

Henry Mitchell – Notes on his Writings¹

Henry Mitchell. 1869. Report Concerning Vineyard Haven: Its Character as a Port of Refuge and its Present Condition. *Report of the Superintendent of the Coast Survey, showing the Progress of the Survey during the Year 1869* (Vol. Appendix 15, pp. 239-253).

Vineyard Haven Port “*distinguished neither for its amplitude nor security, but pre-eminently for its convenience.*”

Exposed to the north and northeast. “*The ship that runs into this anchorage before a northeast gale leaves an open door behind her.*”

Ports need – “*facility of approach, depth of water, protection from the sea, shelter from the winds, character of the bottom.*”

Provincetown – is a sheltered basin and outer roadstead.

Merchant ships – need 18 feet of water and 310 feet radius.

Vineyard Haven = *roadstead*, not a harbor properly speaking; interior - Lagoon Pond – has a blocked entrance.

The two Chops are losing ground at extremities. (Henry Whiting estimated these rates and recommended arming them.)

Only three first-rate men-of-war can be accommodated in the most exposed area of VH Harbor; 60 merchant ships, 174 miscellaneous boats; but 200 ships of 220 tons each have been seen.

In 1870 – traffic in the harbor included 52 steamers; 83 ships/barks; 627 brigs, 6,350 schooners, 14 whalers; 25 yachts, 8 sloops totaling 7,159; 410 were foreign mostly British. Total of 70,000 people.

Woods Hole – strong currents, rocky ledges.

Edgartown Harbor – notable refuge – but several miles south of sailing-track of the Sound and not near the most difficult part of the Sound.

Vineyard Haven improvements – needs more room and shelter; can’t close with a jetty or add breakwater as deep [DRF – but see subsequent Army Corps assessment and plan]; could open passageway to the Lagoon; but that would freeze in the winter; the Lagoon could handle 42 merchant vessels ~400 acres versus 544 for Vineyard Haven roadstead.

¹ These articles are all available as free Google e-books, located by searching on the title.

Henry Mitchell. 1871. Report on physical surveys made at Martha's Vineyard and Nantucket during the summer of 1871. *Report of the Superintendent of the Coast Survey, showing the Progress of the Survey during the Year 1869.* (Page 254-259).

[Essential reading for anyone interested in opening a breach in a barrier beach, understanding how these operate, and figuring out the dynamics of Norton Point.]

Barriers of sand to the north and south sides of the island; more on the south due to greater storm waves. Vineyard Haven lagoon strip – a similar structure – a “*littoral cordon*” same as South Ponds and Chappaquiddick Neck at Edgartown. Edgartown Harbor – north opening is maintained by tidal circulation, south becomes closed as tidal circulation is inadequate. When there are two openings – great tidal circulation is possible – the opening gradually loses its strong tidal current as the barrier beach and current move eastward and especially at Muskeget Channel.

Waves strike south shore diagonally [longshore current west to east] – closes ponds and forms shoals in Muskeget, great current stream down from the Sound.

Material eroded not borne off but continually is crowded at the shore. Sea is constructive to a particular level – will preserve a dike; [the dike or littoral cordon] “*it does not restrain the over-leaping sea in the fury of the storm, but limits its peaceful domain.*”

Important to distinguish the action and limits of wind versus water in shaping the coastal landscape. Distinguishing features of each: irregular mounds versus smooth surfaces; concentric circles versus parallel straight lines; slopes are reversed. Wind plays on the stage previously raised by water and builds higher still; coarse grasses then trap the sand and strengthens the dike into a condition that is almost permanent.

Exposed to open ocean – the [barrier beach, littoral cordon, etc.] dike can reach 7-8' above high water; less in bays and sounds. Levee moves [northward on the south shore] with little change in its form. [Mitchell is essentially describing the formation, maintenance, and inland migration of barrier beaches; these can reach a maximum elevation of about 8 feet above sea level.]

“*In the natural formation of an opening through the littoral cordon of the coast, the waves play only a preliminary part; it is the current which digs the channel. The overleaping waves weaken the dike, but it is by filling the basin behind to overflowing that the breach is opened wide and deep.* [This is the key to the formation of a breach in a barrier beach. The wind, or a front-end loader or back-hoe, can weaken or even open a breach, but the full opening and great erosive force comes from the tidal current as the pond empties or difference in tidal height on either side leads to water flowing through the breach.]

In cases like Chatham, where the length of exposed beach is in very great ratio to the area of the basin, the latter is very liable to overflow, and inlets are the frequent

products of great storms. The Haulover Beach [Nantucket], on the contrary, is so short from Coskata to Squam that it does not admit many over-leaping seas, and therefore the basin within never, perhaps, swells to overflowing. The experiment [proposed on Nantucket to cut through the Haulover] proposed is, therefore, one which nature may never have tried. [Same is true for many of the south coastal ponds on the Vineyard. Archaeological studies show that pre-historically these have not been open (true even of Tisbury Great Pond where there are no shell middens such as there are at Squibnocket Pond. These ponds have been opened historically by shovels, horses, or nachhines but close relatively rapidly.)]

“There is no other part of the world, perhaps, where tides of such very small rise and fall are accompanied by such strong currents running far out to sea.” [The distinctive quality of the waters south of the Cape—they have modest tides but extremely strong currents.]

Waves open hole in barrier, current digs channel. More likely where basin lies behind a long exposed beach. [HM proposed cutting through barrier beaches to initiate this action. Examines the possibilities at Katama Bay, where the north end is open and could be used to generate a strong tidal current through a breach.]

Edgartown – Maximum height of Cotamy [Katama] Bay over the sea 1.36 feet; during a northeast gale 1.83 feet. Cotamy Bay is at the same level as the sea 2^h 32 minutes before moon’s transit. [Mitchell then goes on to calculate when these differences are greatest and could be used to advantage in opening the breach.]

High water in Cotamy Bay 0^h 28 minutes after moon’s transit.

Greatest height in Cotamy Bay above the sea 0^h 40 minutes after moon’s transit.
Cotamy Bay and sea at the same level 4^h 40 minutes after moon’s transit.

So open the canal [breach] two hours before transit. During this period the current runs south through Muskeget Channel. Identify the larger of the day’s two tides; most effective in period of high tides; most effective with north to east wind.

1847 – Lieutenant Davis – Edgartown Harbor currents – run north by town two hours before low water and continue until two hours before high water; south ~ low water, halts at fourth hour then continues until high water.

Old regimen – much more water northward than back in – as when low in Cotamy Bay high on the outside so inlet and channel were broad and deep. When bay full the tide outside was low and the channel reduced. Edgartown has an advantage when there is a southern opening. [??]

Shoal in Cotamy Bay has increased greatly; as has sand in Chappaquiddick Point. [Over time when breach is present a large shoal develops in Katama Bay.]

Edgartown and Vineyard Haven Harbor field work.

139 linear miles of soundings, 20,547 casts of the lead, 2,016 angles, nine current and three tidal stations occupied.

Bench for survey in Edgartown = top of stone foundation under right hand window of Martha's Vineyard National Bank.

Distance between mean low and high tide – two feet. Highest storm is 2.66 feet above that – November 1871.

See also

Whiting, H. L. 1869. "Edgartown Harbor" Report of the Superintendent of the Coast Survey, showing the Progress of the Survey during the Year 1869. In H. L. Whiting & H. Mitchell (Eds.), *Reports concerning Martha's Vineyard and Nantucket* by (Vol. Appendix 15, pp. 236-239).

Whiting, H. L. 1872. Shore-line Changes at Edgartown Harbor *U. S. Coast Survey 1872* (Vol. Appendix 17, pp. 262-265).

Whiting, H. L. 1886. Report of Changes in the Shore Line and Beaches of Martha's Vineyard as Derived from Comparisons of Recent with Former Surveys *U. S. Coast Survey 1886* (Vol. Appendix 9, pp. 263-266).

Whiting, H. L. 1889. Recent Changes in the South Inlet Into Edgartown Harbor, Martha's Vineyard *U. S. Coast Survey 1889* (Vol. Appendix 14, pp. 459-460).