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U. S. COAST AND GEODETIC SURVEY.

F. M. Thorn, Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Hydrographic Sheets Nos. 1829, 1832 & 1833.

LOCALITY:

Vineyard Sound
&
Woods Hall.

1888.

CHIEF OF PARTY:

Lt C. P. Perkins, U.S.N.

~~Chief Clerk~~ & to C. Pilot on Tug

297

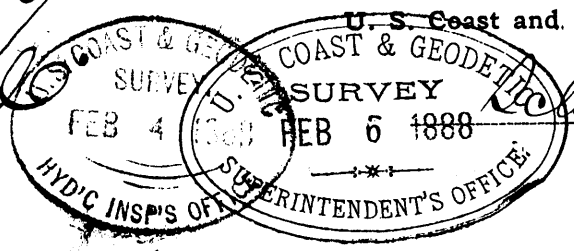
☞ Give here full address to which reply should be sent: Navy Yard New York

Report 1888

Section I

(19)

U. S. Coast and Geodetic Survey,



Schooner Eagre

February 1, 1888.

Mr F. M. Thorn

Superintendent

U. S. Coast & Geodetic Survey

Sir:-

I have the honor to forward by Express the original records of the work done by the hydrographic party on board this vessel in Vineyard Sound during the season of 1887.

The records consist of one projection 1/20.000 of Vineyard Sound with 4 small additions one projection Vineyard Sound (II. to the E'd of Martha's Vineyard) 1/10.000: one projection Woods Holl. 1/5.000: and one projection 1/10.000 with work in Robinsons Hole. I have also returned four projections which were not used for the reason that the scale made them to unwieldy - There are 38 Sounding books and 29 Tide and angle books recording 2086 l.

miles of lines and 157.531 Sounding.
The locality of the work has been in Vineyard Sound to the Westward Northward and Eastward of the Island of Martha's Vineyard from Nomans Land to Cape Poge including the harbors of Woods Hole Vineyard Haven and Edgartown. Quick's & Robinsons Holls. The channel thro' the Sound carries no less than 8 fathoms & thro Quicks Holl 6 fathoms. Robinson's Holl is impracticable & Woods Holl dangerous except for small craft. There is a passage thro Canapitsit Channel between Cuttyhunk and Naohawna for small boats but it is very dangerous. The shores of the Elizabeth Islands should not be approached nearer than one half mile as the coast along them is lined with innumerable boulders which constitute serious dangers. Dangers upon the other side of the channel are marked and consist of the Devils Bridge off Gay Head Lucas and the Middle Ground Shoal

The channel is permanent. the change taking place seems to be a deepening along

the Channel side of the Sound and a corresponding shoaling on the South side. While the shore of Martha's Vineyard is washing away to a very marked degree.

Harbors proper there are none worthy of the name. Wood's Holl is very small and dangerous on account of the tidal currents. Vineyard Haven affords fair holding ground and a refuge for passing Coasters against the Southerly winds but is open to the N.E. & E. and has been the scene of serious disaster to many vessels. A Breakwater is talked of for this harbor — Tarpaulin Cove affords anchorage & protection from N'ly winds. Edgartown Harbor is small and dangerous since Katama Bay is now open to the Sd and the tidal currents are very strong.

The tides in the Sound are very complex much influenced by the winds — I forward a Note book of Tidal data from the tide books. in which I computed the diffrence in elevation of the zeros of the

different gauges used and referred all to the lowest plane, that at Menemsha The M.L.Water plane at West Chop is 0.8 ft higher than that of Menemsha and I have marked the projection for a correction to be added in order to obtain absolute depths. I have noted that the Mean low water at Menemsha is 0.2 ft higher than that referred to the Bench mark in 1854. and at Noboska Point it is 0.1 ft higher -

On account of the unwieldiness of the projections sent for inshore work, all the lines have been plotted on the projection scale $\frac{1}{20,000}$, of the principal part of the Sound This made so much work upon that sheet such close work, that there was not sufficient room to put in the bottom characteristics - They appear however upon the other projections.

A tracing with soundings, has already been forwarded, of the locality in the vicinity of West Chop. Persistent efforts were made to find any danger in the vicinity of the danger

5/15/85

buoy to the Southward of Cuttyhunk also a reported danger off Nashawena and the shoalest water on Ribbon Reef by dragging &c Middle Ground Lucas shoal ~~Hedges Knee~~ & Squash Meadow shoal have been developed and Lone Rock, Old Man Rock Devils Bridge and Sow and Pigs reefs have been examined with care

Very Respectfully
O. P. Perkins
Lieut USN Assistant C&HS.
Comdg Eagre

Give here full address to which reply should be sent. Navy Yard New York.

Coast and Geodetic Survey,

Schr. "Eagle"

February 28th, 1888.

Descriptive Report

Asst. W. McThorn

Superintendent U.S.C.&G. Survey.

Washington. D.C.

Sir:

In accordance with your circular of instruction regarding descriptive reports. I have the honor to submit the following memoranda of information relative to the locality surveyed by the hydrographic party under my charge during the season of 1887.

Report B.

The locality covered by the sheets submitted is Vineyard Sound and the adjacent harbors and passages. The Sound is the thoroughfare for vessels passing from Long Island Sound around Cape Cod. There is little or no difficulty in navigating it, the only dangers to be avoided being the shoals

shown in the chart. The Sound is used by both steam and sailing vessels, about one hundred passing through on an average day. There are plenty of buoys beacons and light houses but no natural landmarks of any importance. The country is hilly and generally wooded and the shores rocky. Approaching from the eastward the first land fall is Cape Poge Lt. Hs and from the S. W., Gay Head. There are three life saving stations all of which are maintained by the state of Massachusetts, they are situated on the N E end of Cuttyhunk, at Cape Poge and Squipnocket

There is no difficulty in entering the sound, the Devils bridge at the S W end and the rocks lying off West Chop Lt Hs. are the principal dangers, the sound is well buoyed and lighted.

It is not customary to take tow-boats or pilots. There are no quarantine regulations or boarding stations.

There are harbors of refuge at Tarpaulin Cove, Menemsha Bight, Vineyard Haven,

Edgartown Harbor, and Woods Holl.

The latter harbor owing to the narrow passage and strong tide is difficult to enter.

There are no harbor dues or regulations.

Supplies and ships stores can be obtained at Vineyard Haven and Edgartown, coal is scarce and fresh water can only be obtained by going alongside the wharves, as there are no water-boats. The nearest place where machinery can be repaired is New-Bedford.

There is a time ball at Woods Holl on the building of the U. S. Fish Commission.

There is telegraphic communication with New Bedford from Vineyard Haven and Woods Holl and communication by telephone between the principal towns on Marthas Vineyard.

There is a U. S. Marine Hospital at Vineyard Haven and a marine rail-way capable of taking out a vessel of 500 tons,

also a small sailors library.

At West Chop Lt Ho there is a station for reporting vessels. Approaching this point in order to be reported vessels should not pass nearer than one half mile from the light house, that is well outside the danger buoys, owing to the many rocks that have recently been located in that vicinity.

At Vineyard Haven there is a U.S. Signal Service Station and a secondary station connected with this by Gov't telegraph line at Gay Head, there is also a station at Woods Holl. Cautionary weather signals are displayed at Gay Head, Nobska, and East Chop.

Nearly all steamers engaged in Coastwise trade North and South go through Vineyard Sound. There is a local line running from New Bedford to Vineyard Haven touching at Woods Holl, and Cottage City. Woods Holl is connected with New Bedford by rail-road and there is a stage line running from Vineyard Haven to

the towns in the interior of the island.

At the following towns there are post-offices, Woods Holl, Vineyard Haven, Edgartown, Cottage City, Squipnocket, Westbury, and Gay Head.

There is a Deputy Collector of Customs at Vineyard Haven, which is the most important town in the vicinity. Its harbor is much used as a harbor of refuge by coasting vessels owing to its ease of access, vessels anchored well in the harbor are protected from all gales except those from the N. and N. and E. Owing to its broad mouth it is rarely blocked by ice.

Edgartown Harbor is almost completely land locked but the entrance is through a narrow and crooked passage, and the tide runs with such force that it is an indifferent anchorage.

The prevailing winds are N.E. & S.W.

Fogs are frequent throughout the year especially during the Fall.

There are few wrecks, comparatively:

during heavy N. E. blows many vessels go ashore. It generally takes a long time for a wreck to break up as the sea is rarely very heavy.

In passing through the Sound attention should be given to the tide especially in passing near Woods and Lucks Hole. The tide runs through these openings with great force.

In summer Fogs are prevalent with S. W winds which occasionally increase to a moderate gale and wind up by a sudden shift to N. and E. blowing hard and moderating. This same thing occurs in winter and makes all the harbors poor, all being open either to N. or S. It is proposed to build a breakwater at Vineyard Haven where so many vessels anchor to await favorable winds and the turn of the tide and to seek a lee from S. W. gales. This would seem to be a much needed improvement when the value of the shipping annually anchoring there is taken into consideration.

As many as 23 vessels have been wrecked in one day in this harbor during a N. E. gale -

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Very respectfully
C. P. Perkins
Lieutenant Asst C. & G. S.
Commanding

U. S. COAST AND GEODETIC SURVEY.

F. M. Thorn & T. C. Mendenhall, Superintendents

State: Mass.

DESCRIPTIVE REPORT.

A & B.

Hydrographic Sheets Nos. 1833.

(1941 — 1942 — 50 cm)

LOCALITY:

South of Martha's Vineyard & Nantucket.

1888-9.

CHIEF OF PARTY:

Lieut. J. F. Moser, U.S.N.

Write me at: Key West, Fla.

Telegraph me at:

My Express Office is:

1.25 2.11

Report "A"

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

Key West, Fla.

January 30th, 1890.

2—547

Prof. T. C. Mendenhall
Superintendent U. S. C. & G. Survey
Washington, D. C.

Sir:

I beg leave to submit the following report "A" as required by Instructions and Memoranda for Descriptive Reports.

The work for the party on board this vessel for the season consisted of a continuation of the Coast hydrography South of Martha's Vineyard and Nantucket. The projection of the preceding season, and extending to Muskeget, was left in an unfinished condition. A new projection for this season was however furnished, extending from No Mans Land to Sankaty Head; and on this sheet the lines bordering on and extending over the unfinished portion were furnished by the Office.

This large projection, scale 1:40,000, I

was again obliged, on account of the unfavorable weather, to leave unfinished or ragged on the eastern end. I had hoped to square the work to a point South of Surfside, and in running the east and west lines from No Mans Land I turned the eastern ends of the lines with this in view, but the opportunity never offered to complete the north and south system. It will take six lines to the 20 fathom curve, with six more between these lines for a distance of six or eight miles, to complete the system of normals, and a few more east and west lines; these latter however extending only a short distance. I will indicate on a tracing to be sent with the sheets, the lines I had intended to run to finish the projection. On the 1:20,000 I had intended to cross the normal boat lines in the vicinity of Nicomet Rip to fully develop the tongue making out there, but was unable to accomplish it.

It will be found that all the features in the vicinity of Smiths Point have changed. We made a survey of the inlet there, but I

fancy it will all change very rapidly. As will be noticed on the topographical sheets the shore line from the Western point of Muskegat to Smiths Point is all changed. The inlet at Smiths Point is used by small-boat fishermen on fair days; no depth of water can be carried through into the sound. I doubt whether a launch could go through except at high water.

I do not believe that the changes on the shoals lying off shore are as great as is generally supposed. I think a thorough survey will show great differences from the original work, but they will be differences arising from a more thorough development.

Referring to harbor improvements I would say that no improvements are being made or contemplated on our work, but in the Sounds the question of building a breakwater is constantly being agitated, and examinations have been made at several points by the U.S. Engineers. Breakwaters at Vineyard Haven and Edgartown are frequently suggested. I believe the former to be impracticable, and the latter,

though giving good protection, not as serviceable as other places. A harbor built for coasters must be on the line of traffic, and must be accessible. What better place than Squash Meadow Shoal? a breakwater three miles long could be built here on the crest of the shoal, at comparative little cost, enclosing a large bay with good holding ground, that could hold all the vessels in our country, and directly upon the line of traffic and perfectly accessible.

The statistics of the sheets will be found appended.

Very respectfully
J. F. Moser.
Lieut. U.S.N., Asst C. & G.S.
Chief of Party.

Hydrography :— Proj. № 10; Off Martha's Vineyard & Nantucket Islands, Mass. — Summer, 1889.

Date	Letter	Number of — Sdg. Book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
July 22	A	1	63.71	385	115	Ship	Lieut. Moser & Ens. Bispham, Tisdale & Strite
" 24	B	2	69.00	566	113	"	" " " Strite & Cloke
" 25	C	1	82.50	638	176	"	" " " Bispham, Tisdale, Strite & Cloke, & P.Yeo. Dunn
" 26	D	2	65.89	571	109	"	Ens. Bispham, Tisdale, Strite & Cloke, & Pay. Yeo. Dunn
Aug. 6	E	1	64.08	539	235	"	" Tisdale, Strite & Cloke, & Pay Yeo. Dunn
" 7	F	2	87.32	649	271	"	" " " " " "
" 8	G	3	31.34	235	95	"	" " " " " "
" 9	H	3	39.10	386	154	"	Lieut. Moser, Ens. Bispham & Tisdale & " "
" 19	I	4	22.55	133	17	"	Ens. Tisdale, Strite & Cloke, & " "
Sept. 24	J	3	75.83	574	186	"	Lieut. Moser, Ens. Bispham, Strite & Cloke, & Pay Yeo. Dunn
" 25	K	4	54.06	438	158	"	Ens. Bispham, Strite & Cloke, & Pay Yeo. Dunn
" 29	L	5	62.92	428	147	"	" Tisdale, " " " "
" 30	M	4	6.95	73	24	"	" " " " " "
Oct. 3	N	4	61.78	596	200	"	" " " " " "
" 18	O	5	28.38	283	103	"	" " " " " "
" 19	P	6	68.74	660	256	"	" " " " " "
Total on Sheet			884.16	7,154	2,359		

Hydrography :— Proj. No 5 ; Southern coast of Nantucket Island, Mass., — Summer, 1889.

Date	Letter	Number of— Sdg book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
Aug. 8	a	1	15.00	720	124	Whaleboat	Ensign R.B. Tisdale & Pay Yeo. J.L. Dunn
" 9	b	1	10.00	336	73	"	" " " "
" 21	c	2	10.50	481	100	"	" " " "
" 23	d	1	11.00	440	115	"	" " " "
			46.50	1,977	412		
Aug. 8		1	13.20	615	150	Gig	Ensigns S.M. Strite & W.S. Cloke
" 9		2	7.70	447	117	"	" " "
" 21		1	9.60	459	108	"	" " "
" 23		2	10.30	434	122	"	" " "
			40.80	1,955	497		

Recapitulation				
	46.50	1977	412	Whaleboat
	40.80	1955	497	Gig
Total on Sht	87.30	3,932	909	

Hydrography:— Examination of rock S.W. of Cape Poge, Muskeget Channel, Mass., — Summer, 1889.

Date	Letter	Number of —				Name of Vessel	Observers
		Sdg book	Miles Naut.	Soundings	Angles		
Aug. 20	---	1	0.75	104	15	Gig	Ensigns S.M. Strite & W.S. Cloke.

Hydrography :— Proj. № 13 ; Wood's Holl Harbor, Mass.

Summer, 1889.

Date	Letter	Number of— Sdy book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
Oct. 22	a	1	5.50	922	123	Whale boat	Ensign R.D. Tisdale & Pay. Yeo. J.L. Dunn.
" 23	b	2	4.00	761	30	"	Ensigns " & L.C. Bertolette
" 24	c	2	——	1	2	"	" " "
" 25	d	2	2.25	326	68	"	" " "
" 26	e	1	1.00	118	44	"	" " "
			12.75	2,128	267		
Oct. 22		1	6.00	745	192	Gig	Ensigns S.M. Strite & L.C. Bertolette
" 23		2	2.00	276	105	"	" " & W.S. Cloke.
" 24		2	——	——	2	"	" " "
" 25		1	——	1	2	"	" " "
" 26		1	1.20	131	56	"	" " "
			9.20	1,153	357		

Recapitulation				
	12.75	2128	267	Whale boat
	9.20	1153	357	Gig
Total on Sht	21.95	3,281	624	

Hydrography:—Examination of Cox Ledge,—about 15 miles S.W. of No mans Land, Mass.,—Summer, 1889.

Date	Letter	Number of—				Name of Vessel	Observers
		S'd'g book	Miles Naut.	Soundings	Angles		
Oct. 31	A	1	21.25	191	22	Ship	Lieut. Moser & Ens. Bispham, Tisdale & Strite

Forwarded:

Chas. M. Thomas, Lt. Comd'r., U. S. N.,
Hydrographic Inspector C. & G. Survey.

Write me at: Key West, Fla.

Telegraph me at:

My Express Office is:

1.25.90 A.J.M.

Report B

U. S. Coast and Geodetic Survey,

Steamer A.D. Bache

January 20th, 1890.

2—547

Prof. T. C. Mendenhall.

Superintendent U.S.C. & G. Survey.

Washington, D.C.

Sir:

In obedience to Laws and Regulations, Coast and Geodetic Survey, I beg leave to submit the following report of the operations of the hydrographic party under my charge during the summer season of 1889.

This party, after a successful season's work on the Coast of Florida, in compliance with your instructions returned to New Bedford, Mass., May 23rd, and prepared for the summer's work. As however, there was no money available for repairs or equipment for field work, limited preparations only could be made until after July 1st, when the Appropriation became available.

Owing to the necessity for making some slight repairs, the vessel was detained until July 10th, and the following day the party was in the field and commenced operations by building and locating signals. Work was prosecuted as vigorously as the very unfavorable and inclement weather would permit until October 31st, when the party by your instructions returned to Baltimore, Md., there to refit for the winter's work on the Southern coast.

The work assigned this party was a continuation of the Coast Hydrography South of Martha's Vineyard and Nantucket, thus extending the work commenced during the summer of '87 at Point Judith and continued during the summer of '88.

The projection on which we were engaged during the summer of 1888, and extending to Muskeget Channel, was not finished at the close of that season owing to the unfavorable condition of the weather. This then was the first work upon which the vessel was employed this season.

The off-shore work is executed on a scale of 1:40,000, and the boat work bordering the shore on a scale of 1:20,000.

The system of lines adopted is similar to that executed during ~~p~~preceding seasons, viz:— normals every half mile for a distance of six or seven miles, and thence to seaward limit normals every mile. This system is then crossed by lines half mile apart for a distance of six or seven miles from the shore, and thence seaward the cross lines are gradually spread until at the seaward limit where they are one and one-half miles apart. The boat system connecting the shore line with the ship varies as the formation demands. Where the shore line is bold a simple system of connecting traverses is deemed sufficient, but in the vicinity of shoals and inlets a more thorough development will be found.

The work lies on an exposed coast, which during the smoothest part of the season is enveloped in fog. The prevailing winds are S. W. during the summer, often increasing to half a gale and ending in a very uncomfortable

sea. Southerly winds also bring hazy weather so that outside work is much retarded by very unfavorable conditions.

I trust I need hardly say that this season was an exceptionally unfavorable one; in fact I call our work here a dismal failure. During the past five season's we have averaged over 6000 miles of soundings; this summer we have 1015 miles to show. And now that it is numbered with the past, and I have leisure to review the work, I do not see how at any time we could have accomplished more work under the unfavorable conditions that prevailed. The weather was decidedly rainy, and when it did not rain it either blew a gale of wind or the atmosphere was thick with fog or haze. We went outside day after day and simply burned coal without getting a cast of the lead. It is impossible to do off-shore ship work successfully where the signals cannot be seen eight miles at least.

It is difficult to compare working days of parties engaged on inside hydrography

with those employed on the sea coast, though both are working in the same general locality. After a gale of wind an inside party can go to work at once, and then again it is frequently clear inside when it is hazy and foggy outside, the land seems to burn off the fog; besides this, inside work can be carried on in moderately thick weather because the signals need not be carried so far.

The work is now a long distance from port; about thirty-five (35) miles from any shelter, and such a harbor as can be made is either through Muskeget Channel or between Old Man and Pass Rip Shoals, neither of which can be used at night and both are treacherous and dangerous even to those acquainted with the locality. I do not hesitate to anchor outside when the conditions are favorable, and do so frequently, but it is impossible for a vessel of this size to remain out in all weather and keep the seas amidst the shoals, rips and ~~ever~~ varying currents south of Nantucket.

I have many times after working all day retired very tired only to be hammered and

slammed around in my bunk all night, and when crook was called next day I was simply unfit to do anything.

The fact is that the continuation of this work to the eastward must be regarded and put on the same basis as deep sea work. As before mentioned, the locality is far from port, and spells of clear days cannot be taken advantage of unless the vessel is on her station.

Another drawback to our ~~progress~~ this season was the number of signals we had to maintain. The length of coast line we were engaged on is forty (40) miles, and we had to maintain a system of signals over this entire distance. Gales of wind would frequently wreck them and cause us great inconvenience.

This part of the coast is clear of all commerce. No vessels engaged in the carrying trade are ever found, unless off their course, between No mans Land and Nantucket Shoals. All the coast trade passes inside and through the sounds, and the ocean track lies well outside. During the summer months many

fishermen will be found between No Mans Land and Muskeget, and some few a short distance to the eastward. The sail craft are generally engaged in sword-fishing, and the steamers in seining manhaden. I counted twenty-one manhaden steamers in sight at one time, south of Martha's Vineyard. The catch this year was large as there was an unusual run of fish. There is no doubt, however, in my mind that these steamers are destroying the fish, for they not only take the manhaden but large numbers of edible fish. And after all the porgie is the food for the edible fish and when they are removed the other fish will leave. The catch of blue-fish this season by the local fishermen was small.

After the fishing season was over the "Pache" occupied the field solitary and alone; the very loneliness seemed oppressive, and the words of Coleridge in the "Ancient Mariner" frequently came to my mind where he says: "So lonely 'twas, that God himself scarce seemed there to be."

I wish I could speak intelligently

about the currents and convey some additional information, but I can not. I can only say that in different parts of the field the currents vary very much in force and direction, and that some day when the Office has fully determined to take the field for this important work it will be benefitted by a thorough investigation of this locality. I desire, however, in this connection to call attention to immense numbers of Physalia which during the summer months in fair weather fairly covered the waters South of Nantucket and Marthas Vineyard. These marine forms are born and mature in the tropical seas, and are thence carried northward in that great ocean river, the Gulf Stream, but the question would continually come to one, how do they reach these shores for the Stream is several hundred miles distant? These Physalia are in good condition, they average as large as any I have ever seen in the tropics; their colors are bright, even brilliant, and tentacles and other parts vigorous and healthy. Now and then a few are encountered that have an unfavorable appearance, no color,

tentacles attacked by small fishes that can be seen hovering underneath them, and the object is evidently undergoing a change, but these are the exception. The question has occurred to me, how do they get here? The Gulf Stream at Hatteras trends to the eastward, and this tendency becomes greater as a higher latitude is reached; and then the prevailing winds are decidedly from the South-west. The wind that would bring these objects in shore would be from the South-east, and we rarely have this wind during the summer on this coast. To me it looks very much as if the current, tidal current if you please, setting on shore was greater than that setting off shore. And may it not be partly Gulf Stream, some ramifying branch straying away from the main body of water. I very often think that we follow the idea of the river in the ocean, when referring to the Gulf Stream, too far. I don't believe that the Stream preserves its sharply defined borders in the northern latitudes; it must branch out, radiate, ramify, until finally swallowed or lost in

the great ocean volume. However I will simply state the fact and leave to others more competent, the solution of the problem.

The territory embodied by our work during this season is largely embraced in the work of last summer, and fully described in my report then. It would therefore be a useless repitition for me to enter into the details of a description embracing the shore features, formation of the islands, shoals &c &c, and I beg leave therefore to refer to my report for the summer of 1888 for any apparent omissions here.

I desire here to renew my recommendation of last year for a sea buoy at Muskegat Channel and a First Order Light at Chomans Land. This same recommendation did not find favor with the District Inspector. If, however, additional experience should lend additional weight to so important a matter I can only say that my late experience only confirms more and more the correctness of my former suggestion. A sea buoy or a single bar buoy at Muskegat Channel would not only

permit vessels to use it, but it would be a guide past the shoals which are five miles from the nearest land. I have with difficulty maintained a barrel buoy there all summer, and have had captains of fishing steamers come to me for directions to enter. I have seen thirty fishing vessels, steamers and sail craft, within six miles of the shoals at one time. The Board recognizes Muskeget Channel and buoys the safe inside part and leaves the dangerous bar unmarked. I do not suggest an elaborate system of buoyage here, a single metal bar buoy is all that is necessary, and if placed on the turn of the sailing line, which I shall give later, four fathoms of water can be carried across at all times.

My recommendation for a First Order Light at No Mans Land in place of Gay Head, which was also adversely criticised, I beg leave to renew. I think no intelligent man can visit the locality, or examine it on a chart, without seeing the correctness of my suggestion. A sea coast light on

Cto Mans Land would be five and one-half (5½) miles farther seaward than Gay Head, yet the former is in perfect darkness. All that is necessary, in my opinion, at Gay Head is a Third or Fourth Order Light as a guide to the entrance of the Sound. The site for a light at Cto Mans Land is equally as good as Gay Head; the sea bluffs are ninety (90) feet above tide water and the highest point of the island one hundred and ten (110) feet above the sea. If poor desolate Cto Mans Land had a numerous constituency I have no doubt but what a light would have been there long ago.

In my report last summer I gave directions for entering Muskeget Channel which may be supplemented by my experience during the past season. Wasque Hill is a bald hill, and when it bears N. by E. (mag.) from sea is the extreme east land that can be seen on Martha's Vineyard, and looks like a yellow rounded knoll with a patch of woods adjoining it on the west; get this knoll to

head N. by E. (mag.) in not less than ten (10) fathoms and run for it on this bearing; the water will shoal very rapidly. When the shoalest sounding is obtained, about four (4) fathoms, haul up N.N.E. 1/4 E. (mag.); this course carries in mid-channel between Mutton Shoal and Skiff's Island. With Mutton Shoal buoy abeam steer N. 3/4 E. (mag.) and enter the sound at Black buoy No. 15.

As it is quite probable that I may not be permitted to continue the work to the eastward next season, my suggestions as to the manner of extending it may be of some service. The work on the shoals is not going to be pleasant, and it will require the constant attention of the Chief of Party. Take, for example, Chart 111 and examine critically that portion bordering upon the Eastern and South-eastern part of Nantucket, you will notice that the original work lacks fullness and that very little development was made. By drawing the six fathom curve this becomes more apparent. Notice, for example, from Miacomet Rip to Great Point there are no

boat lines, and then notice the large areas where there are no soundings at all. There is no doubt in my mind that a thorough development of this locality will make a very different appearing sheet. The question may be asked, what is the use of making such a close survey of a locality out of the commercial track? I can only say if it is worth doing at all it is worth doing well; this is a resurvey and should be as accurate as our means will permit. If it has no value at the present moment it will have in the future, even if only to study the action of the currents and compare the physical features of the locality. I think the Office should give this work some study; the old records should be searched and the Experience of former parties collected from such data as may remain in the archives. Where a vessel stands a chance of knocking a hole in her bottom, as she does on this work, the Chief of Party should be furnished with all the information and advice possible. In my opinion the same system of lines should be

carried over this work that I adopted from Point Judith to the close of the season, and which I have already referred to, with the exception, that in the vicinity of the shoals and lumps the lines should be increased so as to thoroughly develop them. I have before me my copy of Chart 111 on which I have drawn the four, five, and six fathom curves; these curves outline the shoals as far as we know them and permit one to study the features. If I were to continue this work I should make a requisition on the Office for five or six tents; with these I would encamp a party on the shore at the point of commencing the boat work and let them, with a whale boat, continue the shore line boat work entirely independent of the vessel. I should visit them when necessary, relieve the whole party once a month if it was deemed advisable, but otherwise let them act independently. When the condition of the sea is such that boat work can be done to advantage, a boat can always be launched safely through the surf. By this means the vessel is relieved

of an element which is a continual drag. I should then take each system of shoals and lumps and develop them separately by ship and boat, and afterwards connect all by ship lines. The question of fully developing such shoals as Rose and Crown, Great Rip, Davis Bank, Old South Shoal and Davis South Shoal by shore signals will require some study, and possibly a different order of work from that usually adopted.

For the development of Old South Shoal and Davis South Shoal the accurate location of the Light Ship is necessary. To effect this I should, on a clear day, get a cut on it from Sankaty Head Lt., and then on another clear day anchor the vessel south of "Surfside", and as far out as possible so as to locate the vessel, and get another cut on the Light Ship. With this object once determined, buoys on the shoals could be located by bearings and mast-head angles checked by course and distance run by the vessel. The development could then be made from the buoys. Of course all this takes time, but it is time

well spent. If I found it impossible to develop Rose and Brown, Great Rip and Davis Bank from the shore signals, I should either try to erect signals on the bank or locate buoys on it, and if both failed, then I should locate the vessel on the bank and by boats run radial lines over it and fix the positions by cuts taken from the masthead on the boat, and from the boat on the mast-head. It is extremely probable that signals for locating and cutting in can always, in clear weather, be seen from the vessel's deck or mast-head. There are many ways in which this work can be done, and each Chief of Party may have his own views as to which is best. If I have gone a little more into details than seems pertinent my excuse must be that I have only the interest of the work at heart and desire to see it well done.

I believe myself that the Steamer "Endeavor" is better fitted to execute the shoal water work here than this vessel; she is fully equipped to do the sounding and draws three feet less than the "Bache." She can

cross nearly all the shoals, is heavily built, and should she found on a shoal will probably do no damage, where the result with the "Bache" might be serious. Besides all this, the "Endeavor" can go in and out of Nantucket freely whilst the Bache must make her harbor at Hyannis or Edgartown, both of which are a long distance from the field. This however is a matter for the consideration of the Office.

Referring now to "Instructions and Memoranda for Descriptive Reports", and the different paragraphs affording headings for Report "C", I would say that my report of last summer covered nearly the entire locality on which we were engaged this season, and I will only here refer to such portions as may not have been noticed before.

The prominent features seen on Nantucket, on approaching the island from the southward, are on the east, Sankaty Head Lt. Hs., and Dom Stevens Head; near the central portion of the island, the spires and buildings of the town of Nantucket; and on the west,

the hill on which Δ North is located, and near it a large water tank. This latter is a very prominent object, can be seen a long distance, and would make a good day mark for mariners if engraved on our charts. The Hotel at Surfside is also very prominent, and at a distance looks like a high Swiss barn; this building prominently indicated would also be of service to locate a vessel.

There is but one Government Life Saving Station on the South shore of Nantucket, that at Surfside, but there are several Humane Houses under the care of the Massachusetts Humane Society.

Referring to additional work done by this vessel I beg leave to say: the development and location of the four (4) foot boulder S.E. of Cape Poge Lt. Ho. was reported to the Office in my letter of August 21st, and is now engraved on the plates.

In the supplementary work at Woods Holl and vicinity, I hardly know whether to say that I am entirely satisfied with our results there or not, because in the survey of a

locality where it is known that the bottom is strewn with boulders it is merely a matter of accident if in the ordinary course of sounding any are found; in fact the rounded tops even if the lead strikes them will deflect the lead and give no indication of shallow water. An Eight (8) foot uncharted boulder was reported S.W. of Hobska. I had the locality searched and found an eight (8) foot boulder and two of less depth, but the informant, Mr. Gifford, said that the one referred to was farther off-shore. I had the locality sounded and dragged for two days on all the ranges given, and one half day with Mr. Gifford in the boat, but was unable to find anything. I would not say that this boulder does not exist, but I am inclined to think that those one found are possibly the ones referred to. Mr. Gifford said if the outer boulder was again found he would mark it so we might locate it, and I also asked Capt. Gibbs, of the Light House Tender "Verbena" to inform me if anything definite was heard about it. I.

would suggest that a memorandum be made of it. The diver at the Fish Commission said there was a boulder lying one hundred (100) feet from, and on the prolongation of the north side of the Fish Commission Wharf. We spent a day dragging for this, but were unable to find it; we found a ledge of rocks with about three (3) feet less water than the surrounding surface, but no boulder. The pilots said they knew of no boulder in that locality. Two boulders were found, one outside and one inside of the bush buoy, (black spar buoy No. 1) and a rocky ledge off black buoy No. 5, at the bay entrance.

The U.S. Engineers, some two years ago, made an elaborate survey of this locality; spending the greater part of the summer on this work. It is on a very large scale and has been issued on blue print. This survey, in connection with the work done here by us, might throw some light on any doubtful points. - I am told that some boulders have been removed during the past years by the Engineers, and by Mr Forbes, in the

channel from the Bay through Woods Holl.

A 15 fathom ledge, known as Cox Ledge, lying about fifteen (15) miles S.W. of Chatmans Land, and which any lines of soundings a year ago did not indicate, I again looked for but was unable to find. I went over the locality carefully, and whilst our soundings this year agree with those in this locality taken last year, they both disagree from the original soundings made there some thirty-five (35) years ago. I do not know where the trouble is. I do not believe there have been any changes in the bottom and I think Cox Ledge exists, but think it possible that the location on our original sheets slightly in error. I would suggest that the original records be searched and the work in the locality replotted. I would beg also that when this party goes east next summer that they be directed to look for the ledge again, with any additional data the Office can furnish in order to definitely settle the question.

As the estimates for the next fiscal year

call for a resurvey of Buzzards Bay, I beg leave to call attention to several localities where rocks have been reported, viz: —

In Quick's Hole, a rock with ten (10) feet over it, N.N.E. about five ship lengths from the large lone boulder standing in the water clear of the shore off the N.E. end of Nashawena. Foul ground between the above boulder and Lone Rock, and surrounding Lone Rock. A seven foot rock outside the three (3) fathom curve off the N.W. point of Nashawena. Less water on the rocks in Cuttyhunk Harbor than indicated on our charts (See Buoy Book). Ten (10) foot rock about one mile north of Penikese (See Eldridge's Chart). An eight (8) foot rock 1¼ miles east (true) of Clark's Point Lt.

I have no definite knowledge of any of these rocks. They have come to my notice in conversation with pilots and fishermen who know them by report only, not one having any definite information. It was my intention to examine these several localities and I was authorized by the Hydrographic Inspector to do so, but they were so far from my regular

work, which was so much delayed by foul weather, that it was too late for one to make the attempt when the work was closed as the season was too far advanced. As, however, a resurvey of the localities is to be made I thought it well to call attention to the matter.

Referring to the tidal observations during the season I beg leave to quote the report of Ensign Bispham, who under my direction had charge of the gauges and gave careful attention to the observations.

"A tide gauge was established at No Mans Land, and by this gauge was reduced all the work off the South shores of Martha's Vineyard and Nantucket, both of the ship and of the boats.

No regular continuous observations were made, the gauge not being read at night, on Sundays, or on such days that work was evidently impossible.

The gauge was planted alongside the rock marked with the Bench Mark (For Description,"

"see Wm. H. Mitchell's Report, 1857), with its 3.1 division on level with B.M. The height of B.M. above the plane of M.L.W. as furnished by the Office was used to determine the constant for the correction of the tide gauge readings.

The gauge remained perfectly stationary and did not carry away during the entire season, notwithstanding the many violent gales; this was far from being the case during the seasons of 1887 and 1888.

The method employed in planting the gauge was to shove a piece of 4×4 scantling; rocking this down between the rocks on the bottom (being unable to drive down), a chain was swept diagonally around the rock, taking in the scantling near the top of the rock, around under a projecting ledge at the bottom of the rock on the far side; wedges were then driven between rock and scantling, taughtening the chain; spikes were driven between the links to prevent the chain riding down; to the scantling thus secured was nailed the tide staff"

"No new noticeable tidal features were observed.

The tide observers were Martin Christopherson (Asst.) and Martin W. Harris (Asst.) who were boarded during their respective stays on the island with Mr. Butler, the only permanent resident.

At Woods Hole two gauges were established in the same places as selected by Lieut. C. P. Perkins, U.S.N., in 1884. At the Fish Commission Wharf the gauge was placed identical with the former gauge - still standing, though numbers almost obliterated - marks corresponding. At Mr. Forbes's Wharf, Uncatena Island, the gauge was placed on the same pile, but the 8.7 mark was on a level with sill, thus marking the 0 of the gauge of 1889, 0.7 foot below the 0 of the gauge of 1884. With this change, the same constants were used in correcting the tide books, as furnished from the observations of Lieut. Perkins. The same limit for reducing the soundings was used, - shown on projection by a red dotted line, marked A-A, except the"

" the rock around Ram Island, which was referred to the Fish Commission gauge.

The tide observers were:— Fish Commission Wharf, Jorgan Egostol (Asst.); Uncatena Island,— Martin W. Harris (Asst.) and G. D. Savage (Asst.) "

The following Δ^ns were visited and tripod signals erected over them:— Indian Hill, Weequobska, Squibnocket, Tuckernuck '87, Tom Nevers Head, Peaked Hill, West End, No Mans Land, North, Nunnock.

The descriptions furnished by the Office are correct and the surface marks are in good condition, except in the following instances:—

"Indian Hill", copper nail in boulder, missing; replaced it by driving two iron spikes in hole, and cut Δ in rock around spikes

"North" The boulder marking this Δ^n has been taken away. I did not attempt to remark it as I was not positive of the point.

In conclusion I beg to call your attention to the officers and men of my command who faithfully performed the

various duties demanded by the work.

The following is a list of the officers:—

Ensign W. A. Bispham, U.S.A.
Ensign R. D. Tisdale, U.S.A.
Ensign S. M. Stone, U.S.A.
Ensign L. C. Bertolette, U.S.A.
Ensign W. S. Cloke, U.S.A.
P. A. Surgeon J. M. Steele, U.S.A.
P. A. Engineer C. H. Scribner, U.S.A.
Recorder Geo. R. Jones
Recorder J. L. Dunn.

The statistics will be found appended.

Very respectfully
L. F. Moser.
Lieut. U.S.A., Asst. C. & G. S.
Chief of Party.

Forwarded
Chas. H. Thomas, Lt. Comd'r., U. S. N.,
Hydrographic Inspector C. & G. Survey.

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

Statistics of Field Work executed by Lieutenant J. F. Moser, U.S.N.

Date of beginning field work	July 11th 1889
Date of closing field work	October 31st 1889
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	500
Number of miles (geographical) run while sounding	(1169.3*
Number of angles measured	3929
Number of soundings	14662
Number of tidal stations established	3
Number of specimens of bottom preserved	15
Current stations, number of	
Hydrographic sheets finished & unfinished, number of	3
Hydrographic sheets, scales of	1:20,000 & 1:40,000

Hydrographic sheets, limits and localities of:

Proj. No 10:— Off Martha's Vineyard & Nantucket Islands, Mass.

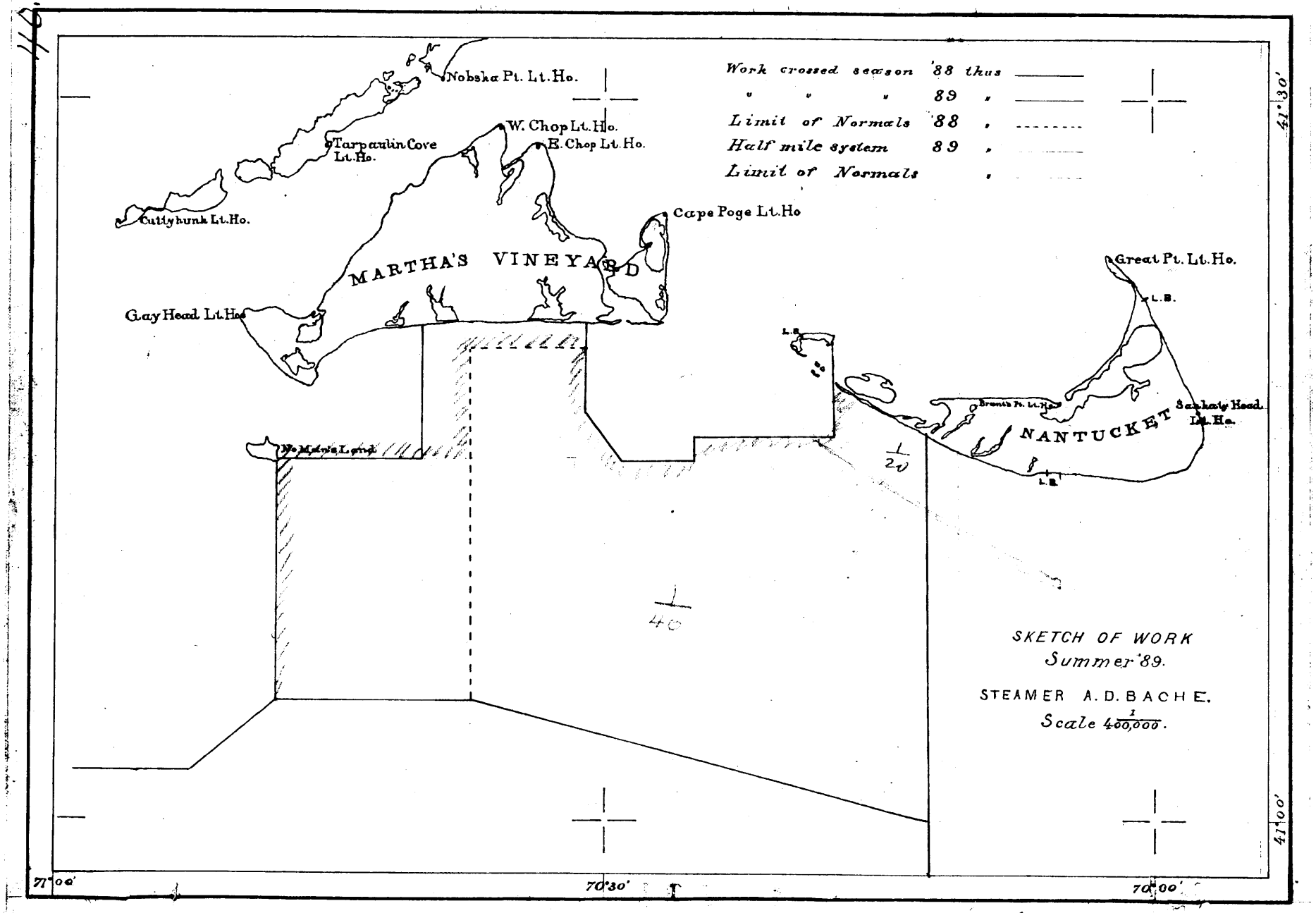
" " 5:— Southern coast of Nantucket Island, Mass.

" " 13:— Woods Hell Harbor, Mass.

Examination of rock S.W. of Cape Poge, Muskeget Channel, Mass.

" " Cox Ledge — about 15 miles S.W. of No mans Land, Mass.

* See summation on 6th page following — which appears to be correct: 1015.4 miles. E.G.


Work crossed season '88 thus
" " " 89 "
Limit of Normals '88 "
Half mile system 89 "
Limit of Normals "
Nobska Pt. Lt. Ho.
W. Chop Lt. Ho.
Tarpaulin Cove Lt. Ho.
E. Chop Lt. Ho.
Cuttyhunk Lt. Ho.
Cape Poge Lt. Ho
MARTHA'S VINEYARD
Gay Head Lt. Ho
Great Pt. Lt. Ho.
L.B.
Brants Pt. Lt. Ho.
Sankaty Head Lt. Ho.
NANTUCKET
1/20
1/40
SKETCH OF WORK
Summer '89.
STEAMER A. D. BACHE.
Scale 1/400,000.
41°30'
41°00'
71°00'
70°30'
70°00'

Hydrography:— Proj. Nº 10; Off Marthas Vineyard and Nantucket, Mass. — Summer, 1889.

Date	Letter	Number of — Sounding book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
July 22	A	1	63.71	385	115	Ship	Lieut. Moser & Ens. Bispham, Tisdale & Strite
" 24	B	2	69.00	566	113	"	" " & " Strite & Cloke
" 25	C	1	82.50	638	176	"	" " & " Bispham, Tisdale, Strite & Cloke, & Pay Yeo. Dunn
" 26	D	2	65.89	571	109	"	Ens. Bispham, Tisdale, Strite & Cloke, & Pay Yeo Dunn
Aug. 6	E	1	64.08	539	235	"	" Tisdale, Strite & Cloke, & Pay Yeo. Dunn
" 7	F	2	87.32	649	271	"	" " " " " "
" 8	G	3	31.34	235	95	"	" " " " " "
" 9	H	3	39.10	386	154	"	Lieut. Moser, Ens. Bispham & Tisdale, & " "
" 19	I	4	22.55	133	17	"	Ens. Tisdale, Strite & Cloke, & " "
Sept. 24	J	3	75.83	574	186	"	Lieut. Moser, Ens. Bispham, Strite & Cloke, & Pay Yeo. Dunn
" 25	K	4	54.06	438	158	"	Ens. Bispham, Strite & Cloke, & Pay Yeo. Dunn
" 29	L	5	62.92	428	147	"	" Tisdale " " " "
" 30	M	4	6.95	73	24	"	" " " " " "
Oct. 3	N	4	61.78	596	200	"	" " " " " "
" 18	O	5	28.38	283	103	"	" " " " " "
" 19	P	6	68.74	660	256	"	" " " " " "
Total on Sheet.			884.15	7,154	2,359		

Hydrography :— Proj. No. 5; Southern coast of Nantucket Island, Mass. — Summer, 1889.

Date	Letter	Number of — S'd'g book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
Aug. 8	a	1	15.00	720	124	Whale boat	Ensign R.D. Tisdale & Pay Yeo. J.L. Dunn
" 9	b	1	10.00	336	73	"	" " " "
" 21	c	2	10.50	481	100	"	" " " "
" 23	d	1	11.00	440	115	"	" " " "
			46.50	1977	412		
Aug. 8		1	13.20	615	150	Gig	Ensigns S.M. Strite & W.S. Cloke
" 9		2	7.70	447	117	"	" " "
" 21		1	9.60	459	108	"	" " "
" 23		2	10.30	434	122	"	" " "
			40.80	1,955	497		

Recapitulation				
	46.50	1977	412	Whale boat
	40.80	1955	497	Gig
Total on Sht	87.30	3,932	909	

Hydrography: — Examination of rock S.W. of Cape Poge, Muskeget Channel, Mass. — Summer, 1889.

Date	Letter	Number of				Name of Vessel	Observers
		Sdg book	Miles Naut.	Soundings	Angles		
Aug. 20	——	1	0.75	104	15	Gig	Ensigns S.M. Strite & W.S. Cloke.

Hydrography:— Proj. No 13; Wood's Holl Harbor, Mass.

Summer, 1889.

Date	Letter	Number of — S'd'g book	Miles Naut.	Soundings	Angles	Name of Vessel	Observers
Oct. 22	a	1	5.50	922	123	Whaleboat	Ensign R.D. Tisdale & Pay Yeo. J.L. Dunn
" 23	b	2	4.00	761	30	"	Ensigns R.D. Tisdale & L.C. Bertolette
" 24	c	2	—	1	2	"	" " "
" 25	d	2	2.25	326	68	"	" " "
" 26	e	1	1.00	118	44	"	" " "
			12.75	2,128	267		
Oct. 22	a	1	6.00	745	192	Gig	Ensigns S.M. Strite & L.C. Bertolette
" 23	b	2	2.00	276	105	"	" " & W.S. Cloke
" 24	c	2	—	—	2	"	" " "
" 25	d	1	—	1	2	"	" " "
" 26	e	1	1.20	131	56	"	" " "
			9.20	1,153	357		

Recapitulation

	12.75	2128	267	Whaleboat
	9.20	1153	357	Gig
Total on Sht	21.95	3,281	624	

Hydrography: — Examination of Cox Ledge, — about 15 miles S.W. of No Mans Land, Mass., — Summer, 1889.

Date	Letter	Number of —				Name of Vessel	Observers
		Sdg book	Miles Naut.	Soundings	Angles		
Oct. 31	A	1	21.25	191	22	Ship	Lieut. Moser & Ens: Bispham, Tisdale & Strite.

Hydrography :— Grand Recapitulation — Summer, 1889.

Name of Vessel	Number of —		
	Miles (Nautical)	Soundings	Angles
Ship	905.40	7345	2381
Whale boat.	59.25	4105	679
Gig	50.75	3212	869
Grand aggregate	1,015.40	14,662	3,929

Signals

Erected	Occupied	Determined
27	8	23

Number of days on Station, and how employed.

Number of days on Station	113
" " " " which hydrographic work was done	24
" " " prevented from hydrographic work by bad weather	59
" " " " " " " " other causes	7
" " " on which signals were built & cut in	8
" " Sundays	16

Number of officers and men attached to Party.

Lieutenant	1
Ensigns	5
P. A. Surgeon	1
P. A. Engineer	1
Master-at-Arms	1
Paymaster's Yeoman	1
Machinists	4
Ship's Writer	1
Carpenter's Mate	1
Boatswain's "	1
Quartermasters	4
Ship's Cook	1
Cabin Steward	1
Cabin Cook	1
Second-Class Firemen	4
Seamen	15
Landsmen	3

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.: