

2226

Diag. Chart No. 1207-1

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey *Hydrographic*
Field No. Office No. *2226*

LOCALITY

State *Mass*
General locality *Coast of*
Locality *Massachusetts*

1895
194

CHIEF OF PARTY

St. R. B. Leek U.S.N.

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DATE

2226

U. S. COAST AND GEODETIC SURVEY.

Gen. W. W. Duffield , Superintendent.

State: *Mass.*

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2226

LOCALITY:

Coast of Massachusetts

1895.

CHIEF OF PARTY:

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

2226

Received
Assistant in Charge

Form 65.—Field Letter.

Write me at:

DEC. 16. 1895. 033807

Telegraph me at:

My Express Office is:

wd
U. S. Coast and Geodetic Survey, *Str. "Bache,"*

New York City,

November 27, 1895.

2-517

Descriptive Report.

Gen. W. W. Duffield,

Superintendent,

U. S. Coast and Geodetic Survey,

Washington, D. C.

Sir :-

I have the honor to submit the following descriptive report of the hydrography executed by the party under my command during the past season on the Coast of Massachusetts under your instructions of June 17, and the detailed instructions of the Hydrographic Inspector dated June 19, 1895.

For the execution of this work projections and tracings were sent to me from the office, as follows :-

1 projection, scale 1-10000, from Nahant to Marblehead, not finished by the Bache last season.

2 projections, scale 1-10000, Marblehead to Gloucester.

1 projection, scale 1-40000, Approaches to Boston Bay.
 Tracings for special examinations near Minot's
 Ledge, and in Boston, Salem and Gloucester
 Harbors.

Special Examinations - Minot's Ledge, Boston
 Harbor, and Broad Sound. -

These special examinations received my
 first attention, and on their completion
 all original records and data connected
 therewith were sent to the office together
 with my report of results, dated August
 12, 1895.

Sheet 2200 - Nahant to Cat Island.

The general development of this sheet
 was finished last year, but owing to the
 irregular character of the bottom its com-
 pletion required a large amount of special
 development, as well as many special examina-
 tions for shoal spots coming down from former
 surveys and where our own work of last year
 had given indications of shoaler water. The
 results of these examinations are given in
 the appended table in which the letters

used to indicate the search refer to corresponding letters assigned on the tracings to the shoal spots searched for.

In several cases after very careful investigation the depth on well known rocks was found to be somewhat greater than that given by the chart, and I am convinced that the difference is due to the depth originally given having been referred to a low water spring tide instead of to Mean low water. Boden's Rock in Marblehead Harbor is a case in point. At low water the rock is plainly visible and the least water found by two searches of independent parties was 9.2 ft., while the chart gives 8 ft. A similar case is that of the charted 7 ft. spot just west of Marblehead Rock where two careful searches failed to develop less than 9.8 ft.

Special Examinations - Salem Harbor.

The results of these special examinations are given in table appended.

Sheet, Marblehead to Manchester. #2226

The scheme of lines for this sheet was made to correspond with that of the preceding sheet, Nahant to Cat Island, and consists of two systems of lines, 100 metres apart, the one normal to, and the other parallel with the general direction of the coast, thus giving right-angled intersections. In the vicinity of Baker's Island the work was made much closer by reducing the intervals in both systems to 50 metres. All Shoal spots given on the present chart were transferred to our sheets and special examinations of these were made for least water. Indications occurring in the regular course of our work were likewise examined in the same manner.

It had been my intention to divide the work between this sheet and my next with the line marking the Eastern limit of the inshore sheet of Lieut. Low, executed the preceding year. In order however to carry the work as far as possible on the coast, some additional normal lines were run on the

eastern side of the sheet, and as the water is here quite deep it was believed that the development from this one system would be sufficiently close to admit of the work being considered complete as far as they go.

Tide Stations.

The following-named and described tide stations were established and used during the progress of our work:—

Nahant Steamboat Wharf.— This is the same station that was used the year before for that part of our "Nahant to Cat Island" sheet westward of a line drawn southerly from Dread Ledge. This year it was used for the special developments on the same part of the sheet. The plane of reference was obtained in 1894 by comparisons with the Salem gauge on Phillips' Wharf.

Cat Island. This station was used both this year and last year for all the "Nahant to Cat Island" sheet eastward of a line southerly from Dread Ledge, and also for the sheet of the present year entitled "Marblehead to Manchester."

It was connected by comparisons in 1894 with the Salem gauge on Phillips' Wharf, but as a new wharf had replaced the old Cat Island wharf of last year the plane of reference was again determined this year by a new series of comparisons. A box gauge was used here which gave excellent results.

Salem - Phillips' Wharf. - This station was used for most of the special examinations of the Salem Harbor sheet. The plane of reference was determined by Lieut. Low in 1894, and this plane of reference is the basis of all the work in this vicinity from Nahant to the eastern limit to which the work has been carried.

Marblehead Harbor - Gilbert's Wharf. - This tide station was established for temporary use while making some special examinations in the immediate vicinity. It was connected directly with the Salem gauge. Owing to the openness of the entrance to Marblehead Harbor and the absence of tidal current, both the time and the range of the tide were found to be the

same here as at the Cat Island gauge.

Marblehead Harbor - Eastern Y. C. Landing. - At the request of some members of the Club a fine permanent gauge was established at the pier of the Yacht Club landing, the zero of the gauge being placed at mean low water. The plane of reference was determined by ten simultaneous readings, taken near mean low water, with the gauge across the harbor at Gilbert's Wharf.

The observations taken for connecting the gauges of the different tide stations mentioned with the Salem gauge are given in tables appended.

Descriptions of Bench Marks are likewise appended.

"Points" for Charts.

The following descriptions of the most notable "points" of our sheets are given, and it is recommended that so far as it can be conveniently done they be placed on the new charts as landmarks. From their great range of visibility I consider them a valuable addition to the chart. Yachtsmen

in particular seem to appreciate all the "points" that we can give them.

✓ "Tem" - A plain rectangular stone building with columns, resembling a Greek temple, on the estate of Senator Lodge, near East Point, Nahant. From its elevated position and separation from other buildings, it is very conspicuous.

✓ "Cup" - Cupola of Episcopal Church, Nahant.

✓ "Drown" - Protestant Church with clock tower, Nahant.

✓ "Cross" - Catholic Church Spire, Nahant.

✓ "Lit" - Cupola of fine residence on Little Nahant. Easily recognized and conspicuous.

✓ "Stand" - Swampscott stand-pipe. Very conspicuous and visible far seaward.

✓ "Swamp" - Cupola of Swampscott High School. This is a large red brick building on a hill and shows against the sky. It can be seen from far seaward and should by all means be placed on the chart.

✓ "Doubt" - Observation tower at corner of residence of John M. Little estate.

✓ "Phil" - Cupola of Hotel Preston, Phillips' Beach. Very conspicuous and should be charted.

- ✓✓ "Cone" - Cupola of residence of Mr. Ford, publisher of the "Youth's Companion." The house occupies high ground and is very conspicuous.
- ✓✓ "Nau" - Central Chimney of Naupashmit Hotel. The building is very large and occupies high ground on Southeastern part of Marblehead Neck. It is visible far seaward and should be charted.
- ✓✓ "Pipe" - The Marblehead stand-pipe. An excellent landmark as usual with stand-pipes. Should by all means be on chart.
- ✓✓ "Church" - Spire of Catholic Church. Very conspicuous.
- ✓✓ "Tall" - Square clock tower, with pyramidal top and vane, of Abbott Hall, public building in Marblehead. This is a large red brick building on a hill and shows against the sky. It is visible far seaward and is very conspicuous in every direction. The signals of the U.S. Weather Bureau are shown from a flag-staff on same hill, near east end of building. It should by all means be on the chart.
- ✓✓ "Jap." - Spire of Universalist church, Marblehead.

✓ "Flat." - Spire of Unitarian Church, Marblehead.

✓ "Home." - Cupola of Orphan's Home - large yellow building on Cat Island and very conspicuous.

Manchester Stand-pipe - This does not fall on our sheet, but cuts were obtained to fix it from Pickering Lighthouse, Baker's Island St. Ho., and Halfway Rock. These angles will be found in angle book. This will be found a useful object and should be on our charts.

Stand-Pipes in general.

In my judgement all stand-pipes should be charted. They are not only very valuable as landmarks because so conspicuous, but for nautical use have a still greater value because so easily identified and unmistakable.

Newcomb's Ledge.

About a quarter of a mile outside the "Outer" or S. E. Breaker Buoy (R. No. 2), southward of Baker's Island, is a shoal having over it a depth of 4 to 10 fathoms and where the present chart would indicate from 13 to 15. The least water found by two searches, one

using a drag, was 19 ft. The ledge is known to the fishermen as Newcomb's Ledge, and it was from information by a fisherman that this dangerous 19 ft. rock was there found.

Sheet, Manchester to Gloucester.

Considerable time was spent and work done in preparing this sheet by erecting signals, cutting in points, etc., in order that no time might be lost in passing to it on the completion of the preceding one. Advantage was taken of exceptionally good days to detail one boat for this duty while the other continued the hydrography of the sheet in hand. This is my usual plan of procedure. Owing to the loss of time from our beacon-building trip to the coast of Maine, and the difficulty of finishing so late in the season the important special developments over the very rough and exposed ground to the southward of Baker's Island, it was not found practicable to begin the hydrography of this sheet. Had it not been for the desire of the Hydrographic Inspector,

expressed in his letter of October 8, to square up the work and make it complete to whatever point carried for the season, it would have been my plan to leave these special developments until the next summer and push ahead the general development of the Manchester to Gloucester sheet, which could have been done in moderately rough weather. With the work already done in preparation, this sheet could be finished in a few weeks and its completion would give to the re-survey a better stopping place than the point on the coast which now marks its termination.

Very respectfully,

Robert S. Peck,

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



Forwarded

J. F. Moser Lt Com'd'r, U. S. N.,
Hydrographic Inspector C. & G. Survey.

Results of special developments of or searches for
Shoal Spots - Nahant to Cat Island.

Locality of spot	Index Letter	Depth Sought	Least Depth found	For Least Depth ref'd to spot	Character of search, and Remarks.
1020 m. W. & W. 3/4 W. from Egg *	a	13 ft.	6 to 8 fms.	no indication of spot.	Dragging with 30 ft. pipe and using two leads.
872 m. W. S. W. from Egg *	b	12 "	8.3 ft.	10 m. E. N. E. of spot.	do.
660 m. S. 7/8 E. from Egg *	c	26 "	19.7 "	On spot.	do.
620 m. S. x E. from Egg *	d	19 "	10 fms.	See spot "C."	do.
570 m. S. W. x S. from Rau Island Middle Ground, 500 m.	e	3 "	-.2 ft.	73 m. N. x W.	Using drag and four leads.
S. 1/2 E. from Rau Island 600 m. S. E. x E. 1/2 E. from Rau Island	f	5 x 17 "	15.5 "	40 m. E. of spot.	" " " leads.
Dolphin Rock 1050 m. S. S. W. from Rau Island	g	18 "	13.5 "	160 m. S. W. 1/2 W.	" " " "
1000 m. S. from Rau Island	h	7 "	6.2 "	On spot	" " " "
1300 m. S. 1/2 W. from Rau Island	i	25 "	43.5 "	" "	" " " " Much shall- er water found to N'd on the Middle Ground.
1450 m. S. 1/4 E. from Rau Island	j	28 "	45 "	" "	Using drag and leads.
400 m. S. S. W. from Great Pig Rocks	k	21 "	19.4 "	120 m. N. x W. 1/2 W.	" " " " Shoalest spot is nearly "between" j and k.
850 m. E. S. E. from Great Pig Rocks	l	22 "	11.4 "	On spot.	Using drag and leads.
1100 m. E. S. E. from Great Pig Rocks	m	31 "	16.2 "	60 m. N. E. 1/2 N. from spot.	" " " " "
800 m. S. W. from Tinker's Island	n	8 "	7.8 "	30 m. N.	" " " " "
700 m. E. N. E. 1/2 E. from Tinker's Island	o	31 "	16.6 "	On spot	" " " " "
800 m. E. of Marblehead Beacon	p	22 "	18.2 "	400 m. N. E. x N.	Drag & leads. - Depth in immediate vicinity of spot as shown on tracing is from 8 1/2 to 9 1/2 fms.
150 m. W. 1/2 N. from Marblehead Beacon	q	25 "	27 "	100 m. E. 5/8 S.	Drag and 2 leads.
Archer's Rock, 1000 m. N. N. E. from Marblehead Beacon	r	11 "	9.8 "	On spot	" " " " "
350 m. N. x E. from Marblehead Lt. Ho.	s	10 "	10.1 "	" "	" " " " "
830 m. N. 1/2 E. from Marblehead Lt. Ho.	t	17 "	15.8 "	120 m. S. x W.	" " " " "
	u	19 "	18.7 "	On spot	" " " " "

Results of special developments of or searches for Shoal Spots - Nahant to Cat Island.

Loc. City of spot	Index letter.	Depth Sought	Least depth found	Pos. Least depth reef/id to spot.	Character of search, and Remarks.
950m. N. 1/2 E. from Main Head Beacon } Jack's Rock. 100m. S.E. }	V	21 ft.	18.6 ft.	On spot	Using drag & leads. Drag on spot, and then located Rk. which was plainly visible.
of Gerry's Island } Boden's Rk. - 1000m. W. S. 20 }	W	2 "	2.9 "	40m. N.W.	
from Marblehead St. Ho. } South of Savin Hill, }	VX	8 "	9.2 "	On spot	Drag & leads - Rock plainly visible.
Marblehead Harbor } E. N.E. of Marblehead }	VY	1 "	1.6 "	" "	Found while searching for rock reported by sailing master of yacht.
St. Ho. } E. of Marblehead St. Ho. }	✓		15.5 "		
near Elk buoy No. 1. }	V		10.6 "		ditto.
Marblehead Harbor, vicinity }	✓		10.7 "		Found after search from inform- ation given by residents.
of Boden's Rock }	✓		7.1 "		New rock from information by sailing master of yacht which struck on it.
Marblehead Harbor, }					
S. side, W'd of }					
Boden's Rock }					

Special developments - Salem Harbor.

Locality of spot.	Index letter	Depth Sought	Least depth found	Pos. of least depth referred to spot.	Character of search, and remarks.
1300 m. W. x S. from Hospital Pt. Lt. Ho. } Buoy No. 12, Salem Harbor.	a	12 ft.	11.9 ft.	30 m. N.W.	Using Whale Boat.
280 m. S.W. $\frac{3}{4}$ W. from Pickering Lt. Ho. }	b	—	11.6 "	Locator buoy.	{ Half-Tide Rock (-2.7 ft.) lies 90 m. N.W. x W. from the buoy.
130 m. S. x E. $\frac{1}{4}$ E. from Little Aquavitae spindle }	c	4 ft.	4.2 "	70 m. W. x W. $\frac{1}{2}$ W. from spot.	Using Whale Boat.
740 m. N.W. x W. from Kettle-bottom spindle }	d	8.5 "	10.7 "	On eastern spot.	" " " " " " " "
190 m. W. of Kettlebottom spindle } Privy Ledge, 130 m. E. of Corner's Island	e	12 "	11.3 ¹⁸ "	See remarks	{ Drag & leads. - The depth, 11.3 ft., was found about 20 m. N. of spot, but less depth at and inside the red buoy.
340 m. S. x W. $\frac{1}{2}$ W. from Kettlebottom spindle }	f	8 "	8.1 "	On spot	{ Using Whale Boat. - Rky. ledge extending W'd. - 60 m. W. of spot 3.6 ft. found.
700 m. S. S.W. $\frac{1}{2}$ W. from Kettlebottom spindle }	g	9 "	3.6 "	40 m. S. x W.	Drag and 4 leads.
600 m. S. $\frac{1}{2}$ W. from Kettlebottom spindle }	h	6 "	6.3 "	10 m. S. of spot.	" " " " " " " "
720 m. S. $\frac{1}{2}$ W. from Kettlebottom spindle }	i	17 "	14.1 "	60 m. S. of spot.	Using Whale Boat. - Another Rk. with 16.1 ft. on it was found 38 m. to N'd of latter.
490 m. E. N.E. from Kettlebottom spindle }	j	21 "	18.7 "	On spot.	Using Whale Boat.
880 m. S. E. $\frac{1}{2}$ E. from Little Haste Beacon }	k	19 "	19 "	" "	" " " " " " " "
520 m. S. E. x E. $\frac{1}{4}$ E. from Little Haste Beacon }	l	21 "	20.9 "	" "	{ with 18.6 was found 400 m. further N. where tracing showed 24 ft.
400 m. E. N.E. $\frac{3}{4}$ E. from Little Haste Beacon }	m	29 "	20.7 "	30 m. W. from spot.	Using 2 leads.
740 m. E. S. E. $\frac{1}{4}$ E. from Hospital Pt. Lt. Ho. }	n	16 "	27.5 "	18 m. W. N.W. from spot.	To be Rk. - examined.
140 m. N.W. x N. from Bowditch Beacon }	o	21 "	18.8 "	50 m. W. x S. from spot.	" " " " " " " "
Manchester Rk. 600 m. W. of Chubb's Island }	p	7.5 "	7.4 "	100 m. N.E. $\frac{3}{4}$ E. from spot.	Whale Boat. - Thorough search.
570 m. N. $\frac{1}{4}$ W. from Bowditch Beacon }	q	9 "	24.5 "	On spot.	Using drag and leads.
780 m. N. x E. from Bowditch Beacon }	r	1 "	11.6 "	" "	Drag & leads. - No indication whatever of existence of Rk. - Lt., ethy. bottom.
	s	10 "	13.12 "	" "	Using drag & leads.
	t	7 "	10.9 "	15 m. W. of spot	" " " " " "

Special developments - Salem Harbor.

Locality of spot.	Index letter	Depth Sought.	Least depth found.	Pos. of least depth referred to spot.	Character of search, and Remarks.
920 m. N.E. x N. from Bowditch Beacon	VU	6 ft.	12 ft.	on spot	Drag & leads. - It is likely that Rk. is much to Sd or N'd. - See V & V'.
500 m. N. x E. 1/2 E. from Bowditch Beacon	VV	10 "	16.8 "	" "	Drag & leads.
600 m. N.N.E. 3/4 E. from Bowditch Beacon	W	20 & 21 "	14.8 ¹⁸ "	90 m. N.	" " " "
930 m. N.E. x E. from Bowditch Beacon	W	14 "	25 "	On spot	" " " - No indication of spot.
640 m. E. N.E. from Bowditch Beacon	VY	21 "	38.5 "	" "	Using four leads.
150 m. S. of Little Misery Island	VZ	21 "	25 "	" "	Drag & leads.
1300 m. S.W. 1/4 S. from Bowditch Beacon	Va'	1 "	15.1 "	" "	" " " " - No indication of spot.
500 m. S. x E. from Hardy Spindle	Vb'	16 "	26 "	" "	" " " " - " " " " "
300 m. N.N.W. from Baker's Isld Lt. Ho.	Vc'	9 "	10.4 "	50 m. W.N.W.	Drag and leads.
160 m. N.W. x W. from Whaleback Spindle	Vd'	20 "	20 ¹⁸ "	in Lammok @ On spot.	Careful search with whale boat.
2400 m. N.E. x E. 1/2 E. from Baker's I. Lt. Ho.	Ve'	20 "	17.7 "	50 m. S.S.E. from spot.	Using drag & 2 leads. - Deep water between this spot & Gale's Ledge.
Off Gale's Point on Sheet Martha's to Manchester. " No. 2. Salem Harbor charts.		✓	4.2 "		New rock found from information given by sailing master of yacht Chiquita.
E.S.E. of outer Breakers Br y No. 2		✓	19. "		Sounding & dragging. - Several searches. New rock, from information given by fisherman. - The locality is called by fishermen Newcomb's Ledge.

Comparison of Tide Gauges for Difference of Elevation of Zeros.

Date 1875	Tide	Salem Gauge (Phillips' Wharf)				Cat Island Gauge				Diff. Time		Diff. Ready		Mean of Diff's.
		Time	Ready	Range	Stand m.	Time	Ready	Range	Stand m.	H.W.	L.W.	H.W.	L.W.	
Aug. 13	L.W.	9.45 A.M.	3.40			9.45 A.M.	3.98		25	0		53		.595
" 13	H.W.	4.07½ P.M.	10.55	7.15	25	4.05 P.M.	11.16	7.18	20	-2½		.61		
" 14	L.W.	10.42½ A.M.	3.50		30	10.22½ A.M.	4.04		30	-20		.54		.535
" 14	H.W.	4.50 P.M.	10.55	7.05	35	5.05 P.M.	11.08	7.04	30	+15		.53		
" 15	L.W.	11.32½ A.M.	3.50		25	11.37½ A.M.	4.06		30	+5		.56		.555
" 15	H.W.	5.55 P.M.	10.65	7.15	25	6.10 P.M.	11.20	7.14	30	+15		.55		
" 19	H.W.	9.43 A.M.	10.95		15	9.45 A.M.	11.46		25	+2		.51		.470
" 19	L.W.	3.37½ P.M.	1.85	9.10	25	3.45 P.M.	2.28	9.18	30	+7½		.43		
" 20	H.W.	10.42½ A.M.	11.32		35	10.35 A.M.	11.84		35	-7½		.52		.565
" 20	L.W.	4.32 P.M.	1.05	10.27	15	4.30 P.M.	1.66	10.18	20	-2		.61		

The zero of the Cat Island gauge is below the zero of the Salem gauge .54 ft.
 " " " " Salem " " " M. L. W. 2.14 "
 " " " " Cat Island " " " " 2.68 "

Comparison of Tide Gauges for Difference of Elevation of Zeros.

Date, 1895	Tide	Salem Gauge - Philips Wharf.				Marblehead Gauge - Gilbert's Wharf.				Diff. Time.		Diff. Read'g		Mean of Diff'ces.
		Time	Ready	Range	Stand	Time	Ready	Range	Stand	H.W.	L.W.	H.W.	L.W.	
Aug. 20	H.W.	10.42 1/2 AM.	11.32		M. 35	10.40 AM.	13.46		M. 20	-2 1/2		2.14		2.17
" 20	L.W.	4.32 P.M.	1.05	10.27	15	4.30 P.M.	3.25	10.23	20		-2		2.20	
" 24	L.W.	7.35 AM.	0.94		25	7.37 1/2 AM.	3.05		20		+2 1/2		2.11	2.10
" 24	H.W.	1.55 P.M.	12.46	11.52	15	1.52 1/2 P.M.	14.55	11.50	15	-2 1/2		2.09		
" 26	L.W.	9.25 AM.	2.08		10	9.25 AM.	4.22		15		0		2.14	2.13
" 26	H.W.	3.40 P.M.	11.58	9.50	20	3.42 P.M.	13.70	9.48	25	+2		2.12		


The zero of the Marblehead gauge is below the zero of the Salem gauge 2.13 ft.
 " " " " Salem " " " M. L. W. 2.14 "
 " " " " Marblehead " " " " 4.27 "

Description of Bench Marks -


Nahant tide gauge. - The bench mark consists of ten (10) nails driven in horizontal row in the second pile inshore from N. corner of Nahant Steamboat Wharf. By comparison with Salem gauge (Phillip's Wharf), 1894, in which correction was made for difference in range of tide, this B.M. is 10.99 feet above M.L.W. - For the developments to S'd and W'd of Nahant (Broad Sound, sheet no. 2129), in order to be in harmony with original work which was based on the Fort Warren gauge, the plane of reference used was obtained by comparisons with Navy Yard gauge without correction for difference of range. For this plane of reference the above described B.M. is 11.39 feet above M.L.W.

Cat Island tide gauge. - The Bench mark consists of six (6) nails driven into pile at 12 ft. mark on gauge, and is nine and thirty-two hundredths ^(9.32) ft. above M.L.W., the plane of reference. B.M. is on third pile shoreward from angle of wharf where it is made broader towards the end.

Salem gauge - Phillip's Wharf. - B.M. No. 1, made to correspond to 11 ft. mark on gauge, consists of three (3) nails driven into pile 8.86 ft. above M.L.W. - This B.M. was

established by Lieut. Low, 1894. B.M. No. 2 consists of five (5) nails driven into pile, abreast of 15 ft. mark on gauge, in shape of square with one nail in center, thus , the center nail being 12.86 ft. above M.L.W.

Marblehead Harbor - Gilbert's Wharf. - The bench mark for this gauge is on second pile shoreward of S.W. corner of wharf, and consists of six (6) nails driven into pile in horizontal row abreast of 16 ft. mark on gauge, and is 12.73 ft. above M.L.W. the plane of reference.

Marblehead Harbor - E. Y. Club Landing. - The B.M. consists of ten copper nails driven in form of a cross, thus , at 10 ft. mark on gauge which corresponds with horizontal row, and is ten (10) feet above M.L.W. - B.M. is on outward face of pier at upper end of gangway landing.

Hydrography: Coast of Massachusetts... Summer Season, 1895.
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache,"
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.

Date, 1895.	Day letter.	Vol.	Number of -			Vessel or Boat.	Observers.
			Angles	Soundings	Naut. miles.		
<i>Off Cohasset.</i>							
Aug. 5	a	1	32	90	2.00	Stm. I. No. 25	Lt. E. H. Tillman & Ens. A. H. Davis, U.S.N.
<i>Boston Harbor.</i>							
Aug. 6	a	1	68	177	3.00	"	" " " "
<i>Broad Sound.</i>							
Aug. 7	a	1	32	107	1.25	"	" " " "
" 6	a	1	68	245	3.00	Whale boat	Ensigns H. K. Hines & F. M. Russell, U.S.N.
" 7	b	1	16	59	.75	"	" " " "
Total - Broad S'd			116	411	5.00		
<i>Recapitulation</i>							
<i>Off Cohasset</i>			32	90	2.00	Stm. I. # 25.	
<i>Boston Harbor</i>			68	177	3.00	"	
<i>Broad Sound</i>			116	411	5.00	Stm. I. & Whale b.	
<i>Total</i>			216	678	10.00		

*Hydrography:—Coast of Mass. Nahant to Cat Island. Summer Season, 1895.
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache,"
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.*

Date, 1895.	Day Letter	Vol.	Number of—			Vessel or Boat.	Observers—
			Angles.	Soundgs	Na ^{t.} miles.		
Aug. 8	a	1	104	231	2.00	Stm. I. No. 25.	Lt. E. H. Tillman & Ens. A. H. Davis, U.S.N.
" 9	b	2	64	234	2.50	"	"
" 13	c	2	20	58	.25	"	"
" 14	d	2	138	571	4.50	"	"
" 15	e	2	86	281	1.25	"	"
" 16	f	2	106	329	2.50	"	"
" 19	g	1	76	374	1.25	"	"
" 20	h	1	82	374	2.00	"	"
" 21	i	1	88	259	1.00	"	"
" 29	k	1	6	3	0	"	"
Total—Stm. Launch			770	2714	17.25	"	"
Aug. 8	a	1	112	393	4.50	Whale boat	Ensigns H. K. Hines & F. M. Russell, U.S.N.
" 9	b	2	92	292	2.50	"	"
" 13	c	1	58	164	1.50	"	"
" 14	d	2	180	460	9.25	"	"
" 15	e	1	222	467	10.50	"	"
" 16	f	2	132	355	6.20	"	"
" 19	g	1	148	571	4.75	"	"
" 20	h	2	172	533	6.00	"	"
" 21	i	1	100	350	2.25	"	"
" 29	k	2	24	65	.50	"	"
Sept. 30	l	2	6	3	0	"	"
Oct. 24	m	1	7	2	0	"	"
Total—Whale boat			1253	3655	47.95	"	"

Recapitulation.

Stm. Launch #25	770	2714	17.25
Whale boat	1253	3655	47.95
Total on Sheet	2,023	6,369	65.20

Hydrography: - Coast of Mass. - Examination of Salem Harbor. - Summer, 1895. -
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache,"
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.

Date 1895.	Day letter	Vol.	Number of -			Vessel or Boat.	Observers -
			Angles.	Sound'gs	Naut. miles.		
Aug. 22	a	1	34	17	0	Stm. L. #25	Lt. E. H. Tillman & Ens. A. H. Davis, U.S.N.
" 23	b	1	34	17	0	"	"
" 26	c	2	28	14	0	"	"
" 27	d	2	48	24	0	"	"
" 28	e	2	40	19	0	"	"
" 29	f	2	14	7	0	"	"
Total - Stm. L. #25			198	98	0	"	"
Aug. 22	a	1	104	337	3.20	Whale boat	Ensigns H. K. Hines & F. W. Russell, U.S.N.
" 23	b	1	138	550	5.00	"	"
" 26	c	1	116	461	3.50	"	"
" 27	d	1	50	151	1.00	"	"
" 28	e	1	22	11	0	"	"
" 29	f	1	12	6	0	"	"
Total - Whale boat			442	1516	12.70	"	"

Recapitulation.

Stm. Launch #25	198	98	0
Whale boat	442	1516	12.70
Total on Sheet	640	1614	12.70

Hydrography: Coast of Mass. - Marblehead to Manchester. - Summer, 1895.
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache",
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.

Date, 1895.	Day Letter.	Vol.	Number of -			Vessel or Boat.	Observers.
			Angles.	Sound'gs	Naut. miles.		
Sept. 5	a	9	270	1143	14.75	Stm. Launch #25	Lt. E. H. Tillman & Ens. A. H. Davis, U.S.N.
" 6	b	9	262	955	13.00	"	"
" 9	c	10	42	158	2.70	"	"
" 10	d	10	196	551	13.00	"	"
" 12	e	10	194	543	11.75	"	"
" 13	f	10	110	523	8.50	"	"
" 16	g	10	34	75	2.25	"	"
" 17	h	10	218	906	11.75	"	"
" 18	i	10	26	56	1.30	"	"
" 28	k	10	98	250	5.35	"	Ens. A. H. Davis and Mat. H. Thos. D. Martin, U.S.N.
" 30	l	10	26	40	1.50	"	"
Oct. 1	m	10	16	24	.70	"	"
" 2	n	10	132	213	6.30	"	"
" 3	o	10-12	196	556	12.50	"	"
" 4	p	12	38	93	2.40	"	"
" 7	q	13	206	496	12.20	"	"
" 9	r	12	192	460	12.80	"	"
" 10	s	13	182	416	10.50	"	"
" 10	t	13	116	351	7.25	"	"
" 16	u	12	72	320	2.80	"	"
" 18	v	14	32	97	.80	"	"
" 21	w	14	52	171	1.60	"	"
" 22	x	12	18	35	.50	"	"
" 23	y	14	78	260	1.60	"	"
" 24	z	13	112	310	6.70	"	"
" 26	a'	12	12	6	0	"	"
" 28	b'	15	2	1	0	"	"
" 30	c'	15	160	533	10.70	"	"
" 31	d'	14	12	47	.75	"	"
Total - Stm. L. #25			2,104	9,589	176.10	"	

Hydrography:—Coast of Mass.—Marblehead to Manchester,—Summer, 1895.—
 U.S. Coast and Geodetic Survey Steamer "A.D. Bache."
 Lieut. Robert G. Peck, U.S.N., Asst. Chief of Party.

Date, 1895.	Day Letter	Vol.	Number of			Vessel or Boat.	Observers—
			Angles	Sound'gs	Naút. Miles.		
Sept. 3	a	1	178	719	10.7 ⁵	Oil Launch	Ensigns H. K. Hines & A. H. Davis, U.S.N.
" 4	b	1	186	697	14.0 ⁰	"	" " " " " "
" 5	c	1	188	542	12.9 ⁰	"	" " " F. M. Russell, "
" 6	d	2	224	867	16.00	"	"
" 9	e	2	52	269	4.20	"	"
" 10	f	2	196	673	13.8 ⁰	"	"
" 11	g	3	84	358	6.3 ⁵	"	"
" 12	h	3	208	636	16.1 ⁰	"	"
" 13	i	3	94	200	6.6 ⁰	"	"
" 14	k	3	68	148	3.6 ⁰	"	"
" 16	l	3	24	118	1.0 ⁰	"	"
" 17	m	4	144	551	9.5 ⁰	"	"
" 18	n	4	14	67	1.1 ⁰	"	"
" 28	o	4	100	210	7.2 ⁰	"	"
" 30	p	4	24	63	1.5 ⁰	"	"
Oct. 2	q	4	148	359	10.0 ⁰	"	"
" 3	r	4	184	462	14.3 ⁰	"	"
" 4	s	5	28	77	1.1 ⁰	"	"
" 7	t	5	210	507	14.3 ⁰	"	"
" 8	u	6	24	148	1.0 ⁰	"	"
" 9	v	6	124	708	7.4 ⁰	"	"
" 10	w	6	132	664	9.0 ⁰	"	"
" 11	x	5	94	516	6.3 ⁵	"	"
" 15	y	5	162	765	9.6 ⁵	"	"
" 16	z	7	98	343	4.8 ⁰	"	"
" 18	a'	6	39	188	1.9 ⁰	"	"
" 21	b'	7	49	131	1.2 ⁰	"	"
" 22	c'	6	8	4	0	"	"
" 23	d'	8	93	265	5.6 ⁰	"	"
" 24	e'	8	137	285	9.5 ⁰	"	"
" 26	f'	7	43	59	3.1 ⁰	"	"
" 28	g'	7	30	63	2.4 ⁰	"	"

Hydrography:—Coast of Mass.—Marblehead to Manchester (Cont'd).—Summer, 1895.—
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache,"
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.

Date,	Day	1895.	Number of—			Vessel or Boat—
			Angles.	Sound'gs	Naut. miles.	
Oct. 29	h'	7	30	46	2.40	Oil Launch
Total—Oil Launch			3,417	11,708	229.15	"

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Recapitulation.

Stm. Launch #25	3104	9,589	176.10	Stm. L. #25.
Oil "	3417	11,708	229.15	Oil Launch
Total on Sheet	6,521	21,297	405.25	

Recapitulation of Season's Work.

Sheet, or Locality—	Angles.	Soundings.	Naut. Miles.
Off Cohasset—Vicinity of Minot's Ledge	32	90	2.00
Boston Harbor Entrance	68	177	3.00
Broad Sound	116	411	5.00
Nahant to Cat Island	2023	6369	65.20
Salem Harbor—Examination of	640	1614	12.70
Marblehead to Manchester	6521	21,297	405.25
Grand total, — Season —	9,400	29,958	493.15

Recapitulation by Boats.

Steam Launch No. 25	4,204	12,775	199.60
Oil Launch	3,417	11,708	229.15
Whale-boat	1,779	5,475	64.40
Grand Total	9,400	29,958	493.15

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*Hydrography:- Coast of Mass. - Summer Season, 1895.-
 U.S. Coast and Geodetic Survey Steamer "A. D. Bache",
 Lieut. Robert G. Peck, U.S.N., Asst., Chief of Party.*

Number of Days on Station, and how Employed:-

<i>Number of days on which hydrographic work was done</i>	<i>50</i>
<i>" " " " " " " " " prevented by bad weather</i>	<i>13</i>
<i>" " " " " " " " " other causes</i>	<i>17</i>
<i>" " " " " " " " " Sundays</i>	<i>14</i>
<i>Total No. of days on Station, - July 29 to Nov. 1 (not including either date)</i>	<i>94</i>

Signals -

<i>Erected</i>	<i>Occupied</i>	<i>Determined -</i>	<i>Used</i>
<i>5</i>	<i>13</i>	<i>22</i>	<i>55</i>

List of Officers and Crew attached to U.S. Coast and Geodetic Survey Steamer "A. D. Bache," under Command of Lieut. Robert G. Peck, U.S.N., Asst. - Summer Season, 1895:-

<i>Rates</i>	<i>No.</i>
<i>Lieutenant, U. S. N.,</i>	<i>1</i>
<i>Ensigns " "</i>	<i>3</i>
<i>Past Asst. Surgeon, U. S. N.,</i>	<i>1</i>
<i>" " Engineer, " "</i>	<i>1</i>
<i>Pay. Yeoman " "</i>	<i>1</i>
<i>Master-at-Arms, 1st " "</i>	<i>1</i>
<i>Machinists " "</i>	<i>3</i>
<i>Ship's Writer " "</i>	<i>1</i>
<i>Carpenter's Mate " "</i>	<i>1</i>
<i>Boatswain's " "</i>	<i>1</i>
<i>Quarter-masters " "</i>	<i>3</i>
<i>Ship's Cook " "</i>	<i>1</i>
<i>Cabin Steward " "</i>	<i>1</i>
<i>" Cook " "</i>	<i>1</i>
<i>Second Cl. Firemen " "</i>	<i>6</i>
<i>Seamen " "</i>	<i>11</i>
<i>Mess Attendants " "</i>	<i>4</i>
<i>Total</i>	<u><i>41</i></u>