferred until another season.

Tide Gauges.

Two tide gauges were established, one at the Steamboat Landing, Nahant, and the other at Cat Island, off the entrance of Marblehead Harbor. That portion of the work to the westward of a line drawn S.S.E. from Dread Ledge Beacon was made to depend on the Nahant gauge, and all to the Eastward of this line on the Cat Island gauge.

Both gauges were connected with the gauge established by Lt. Low of the "Eagre" at the wharf of the Lehigh & Wilkesbarre Coal Co. in Salem, by the following simultaneous observations:- (See tables appended).

Tinker's Ledge.

A careful investigation by sounding and dragging developed a least depth of 5¼ fathoms where the chart shows 6½ fathoms.

Sheet 2146 - Approaches to Boston Harbor.

In accordance with instructions from the Hydrographic Inspector received October 22, special developments were made of seven shoal spots given on sheet 2146.

survey of '92, not found by that survey nor by a subsequent search the following year. The results obtained are given in the appended table.

Tide Gauge.

The tide gauge for this work was established at the wharf on the westerly side of George's Island in the position of the original gauge on which the survey of '92 was made to depend.

General remarks and further information concerning the locality covered by sheet No. 2 are deferred until the completion of the sheet.

Very respectfully,
Robert G. Peck,
Lieut. U.S.N., Asst. C. & G. Survey,
Comdg. "Bache."

Comparison of Tide Gauges
for
Difference of Elevation of Zeros -

Date, Tide 1894	Cohasset Gauge No 1 - Time	Read'g	Range	Stand	Boston Light Gauge - Time	Read'g	Range	Stand	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces.
				m.									
July 20 H.W.	1.00 P.m.	9.42		10.	1.06 P.M.	9.40			-6		+.02		+.125
" 20 L.W.	6.50 "	2.33	7.09	10.	7.00 "	2.10	7.30			-10		+.23	
" 21 L.W.	7.20 A.M.	1.59		—	7.25 A.M.	1.40			-5		+.19		+.120
" 21 H.W.	1.35 P.M.	9.75	8.16	10	1.51 P.M.	9.70	8.30			-16		+.05	
			15.25				15.60						.245
			7.63		Diff. of range .174		7.80						.12

The Zero of the Cohasset gauge is below the Zero of the Boston St. gauge .12
" " " " Boston St. " " " M. L. W. .66
" " " " Cohasset " " " " .78

Description of Bench Mark -
(See following sheet)

Note - Data for Boston St. gauge was obtained from Lieut. W. F. Low, U.S.N., Comdg. "Eagre".

Table of Results of Search for Shoal Spots_Sheet 2133.

Letter designating locality	Depth searched for.	Least depth found	Position of same refered to Charted spot.	Remarks.
a	18 ft.	19¼ ft	30 metres from spot.	
b	18 "	10 "	On spot.	
b^2	12 "	8.6 "	215 metres N.E. from W. Shag.	
c	18 "	18¼ "	on spot.	
d	18 "	19 "	20 metres from spot.	Plotted as 18 on sheet H.C.W.
e	7 "	—.6 "	On spot.	
f	24-29 "	30 "		
g	22-29 "	25 "	On spot.	
h	21 "	15-22¾ "		
i	18 "	15¾ "	On spot.	
j	25-26 " 29-21 "	28 "	" "	
k	26 "	75 "	30 metres from spot.	
l	26 "	31 "	On spot.	
l	30 "	31½ "	14 metres from spot.	
m	15/16 "	19 "	On spot.	Plotted as 18 on Sheet H.C.W.
n	16 "	31½ "	" "	
n	14 "	16¼ "	20 metres from spot.	
n	21 "	21¼ "	On spot.	
n	21	17 "	" "	
n	26	34 "	" "	

✓ O	23 ft.	36½ ft.	On spot.	
✓ P	26 "	23 "	" " .	
✓ Q	29 "	29 "	50 metres from spot.	37½ ft. on spot.
✓ R	31 "	73 "	On spot.	
✓ S	48 "	57½ "	20 metres from spot.	
✓ T	Tobias Rock.	48½ "	On Spot.	
✓ U	32 ft.	39½ "	" " .	
✓ V	24 "	33½ "	" " .	
✓ W	28 "	18½ "	" " .	
✓ X	23 "	22½ "	" " .	
✓ Y	12 "	5.9 "	" " .	
✓ Z	23 "	21 "	15 metres from spot.	
✓ a'	23 "	19¾ "	5 " " " .	
✓ b'	26 " 26 "	22¼ "	On spot.	
✓ c'	22 "	17.8 "	5 metres from spot.	
✓ d'	19 "	22½ "	On spot.	
✓ e'	22 "	16 "	" " .	
✓ f'	12 "	15 "	5 me. from spot.	14 ft. 22 me. from spot
✓ g'	29 "	18 "	On spot.	
✓ h'	27 "	25½ "	" " .	
✓ i'	21 "	20¼ "	" " .	
	27 "	26 "	" " .	
		28		

j'	27 ft.	21½ ft.	40 metres from spot.	
k'	21 "	20 "	On spot.	
l'	22 "	45 "	50 me. from spot.	33 ft. 50 me. from spot.
m'	3 "	30 "	On spot.	
n'	22 " 24 "	22¾ "	" "	
o'	19 "	24 "	" "	
p'	24 " 30 "	25 30 "	" "	25½ ft. 30 me. from spot.
q'	30 "	64 "	" "	
r'	10 "	11 10 "	23 me. from spot.	
s'	1 "	1.5 "	26 " " "	
e"	H. Ledge	19½ "	On Spot.	
x'	12 - 12 "	14½ "		
x'	13 - 12 "	15 "		
u'	22 "	43½ "	22	
u'	26 "	~~28~~ "	22 (on line 2 - 3 n, Whaleboat)	
v'	29 "	34½ "		
w'	2 "	~~6½~~ "	3 h (Launch) n (Whaleboat	
w'	10 "	~~12~~ "	3 " " "	
z'	18 "	13 "		
z'	19 "	19 "		
y'	13 "	~~25~~ "	12 (at 4 i (Whaleboat	
y'	18 "	~~10½~~ "	12 (at 28 g (Whaleboat)	
a"	21 "	25½ "		
b"	17 "	17¾ "		
b"	18 "	19½ "		
c"	17 - 18 "	17¼ "		

	d"	18-18 ft.	~~19½~~ ft.	18 ft (16-17 k Whalebact)	
1	h	24 "	~~24½~~ "		
	h	24½ "	22 "		
	h	30 "	30 "		
	V		8.6 "	Keg to Hay 60°-30'	See Sdg. Book no. 2,
				Hay to Min. 91-47	Stm. Launch – page 17.

t'	20 ft.	22 ft	On spot.	
z'	19 "	(19) "	" " .	Plotted as 18 on sheet
z' N.W	18 "	(13) "	" " .	Plotted as 12 on sheet
z'	18.	16¼ "	" " .	
u' v'	26 "	22¼ "	" " .	
u' v'	22 "	39 "	" " .	
x' S.W	12.	15¼ "	" " .	
x' center	12 "	15.	" " .	
x' S'ly	12 "	15 "	" " .	
w'	10 "	3.5.	" " .	
w'	2 "	3.1 "	" " .	
S (J & R)		47.	" " .	
c"	17 - 18 "	17¼ "		This depth found by regular system 19 ft. least depth found by special "
d"	18-18 "	18¾ "	18 ft (16 - 17 K. W. Whaleboat)	
b"	17 "	16 "		
u' & x	22 "			Found an average depth of a little over 7 fms. over & around this spot.
v'	29 "	32		
w'	2 "	Found a ledge of rocks about 20 metres about 5 metres wide. Least depth of		long extending E.N.E. & W.S.W. water 3 feet.
x'	12, 12, 12 "			Found average depth of 14½ ft. Kept lead going all the time.
y'	13 "	12¼ "		
m'	26 "			Little Bar Rocks. — Found average depth of 5 fms. on and around spot.

Special Developments of Sheet 2146.

Locality of Spot.	Depth Searched for	Least Depth found	Distance from Spot.	Remarks.
1 mile E'd of Pt. Allerton	24ft. & 23ft.	24½ ft.	Approx. between the two spots - about 100 metres.	27½ found on 23, 28½ " " 24.
1400 metres E. by N. from Boston Light.	14 feet.	15.2 "	100 metres E'd.	21¾ " " Spot.
Near Roaring Bulls	26-30-29 "	26-26½-27	Approx. on spots.	
Broad Sound Channel near Buoy No. 3.	18 "	20 ft.	100 metres S'd & E'd.	20½ on Spot.
Broad Sound Chan., near Buoy No. 5.	13 "	11¾ ft.	25 metres W'd.	14¼ on spot.
Broad Sound Chan., near Great Faun.	10 "	10 ft. & less.	About 150 metres E'd.	16½ on Spot.
Off Shirley Gut, near Buoy No. 2.	10 "	11.1 ft.	About 50 metres W'd.	14 on spot.

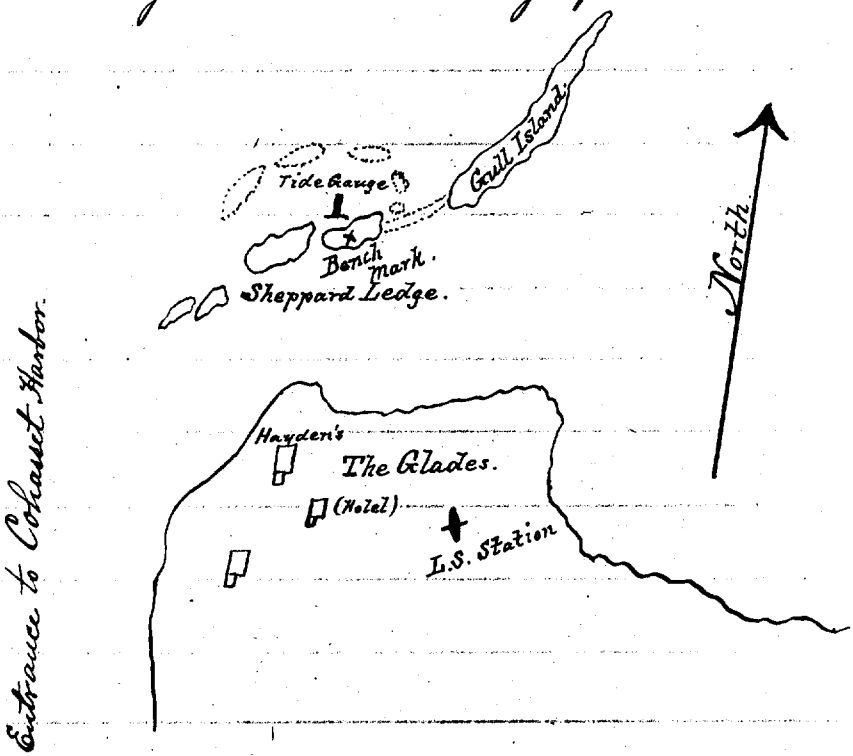
The searches in the first three cases mentioned were prosecuted on a rapidly falling tide and I estimate the difference in the time of the tide between the locality of these spots and that of the gauge may be as much as a quarter hour. A subtractive correction of ¼ of a foot might reasonably be allowed for this difference of time, but this has not been done as it would not be in harmony with the original work.

Description of Bench Mark, Gauge No. 1.

Sheppard Ledge is on the Eastern side of entrance to Cohasset Harbor. The Bench Mark is a cross cut with cold-chisel on horizontal surface of top of rock (highest part) and letters B.M; thus, B + M. It is 19.03 feet above zero of gauge, as found by Level No. 10, U.S.C.&G. Survey, and 18.25 feet above M.L.W.

M.L.W. reads .78 ft. on staff at 1st pos. of gauge used, 1894.

Both tide station and bench mark are shown on the topographical sheet of Asst. Ogden, of the C. and G. Survey, by whom they were located by plane table.

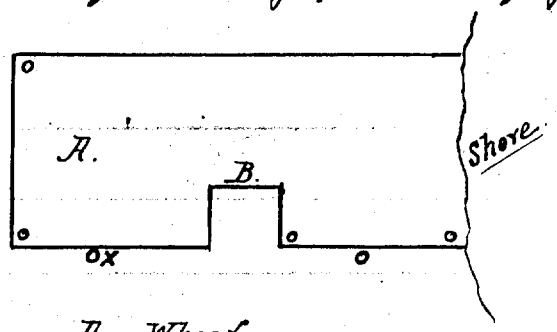


Description of Bench Mark, Gauge No. 2.

The gauge and B.M. were placed on the south side of wooden wharf at Fort Warren, George's Island, Boston Harbor. The wharf makes out to W'd from the west side of the island.

The gauge was fixed to a wooden pile projecting about 3 feet above the wharf, the pile being driven outside the wharf stringer and between the end of wharf and an inclined boat landing built into the structure, and the Bench mark was made on same pile. B.M. consists of 10 iron 10d nails driven in pile in a horizontal row, and is 6.6 feet above M.L.W.

Sketch of wharf, showing position of gauge and B.M.



A. – Wharf.
B. – Boat Landing.
X – Bench mark and tide gauge.

Sheet 2199

Comparison of Tide Gauges

for

Difference of Elevation of Zeros.

Date, 1894.	Tide	No. 5 - Point of Pines Gauge. Time	Reading	Range	Stand	No. 3 - Navy Yard Gauge. Time	Reading	Range	Stand	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces
					m.				m.					
Aug. 16	H.W.	11.25 A.M.	8.84		20	11.30 A.M.	10.58		30	-5		1.74		1.49
" 16	L.W.	5.10 P.M.	1.18	7.66	15	5.30 P.M.	2.42	8.16	20		-20		1.24	
" 17	L.W.	5.45 A.M.	0.42		10	6.02½ A.M.	1.65		25		-17½		1.23	1.50
" 17	H.W.	11.57½ "	8.96	8.54	15	12.05 P.M.	10.73	9.08	30	-7½		1.77		
" 18	H.W.	12.35 P.M.	8.98		20	12.40 "	10.72		20	-5		1.74		1.49
" 18	L.W.	6.37½ "	0.76	8.22	25	6.35 "	1.90	8.82	20		+2½		1.24	

The zero of the Point of Pines gauge is above the zero of the Navy Yard gauge, 1.493

" " " " Navy Yard " " below M.L.W. 1.51

" " " " Point of Pines " " " " .017

M.L.W. on " " " " " reads (minus) -.02

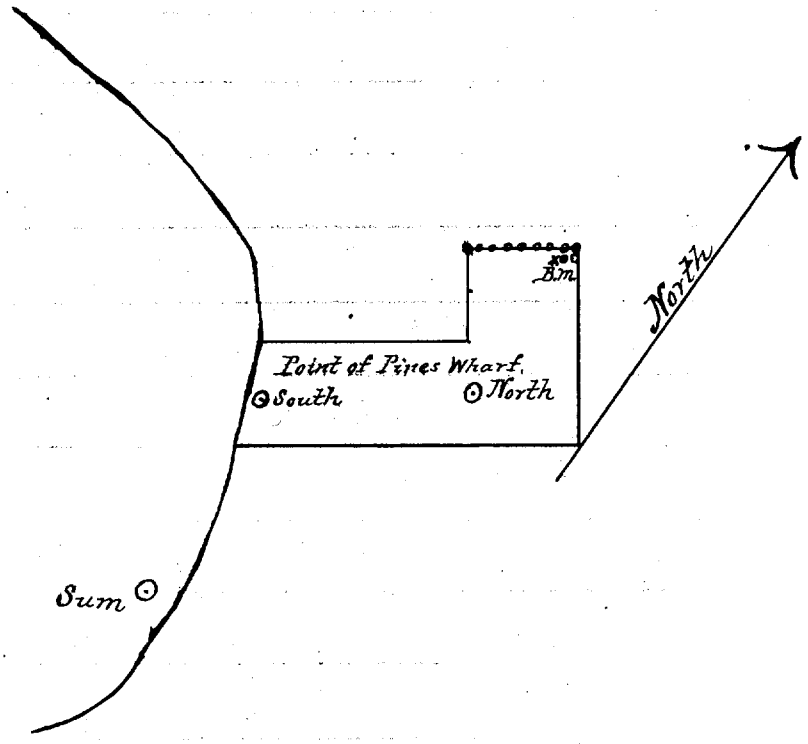
(For description of Bench mark, see the sheet following).

Tide gauges Nos 3 and 6 were referred to New Bench Mark of 1867, on west side of head of dry dock, which is 14.52 ft. above M.L.W.

Description of Bench Mark, Gauge No. 5–

The N. corner of wharf is supported by a group of four (4) piles,– thus :– ⁘. The Bench mark was placed on the pile marked 2 (the S'n one of the four), and consists of 10 nails driven into pile in a horizontal row 10.02 ft. above M.L.W. Two nails in center of row are copper, and the others iron.

Sketch of Point of Pines Wharf showing position of B.M.



Comparison of Tide Gauges for Difference of Elevation of Zeros.

Date, 1894	Tide	Point Shirley Gauge – No. 4 Time	Reading	Range	Stand.	Navy Yard Gauge – No. 3 Time	Reading	Range	Stand.	Diff. Time H.W.	Diff. Time L.W.	Diff. Readg H.W.	Diff. Readg L.W.	Mean Diff'ces.
					m.				m.					
Aug. 16	H.W.	11.27½ A.M.	11.05		30	11.30 A.M.	10.58		30	-2½		.47		.60
" 16	L.W.	5.22½ P.M.	3.15	7.90	25	5.30 P.M.	2.42	8.16	20		-7½		.73	
" 17	L.W.	5.57½ A.M.	2.35		15	6.02½ A.M.	1.65		25		-5		.70	.54
" 17	H.W.	11.55 "	11.10	8.75	45	12.05 P.M.	10.73	9.08	30	-10		.37		
" 18	H.W.	12.45 P.M.	11.15		25	12.40 "	10.72		20	+5		.43		.59
" 18	L.W.	6.40 "	2.65	8.50	25	6.35 "	1.90	8.82	20		+5		.75	
														1.73
						Navy Yard Gauge – No. 6.								.577
Sept. 14	H.W.	10.52½ A.M.	10.95		25	10.55 A.M.	12.60		25	-2½		-1.65		-1.555
" 14	L.W.	4.52½ P.M.	2.52	8.43	25	4.55 P.M.	3.98	8.62	20		-2½		-1.46	
" 15	H.W.	11.20 A.M.	11.33		40	11.27½ A.M.	13.06		25	-7½		-1.73		-1.585
" 15	L.W.	5.25 P.M.	2.36	8.97	20	5.30 P.M.	3.80	9.26	20		-5		-1.44	
				42.55				43.94						3.14
				8.51				8.79						1.57

The zero of the Pt. Shirley gauge is below the zero of the N.Y. gauge (No. 3)	.58
" " " " N.Y. (No. 3) " " " M.L.W.	1.51
" " " " Pt. Shirley " " " " (by comp. Gauge No. 3)	2.09
" " " " " " " " above the zero of the Navy Yard Gauge (No. 6)	1.57
" " " " N.Y. (No. 6) " " below M. L. W.	3.71
" " " " Pt. Shirley " " " " (by comps. Gauge No. 6)	2.14
" " " " " " " " " (by average of all obsns	2.11

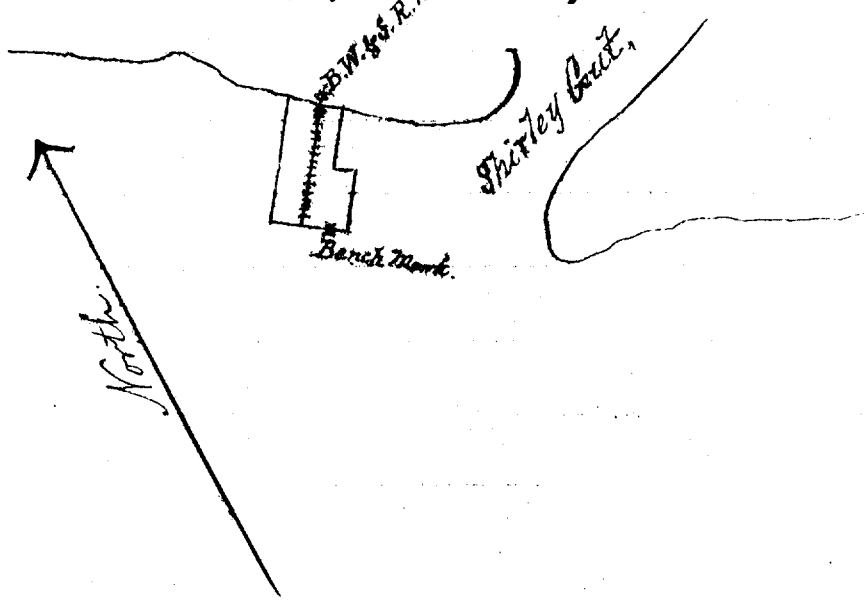
(For description of Bench Marks see sheet following).

Note – This gauge was established in order to connect Pt. of Pines gauge with Navy Yard gauge, but found not to be necessary. – The comparison is sent as it may sometime be of value.

Description of Bench Mark, Gauge No. 4.

Bench Mark consists of one large copper nail driven into N.W. face of pile (near S.E. corner of Point Shirley wharf) and a notch cut at same height in same pile. It is the first high pile from S.E. corner of wharf. The nail and notch forming the B.M. are 9.89 feet above M.L.W.

Sketch showing position of Bench Mark:-



Note. Tide gauges Nos 3 and 6 were referred to New Bench Mark of 1867, on west side of head of dry dock, which is 14.52 ft. above M.L.W.

Comparison of Tide Gauges
for
Difference of Elevation of Zeros.

Date, 1894	Tide	Point of Pines Gauge – No. 5. Time	Read'g	Range	Stand	Point Shirley Gauge No. 4. Time	Read'g	Range	Stand	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces.
					m.				m.					
Aug. 16	H.W.	11.25 A.M.	8.84		20	12.17½ A.M.	11.05		30	-2½		2.21		2.09
" 16	L.W.	5.10 P.M.	1.18	7.66	15	5.22½ P.M.	3.15	7.90	25		-12½		1.97	
" 17	L.W.	5.45 A.M.	0.42		10	5.57½ A.M.	2.35		15		-12½		1.93	2.04
" 17	H.W.	11.57½ "	8.96	8.54	15	11.55 "	11.10	8.75	45	+2½		2.14		
" 18	H.W.	12.35 P.M.	8.98		20	12.45 P.M.	11.15		25	-10		2.17		2.03
" 18	L.W.	6.37 "	0.76	8.22	25	6.40 "	2.65	8.50	25		-2½		1.89	

The zero of the Point of Pines gauge is above the Zero of the Pt. Shirley gauge 2.05

" " " " Pt. Shirley " " below M. L. W. 2.11

" " " " Pt. of Pines " " above " -.06

(See comparison of Point of Pines gauge with Navy Yard gauge direct by which M. L. W. reads on Pt. of Pines gauge .02, defining plane of reference used in our work).

Note – This comparison was found not to be necessary, the Point of Pines gauge being compared directly with the Navy Yard as shown in the foregoing.

Comparison of Tide Gauges for Difference of Elevation of Zeros.

Date 1894	Tide	Nahant Gauge No. 7. Time	Read'g	Range	Stand.	Salem Gauge "Eagre's" M. L. W. 5.14 Time	Read'g	Range	Stand.	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces
					m.				m.					
Sept. 26	H.W.	8.23 A.M.	12.48		15	8.23 A.M.	13.40		40	0		-.92		1.02
" 26	L.W.	2.10 P.M.	3.68	8.80	25	2.15 P.M.	4.80	8.60	35		-5		-1.12	
" 27	H.W.	9.20 A.M.	13.34		10	9.15 A.M.	14.20		35	+5		-8.6		1.00
" 27	L.W.	3.05 P.M.	3.26	10.08	15	3.15 P.M.	4.40	9.80	50		-10		-1.14	
				18.88				18.40						
				9.44	Diff. of range		.24	9.20						

The Zero of the Nahant Gauge is above the Zero of the Salem gauge 1.01 ft.

" " " " Salem " " below M. L. W. 5.14 "

" " " " Nahant " " " " of Salem gauge 4.13 "

Correction for ½ difference of range — .12 "

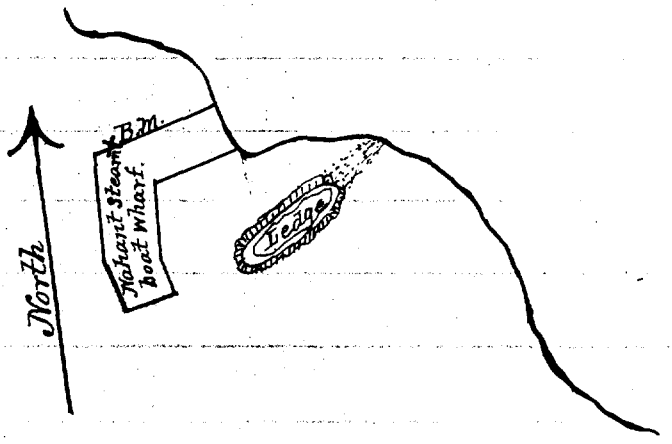
The Zero of the Nahant gauge is below M. L. W. 4.01 "

(For description of Bench Mark see sheet following).

Description of Bench Mark, - Gauge No. 7:-

Bench Mark consists of ten (10) nails driven in horizontal row in pile - the second one inshore from north corner of Nahant Steamboat Wharf - and is 10.99 feet above M. L. W.

Sketch showing position of Bench Mark -



Comparison of Tide Gauges
for
Difference of Elevation of Zeros.

Date, 1894.	Tide	Cat Island Gauge – No. 8. Time	Read'g.	Range	Stand	Salem (M.L.W. 5.14) Gauge – "Eagre's" Time	Read'g	Range	Stand	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces.
					m.				m.					
Sept. 26	H.W.	8.30 A.M.	10.51		20	8.23 A.M.	13.40		40	+ 7		2.89		3.04
" 26	L.W.	2.22 P.M.	1.61	8.90	25	2.15 P.M.	4.80	8.60	35		+ 7		3.19	
" 27	H.W.	9.10 A.M.	11.05		30	9.15 A.M.	14.20		35	- 5		3.15		3.08
" 27	L.W.	3.05 P.M.	1.39	9.66	15	3.15 P.M.	4.40	9.80	50		-10		3.01	
Oct. 8	L.W.	12.05 "	4.00		20	12.05½ "	7.10		30		0		3.10	3.05
" 8	H.W.	6.30 "	10.20	6.20	10	6.30 "	13.20	6.10	15	0		3.00		
" 12	H.W.	9.23 A.M.	9.75		20	9.28 A.M.	12.70		65	- 5		2.95		3.05
" 12	L.W.	3.27 P.M.	1.83	7.92	20	3.25 P.M.	4.90	7.80	40		+ 2		3.07	
				32.68				32.30						.18
				8.17	Diff.	of range	.10	8.07						3.05

The zero of the Cat Island gauge is above the zero of the Salem gauge 3.05 ft.

" " " " Salem " " below M.L.W. (Obsns of Lieut. Low) 5.14 "

" " " " Cat Island " " " " of Salem gauge 2.09 "

Correction for half difference of range −.05 "

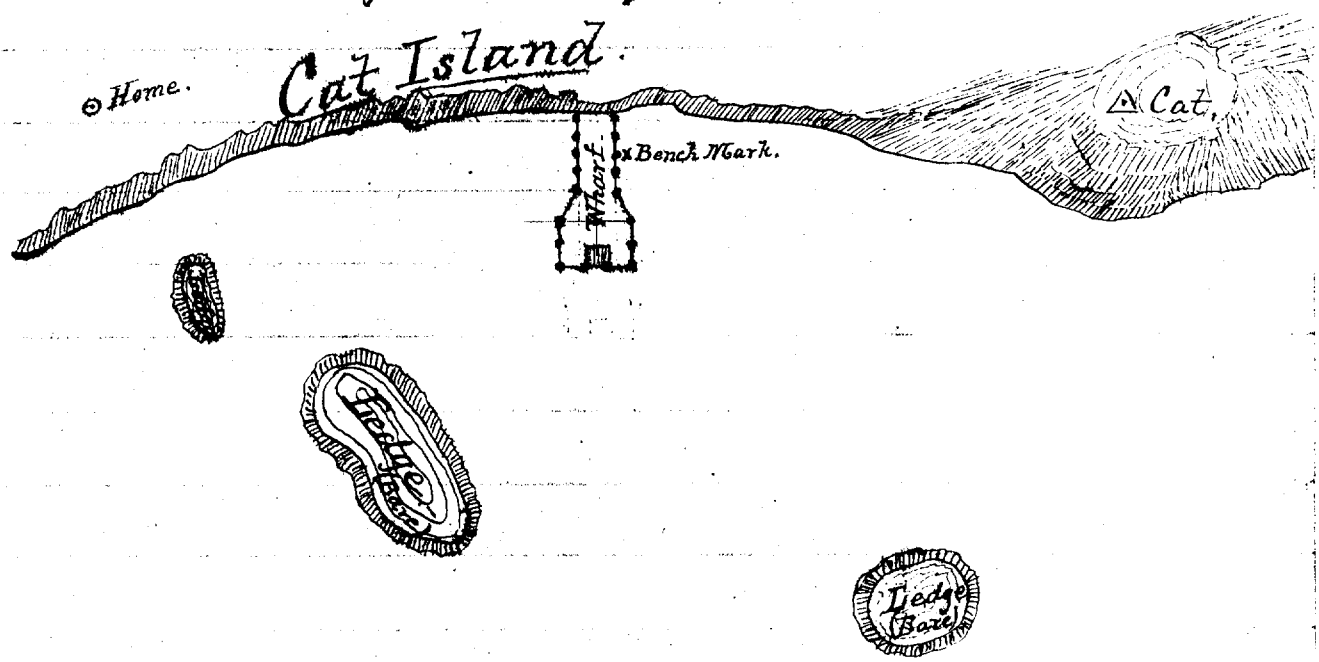
The zero of Cat Island gauge is below M.L.W. 2.04 "

(For description of Bench Mark see sheet following).

Description of Bench Mark, Gauge No. 8.

The Bench Mark consists of twelve (12) nails, in horizontal row, driven into pile on Southerly side of the wharf (the only wharf) on westerly side of Cat Island, off Entrance to Marblehead Harbor. B.M. is 9.96 feet above M.L.W.

Sketch showing position of Bench Mark –



Comparison of Tide Gauges
for
Difference of Elevation of Zeros.

Date, 1894	Tide	Cat Island Gauge No. 8. Time	Read'g	Range	Stand.	Nahant Gauge No. 7. Time	Read'g	Range	Stand.	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces
					m.				m.					
Sept. 26	H.W.	8.30 A.M.	10.51		20	8.22½ A.M.	12.48		15	+7½		-1.97		-2.02
" 26	L.W.	2.22 P.M.	1.61	8.90	25	2.10 P.M.	3.68	8.80	25		+12		-2.07	
" 27	H.W.	9.10 A.M.	11.05		30	9.20 A.M.	13.34		10	-10		2.29		-2.08
" 27	L.W.	3.05 P.M.	1.39	9.66	15	3.05 P.M.	3.26	10.08	15		0		1.87	.10
				18.56				18.88						2.05
				9.28	Diff. of range		.16	9.44						

The zero of the Nahant gauge is below zero of Cat Island gauge 2.05 ft.
" " " " Cat Island " " " M.L.W. by comp. with Salem " 2.04 "
" " " " Nahant " " " " of Cat Island " 4.09 "
Correction " " " " for ½ difference of range −.08 "
The Zero " " " " is below M. L. W. 4.01 "

(See sheet for comp. of Nahant gauge with Salem gauge direct).

Note — The reading of Plane of Reference for Nahant gauge obtained from this comparison agrees with that obtained by direct comparison with Salem gauge.

Comparison of Tide Gauges for Difference of Elevation of Zeros.

Date, 1894.	Tide	Nahant Gauge No. 7. Time	Read'g	Range	Stand	Navy Yard Gauge No. 6. Time	Read'g	Range	Stand	Diff. Time H.W.	Diff. Time L.W.	Diff. Read'g H.W.	Diff. Read'g L.W.	Mean of Diff'ces
					m.				m.					
Sept. 13	H.W.	10.10 A.M.	11.69		20	10.15 A.M.	12.15		30	-5		-.46		-.13
" 13	L.W.	4.02½ P.M.	4.25	7.44	25	4.20 P.M.	4.05	8.10	20		-17½		+.20	
" 14	H.W.	10.45 A.M.	12.17		25	10.55 A.M.	12.60		25	-10		-.43		-.13
" 14	L.W.	4.37½ P.M.	4.15	8.02	15	4.55 P.M.	3.98	8.62	20		-17½		+.17	
" 15	H.W.	11.20 A.M.	12.65		30	11.27½ A.M.	13.06		25	-7½		-.41		-.08
" 15	L.W.	5.20 P.M.	4.06	8.59	20	5.30 P.M.	3.80	9.26	20		-10		+.26	
" 17	H.W.	12.15 "	13.23		30	12.28 "	13.72		25	-13		-.49		-.05
" 17	L.W.	6.20 "	3.76	9.47	30	6.39 "	3.37	10.35	20		-19		+.39	
" 18	L.W.	6.50 A.M.	4.00		20	6.55 A.M.	3.85		30		-5		+.15	-.12
" 18	H.W.	12.53 P.M.	13.39	9.39	25	1.00 P.M.	13.78	9.93	25	-7		-.39		

The zero of the Nahant gauge is above the zero of the Navy Yard gauge .10 ft.
" " " " Navy Yard " " below M.L.W. 3.71 "
" " " " Nahant " " " " of Navy Yard gauge 3.61.
Correction for ½ difference of range .34 "
The zero of the Nahant gauge is below M.L.W. 3.95 "
(See comp. with Salem gauge by which M.L.W. reads 4.01 ft. which defines the plane of reference used in our work).

Note :- This comparison is given to show the difference in planes of reference as brought from Navy Yard and from Salem.

U. S. Coast and Geodetic Survey Steamer "A. D. Bache,"

Lieut. Robert G. Peck, U.S.N., Asst. C. & G. Survey, Chief of Party.

List of officers and crew attached to party during Summer Season, 1894; - Survey of Coast of Mass. :-

Lieutenants	1
Ensigns	3
P. Asst. Surgeon	1
Asst. Engineer	1
Pay. Yeoman	1
Master-at-arms 1st Cl.	1
Machinists	3
Ship's Writer	1
Carpenter's Mate	1
Boatswain's "	1
Quartermasters	3
Ship's Cook	1
Cabin Steward	1
" Cook	1
Second Class Firemen	4
Seamen	10
Mess Attendants	3
Total	37.

Hydrography :- Coast of Massachusetts :- Summer Season, 1894.

U.S. Coast and Geodetic Survey Str'r "A. D. Bache", Lt. Robert G. Peck, U.S.N. Comdg.

Recapitulation of Season's Work.

Sheet or Proj.	No. of Angles	No. of Soundings	No. of Miles.	
Sheet No. 2133	2,856	6,992	87.40	Scituate to Cohasset (Exam'n't'n)
" " 2129	965	3,522	39.10	Entrance to Lynn Harbor (")
Proj. No. 1	3,361	21,519	155.75	Lynn Harbor. (Reg No 2199)
" " 2	8,726	29,831	687.95	Nahant to Cat Island. (Reg No 2200)
Sheet No. 2146	484	1,597	10.90	Boston Harbor and Approaches (Exam'n't'n)
Grand total	16,392	63,461	981.10	

Signals.

Erected	Occupied.	Determined	Used.
7	45	125	135

Number of days on Station and how employed :-

Number of days on which hydrographic work was done	70
" " " " " " " " prevented by bad weather	22
" " " " " " " " " " other causes	14
" " Sundays	18
Total number of days on Station	124

Martin.

Hydrography:- Coast of Massachusetts:- Summer Season, 1894.-
Examination of Entrance to Boston Bay - Scituate to Cohasset.-
U.S. Coast and Geodetic Survey Steamer "A. D. Bache",
Lieut. Robert G. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date, 1894.	Day letter.	Vol.	Number of- Angles	Sound'gs	Miles-	Vessel	Observers:-
July 20	a	1	68	217	1.90	1st Whale boat	Lieut. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 21	b	1	102	258	3.60	"	" " " " "
" 23	c	2	132	223	6.00	"	" " " " "
" 25	d	2	208	428	9.20	"	" " " " "
" 26	e	2	222	574	8.50	"	" " " " "
" 27	f	2	36	145	1.20	"	" " " " "
" 30	g	2	148	416	4.90	"	" " " " "
" 31	h	1	136	484	4.30	"	" " " " "
Aug. 28	i	1	46	118	.65	"	" " " " "
" 29	k	1	48	119	.75	"	" " " " "
Total			1,146	2,982	41.00	"	" " " " "
July 20	a	1	64	96	2.00	2nd Whale boat.	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 21	b	1	93	181	2.80	"	" " " " "
" 23	c	2	86	135	2.00	"	" " " " "
" 25	d	2	168	348	7.00	"	" " " " "
" 26	e	2	156	357	4.50	"	" " " " "
" 27	f	2	92	148	1.60	"	" " " " "
" 30	g	2	157	282	2.30	"	" " " " "
" 31	h	1	136	275	4.00	"	" " " " "
Aug. 2	i	1	102	414	3.00	"	" " " " "
" 3	k	1	30	120	1.00	"	" " " " "
" 6	l	1	40	110	.90	"	" " " " "
" 28	m	1	56	150	1.30	"	" " " " "
" 29	n	3	86	198	1.50	"	" " " " "
" 31	o	3	38	162	1.20	"	" " " " "
Total			1,304	2,976	35.00	"	" " " " "
July 20	a	1	94	188	4.00	Stm. Launch	" " " " "
" 26	b	2	48	132	2.60	"	Lt. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 27	c	2	48	151	2.40	"	" " " " "
Aug. 2	d	2	14	17	.00	"	" " " " "
" 3	e	2	8	4	.00	"	" " " " "
" 4	f	2	38	19	.00	"	" " " " "
" 6	g	2	12	6	.00	"	" " " " "
" 29	h	1	92	239	1.20	"	" " " " "
Sept. 21	i	1	52	278	1.20	"	" " " " "
Total			406	1,034	11.40	"	" " " " "

Recapitulation.

1st Whale boat	1,146	2,982	41.00	1st Whale boat.	
2nd Whale boat	1,304	2,976	35.00	2nd Whale boat.	
Stm. Launch	406	1,034	11.40	Stm. Launch.	
Total on Sheet	2,856	6,992	87.40		

Martin.

Hydrography:- Coast of Massachusetts.- Summer Season, 1894.-
Examination of Entrance to Lynn Harbor.-
U.S. Coast and Geodetic Survey Steamer "A.D. Bache,"
Lieut. Robert G. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date 1894.	Day letter.	Vol.	Number of- Angles-	Soundings	Miles-	Vessel-	Observers-
Aug. 8	a	1	132	395	4.70	1st Whale boat	Lieut. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 9	b	1	46	131	1.70	"	" " " " " "
" 10	c	1	221	759	7.30	"	" " " " " "
Total			399	1,285	13.70	"	" " " " " "
Aug. 8	a	1	164	647	8.00	2nd Whale boat	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 9	b	1	30	189	1.30	"	" " " " " "
" 10	c	1	118	502	5.30	"	" " " " " "
" 14	d	1	102	347	5.30	"	" " " " " "
" 15	e	2	96	416	4.30	"	" " " " " "
" 17	f	2	22	49	.50	"	" " " " " "
Total			532	2,150	24.70	"	" " " " " "
Aug. 14	a	1	4	2	0.00	Stm. Launch.	Lt. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 20	b	1	30	85	.70	"	" " " " " "
Total			34	87	.70	"	" " " " " "

Recapitulation.

1st Whale boat	399	1,285	13.70	1st W. b.	
2nd Whale boat	532	2,150	24.70	2nd W. b.	
Stm. Launch	34	87	.70	Stm. L.	
Total on Sheet-	966	3,522	38.10		

Martin.

Hydrography :- Coast of Massachusetts :- Summer Season, 1894.

Survey of Lynn Harbor — Proj. No. 1.

U.S. Coast and Geodetic Survey Steamer "A.D. Bache",

Lieut. Robert A. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date, 1894.	Day letter.	Vol.	Number of — Angles	Soundgs	Miles.	Vessel.	Observers :-
Aug. 22	a	1	216	972	10.40	1st Whale boat	Lt. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 23	b	1	182	1101	9.50	"	" " " " "
" 24	c	2	176	1072	8.50	"	" " " " "
" 25	d	2	52	312	2.80	"	" " " " "
" 30	e	2-3	180	1336	10.90	"	" " " " "
" 31	f	3	118	723	5.50	"	" " " " "
Sept. 4	g	3	122	819	5.40	"	" " " " "
" 5	h	4	137	579	3.50	"	" " " " "
" 6	i	4	86	505	4.20	"	" " " " "
" 7	k	3	50	217	1.80	"	" " " " "
" 10	l	3	24	128	.90	"	" " " " "
" 11	m	4	34	140	.90	"	" " " " "
" 12	n	4	114	374	2.60	"	" " " " "
" 17	o	4	90	319	2.20	"	" " " " "
" 18	p	5	18	153	.90	"	" " " " "
" 19	q	5	98	235	1.75	"	" " " " "
" 20	r	5	48	216	1.50	"	" " " " "
Total			1,745	9,201	73.25	"	" " " " "
Aug. 22	a	1	120	1,140	8.80	2nd Whale boat	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 23	b	1	118	1,012	8.00	"	" " " " "
" 24	c	2	100	934	6.30	"	" " " " "
" 25	d	2	46	453	3.30	"	" " " " "
" 30	e	2	106	635	4.50	"	" " " " "
" 31	f	3	78	533	5.00	"	" " " " "
Sept. 4	g	3	134	1,002	7.30	"	" " " " "
" 5	h	3-4	108	964	6.30	"	" " " " "
" 6	i	4	110	925	7.50	"	" " " " "
" 7	k	4	76	422	2.30	"	" " " " "
" 8	l	4	62	467	2.30	"	" " " " "
" 10	m	5	34	225	1.30	"	" " " " "
" 11	n	5	112	730	3.00	"	" " " " "
" 12	o	5	118	680	4.80	"	" " " " "
" 13	p	5	80	410	2.30	"	" " " " "
" 17	q	6	64	336	2.00	"	" " " " "
" 18	r	6	100	607	3.00	"	" " " " "
" 19	s	6	98	553	2.50	"	" " " " "
" 20	t	6	52	290	2.00	"	" " " " "
Total			1,616	12,318	82.50	"	" " " " "

Recapitulation.

1st Whale boat	1,745	9,201	73.25	1st W. b.
2nd Whale boat	1,616	12,318	82.50	2nd W. b.
Total on Sheet	3,361	21,519	155.75	

Martin

Hydrography:- Coast of Massachusetts:- Summer Season, 1894.
Nahant to Cat Island - Proj. No. 2.-
U.S. Coast and Geodetic Survey Steamer "A.D. Bache,"
Lieut. Robert G. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date, 1894.	Day letter.	Vol.	Number of- Angles.	Soundgs	Miles.	Vessel.	Observers:-
Sept. 26	A	1	150	229	20.50	Str. "Bache"	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 27	B	1	158	235	18.20	"	" " " " "
Oct. 3	C	1	110	164	14.00	"	" " " " "
" 5	D	1	80	129	10.50	"	" " " " "
" 8	E	1	124	170	15.00	"	" " " " "
" 12	F	1-2	270	446	33.50	"	" " " " "
" 13	G	2	98	152	11.50	"	Ens. C.M. McCormick and P.Yeo. J.L. Dunn, U.S.N.
" 16	H	2	182	272	23.00	"	Ensigns Kline and McCormick, U.S. Navy.
" 17	I	2	90	134	11.00	"	" " " " "
" 18	K	2	168	273	22.00	"	" " " " "
" 19	L	2	228	412	23.00	"	" " " " "
" 20	M	3	96	128	10.00	"	" " " " "
" 22	N	3	180	315	24.00	"	" " " " "
" 23	O	3	238	370	32.00	"	" " " " "
" 24	P	3	58	81	6.00	"	" " " " "
Total-			2,230	3,510	274.20	"	" " " " "
Sept. 25	a	1	222	1,229	16.50	Stm. Launch	Lt. W.S. Benson and Ens. J.W. Oman, U.S. Navy.
" 26	b	1	302	1,388	24.50	"	" " " " "
" 27	c	2	222	864	18.50	"	" " " " "
Oct. 3	d	2	120	423	8.50	"	" " " " "
" 4	e	2	80	234	4.30	"	" " " " "
" 5	f	2	118	401	8.50	"	" " " " "
" 8	g	3	240	875	17.50	"	" " " " "
" 9	h	3	244	901	17.00	"	" " " " "
" 11	i	4	214	875	13.60	"	" " " " "
" 12	k	4	326	1,155	21.50	"	" " " " "
" 13	l	4	58	149	3.00	"	" " " " "
" 16	m	5	218	659	12.25	"	" " " " "
" 17	n	5	66	230	4.25	"	" " " " "
" 18	o	5	264	948	17.50	"	" " " " "
" 19	p	6	288	841	17.50	"	" " " " "
" 20	q	5	132	467	8.25	"	" " " " "
" 22	r	6	210	731	12.75	"	" " " " "
" 23	s	6-7	372	1,311	21.25	"	" " " " "
" 24	t	7	396	1,528	27.00	"	" " " " "
" 29	u	8	326	1,165	21.00	"	" " " " "
Nov. 1	v	8	340	1,073	23.00	"	" " " " "
" 2	w	9	354	954	20.25	"	" " " " "
" 3	x	9	20	72	1.00	"	" " " " "
" 6	y	9	24	82	1.10	"	" " " " "
Total-			5,156	18,555	340.50	"	" " " " "

Martin

Hydrography:- Coast of Massachusetts:- Summer Season, 1894.-
Nahant to Cat Island - Proj. No. 2.-
U.S. Coast and Geodetic Survey Steamer "A.D. Bache,"
Lieut. Robert A. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date, 1894.	Day letter.	Vol.	Number of- Angles.	Soundings.	Miles.	Vessel.	Observers:-
Sept. 24	a	1	106	828	6.00	1st Whale boat	Lt. W.S. Benson and Ens. J.W. Oman, U.S.N.
Oct. 1	b	1	88	529	4.25	"	" " " " " "
" 2	c	1	90	428	4.80	"	" " " " " "
" 3	d	1	42	281	2.20	"	" " " " " "
Total.			326	2,064	17.25	"	" " " " " "
Sept. 24	a	1	86	711	5.00	2nd Whale boat	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 25	b	1	152	1,308	9.50	"	" " " " " "
Oct. 1	c	2	68	467	3.30	"	" " " " " "
" 2	d	3	54	340	3.00	"	" " " " " "
" 3	e	2	68	530	4.00	"	" " " " " "
" 4	f	2	24	164	1.40	"	" " " " " "
" 9	g	2	74	495	4.50	"	" " " " " "
" 27	h	3	12	43	.30	"	" " " " " "
" 29	i	3	76	276	4.00	"	" " " " " "
Nov. 1	k	3	172	640	10.00	"	" " " " " "
" 2	l	3	190	586	9.50	"	" " " " " "
" 3	m	4	38	142	1.50	"	" " " " " "
Total			1,014	5,702	56.00	"	" " " " " "

Recapitulation.

Steamer "A.D. Bache"	2,230	3,510	274.20	"Bache"
Stm. Launch	5,156	18,555	340.50	Stm. Launch
1st Whale boat	326	2,064	17.25	1st W.b.
2nd Whale boat	1,014	5,702	56.00	2nd W.b.
Total on Sheet	8,726	29,831	687.95	

Hydrography :- Coast of Massachusetts :- Summer Season, 1894.-

Examination Boston Harbor and Approaches.-

U.S. Coast and Geodetic Survey Steamer "A.D. Bache,"

Lieut. Robert G. Peck, U.S. Navy, Asst. C. and G. Survey, Chief of Party.

Date, 1894.	Day letter.	Vol.	Number of- Angles	Soundgs	Miles.	Vessel-	Observers :-
Nov. 8	a	1	124	429	2.80	Stm. Launch	Lt. W.S. Benson and Ens. J.W. Oman, U.S.N.
" 12	b	1	202	618	3.50	"	" " " " " " "
Total			326	1047	6.30	"	" " " " " " "
Nov. 8	a		80	225	2.60	2nd Whaleboat	Ensigns G.W. Kline and C.M. McCormick, U.S.N.
" 12	b		78	325	2.00	"	" " " " " " "
Total -			158	550	4.60	"	" " " " " " "

Recapitulation -

Stm. Launch	326	1,047	6.30
2nd Whaleboat	158	550	4.60
Total on Sheet	484	1,597	10.90

U. S. Coast and Geodetic Survey Stmr. "A. D. Bache." [Form 11.—Statistics of Field Work.]

Statistics of Field Work executed by Lieut. Robert G. Peck, U.S.N.

Date and place of beginning field work, Between Scituate and Cohasset	July 19, 1894.
Date and place of closing field work, Entrance to Boston Harbor	Nov. 12, 1894.
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 remeasurements	
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	
GEODETIC LEVELING:	
Elevations determined by spirit-leveling of precision, number of	
Lines of geodetic 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	40.623
Number of miles (geographical) run while sounding	981.10
Number of angles measured	17,179.
Number of soundings	63,461.
Number of tidal stations established	8.
Number of specimens of bottom preserved	0.
Current stations, number of	0.
Hydrographic sheets finished, number of	1, original — 3, Special developments.
Hydrographic sheets, scales of	1 of $\frac{1}{5,000}$, 4 of $\frac{1}{10,000}$

Hydrographic sheets, limits and localities of:

Sheet no. 2133, Scituate to Cohasset (Examination).
" " 2129, Broad Sound - Entrance to Lynn Harbor. Examination
Proj. no. 1, Lynn Harbor.
" " 2, Nahant to Cat Island - including Marblehead Harbor.
Sheet no. 2146, Boston Harbor and Approaches (Examination).

PHYSICAL HYDROGRAPHY:

Number of soundings on cros-ssections	
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.:

2129
2129b

Diag. Cht. No. 1207-1

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. ..... Office No. 2129 2129b

LOCALITY

State Mass

General locality Broad Sound

Locality Boston Bay.

194 .....

CHIEF OF PARTY

LIBRARY & ARCHIVES

DATE .....

B-1870 1 (1)++

2129
2129b

2129

2129

U. S. COAST AND GEODETIC SURVEY.

T. C. Mendenhall, Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2129.

LOCALITY:

Broad Sound, Boston Bay.

Lee 2200

1892.

CHIEF OF PARTY:

Lt. L. M. Reynolds, U.S.N.

2129

2129

Write me at: Navy Yard, Washington, D.C.

Telegraph me at:

My Express Office is:

FEB 10 1893. 001937

Hydrographic Inspector

U. S. Coast and Geodetic Survey,

S.S. "Endeavor"

December 31st, 1892.

4—541

Dr. T. C. Mendenhall,
Superintendent of the Coast and Geodetic Survey
Washington D.C.

Sir:

The following report is to accompany Hydrographic Sheet No. 2129, Broad Sound, Boston Bay.

Broad Sound is the body of water lying north of the entrance to Boston Harbor and forms the entrance to Lynn Harbor Mass. The coast is bold and the depth of water with a few exceptions is great at the shore line. The landmarks most conspicuous in approaching from the seaward are, "Egg Rock" a light house on a large detached rock just east of "Nahant Head"; "Nahant Head" on

which is a church without spire, but separated from other buildings so that it cannot be mistaken;

"Groves Cliff", a bold headland on the west side of the Sound and on which is a group of cottages;

"Bass Rock" marked by a spindle, and "Slip Rock" marked by a horizontal staff-buoy, are easily made out at a distance of two or three miles and can be easily avoided, these are the only dangers.

The anchorage is off "Bass Point" to the westward in about three fathoms of water. The trade is limited, as during the course of this survey traffic was confined to a few fishing schooners and a few two and three masted schooners, coal laden. In all cases observed they were towed both in and out from the anchorage off and to the westward of "Bass Point".

The "Main Ship Channel" into Lynn Harbor, is practicably the same as shown on the last chart. The channel to the eastward of this shown on chart no 337 and known in locality as "Black Rock Channel", is not used being now almost closed at the upper end, just as it joins the "Main Ship Channel"; at low water these channels are distinctly outlined by a heavy growth of seaweed and kelp.

The bottom of this Sound is rocky, consisting of detached boulders gathered in clusters.

The limits of this survey precluded any examination as to the facilities for repairs of vessels or general information in regard to the harbor of Lynn.

Very respectfully,
S. R. Reynolds.
Lieut U. S. Navy, Comdg

H-2129 b

DEPARTMENT OF COMMERCE AND LABOR.

COAST AND GEODETIC SURVEY.

O. H. TITTMANN, SUPERINTENDENT.

BROAD SOUND APPROACH to BOSTON MASSACHUSETTS.

C. & G. S. S. BACHE.

W. C. Hodgkins, Chief of Party.

Begun November 10, 1909.

Ended November 20, 1909.

Scale 1:20000

Positions plotted by Wm. Sanger.

STATISTICS SHEET "K".

Date.	Letter.	Vol.	Angles.	Soundings.	Miles.	Boat.
1909.						
Nov. 10.	A	1	30	49	4.5	BACHE.
" 19.	B	1	70	75	4.3	"
Total.	2	1	100	124	8.8	"
Nov. 16	a	1	142	209	5.7	Launch 31.
" 20.	b	1	126	217	6.6	"
Total.	2	1	268	426	12.3	"

RECAPITULATION.

Stm. BACHE.	2	1	100	124	8.8	
Launch 31.	2	1	268	426	12.3	
GRAND TOTAL.	4	2	368	550	21.1	

Hyd. Sheet No 2129b Apr 19 1900

This spot is very well developed. The least water found was 28 feet

The wands are clear and well kept.

A L Simms

2129b

Department of Commerce and Labor
COAST AND GEODETIC SURVEY

O. H. Tittmann
Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2129b

LOCALITY:

Boston Bay, Broad Sound approach to Boston.

10,000

1909

CHIEF OF PARTY:

W. C. Hodgkins

B

DESCRIPTIVE REPORT

to accompany Hydrographic Sheet No.

Examination of a shoal spot in

BROAD SOUND APPROACH to BOSTON, MASSACHUSETTS.

Scale 1:20000

Surveyed in November, 1909.

by the party on the Steamer BACHE commanded by

Assistant W. C. Hodgkins.

This shoal spot is said to have been formed by the depositing here in excessive quantity of material dredged from the upper harbor.

As the dumping of similar material is constantly in progress a little outside of this spot, it is likely that other shoals may be formed in course of time.

Owing to its distance from the shore and to the hazy weather which prevailed at the time the work was in progress, it was difficult to see signals and the survey was correspondingly retarded.

From the soundings obtained, it would seem that the top of this shoal has washed away a little from the shoalest sounding previously reported. The roughness of the sea prevented the use of a sweep to check the soundings.

Tides were observed at Boston Light.

Respectfully submitted,

W. C. Hodgkins

Assistant, Coast and Geodetic Survey,
Commanding.

To the Superintendent,

Coast and Geodetic Survey,

Washington, D. C.

December 14, 1909.

2133 & 2134

2133 & 2134

Diag. Cht. No. 1207-1

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. ..... Office No. 2133-2134

LOCALITY

State Massachusetts

General locality Entrance to

Locality Boston Harbor

194 .....

CHIEF OF PARTY

LIBRARY & ARCHIVES

DATE .....

B-1870-1 (1)++

U. S. COAST AND GEODETIC SURVEY.

J. C. Mendenhall, Superintendent.

State: Massachusetts

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2133

LOCALITY:

Entrance to Boston Harbor, Mass.

1892.

CHIEF OF PARTY:

C. E. Vreeland, Lieut. Asst. Corps

U. S. COAST AND GEODETIC SURVEY.

J. C. Mendenhall, Superintendent.

State: Massachusetts

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2133

LOCALITY:

Entrance to Boston Harbor, Mass.

1892

CHIEF OF PARTY:

C. E. Pollard, Lieut. Comdr.

Description Report, Entrance to
Boston Harbor, Mass.

1. Entrance to Boston Harbor, Mass

2. The area to be surveyed on this
sheet is the same as that on the
original sheet # 7, Entrance to
Boston Harbor, Mass., and differs
from it only in scale. The description
report of this sheet is therefore the same
as that of sheet 7, which see.

Very respectfully,
C. G. Truland
Lieut. Asst C. & G. Survey.

Descriptive Report, Entrance to Boston Harbor, Mass. From Cedar Point on the South to Brush Island on the West, and Approaches.

1 - Entrance to Boston Harbor, Mass. Sheet 7. (For statistics see appended Form 11.)

2 - Sheet 7 includes Cohasset Harbor, Minots Ledge, the ledges off shore between Minots and Cedar Point, and the approaches for a distance of about 3 miles north and east. The general character of the locality is rocky and dangerous; the bottom is uneven and abounds in sunken ledges with deep water close to.

Cohasset Harbor is marked by the same characteristics. The inner harbor is safe, but unfortunately will admit vessels of only very light draught.

3 - No new information can be given under this head; but it may be proper here to direct attention to the

accuracy of the approach shown on U.S. Chart 334 - (Minots Ledge Light bearing S by E distant 2 3/4 miles) In the direction named Minots Ledge Light is nearly on range with Scituate Tower, and the bearing must therefore be a misprint or the rocks be greatly distorted.

4- The one channel leading to Cohasset mid harbor has from 5 to 6 feet of water at low tide, the shoalest water being just to the eastward of White Head Rock. The channel is a narrow one, and the services of a pilot are required. There is one regular pilot for the harbor, but the fishermen always to be found in the vicinity are proficient pilots and will render service.

There are no local tow boats.

5- The channels are of a permanent character - About 2 feet more of water was found on the outer bar

off White Head Rock than is shown by the old survey.
The channels do not cross shifting bars.
The general character of the bottom is sandy where it is not rocky.
There are no harbor improvements in progress, nor are any contemplated.
The usual anchorage in the outer harbor is just inside of Quaming Rocks, & between East and West Shag Rocks.
Small vessels that go inside are compelled to go to a dock, or to anchor in one of the holes dredged for the purpose.

6- The tides set fair with the harbor channel. To the eastward of North Scituate they set generally north and south. Around Minots Ledge they set about east and west.

7. The survey agrees in general with the old one. The notable results of the present work are the discovery

of shoaler water on some of the outlying ledges as follows:

a. That of 21 feet about 2¼ miles E½S from Umiats Ledge L. No., where a depth of 12 fathoms is shown on the chart.

b. That of 14 feet on Sea Pouch Rock, about 1 mile to N'd and E'd of Sciuate L. No., where a depth of 3¾ fathoms is shown.

c. The new location of the 4½-fathom shoal as indicated on chart 537, near Umiats Ledge (surveyed 1890), it being about ¼ of a mile to the westward of where shown.

d. The 11 foot rock about ⅜ of mile about E&NE of South Entering Rock, was found to have only 7 feet on it.

e. The channel leading to the inner harbor was found to have 3 feet least water, where 1 foot is shown on chart.

Marked discrepancies are noted between the shore line as determined by the party on board this vessel and that traced on the Office sheet, as follows:—

Commencing at the north east end of the harbor there is a discrepancy shown in positions from angle 26 to 36, K day. The shore line from angle 26 to 33 is rocky, with occasional bluffs, and follows the contour of the Office shore line, but at varying distances in shore of it, seeming as if a different assumption of the line of high water had been made. At angle 34 the Office shore line begins to diverge widely, evidently following the outer line of the marsh called "The Glades" on chart 337. Angles 31 to 42, M day, and 90 to 96, L day, were taken following the line of the marsh grass left by the last tide. "The Glades" are very level and cut up by a labyrinth of slues,

steep sided and at low tides having from 1 to 2 feet of water in them, and on ordinary tides the marsh is about flush with the water; but a small variation of the height of high water causes a large displacement in position of the high water mark.

In sketching the line of marsh grass, the tides being ordinary at the time, an estimate of the distance to the high wooded land back of marsh was given, and the line of high land sketched in lightly in pencil on the sheet.

The shore line as laid down by the Office corresponds fairly with the ends of boat lines.

The south shore line from angles 2 to 19, 1 day, is a narrow bar of sand which separates the main harbor from a low marsh, the latter extending back from 1/4 to 1/2 mile and being flooded at high water through sluices at either end of the sand bar (angles 2 & 19, 1 day).

This sand bar is dotted with fishermens huts, (one of which was used as a signal, called "Fish"), and is about 60 metres wide. For a distance of about 200 metres from the high water mark the bottom is covered with eel grass, with here and there a small rock. The fishermen say the water breaks over this sand bar at unusually high tides during northerly gales. The ordinary high water mark is about 200 metres further inland than shown on projection furnished by the Office.

This sandy point at angle 11, 1 day, is very well defined, high and steep, and varies materially in position from that shown on the sheet; but positions 17 and 18 of day of boat work run well inside of Office position, and serve to confirm our shore line.

From angle 22 to 66, 1 day, the shore line is indicated in pencil, and the Office line lies off shore of positions as determined

by the Blake's party, which agreeing closely with the positions of ends of boat lines. The two lines together seem to mark the limits of a marsh extending out from sea wall. At high water the water laps the sea wall, which our angles define.

Between angles 59 and 60, 1 day, no signals were visible and no positions could be obtained, but the intervening line was sketched carefully.

From angle 66 to 74, 1 day, the Office shore line again lies outside of shore line as shown by our records, and the ends of the boat lines again seem to agree with the Office line. The character of the land is indicated in the sketches in the record.

From angle 74 to 89, 1 day, and 29 to 1 4m day, the shore line as determined by us varies considerably from the Office shore line, sometimes being in shore and sometimes off shore

from it, but showing an average error of the Office line to the northward and eastward: this is notably the case at White Head Rock.

Confirmation of the shore line as determined by us is found in the endings of boat lines run on different days, and also by a comparison of the remarks in the sounding books opposite angles 1 and 2, E' day; angles 1 and 6, A day, whaleboat; and angle 19, G day, steam launch.

Southwest of White Head Rock on the projection is noted another island, indicated on chart 557 as marsh. A special examination was made of this locality and resulted in the discovery of a small rock at angle 68 F' day, whaleboat, standing about 4 feet out of water at low tide. Two of the boat lines, angles 1 to 2 and 11 to 12, E' day, run directly over the island and, while showing minus soundings,

indicate no marked rise in the bottom at that place.

Between angles 8 and 13, inday, is a marked discrepancy. At this place there is quite an indentation, at the bottom of which a narrow slue opens out into a large bay, the "Old Harbor". No boat lines were run down this slue, and the only verification of the shore line determined by our angles lies in the position of a Mill, located by theodolite angles and agreeing with its position as indicated in the sketch of coast line.

From angle 8 to 1, inday, no very marked discrepancy occurs.

At Brush Island the high water area as determined by our angles is very much less than that shown in black on the sheet. To the southward of Brush Island position 70, e' day, marks a detached rock noted in remarks as connected with

Brush I'd at low water. This seems to agree with the southern end of Brush I'd as drawn in black ink and it is possible the low water area of the island is the one shown on the projection. On such a supposition the two contours will be found not to differ materially.

8. No new information obtained.

9. No new information obtained.

10. The locality is a dangerous place for a wreck, as, generally, a stranded vessel will not survive a storm. There is one U.S. Life Saving Station situated at North Scituate; also four stations of the Mass. Humane Society — one in Cohasset Harbor, just inside of White Head Rock; one at Strawberry Point; one on the beach inside of Haggard's Rocks; and one on Cedar Point near the old light house of Scituate Harbor.

The Boston hospitals are probably the nearest in point of time.

11. No information obtained.

12- As Cohasset is so near the harbor of Boston there is very little demand for supplies. Small yachts, tugs &c may obtain coal and wood at the wharf in sufficient quantities to supply immediate requirements.

13- There are several wharves at Cohasset, but at low tides most of the bottom is dry- Vessels lie in holes, alongside the wharves, dredged for the purpose. The wharf at the preservation belonging to the Light House Service has about 5 feet at low tide

14- No weather service or time ball.

15- No branch hydrographic office nearer than Boston.
No information covering other items under this head was obtained.

16- None.

17- No passenger steamers.
A branch of the Old Colony R.R. runs along the coast with stations at Scituate, N. Scituate, Green

Cohasset; at which places there are also post offices and telegraph stations.

18. No port of entry.

19. The towns and villages in this vicinity are mostly inhabited by the families of fishermen and summer cottagers.

Regular communication with other places may be had only by the Old Colony R.R.

20-21. Call for no special remark.

Attention is requested to the record in the sounding books for names of rocks not mentioned on the published charts.

Very respectfully,
C. G. Vreeland,
Lt. U.S. Asst. C. & G. Survey.

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

Statistics of Field Work executed by W. I. Blake

Date of beginning field work July 11th 1892

Date of closing field work September 21 1892

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	305
Number of miles (geographical) run while sounding	426.4
Number of angles measured	7420
Number of soundings	28645
Number of tidal stations established	2
Number of specimens of bottom preserved	
Current stations, number of	
Hydrographic sheets finished, number of	3
Hydrographic sheets, scales of #7 1/40000 #7A 1/5000 #7B 1/20000	

Hydrographic sheets, limits and localities of:

#7 - Lat 42° 12' to 42° 19' W
Long 70 " 42 " 70 " 48 W

#7A Lat 42 " 14 " 15 " 42 " 16 " 15 W
Long 70 " 45 " 70 " 50 W

#7B Lat 42 " 11 " 30 " 42 " 19 " 30 W
Long 70 " 36 " 70 " 37 W

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.:

2134

Diag. Cht. No. 1207-1

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. ..... Office No. 2134

LOCALITY

State Mass.

General locality Cohasett

Locality Harbor

1892

~~194~~

CHIEF OF PARTY

C. G. Vreeland.

LIBRARY & ARCHIVES

DATE .....

B-1870-1 (1)++

2134

2134

See descriptive Report Sheet No. 2133.

U. S. COAST AND GEODETIC SURVEY.

T. C. Mendenhall, Superintendent.

State: Massachusetts

DESCRIPTIVE REPORT

Hydrographic Sheet No. 2134

All 2133

LOCALITY:

Cohasset Harbor,
Mass

1892.

CHIEF OF PARTY:

C. E. Vreeland Lt USN Asst Coast Survey

Descriptive Report, Cohasset Harbor, Mass.

1. Cohasset Harbor, Mass.

2. The Chart comprises Inner and Outer Cohasset Harbors and outlying rocks from Minot Ledge on the East to Brush Island on the West.

The Inner area is included in Chart # 7, the Descriptive Report of which embraces all that can be said of Cohasset Harbor.

Very Respectfully
C. E. Truland
Lieut. Asst. C. & G. Survey.

2146

Diag. Cht. No. 1207-1

Department of Commerce and Labor
COAST AND GEODETIC SURVEY
T C Mendenhall
W W Duffield
Superintendent.

State: Mass

DESCRIPTIVE REPORT.

Hydc Sheet No. 2146

LOCALITY:

Boston Bay
also
Appl. S.H.B. 2129
Re Case H 4544

1892 · 94
~~190~~

CHIEF OF PARTY:

P S Peck

U. S. COAST AND GEODETIC SURVEY.

T. C. Mendenhall, Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hydrographic *Sheet No.* 2146

LOCALITY:

Boston Harbor

1892

CHIEF OF PARTY:

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

U. S. Coast and Geodetic Survey.

T. C. Mendenhall, Superintendent.

Massachusetts.

Descriptive Report -
Hydrographic Sheet no. 2146

Boston Harbor —

1892

Edward M. Hughes, Lieut. U.S.N., Chief of Party

Write me at: .....

Telegraph me at: .....

My Express Office is: .....

U. S. Coast and Geodetic Survey, Stmr. Bache.

Navy Yard, New York,

February 24th, 1893.

2—547

Dr. T. C. Mendenhall,

Superintendent U. S. Coast and Geodetic Survey.

Sir;

I have the honor to submit the following descriptive report, to accompany hydrographic sheet (numbered 4 on scheme for the resurvey of Boston Harbor, Mass., 1892.) forwarded this day by registered mail. Attached to this report, marked A., is a piece of chart no. 109, exhibiting the scheme above referred to, with the numbers of the included sheets

The hydrography in question was executed between July 11. and September 30. 1892, the limits of the sheet being the parallels 42° 18' 15" and 42° 22' 15", N., and the meridians 70° 49' 20" and 70° 58' 50", W.

The following statistics are appended hereunto;-

B – General Field Work, Bache's Party (Form 11.)

C – Daily " " , Launch no. 22.

D – " " " , 1st whaleboat.

E — " " " , 2d. Whaleboat
F — " " , Steamer Bache, & Recapitulates
G — Complement of Bache, etc.

For the entire resurvey of Boston Harbor and its approaches, seven hydrographic sheets were prepared, of which no's 1 and 2, covering the inner harbor, were assigned to the Eagle Lieutenant W. H. Low, U.S.N. Comdg., and reference is respectfully asked to his report for information on most of the subjects scheduled in the Superintendent's circular of July 3. 1890.

In view of the detailed and full information concerning Boston Harbor and its vicinity which has already been acquired by the office, attention is asked to the following points only, in connection with the work within the limits of sheet no. 4.

Tides

Under instructions from the office, all soundings on sheets no's 4 and 6 were corrected from the readings of a single tide gauge, which was established at Fort Warren, Boston Harbor.

The gauge was a fixed, plain one of wood, with the numbers increasing with the rise of tide; it was placed on the south side of the wooden wharf making out to the westward from the W. side of George's Id., being fixed to a wooden pile projecting about three feet above the wharf, just outside the stringer, and between the outer end of wharf and an inclined boat-landing built into that structure (See sketch in tide-books.) A B-M was established by driving ten iron 10 d. nails into pile in a horizontal line abreast the ten ft. (10.00 ft.) mark on gauge.

The Fort Warren gauge, which was numbered 1, was connected with the main tide gauge at the Boston navy yard, with the following result

(See following page)

July 27th, 1892.

Boston Navy Yard			Fort Warren		
L. W.	7 31 a m	5.3 ft	L. W.	7 32 a m	3.2 ft
H. W.	1 49 p m	15.5 "	H. W.	1 44 p m	12.8 "
L. W.	7 55 "	6.3 "	L. W.	8 02 "	4.1 "

Zero of Navy Yard gauge is below m. l. w. 5.8 ft

" " Ft. Warren " " above zero of Navy Yard gauge, 2.4 "

" " Ft. Warren " " below m. l. w. 3.4 "

Plane of reference used reads 3.4 on gauge.

Between July 14. and Sept. 30, 1892, the mean of 27 readings of high waters (not consecutive) is 12.7 ft, and the mean of 30 readings of low water (not consecutive) is 4.1 ft — giving a mean range of tide at Fort Warren of 8.6 ft. A better result is probably obtained, however, from a consideration of 38 h. w. readings and 38 l. w. readings, between same dates, of which 12 h. w's and 6 l. w's are well founded interpolations — which would seem to yield the following:—

Mean Rise and Fall of Tides, 8.41 ft

" " " " " Spring Tides, 9.62 "

" " " " " Neap " , 7.21 "

Changes

But little change was noted in the shore-line of islands, etc., falling within the limits of sheet no. 4, much of such parts as are subject to erosion having been protected by granite sea-walls. This sheet includes so much shore-line, that, in view of the limited time at my disposal, amount of rise and fall, etc., it was not practicable to end many of the lines of soundings at h.w. mark.

In Shirley Gut, the n. end of Deer Id. appears to have been built out, as indicated by the positions on end of boat-lines.

In The Narrows, the W. knuckle of Lovell's Id., abreast the E. end of Lallup's Id., does not extend quite so far out as shown by the pencilled outline on the sheet when received from the office.

A large appropriation ($300,000) became available last summer, for the improvement (under the direction of the U.S. Engineer in charge of that District) of the harbor of Boston and its vicinity, and I understand that a further deepening and straightening of the main ship channel is contemplated, the work to extend somewhat to seaward of the Narrows Light.

A depth of but 19 ft. was found on 3½ Fathom Ledge, where chart shows 3½ fathoms.

A depth of but 3½ ft. was found, about 230 metres to N^d and E^d of the outer Roaring Bull, where 7 ft. is shown on chart.

But 10½ ft. was found between Alderidge's Ledge and Half Tide Rocks, where 13 ft. is shown on chart.

A depth of but 5 ft. was found on Toddy Rock, where chart shows 11 ft.

But 16½ ft. was found on Maffitt's Ledge, where 18 ft. is shown on chart.

In a number of instances (see following list) the shoalest depths found were greater than those shown on chart. Where the discrepancy and conditions warrant it, it is recommended that a further search be made for these spots next season, when work on sheet no. 5 is begun.

Place	Depth shown on chart	Least depth found	Recommendation
E. of Winthrop Head buoy no. 2 about 900 metres W. N. W. from Commissioners Ledge	14 / 17	16 / N^t found	Re examine / do
Nantasket Roads buoy no 6	13	16	do
Hunts Ledge	13 14	15	do

(List continued)

Place	Depth shown on chart	Least depth found	Recommendation
Commissioners Ledge	15	16½	Did not locate Commissioners Ledge 16½ is new Rock
Prolongation of Great Gaun ledge, about 500 metres to Ed of buoy no. 2	✓11	13	
The Centurion buoy no. 2	✓18	19	
" " " " 5	✓18	14	Re examine
About 350 metres SSE from Boston Light	✓15	not found	do
Boston Ledge buoy no. 6	✓17	24	do
Between Egg Rocks and Boston Ledge buoy no. 6	✓18	~~22~~ 14	~~do~~
Same	✓13	21	do

Dangers

The dredged channel between Long Island Head and Nix Mate is very narrow, and, as the buoys are now placed, the western side of cut is nothing to the westward of a line drawn from buoy no. 1 to buoy no. 3. About Aug. 1. 1892, the quarantine tug Vigilant, drawing 9 ft., reported having touched at low water, at a point 75 ft East of buoy no. 1, but a careful examination failed to reveal so little water at the point indicated.

The 10 ft. shoal in the bight of Lovell's Island, in the Narrows, although well known, is a source of trouble to many coasters, several having brought up on it during the progress of the work last season. As little as 10 feet of water is found at a distance of 180 metres from the shore-line of this island

Landmarks.

The gilded dome of the House of Correction on Deer Island, (O Cup on sheet no. 4), is very prominent, and should be indicated on the chart, as a mark for vessels in Broad Sound.

The water-tank or tower on Strawberry Hill should be indicated in like manner, but the position of this point, falling on sheet no. 5, cannot be accurately given.

Miscellaneous

Weather service cautionary signals are shown from Nantasket Hill – commonly known as Telegraph Hill. At this point is to be found the only regular telegraph station within the limits of sheet no. 4. (During the summer season only, a telegraph office is maintained at the Pemberton Hotel, Windmill Point)

Post-offices are established at Hull and Point Allerton.

During the summer season, a frequent service daily, both of steamboats and trains, is maintained between Hull, Nantasket, Boston, etc. The terminus of the railroad is at Pemberton Landing. Boats call, as per schedule, either at Pemberton Landing or Hull. During the winter the number of steamboat trips is greatly decreased, a morning and evening service only being provided. This winter (1892-3), for the first time, railway service was not to be discontinued between Boston and Hull, the Old Colony R.R. Co. having announced its intention to run trains to Hull throughout the year.

Fresh water may be obtained at the Pemberton steamboat landing (Windmill Point) from the Hingham Water Co., at about 30¢ per 1,000 gallons.

4/22/93

(Superintendents office is at Hingham, Mass.)

Very respectfully

Edwd. M. Hughes

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

Comdg. Bache.

U. S. Coast and Geodetic Survey,
T. C. Mendenhall, Superintendent.

Projection no. 4.
Scale 1-10,000.

Boston Harbor, Mass., from 42°18'15" to 42°22'15", N. Lat.,
and from 70°49'20" to 70°58'50", W. Long.

Begun July 11th., 1892,
Ended Sept. 30th., 1892.

Lieut. Edw'd M. Hughes, U.S.N., Asst., Chief of Party.

Observers.	Recorders.	Leadsmen.
Lt. W. L. Burdick, U.S.N.	Thos. S. Martin, P. Yeo.	Olai Iversen, B. Mate,
Ens. H. Rodman, " .	Dr E. Barry, Apothy.	O W. Keiskenen, Qrmr,
" G W Kline, " .	E. P. Ellis, Draughtsman.	J. T. Egestol, " .
" J. W. Oman, " .	James Proctor, Sea.	
Mr J. L. Dunn, " .		
Thos S. Martin, P. Yeo.		

U. S. COAST SURVEY,
STEAMER A. D. BACHE.

B.

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

Statistics of Field Work executed by Lieut. Edwin M. Hughes, U.S.N., Asst.

Date of beginning field work	July 11th., 1892.
Date of closing field work	Sept. 30th., 1892.
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	

U. S. COAST SURVEY
STEAMER A. D. BACHE.

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	24.
Number of miles (geographical) run while sounding	795.35
Number of angles measured	13,845.
Number of soundings	45,837.
Number of tidal stations established	1.
Number of specimens of bottom preserved	
Current stations, number of	
Hydrographic sheets finished, number of	1.
Hydrographic sheets, scales of	1-10,000

Hydrographic sheets, limits and localities of:

Boston Harbor, Mass., Proj. No. 4.
From Lat. 42° 18' 15" to 42° 22' 15", North - and
" Long. 70° 49' 20" " 70° 58' 50", West

C.

Stm. Launch no. 22.

Hydrography :- Boston Harbor, Mass., Summer Season, 1892.

U.S. Coast and Geodetic Survey Str. A.D. Bache, Lt. Edw'd M. Hughes, U.S.N., Comdg.

Date, 1892.	Day Letter.	Book.	Naut. Miles.	Soundings.	Angles.	Vessel or boat.	Observers.
July 14	a	1	23.60	664	196	Stm. launch.	Lt. W. L. Burdick & Ens. J. W. Oman.
" 15	b	1	18.00	573	170	"	do. " do.
" 16	c	1	8.60	288	86	"	do. " do.
" 18	d	1-2	26.70	1047	246	"	do. " do.
" 19	e	2	28.50	904	292	"	do. " do.
" 20	f	2	24.20	1025	278	"	do. " T. S. Martin, P. Yeo.
" 21	g	3	26.60	959	280	"	do. " Ens. Oman.
" 22	h	3	25.00	936	236	"	do. " do.
" 26	i	3-4	21.50	746	254	"	do. " do.
" 27	k	4	22.80	987	284	"	do. " do.
" 28	l	4	15.10	548	204	"	do. " do.
" 30	m	4	3.00	131	32	"	Ensigns H. Rodman & G. W. Kline.
July totals,			243.60	8,808	2,558	"	
Aug. 9	n	5	4.20	201	88	"	Lt. Burdick & Ens. Oman.
" 12	o	5	3.80	160	96	"	do. " do.
August totals,			8.00	361	184	"	
Sept. 3	p	5	5.50	258	112	"	Lt. Burdick & Ens. Oman.
" 9	q	5	7.00	427	126	"	do. " do.
" 13	r	5	11.50	567	190	"	do. " do.
" 15	s	6	12.60	729	222	"	Ens. Oman & Thos. S. Martin, P. Yeo.
" 16	t	6	11.30	431	240	"	Lt. Burdick & Ens. Oman.
" 21	u	6	9.00	525	206	"	do. " do.
" 23	v	6	3.00	123	70	"	do. " do.
" 28	w	7	5.60	275	100	"	Ens. Kline & Mr. Dunn.
" 30	x	7	.60	88	24	"	do. " do.
September totals,			66.10	3,423	1,290	"	

Recapitulation.

July	243.60	8,808	2,558	"
August	8.00	361	184	"
September	66.10	3,423	1,290	"
Totals, Stm. launch	317.70	12,592	4,032	"

U. S. COAST SURVEY, STEAMER A. D. BACHE.

1st. whale-boat.

D.

Hydrography:- Boston Harbor, Mass., Summer Season, 1892.

U.S. Coast and Geodetic Survey Str. A.D. Bache, Lieut. Edwd M. Hughes, U.S.N., Comdg.

Proj. no. 4.

Date, 1892	Day letter.	Book.	Naut. miles.	Soundgs	Angles.	Vessel or Boat.	Observers.
July 14	a	1	9.00	563	152	1st. W. boat.	Ens. G.W. Kline and Mr. J.L. Dunn.
" 15	b	1	11.10	737	206	"	do. " do.
" 16	c	1	4.40	297	90	"	do. " do.
" 18	d	1-2	11.60	731	180	"	do. " do.
" 19	e	2	15.00	914	232	"	do. " do.
" 20	f	2	14.60	765	270	"	do. " do.
" 21	g	2-3	15.00	851	236	"	do. " do.
" 22	h	3	11.70	565	190	"	do. " do.
" 26	i	3	7.20	442	136	"	do. " do.
" 27	k	3	13.30	559	212	"	do. " do.
" 28	l	4	7.40	584	128	"	do. " do.
" 30	m	4	2.80	233	92	"	Lt. W.L. Burdick " Ens. J.W. Oman.
July totals.			123.10	7,241	2,124	"	
Aug. 3	n	4	2.60	275	84	"	Ens. H. Rodman and Mr. Dunn.
" 5	o	4	3.40	309	86	"	" Kline " do.
" 6	p	4	9.10	785	170	"	" do. " do.
" 9	q	5	3.80	412	102	"	" do. " do.
" 10	r	5	8.50	719	172	"	" do. " do.
" 12	s	5	.70	55	12	"	" do. " do.
" 15	t	5	10.30	793	190	"	" do. " do.
" 16	u	6	4.80	434	154	"	" do. " do.
" 17	v	6	5.00	388	94	"	" do. " do.
" 18	w	6	4.80	444	120	"	" do. " do.
" 19	x	6	6.20	411	136	"	" do. " do.
" 22	y	6	5.30	418	118	"	" do. " do.
" 25	z	7	1.70	123	40	"	" do. " do.
" 29	a'	7	8.40	806	170	"	" Oman " do.
" 30	b'	7	7.00	745	144	"	" Kline " do.
" 31	c'	7	5.00	512	118	"	" do. " do.
August totals			86.60	7,629	1,910	"	
Sept. 1	d'	8	3.20	294	96	"	Ens. Kline and Mr. Dunn.
" 2	e'	8	1.10	99	50	"	do. " do.
" 3	f'	8	6.00	400	162	"	do. " do.
" 7	g'	8	4.40	395	94	"	do. " Thos. S. Martin, P. Yeo.
" 8	h'	8	5.40	481	116	"	do. " Mr. Dunn.
" 9	i'	8	5.80	329	118	"	do. " do.
" 13	k'	9	4.10	260	80	"	do. " do.
" 15	l'	9	6.25	587	140	"	do. " do.
" 16	m'	9	6.00	512	158	"	do. " do.
" 19	n'	9	10.20	487	208	"	do. " do.
" 20	o'	9	.70	55	18	"	do. " do.
" 21	p'	10	5.10	421	160	"	do. " do.
" 22	q'	10	6.30	504	158	"	do. " do.
" 23	r'	10	6.30	384	164	"	do. " do.
" 28	s'	10	1.10	62	34	"	do. " do.
September totals			71.95	5,270	1,756	"	

Recapitulation.

July	123.10	7241	2124	"
August	86.60	7629	1910	"
September	71.95	5270	1756	"
Totals, 1st. w.b.	281.65	20,140	5,790	"

U.S. COAST SURVEY. STEAMER A.D. BACHE.

2nd. Whale-boat.

E.

Hydrography:- Boston Harbor, Mass., Summer Season, 1892.
U.S. Coast and Geodetic Survey Str. A.D. Bache, Lt. Edwd. M. Hughes, U.S.N., Comdg.
Proj. no. 4.

Date, 1892.	Day Letter.	Book	Naut. miles.	Soundgs.	Angles.	Vessel or boat.	Observers.
Aug. 3	a	1	2.30	241	102	2d. w.b.	Lt. W.L. Burdick & Ens. J.W. Oman.
" 4	b	1	5.50	570	200	"	do. " do.
" 6	c	1	6.10	513	162	"	do. " do.
" 9	d	1	3.70	279	112	"	do. " do.
" 10	e	1-2	7.20	406	220	"	do. " do.
" 12	f	2	1.80	204	72	"	do. " do.
" 15	g	2	7.80	555	261	"	do. " do.
" 16	h	2	8.10	518	160	"	do. " do.
" 18	i	2	9.30	663	140	"	do. " do.
" 19	k	3	10.90	793	158	"	do. & Thos. S. Martin, P.A.
" 22	l	3	7.30	697	184	"	do. " Ens. Oman.
" 25	m	3	4.80	427	82	"	do. " do.
" 29	n	4	12.75	848	196	"	do. " T.S. Martin.
" 30	o	4	10.00	710	174	"	do. " Ens. Oman.
" 31	p	4	6.10	670	112	"	do. " do.
August totals.			103.65	8,094	2,335	"	
Sept. 1	q	5	5.80	491	116	"	Lt. Burdick & Ens. Oman.
" 2	r	5	1.25	182	68	"	do. " do.
" 3	s	5	2.20	270	66	"	do. " do.
" 7	t	5	2.70	427	98	"	do. " do.
" 8	u	5	6.00	560	120	"	do. " do.
" 19	v	6	3.50	315	140	"	do. " do.
" 21	w	6	.60	70	28	"	do. " do.
" 23	x	6	2.60	353	128	"	do. " do.
" 28	y	6	2.90	351	90	"	Ens. Oman " T.S. Martin.
" 29	z	6	3.10	438	154	"	Lt. Burdick " Ens. Oman.
" 30	a'	6	1.80	196	54	"	Ens. Oman " T.S. Martin.
September totals.			32.45	3,653	1,062	"	

Recapitulation.

August,	103.65	8,094	2,335	"
September,	32.45	3,653	1,062	"
Totals, 1st. w.b.	136.10	11,747	3,397	"

U.S. COAST SURVEY
STEAMER A. D. BACHE.

Ship - Recapitulation - Signals.

F.

Hydrography :- Boston Harbor, Mass., Summer season, 1892.
U.S. Coast and Geodetic Survey Str. A.D. Bache, Lt. Edw'd M. Hughes, U.S.N., Comdg.
Proj. no. 4.

Date, 1892.	Day letter.	Book.	Naut. miles.	Soundings.	Angles	Vessel or boat.	Observers.
Sept. 22	A	1	31.00	563	304	Bache.	Lt. W.L. Burdick & Ens. J.W. Oman.
" 29	B	1	28.90	795	322	"	Ens. G.W. Kline & Mr. J.L. Dunn.
Total, Ship			59.90	1,358	626	"	

Recapitulation, by boats.

A.D. Bache,	59.90	1,358	626	Bache	
Stm. Launch,	317.70	12,592	4,032	Launch	
1st. whale-boat,	281.65	20,140	5,790	1st. w.b.	
2nd. do.	136.10	11,747	3,397	2d. w.b.	
Total, Season	795.35	45,837	13,845	All.	

Recapitulation, by months.

July,	366.70	16,049	4,682	All boats.	
August,	198.25	16,084	4,429	"	
September,	230.40	13,704	4,734	"	
Total, Season	795.35	45,837	13,845	"	

Signals.

Erected.	Occupied.	Determined.	Used.	Angles measured.
12.	33.	36.	45.	654.

U. S. COAST SURVEY,
STEAMER A. D. BACHE.

G.

Hydrography:- Boston Harbor, Mass., Summer season, 1892.
U.S. Coast and Geodetic Survey Str. A.D. Bache, Lt. Edwd M. Hughes, U.S.N., Comdg.
Proj. no. 4.

Number of days on Station, and how employed:-

Number of days on Station,	82
" " " " which hydrographic work was done	46
" " " " " signals were built	3
" " " " " hydro. work was prevented by bad weather	17
" " " " " " " " " " other causes	16

List of officers and men attached to party:-

Rates.	No.
Lieutenants	1
Ensigns (1 detached Aug. 4th., 1892.)	3
Asst. Engineer	1
Apothecary (detached July 28th., 1892.)	1
Master-at-Arms	1
Draughtsman	1
Paymaster's Yeoman	1
Machinists	3
Ship's Writer	1
Carpenter's Mate	1
Boatswain's "	1
Quartermasters	4
Ship's Cook	1
Cabin Steward	1
" Cook	1
Second-Class Firemen	4
Seamen	14
Landsmen	3

U. S. COAST SURVEY, STEAMER A. D. BACHE.

MASSACHUSETTS BAY

COAST CHARTS 109 & 110

Boston Harbor

Topography by H.L.WHITING J.B.GLUCK A.M.HARRISON and R.M.BACHE Assts.

Hydrography by the parties under the command of

Lieuts.Comdg.C.H.DAVIS C.H.McBLAIR H.S.STELLWAGEN

C.R.P.RODGERS and W.G.TEMPLE U.S.N. Assts.

Scale 1/80000

Issued Dec. 1877 C.P.PATTERSON Superintendent.
Verified A.E.HILGARD Assistant in Charge of Office.

Date of first publication 1872

A. U.S. COAST SURVEY — STEAMER A.D. BACHE — SALEM

Note. *The red sectors covering Hunt Ledge and the Centurion, with the white sector between, are from an auxiliary light 57 feet south of Boston Light.*

No. 1. Eagre

No. 2. Eagre

No. 3. Endeavor

No. 4. Endeavor

No. 5. Bache

No. 6. Endeavor

No. 7. Bache

THE MAGNETIC NEEDLE

de	Longitude	Date	Observed Variation West	Variation West Jan. 1876
8	70° 50.1	*July.....1859*	11° 14′	13° 05′
4	70 40.6	*Aug.....1849*	11 37	14 06
2	70 38.6	*July.....1859*	12 03	14 01
7	70 43.8	*July.....1859*	11 09	13 00
2	70 47.2	*Sept.....1849*	12 17	14 46
9	70 52.5	*Aug.....1855*	10 50	12 38
9	70 51.3	*Sept.....1849*	11 50	14 19
2	70 55.8	*Aug.....1849*	9 41	12 10
0	71 02.6	*Aug.....1855*	10 14	11 49
2	70 54.3	*Sept.....1847*	9 37	11 42
7	71 06.9	*Oct.....1845*	9 14	11 26

al increase 2′2 nearly.

TING STATIONS

ks are designated thus ✦

me Ball

on the Post Office Building in Boston
00m 00s Greenwich Mean Time.

TATIONS

Weather Bureau
ing the weath-

.....Mass.
.....Mass.
. Building
.....Mass.

IATIONS OF BOTTOMS

Colors and tints	Other qualities three small letters	
bk. for black	*hrd. for hard*	
wh. „ white	*sft. „ soft*	
rd. „ red	*fne. „ fine*	
yl. „ yellow	*crs. „ coarse*	
gy. „ grey	*brk. „ broken*	
bu. „ blue	*lrg. „ large*	
dk. „ dark	*smd. „ small*	
lt. „ light	*rky. „ rocky*	
gn. „ green		
br. „ brown		

d materials and their qualities are
er letters than the subsidiary.
ock; ✳ Rock awash at Low-water.

SOUNDINGS

are expressed in feet to 18 feet, or within the dotted surfaces,
thoms, and show the depth at mean low water-the plane of
ed surfaces beyond low water mark represent the bottom with-
epths of 6, 12 and 18 feet.
soundings only are given on the chart; they are selected
s soundings taken in the survey, so as to represent the figure

BUOYS

left in entering on Starboard hand
„ „ Port „
horizontal stripes-Danger Buoy.

SAILING DIRECTIONS

oston Bay, *from the vicinity of* Cape Cod *and about 25 miles off shore, the course for*
W.by W¼ W. When within 1 mile of it, and Point Allerton bears S.W¼ W. distant about 1 mile,
or entering Main Ship Channel given on the Harbor chart.
ight should *not be approached nearer than 1 mile. In thick weather, vessels, after having*
his Bay *in 13 fathoms water, should keep outside the 20 fathom curve, in order to avoid*
epth within it being so irregular as to afford no safe guidance.
vicinity of Cape Ann, *beware of the* Londoner, *a rock 200 yards in extent, ½ mile S.E.by E.*
outh Light.
oston *by Main Ship Channel, when Cape Ann Lights bear West, distant about 1¼ miles, run*
Allerton, *till within about 1 mile of it, with Boston Light bearing N.W.by W¾ W. distant 1 mile.*
ions *given on the Harbor chart. In thick weather vessels should not attempt to run into*
20 fathoms, the greatest precaution being necessary to avoid dangers, an account of the
hin the 20 fathom curve.
South Channel a S.W.by W. course, with Long I. Head Light ahead, will lead you clear of all
estward of the Graves; then follow directions for entering this Channel given on Harbor
rather, **vessels** *should keep in from 20 to 25 fathoms, and not attempt to run into shoaler*
precaution being necessary to avoid dangers.
oucester Harbor *from* Cape Ann, *steer S.W.by W. till Eastern Point Light bears nearly North;*
Point to the Northward and Westward and follow directions given on the Harbor chart.
lem Harbor *from* Cape Ann, *steer S.W. by W. till Eastern Point Light bears N.E.by N. distant*
way Rock Beacon bears W.by S. distant 3¾ miles, then haul up for Baker's Island Light,
and follow directions given on Harbor chart.
e Southward and Westward stand for Halfway Rock, passing it on either side.
. Bring its Beacon to bear S.E¼ E. and follow directions given on Harbor chart.
magnetic and the distances in Nautical miles.

TIDES

	Annisquam	Salem	Boston Light	Boston U.S. Dry Dock
Corrected Establishment	XI^h 0^m	XI^h XIII^m	XI^h XII^m	XI^h XXVII^m
Rise of Highest Tide observed above the plane of reference	11.8 ft.	11.4 ft.	12.2 ft.	15.1 ft.
Fall of Lowest Tide.....do.....below.....do.	2.2 „	2.0 „	2.5 „	3.3 „
Fall of Mean Low Water of Spring Tides below.....do.	0.9 „	0.7 „	0.9 „	0.7 „
Height of Mean Low Water of Neap Tides above do.	1.0 „	0.7 „	0.7 „	0.8 „
Mean Rise and Fall of Tides	9.0 „	9.2 „	9.3 „	10.0 „
Mean.....do.....of Spring Tides	10.8 „	10.6 „	10.9 „	11.3 „
Mean.....do.....of Neap Tides	7.1 „	7.6 „	8.1 „	8.5 „
Mean Duration of Rise, Reckoning from the middle of one	6^h 6^m	6^h 19^m	6^h 20^m	6^h 13^m
Mean.....do.....of Fall, to stand to the middle of the next	6 18	6 6	6 6	6 13
Mean.....do.....of Stand	0 23	0 6	0 11	0 9

Note. At the entrance to Boston Harbor, Ebb begins about 15 minutes after H.W. and Flood begins about 15 minutes after L.W. at the Navy Yard.

U.S. COAST AND GEODETIC SURVEY

Diag. Cht. No. 1207-1

Department of Commerce and Labor
COAST AND GEODETIC SURVEY
T C Mendenhall
W W Duffield
Superintendent.

State Mass

DESCRIPTIVE REPORT.

Hyd. C Sheet No. 2199

LOCALITY:

Boston Bay
See SHA 2129

1892-94

CHIEF OF PARTY:

R. D. Beck

Diag. Cht. No. 1207-1

Hdrs No.

Department of Commerce and Labor
COAST AND GEODETIC SURVEY
T. C. Mendenhall
W. W. Duffield
Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hyd. X Sheet No. 2200

LOCALITY:

Boston Bay

Su. SHA 2129

1892-94
~~100~~

CHIEF OF PARTY:

R. D. Pecs.

2133
2146
2199