U. S. Coast and Geodetic Survey.
JUN 30 1888
ARCHIVES

193. 4.

U. S. COAST AND GEODETIC SURVEY.

D. M. Thorn, Superintendent.

State: Mass.

DESCRIPTIVE REPORT.

Topographic Sheets Nos. 1785, 1814, 1815, 1818.

LOCALITY:

Nantucket

1888.

CHIEF OF PARTY:

E. L. Davey.

339.

DESCRIPTIVE REPORT*

P. T. Shuts by Taney and Van Orden in 1887.

archives

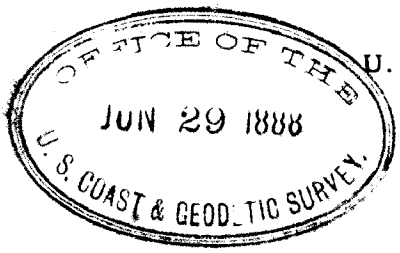
July any [illegible]

HENRY L. WHITING.

Tape. { 1785 - 1814 - 1815 - 1818

* This is a copy of Mr Whitings report [illegible] sent in for files of Supt. — but does not contain the changes made in his copy returned [illegible]

Give here full address to which reply should be sent :



U. S. Coast and Geodetic Survey,

Washington, D.C.

June 29th, 1888

Descriptive Report

to accompany the following Plane table Sheets:

No. 1818, Great Point and Nantucket Harbor.
No. 1815, Atlantic Coast of Nantucket from Squam Head to Tom Nevis Head
No. 1814, North and South shores of western part of Nantucket Id, including Matacut Harbor.
No. 1785, Tuckernuck, Muskeget and neighboring small islands and shoals.

The survey was confined to a narrow strip along the coast of about 400 miles in width. The entire shore line is a simple sand beach, backed by sand dunes and occasional bluffs of considerable height, as at Squam Head, Sankaty Head, Siasconset, Tom Nevis Head and on North shore N.W. from town of Nantucket. The highest bluff is at Sankaty Head

339.

DESCRIPTIVE REPORT*

REPORT 1888.

WEST TISBURY, DUKES Co. MASS.

BY

HENRY L. WHITING.

Tape. { 1785 - 1814 - 1815 - 1818

* This is a copy of Mr Whitings [illegible] sent in for files of Supdt. — but [illegible] the changes made in his copy [illegible]

where it is about 90 ft. high.

On the east and South shores of Nantucket the slope of the beach is quite steep there being generally but one line of breakers and the beach is beaten hard. On the north shore of Nantucket and about Muskegut and Tuckernuck and South and West of Smiths Point there are many shoals and for considerable distance about there is no deep water except in some very narrow channels. In a heavy blow it is white water every where. If a vessel should be stranded about this portion of the coast I think it would be better to stay by the ship, but if on the South or East coast of Nantucket would abandon the ship unless in sight of guns of life saving crew.

From high water line back to the sand dunes there is generally a pretty good width of clean sand beach. I dont know as the dunes can be called traveling dunes, but do know that on exposed points as Great Point and Muskegut Id., where the only vegitation is a scanty growth of beach grass, they often change shape and position during heavy blows.

The vegitation bordering the coast consists almost wholly of beach grass with here and there bunches of bay bushes. There are no trees of any considerable

West Tisbury, Dukes Co., Mass.

. .....1888.

Hon. F. M. Thorn,

Superintendent Coast and Geodetic Survey,

Washington, D. C.

Dear Sir:-

I present herewith a report of such facts and circumstances in relation to the resurveys made by the parties working on Marthas Vineyard, Nantucket, and other adjacent Islands, in Massachusetts, under my general supervision during the past season of 1887, according to your instructions of June 20, as have come to my knowledge while inspecting this work and examining the results of the surveys.

The exigencies of the service prevented the triangulation, in charge of Mr. Marr, from being commenced in advance of the topography, which, if it had been practicable, might have facilitated the latter work. As it was however, the topographical parties took up their work in localities where the old points were most available.

In the ground assigned to Mr. Vinal, along the east side of Marthas Vineyard, these were sufficient except in the stretch of shore work between the former group of points above Edgartown and Edgartown harbor, and the groups about Vineyard Haven

size on the whole island except in the town of Nantucket. There are a few scattered bunches of low scrub pine in the interior but they are rapidly dying off.

There are two town on the coast, Nantucket and Siasconset, none in the interior. Nantucket owes its settlement to the whale fishing. Siasconset to the fact that fishermen made this place their headquarters during the cod and mackeral fishing time. Both places are now rapidly growing in favor as summer resorts. Many cottages were built in each place last year and many, I understood, were planned to be built this summer. The native population has, however, decreased and the town decreased in wealth.

A narrow guage railroad has been built to connect the towns of Nantucket and Siasconset. It is used onely during the summer season.

The islands of Tuckernuck, Muskegut and other small islands in the neighborhood have a low form of beach and are surrounded by shoals.

The main body of the island of Tuckernuck is well defined by a slight bluff and difference in character of soil from the surrounding sand beach. There is considerable scrub oak and other small trees growing on the island, and the soil is better than

harbor and Cottage City. This deficiency was the more felt on account of the loss of the old point, "Edgartown," which would have partially commanded the ground in question. A further difficulty in the execution of the survey and one that effected the accuracy of positions, was the unusual distortion of the paper on which the projections were made, probably owing to the fact that the need for the field sheets did not give sufficient time for the fiber of the paper to season and set before the sheets were required for use in the field. The unequal change in the condition of the paper of the two sheets covering Edgartown harbor was so remarkable that it induced me to make this special mention of it, as such unusual variation in the material of field sheets vitiates results and makes a comparison of them unreliable. My means of examination are not so good as afforded by the office. Mr. Hergesheimer can make a better test and more thorough examination of these sheets and I am sure he will be interested in doing so. As far as I could judge, measuring minute by minute, the projections were well made. According to my tests on the sheets of 1887 the following distances were shorter than on the sheet of 1886. viz:

Cape Poge Light House to Edgartown Spire	-77 Decᵈ	millimetres
" " " " " Edgartown Light House	-78	"
" " " " " Sampson Hill	-92	"
Sampson Hill to Edgartown Spire, longer,	+15	"
" " " Edgartown Light, House "	+10	"

that of Nantucket. There are a few families living on the island.

The island of Muskeget is very low and almost barren of any vegitation. No trees or bushes. Nothing but a scanty growth of beach grass. None of the sand dunes are over 12 ft. above high water.

There is a Life Saving Station on the North side of the island.

Since the survey of 1846 there has been many marked changes in the shore line, notably on the S. E. point of Nantucket and on the sand islands which are between the Ocean and the islands of Tuckernuck and Muskeget. These changes are due to the action of the waves and currents. In some places the beach has made as at Seasconset and the west point of Tuckernuck Id., but it has washed away greatly on the South shore of Nantucket especially from Wedweden Shoal to E. end of island, and the S. W. part of Muskeget Id.

Altogether there is less area enclosed by high water line than in the survey of 1846.

Yours respectfully
C. L. Tanner
Sub. Assistant C. & G. S.

Showing a remarkably different effect and change in what might be termed the warp and woof of the fiber of the paper.

This condition of the projections, comparatively and in themselves, is deserving of notice as effecting the character and quality of Mr. Vinal's results, which were not in all cases, perfectly accurate. I did not consider the degree of discrepancy, except in one case where it was corrected, sufficient to warrant going over any portion of the work. The details in themselves, were closely, accurately and characteristically given, and , under the circumstances of difficulty , referred to, I can report Mr. Vinal's work as well and faithfully executed. I would respectfully refer to his own report, to you sir, for the details of statistics, expenditures, &c.

The changes which have taken place within the scope of Mr. Vinal's survey, along the east shore of Marthas Vineyard, in the interval of the forty-one years since the first survey was made,are not of special importance and do not effect matters of navigation. The waste of the bluff at the east chop of Vineyard Haven harbor has not been as much since the resurvey of 1871- the ratio not so great- as it was between 1846 and 1871- This is probably owing to the influence of the recent structures, along this part of the shore, wharves, railroads pilings, &c. , which have arrested the litteral movements of the sands. The same may be said of the ratio of change at the West Chops.

I made a communication to the Assistant in Charge of the Office, Mr. Colonna, in answer to inquiries respecting changes of this point, West Chop, which I will briefly restate, in substance.

The first survey of this point by the Coast Survey, was my own of 1845, next my resurvey of 1871 and lastly the survey just made, 1887 by Mr. Vinal.

In regard to the last survey I would remark that the unequal expansion and contraction of the map paper by field use in the last survey, 1887, before referred to, has effected it in such a manner that close comparisons of minor details cannot, in all places be relied upon. The worn condition of the original topographical sheet of 1845 also makes close comparisons uncertain. I have used my best judgement in adjusting the results of the two surveys. The details at West Chop, however, are so near the triangulation point of the Light House, that they may safely be based upon it.

The comparison of results shows that some changes have taken place in the outline and material of the Chop and of the sound and harbor shores on either side of it. The most waste seems to have occurred at the north easterly point of the Chops. The extreme extent of waste at this place, as measured by the position of the high water lines, is about 140 feet since 1845 and about 75 feet since 1871. Along the square-shaped end of the Chop, forming its north-eastly face, a slight waste has taken place averaging from 25 to 30 feet. Near the site of the old Light house the

the shore line is about the same position it was in 1871 which was then about 75 feet inside the line of 1845. About 200 feet to the westward of the position of the old Light house, there seems to be a "node" where the lines of waste and accretion intersect, at which point but little change has occurred within the last 41 years. South westward from this point the sound shore for nearly a mile has made outward an average distance of from 30 to 35 feet. The inlet to Chappaquonsett pond, about two miles from the Chop, has worked south-westerly about 275 feet, but is in about the same allignment as in 1845.

From these facts which are positive, there is no evidence of extensive waste of West Chop by either wave or current action. The face of the rather low bluff or bank has been washed down and the crest line of it has fallen about 50 to 60 feet. This however, is is probably more due to the freezing and thawing of the face of the bluff in winter than in cutting away of the beach at its base. Mr. Vinal's survey indicates but little change in the summit line of this bluff since the survey of 1871. Marks of the inner part of the foundation of the old Light house are still discernable in the edge of the bluff. In the recapitulation and answer to the assertions, referred to in Mr. Colonna's letter, that six hundred yards -1800 feet- of West Chop had been washed away within the last fifty years, it seems entirely safe to say, positively, that nothing like such a change has taken place. It is an important fact that at

Omitted in Whitings corrected report - on file in Supt. Office

345.6

this most salient point of contraction in the width of the sound between the shores of Marthas Vineyard and the mainland, at Nobska Point, in Falmouth, but little if any, change has occurred in the geographical position of the high water line within the last fifty years.

Another paragraph substituted by Whiting - see his letter of March 30 filed with his report. E.G.

It was not expected that much change would be found along the easterly shores of Marthas Vineyard from the fact that they border upon the less exposed waters of Cape Poge Bay and Nantucket and Vineyard Sound, which are not subjected to heavy ocean swells and their accompanying undertow. Some waste or beating inward of the beaches opposite Sengekontacket Pond has taken place, which in later years has undermined and in places washed out the railroad track, which was unwisely, put too near the shore. The points of beach forming the entrance to the pond have moved south-easterly a distance of about 300 feet, the width of the inlet remaining the same. These changes have no physical importance nor do they effect navigation. The main feature of interest in the resurvey is the delineation of the culture improvements of settlement, particularly on East Chop and southward from it, including the townships of Cottage City, where in 1846 there was no settlement visible fron seaward, there are now the conspicuous buildings of Vineyard Highlands, the Camp ground and Oak Bluffs, among which are many large hotels, spires, towers, and ornate cottages that serve as land-marks in the navigation of the surrounding waters.

Since my report of my resurvey of 1886 I had the opportunity to compare the results of the part of that work including the Cape Poge with the survey of 1846, by which I found a general correspondence in the geographical position of the shore line along the east side of Chappaquiddick with occasional wavws in shore line common to such beaches. Showing that the resultant of the forces of the strong current and wave actionthrough Muskeget channal have tended to maintain its westerly boundary in about the same general position. This similarity exist along the beach forcing the northwesterly shore of Cape Poge Pond, except about the more convex part of the beach, opposite the middle of the pond, there the outer line has been beaten inward from 25 to 30 feet. The waste of beach and bluff at the point of Cape Poge has been more that at any other place in thispart of the Island, being about 325 feet. Along the shore of Chappaquiddick, from the entrance to Cape Poge Pond to the large point of the Island opposite Edgartown village, there has been no marked change. The immediate inner or westerly part of this point has, however, increased by a deposit of sand, evidently a resultant of swift action of current around this point. Theextent of the increase, nearest the outer point, is about 200 feet. The location of this deposit of sand, for it has not been thrown up as at places more exposed to sea dash, shows the resultants to be from the flood or inward tide.

In the upper part of Edgartown harbor- Cotamy Bay- but little changes have been made, which is a natural conse quence of

the more sheltered nature of the shores. As the re-survey of this part of the harbor was not worked in the work of 1886 it was completed during the latter part of the present season- 1887- by Mr. Vinal, and while joining the former work a second re-survey was made of the new south inlet, including the short reach of the shore on either side of it. A remarkable and interesting change has taken place in the position of this inlet between the dates of the two last surveys, about fifteen months. During this time the position of the inlet has changed a distance about equal to its width, namely, about 1200 feet. The point of beach forming the westerly Chop of the inlet being now about where the easterly Chop was last year. The easterly point has moved still further eastward so that the inlet is now about 400 feet wider than it was in 1886, being on October 26, 1887 about 1640 feet in width. The general position of the beach west of the inlet does not seem to have under gone much change, but east of it the mass of the beach has been beaten inward, northerly, for about a mile, as far as the re-survey extended. The greatest movement being at the point which is now about 325 feet farther inward than its position in 1886. These changes give an additional basis for the prediction, made in my last report, that this inlet would, eventually, work eastward. The rapidity of this movement, however has been greater than was anticipated. At the same ratio the westerly point of the inlet will

reach the line of the fast land of Chappaquiddick in about six years when it will again be in the same condition and subject to the same forces that caused it to close in 1869. It was thirteen (13) years in making an equal previous movement. In my letter of November 14, 1887 I submitted a tracing from the sheets of the surveys of 1886 & 87 showing the changes of this inlet cartographically, to which I would refer.

The work of Mr. Taney comprises the re-survey of the shores of the Island of Nantucket and the smaller ones of Tuckernunk and Muskeget with the still smaller beach island and shoals adjacent them.

Mr. Taney's work was not effected by the same character of draw-backs that attended Mr. Vinal's survey in the irregularities of projection. With the triangulation points that were available Mr. Taney's sub points and the details of his topography were uniformly accurate. The object of the re-survey did not call for so much interior as that desirable on Marthas Vineyard for the reason that the features of the shore were more simple in character with fewer artificial changes, except, in a small degree at Siasconset, where some cottages and larger buildings have been added to the quaint settlement as it was forty years ago.

The changes in the position of the immediate shore, particularly along the south side and at the west end of the island have been much greater , in general results, than on Marthas Vineyard.

yard

One of the more important natural features of the Island of Nantucket, in its physical aspect and its relation to navigation is Great Point, which marks the southerly limit and is the south easterly head-land of Nantucket Sound and the water way between Nantucket Island and Monomoy Point, through which our best coast-wise fleet passes. This point in former years, according to history to which I am not now able to refer, has under gone marked changes, affecting the navigation limit of the water way referred to. But it is interesting now, to note that the extremity of Great Point is almost in the exact geographical position that it was forty one (41) years ago. The shapes of the point being, now, not quite so sharp. About 1-8 of a mile south of the extreme point, on the inner side, the shore lines of 1846 and 1887 exactly coincide. From this point for about 5-8 of a mile, the inner shore of the point has made out, in convex form, the extreme extension being, about opposite the Light House, about 250 feet. From this locality again southward, for a distance of about 7-8 of a mile there has been a waste of point, averaging a width of about 125 feet. A corresponding gain or making out of the shore of the point, on its seaward side, has taken place. This extends for about 7-8 of a mile with a greatest width of about 250 feet. The gain of this part of the point is considerably in excess of the waste. From the last point referred to on the inner side of the point as the shore

sweeps around to the part called "Coatue" the surveys of 1846 and 1887 very closely coincide. Now the last point referred to on the outer side of the point, for nearly a mile, the shore lines of 1846 and 1887 also nearly coincide. From this last locality, again, for nearly 3½ miles there has been a continued waste of the beach reaching a extreme width of about 200 feet. At the narrowest part or what may be called the isthmus of the point, a narrowing of the beach has taken place- about 1½ miles southeasterly from the Light-house, making the width of this neck of beach about 75 feet less than it was 41 years ago- The survey of 1846 shows a width of 275 feet, and that of 1887 200 feet.

In general terms the changes of Great Point, indicated by the two surveys, have resulted in a narrowing of the southerly part with a broadening of the last . 3-4 of a mile of the extreme end.

I append to my report a tracing from the surveys of 1846 and 1887 which more geographically shows the changes I have endeavored to describe.

The waste along the east shore of the island continues for about 1½ miles south of the "Hand-over" beach, from which place to nearly opposite Sankaty Light house the shore lines of 1846 and 1887 nearly coincide. From Sankaty Head south and west there has been a large gain of beach in the form of along outward sweep or wave in the beach line extending for about 2½ miles, showing a

width at Sankaty Head of about 100 feet; about one mile south west of the Lt. ho. about 400 feet; off Siasconset village 250 feet, still further on about 350 feet. Beyond the present point where the lines of waste and accretion cross each other, for about 3-4 of a mile south east and easterly to about opposite "Tom Never's Pond" a former outward bend or wave in the shore has been washed away, the greatest waste being about 600 feet. It may be remarked in regard to these peculiar sweeps or waves in such beaches that they are the resultants of prevailing forces of sea-dash and littoral currents and have a slow movement in the directions given by these forces. The same formation and movement is very observable on the outer shore of Cape Cod, particularly between the locality of the Highland Light and Race Point and are caused there by the rapid tidal current setting towards Massachusettes Bay. In like manner these undulations of the beach of Nantucket near the corner of the Island are caused by tidal currents along the shore tending toward the entrance into Nantucket Sound. Following this inward wave or bend in line of the beach there is again an outward bend of about 1½ miles in length with a width of about 350 feet. From this point still westward the lines of shore nearly coincide for about 1½ miles. Beyond this point for about 3½ miles there has been large waste of beach and bank averaging in width about 500 feet. Beyond this again is the last wave or section of accretion which extends for about 1½ miles the greatest gain in width, being about

900 feet. From this last mentioned point where the lines of waste and accretion cross and which is about opposite Miacomet Pond, there is a continued waste of the beach and shore to the present end of Smith's Point. This distance is about 7 miles, for the first six miles of this beach of shore, to about opposite Narrow Creek the average extent of water is about 300 feet. In the last westerly mile of the south shore the waste has been still greater, the extreme westerly point, which I suppose may still be called "Smith's " Point" has been beaten in- northward, a distance of about 950 feet. Nature repeats itse lf in the formation of sand dunes and bluffs with the changes of the shore. On the former beach, about opposite the present position of Smith's Point, was one of the highest sands hills of the south shore. The site of this dune is now far out beyond the present breaker. On the other hand, where the present station of Hammock Pond is located, quite a high sand hill has been thrown up where none existed before. Another character of change along the south side of the Island is the filling- in with sand, by wind drifts and the ever shot of breakers of the series of ponds next the shore. Some of the smaller ones nearer the shore are strictly filled up with sand where in 1846 was water with well defined shore line.

The most notable changes indicated by the last re-survey are those of Muskeget Island and the beaches south of it and of Tuckernuck. These changes are not so surprising as might appear when the low form of the beaches and the great mass of sand shoals

surrounding them is considered, as these sand hills will probably be subjected to great movements for ages to come. The character of the changes which have taken place in the last forty years, however indicate a general receding northward and eastward, of the ocean boundary and that the forces which throw up the sand above high water are driving back the high water line before them. An interesting exception to this action, however, is seen in the present westerly part of the long tongue of the beach which makes out from the south-westerly point of Tuckermuck Island and where for over a mile it nearly coincides, in location, with the former beach Island that existed in 1846 and had disappeared in 1856. This tongue of beach is also remarkable for having bridged over the former broad opening between Smith's point of 1846 and the beach Island, above mentioned, and nearly closing the water space between the Gravel Islands and the southerly part of Muskeget Island of 1856. An equally notable change is the breaking through of the beach of 1846 (which seemed in September 1869) between the present end of Smith's Point and Tuckermuck, making a south opening into Maddeguet Bay or harbor of 2150 feet in width. A great portion of the south west part of Muskeget Island has been washed away since the survey of 1856. The extreme distances in change of position being from the present to the former points, viz: in a southwesterly direction 2800 feet, southerly 2050 ft. westerly nearer the main body of the Island - 1500 feet, while on the northerly side of the Island, oppo-

site the site of the present Life Saving Station, a salient point of beach has made out, northerly about 1050 feet, the extreme easterly point of the Island has also made out, since 1846, about 950 feet, Another notable change is the disappearance of the long bough of 1846 ending in what was then called Smith's Point and whic which formed with Tuckermuck, quite a broad channel between it and athat Island. The loss of this beach now exposes the south side of Tuckermuck to th unobstructed forwe of Ocean breakers which will probably cause a greater abrasion of its shore than at any former period.

I append to my repobt a tracing from the surveys of 1846, 1856 and 1887 which gives a better understanding of the changes which have taken place from time to time than can be conveyed by a written description.

I leave the matters of party operations and expenditures for the officers in respective charge of them to report.

Very respectfully submitted,

(Signed) Henry L. Whiting

Asst. C. & G. Survey.

F. 6.