

Nathaniel Shaler (Wikipedia)

Notes from Harvard Library Bulletin: The Archives also has manuscript drafts of a life of Shaler by J. B. Woodworth.

American Earth: Environmental Writing Since Thoreau

Author: Bill McKibben

- See more at:

http://www.adirondackexplorer.org/book_reviews/american-earth-environmental-writing-since-thoreau#sthash.A1tZto8j.dpuf

McKibben has rescued a prescient 1905 statement from Harvard geologist Nathaniel Southgate Shaler about the thoughtless consumption of the Earth's finite resources, one that rings unnervingly true today: "We may be sure that those who look back upon us and our deeds from the centuries to come will remark upon the manner in which we use our heritage, and theirs, as we are now doing, in the spendthrift's way, with no care for those who come." Just think what our world might be like had our grandfathers and grandmothers, not to mention their elected representatives, carefully pondered Shaler's admonition. - See more at:

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Nathaniel Southgate Shaler (1841-1906) was an American [paleontologist](#) and [geologist](#) who wrote extensively on the [theological](#) and scientific implications of the theory of [evolution](#). Shaler studied at [Harvard](#) under the legendary [Louis Agassiz](#) and would go on to become a Harvard fixture in his own right, as lecturer and professor of paleontology for two decades (1869-1888) and as professor of geology for nearly two more (1888-1906).

Ten years after [Charles Darwin](#)^[1] realised the importance of [earthworm](#) soil [bioturbation](#) to [soil formation](#), Shaler expanded on Darwin's observations by examining other animals, such as [ants](#).^[2]

In his later career, Shaler served as Harvard's Dean of Sciences and was considered one of the university's most popular teachers. He published scores of long and short treatises in his lifetime, with subjects ranging from [topographical](#) surveys to [moral philosophy](#).

Early in his professional career Shaler was broadly a [creationist](#) and anti-Darwin. This was largely out of deference to the brilliant, but old-fashioned, Agassiz, whose patronage served Shaler well in ascending the Harvard ladder. When his own position at Harvard was secure, Shaler gradually accepted [Darwinism](#) in principle, but viewed it through a

Neo-[Lamarckian](#) lens: basic tenets of [natural selection](#)—chance, contingency, opportunism—were rejected for a picture of order, purpose and progress which saw characteristics inherited through the efforts of individual organisms. Shaler also continued to support Agassiz's [polygenism](#), an essentially [racist](#) theory, given a genteel, academic gloss.

Shaler also served as a [Union](#) officer in the [U.S. Civil War](#).

[\[edit\]](#) References

1. [^](#) Darwin, C., 1881, The formation of vegetable mould through the action of worms, with observations on their habits: London, John Murray
2. [^](#) Shaler, N. S., 1891, The origin and nature of soils, in Powell, J. W., ed., USGS 12th Annual report 1890-1891: Washington, D.C., Government Printing Office, p. 213-45

[\[edit\]](#) External links

- [Works by Nathaniel Shaler](#) at [Project Gutenberg](#)
- [The Autobiography of Nathaniel Southgate Shaler](#) at Google Books

Quotes from: Livingstone, D. N. 1987 Nathaniel Southgate Shaler and the Culture of American Science, The University of Alabama Press, Tuscaloosa, Alabama.

"I have just read Shaler's autobiography, and it has fairly haunted me with the overflowing impression of his myriad-minded character. I knew no man whose sense of the larger relation of things was always so true and right. Of all the minds I have known, his leaves the largest impression, and I miss him more than I have missed anyone before.

—William James" Front page

"So highly regarded was this genial southerner, forty years professor at Harvard, that, on the afternoon of his funeral, flags on city buildings and student fraternities were hung at half-mast, and shops in 'old Cambridge' were closed." Chapter 2, page 10

"Perhaps not teacher has in recent years so indelibly impressed himself upon the lives of college men as did Dean Shaler." Chapter 2, page 11

"there is probably no American geologist at the present time who is more successful in presenting the facts of geology in a popularly comprehensible and attractive form, and at the same time keeping himself within the bounds of scientific accuracy, than Prof. Shaler."

Chapter 2, page 41

"I was a student under Shaler over a third of a century ago and I can well remember how many smug, self-satisfied workers in science sneered at him for daring to popularize the study of geology and take it out of the cloister of the recluse."

—R. A. F. Penrose, Jr. Chapter 2, page 41

"In 1888 Shaler purchased a tract of land along the northern shore of Martha's Vineyard. Here, for many years, he spent the summer months away from the bustle of Cambridge life. At 'Seven Gates' he found "a 'civil wilderness'—that is, spacious possessions tamed to comfort, but not made artificial, nor yet closely packed with humanity." Chapter 2, page 41

"Nathaniel S. Shaler, was an outstanding figure in the last quarter of the nineteenth century because, like Marsh, he looked at conservation from a world point of view and because he was interested in so many phases of the subject. —Glacken, "Origins of the Conservation Philosophy" Chapter 7, page 192

"Shaler's synthesis of preservation and conservationist thinking fitted comfortably into a conceptual framework derived from a varied of sources. Of fundamental importance, of course, was the work of George Perkins Marsh." Chapter 7, page 195

"Not content to specify particular solutions to problems of soil and forest management, hydrological regulation, and energy supply, Shaler also wanted to instill in the American consciousness a sense of ecological accountability; for only by overhauling the social conscience could the nation every seriously come to grips with its resource problem." Chapter 7, page 207

“In his concept of the humanized landscape, Shaler thus found a means of integrating, to some degree, the artistic and the pragmatic, the aesthetic with the economic.”
Chapter 7, page 212

“As Hitchcock confessed, ‘Agassiz’s ice mechanism afforded the first really satisfactory explanation of such apparently dissimilar features as morainic accumulations, furrowing of rocks, and erratics and perched blocks on top of gravel deposits.’” Chapter 8, page 228

“A great mass of water is taken from the sea and heaped to the depth of a mile or more upon the land. A mile in depth of ice weighs about as much as half a mile of ordinary rock, so that by covering the continent of North America with a deposit of this kind we more than double its altitude above the sea. Now if the weight of the mass uplifted be an element in determining the height to which the continents are raised, then we must allow this ice mass a decided influence in depressing the continental areas.” Chapter 8, page 230-231

“In endeavouring to account for the changes of level of the continents, ‘he began his December discourse, ‘it is necessary to consider not only the changes of the land, but those of the sea as well.’” Chapter 8, page 231

“Shaler I do not understand. From his Memoir in Mem. Boston N. H. S. printed in 1874, you would think him heels over head in the Glacial theory; for he makes the polar ice cap thick enough and extended enough to cause a sinking of the earth's crust and a submergence in part of the land all the way from the Pole to New Haven.”
—James Dana's letter to Asa Gray in August 1878 Chapter 8, page 231

“Second, Shaler now focused more sharply on the problem of glacial motion. He had already advanced his own theory of pressure melting in 1875, which, drawing out the implications of James Thomson’s research on water refrigeration, proposed that the sheer pressure of the glacier would melt a portion of the ice base. Any upward movement of melt water through ice crevices would alleviate pressure and therefore be refrozen.”
Chapter 8, page 234

“R. A. F. Penrose, Jr., for instance, suspicious that Davis only wanted ‘to commercialize his memory instead of making it an inspiration to others,’ offered to, and later did, commission Robert Aiken, a well-known New York sculptor, to produce a life-size bronze bust of Shaler. To Penrose, Shaler was both ‘a philosopher and a far-sighted prophet,’ and he therefore regarded the bust as ‘an inspiration not only to geologists who may look at it, but to those who realize the broad humanitarian instincts for which Shaler was given the degree of LL.D. at Harvard.’” Chapter 9, page 250

“For Shaler had insisted in *Outlines of the Earth’s History* that ‘all study of Nature should begin not in laboratories, nor with the things which are remote from us, but in the field of Nature which is immediately about us.’” Chapter 9, page 251

“In 1868, some five years prior to the Penikese project, he himself had begun ‘Summer School instruction . . . with the unadvertised offering of excursions and lectures on Geology in the Connecticut Valley and the Berkshire Hills, ranging as far as the Hudson Valley.’ Nor was this excursion a mere flash in the pan. The success of the trip encouraged him to push for it in the public school arena and to repeat the exercise over the next three summers.” Chapter 9, page 254

"Prof N. S. Shaler, who first suggested to his colleague, Louis Agassiz, the establishment and maintenance during the summer of a seaside laboratory at Nantucket for the benefit both of university students and of teachers of science in secondary schools. The outcome of this suggestion was the establishment of the Anderson School on Penikese Island."

—W. W. Willoughby Chapter 9, page 254

“As Andrews summarizes Shaler’s contribution: "Shaler’s conclusion is that it is the mass of the ice load that causes the depression of the continents. He uses an analogy of a weight placed on a sheet of lake ice—the ice is depressed around the weight and an elevated area occurs around the 'sunken point.' This may be the first suggestion of the existence of a forebulge! Shaler thus envisages the crust as being rigid but having an underlying region where loads are accommodated by the outward flow of material. This is basically the concept that is still in use today." —Andrews, *Glacial Isostasy*, p. 20. Notes to Chapter 8, page 331

Man and the earth, by Nathaniel Southgate Shaler ...

[Shaler, Nathaniel Southgate, 1841-1906.](#)

CREATED/PUBLISHED

New York, Fox, Duffield & company, 1905.

SUMMARY

American Memory note: Shaler was a Harvard geologist who attempts in this work to lay a scientific foundation for a new ethic of sympathetic and responsible stewardship toward the earth and its resources. Shaler maintains that such an ethic must become the final dimension of conservationism: he prophesies that there will come a time when "the care for the economical resources of the earth... for which people are already prepared, will be merged into a larger care for the sphere as a part of man from which he has been alienated by ignorance, but with which he is to be reconciled by knowledge" (p. 230). The book includes an extensive survey of global resources on the basis of projected human needs; here Shaler is optimistic, and thoroughly utilitarian (as well as frankly imperialistic) in his concerns. However, the work also emphasizes aesthetic values in relation to nature and the earth, and advocates establishing a worldwide system of scenic and wildlife preserves. Analyzing man's disruptive impact on nature, Shaler describes natural relationships in terms which anticipate later models of the balanced ecosystem, and he draws attention to the human assault on biodiversity, urging mankind to undertake

efforts to preserve and protect endangered species as a task of paramount importance. Shaler's arguments may sound entirely contemporary to readers at the end of the twentieth and beginning of the twenty-first centuries, for in its recognition that problems of ecology and biodiversity and the necessity for a new ethic of man/earth relations are the ultimate challenges of conservation stewardship, this work anticipates some of the most significant insights of later environmental thought.

Shaler, N. S., 1909. *The autobiography of Nathaniel Southgate Shaler.* Houghton Mifflin, New York. p. 370.

“In the paper on School Vacations already referred to, is found the substance of his argument for summer schools of natural science. ‘It may be asked,’ he says, ‘how the student weary of his school year can be expected to devote a large part of his holiday to this other form of schooling; how are we to avoid the evils of overtaxing the pupil if we put a large share of his labor into the time we have found to be required for refreshment? Experience gives a satisfactory answer to this question: for it shows us that the character of true scientific work so far differs from the labor done in the school-room that he finds a large measure of diversion in the change in the nature of his employment..... In the laboratory or the open field work of nature the memory is no more taxed than in the ordinary occupations of men, but the constructive imagination which is generally unemployed in the tasks of term-time is actively aroused. In the class-room the pupil is tied to print, in laboratory work he deals with natural objects and finds in his contact with them the quickening of spirit which to be conceived needs to be felt. My own experience with vacation schools shows me that ordinary students may, without suffering any tax upon their vitality, year after year devote six weeks of summer vacation to hard work in natural-science schools.’”

<http://www.answers.com/topic/lawrence-scientific-school>

Lawrence Scientific School, established at Harvard University in 1847 by a gift of \$50,000 from industrialist Abbott Lawrence, who wished to support applied science in eastern Massachusetts. The school existed until 1906 but enjoyed only mixed success, since Harvard presidents Edward Everett and Charles W. Eliot did not favor applied subjects in their liberal arts university. Everett thought the school would be a means for bringing a German university to Cambridge and from the start tried to direct the school into advanced studies of pure science. He hired Eben N. Horsford to teach pure and applied chemistry and Louis Agassiz, the eminent Swiss naturalist, to teach [zoology](#) and geology. The school was most popular as an engineering school under Henry L. Eustis. Many of his students went on to have important careers in railroading and mining around the world. Other scientists, such as Simon Newcomb, Harvey W. Wiley, Charles F. Chandler, John D. Runkle, and Thomas M. Drown, also attended the school.

The school had an [uneven](#) history. It began with high hopes but had only modest enrollments in the 1850s, declined in the 1860s, and did not recover until the late 1890s. As it was unable to compete with the Sheffield Scientific School at Yale and the

Massachusetts Institute of Technology (MIT), then in Boston, Eliot tried repeatedly to transfer its programs to MIT. Nathaniel S. Shaler, a Lawrence alumnus and Agassiz's successor on the faculty, became dean in 1891 and devoted himself to building up the school. Despite his success (the enrollment reached 584 in 1902, an all-time high) and a 1903 [bequest](#) of approximately \$30 million from manufacturer Gordon McKay, Eliot tried another merger with MIT in 1904. To protect the new endowment and to preserve a place for applied science at Harvard, Shaler agreed in 1906 to dissolve the Lawrence Scientific School and send its remaining undergraduate programs to Harvard College in return for a new Graduate School of Applied Science, which survives.

Bibliography

Elliott, Clark A., and Margaret W. Rossiter, eds. *Science at Harvard University: Historical Perspectives*. Bethlehem, Pa.: Lehigh University Press, 1992.

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SUMMER SURVEYING CAMP AT SQUAM LAKE

Prior to 1895, all classroom instruction and field work in engineering took place during Harvard's regular academic year. Growing concern about sufficient time and proper conditions for field work led to the establishment of Harvard's first summer engineering camp on Martha's Vineyard in 1895, on land belonging to Professor Nathaniel Shaler, who served as Dean of the Lawrence Scientific School from 1891 to 1906. The Engineering Camp relocated to New Hampshire in 1901, where it continued to operate for many years.

Harvard president Charles W. Eliot wrote about the camp in his 1901-02 annual report:

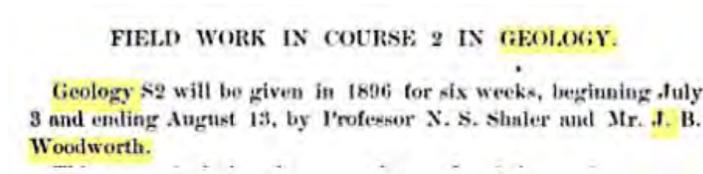
The instruction in surveying and railroad engineering, which must be taken by students of engineering, is now given altogether in the summer, but is required of the students just as much as any of the instruction given in term time. After a five years' experiment, beginning in 1895 on the estate of Professor Shaler at Martha's Vineyard, the University acquired, through the generosity of Mr. Francis L. Higginson, an establishment of its own for this summer teaching.

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Other notes on field camps on MV. In the days after Shaler stopped taking courses there.



Harvard Crimson. Geological Excursions April 16, 1896

The Department of Geology has arranged for two excursions during the April recess, as before announced. Professor Davis will conduct one party to the middle Susquehanna district with the object of studying the deflected tributaries of the Susquehanna River. The reading reference is "The Rivers and Valleys of Pennsylvania," by W. M. Davis in the Nat. Geographic Mag., Vol. I, 1889: pages 241-243....

The other excursion is in charge of Mr. J. B. Woodworth; the objective point is Gay, Head, Martha's Vineyard. The reading will be found in the special pamphlet, Geology S. 2, Summer School of 1896, which has recently been issued. ...

In the summer vacation there are two series of excursions, one to be conducted by Dr. G. E. Ladd '87, now of the Geological Survey of Georgia, the other to be taken charge of by Mr. J. B. Woodworth. The course Geology S. 1, under the direction of Dr. Ladd, will make excursions during July which will be a rereception of those now being conducted during the spring months.

The excursion of Geology S. 2, conducted by Mr. Woodworth, will be changed from those of previous years, in that the field to be visited this year lies wholly within the New England States. The class will assemble in Cambridge on July 3, and after ten

days spent in preparation for studies in the field, will proceed to Attleboro, situated in the northern part of the Narragansett coal basin. Two weeks will be spent in the examination of the country between Attleboro and Newport. From Newport the party will go to the island of Martha's Vineyard, and take up its headquarters with the Gay Head Indians. At this point the attention of the class will be devoted to the intricate structure of the famous Gay Head cliffs, also to the great terminal moraine and to the encroachment of the sea upon the island. After leaving Martha's Vineyard the party will go to the last section of its work in the district of old lava beds and triassic sandstones about Meriden in the central part of Connecticut. The party will break up on August 13. Professor Shaler will take a limited share in the work in Rhode Island and Martha's Vineyard.

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Geography is commonly regarded as a matter somewhat distinct from **geology**. Experience however shows that although the political branch of the subject can in a narrow way be taught independently, any large consideration of the subject demands that it take account of the conditions which have given the earth its present aspect. In **Harvard** University, where the earth-sciences have been more extensively taught than in any other school in this country, and perhaps in Europe as well, it has been found necessary to place geography in close relation with all the other branches of **geology**. . . . We may indeed term geography the **geology** of the present. In it the earth is considered not as record of things which have been done, but as an exhibition of that inorganic and organic life which has from the beginning been the great spectacle of the sphere.

It is the province of the geographic geologist to consider the immediate relation of the existing organic life, including that of man, to the theatres of land and sea. Taken in a large way, the science assembles on the plane of the present age all those considerations derived from the study of the earth which are necessary to rationalize the actions which are now going on upon its surface. On one side it has a most important relation to human affairs, for it renders an account of the environment to which man is now subjected, the conditions which so far determine his history as an individual, as a citizen, as a member of a race, and as a unit in the noble host of mankind. It is thus a most extensive subject, and for its proper treatment in a great school demands the labor of three or four able and learned men who shall deal with its various branches.⁵²

Man and the earth, by Nathaniel Southgate Shaler ...

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The Literary World
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OUTLINES OF THE EARTH'S HISTORY

WE can think of no finer summer school for stay-at-homes than this volume introductory to the study of the earth on which we live and its phenomena, furnished by that foremost of naturalists and prince of teachers, Professor Shaler of Harvard University. With its fascinating pages open in his hand, and the globe under his feet, the studious and thoughtful reader swinging in his hammock, or rocking gently on the piazza to the rhythm of the waves, or basking in the sunshine on the mountain summit, can set forth upon a tour of investigation accompanied by processes of reflection as instructive as they will prove fascinating, and as delightful as they will prove profitable.

What a complexity of marvels and mysteries is nature, whether we look upon it at its minimum, as in a bee or a flower; or in its maximum, as in the heavens above our heads or the waters over which we sail. Professor Shaler is an explorer, but he is more than an explorer; he is a collector, an organizer, an interpreter, a reverent worshiper, independent of fancies, but not destitute of sentiment, planted upon facts but open to reason. Intensely scientific in his temper, but poetic and devout, he holds a bunch of keys which unlock many a door and by use of which he ushers his followers into secret chambers as profound and solemn as the great caves which underlie the surface of the planet, as deep and unfathomable as the recesses of the firmament, as full of life and beauty as a tropical forest in color and form. There are but nine chapters in this book, but every one of them is a master statement. They constitute a graded school. Their primary department is a pair of introductory chapters upon the study of nature, which map the field, lay down general principles, describe the apparatus to be used, and emphasize the motives. Then, with a bound, we ascend into the stellar spaces, and in fifty pages survey the firmament, its masses and its movements, its brilliant illuminations, its untold wonders. Then we return to the earth, unwrapping as it were its envelope of atmosphere, balancing the continents against the oceans, the currents of the winds with the currents of the seas. There follows a brilliant chapter on the glaciers, with their mighty but silent forces, and the marks they make upon the countenances of mother earth. Then the work of water underground is elaborately described, soil is analyzed, the formation of the rocks is accounted for, and feature by feature the whole round world, with all its peculiarities and characteristics, is spread before the eye with the accuracy of a photograph, and with the skill in statement which comes from absolute knowledge, clear comprehension, and the facility acquired by long experience. Ten half-tones occupy as many full pages, but Professor Shaler's style needs little illustration. His text is luminous and pictorial.

It is best that all study of Nature should begin not in laboratories, nor with the things which are remote from us, but in the field of Nature which is immediately about us. The student, even if he dwell in the unfavourable conditions of a great city, is surrounded by the world which has yielded immeasurable riches in the way of learning, which he can appropriate by a little study. He can readily come to know something of the movements of the air; the buildings will give him access to a great many different kinds of stone; the smallest park, a little garden, or even a few potted plants and captive animals, may tell him much concerning the forms and actions of living beings. By studying in this way he can come to know something of the differences between things and their relations to each other. He will thus have a standard by which he can measure and make familiar the body of learning concerning Nature which he may find in books. From printed pages alone, however well they be written, he can never hope to catch the spirit that animates the real inquirer, the true lover of Nature.

On many accounts the most attractive way of beginning to form the habit of the naturalist is by the study of living animals and plants. To all of us life adds interest, and growth has a charm. Therefore it is well for the student to start on the way of inquiry by watching the actions of birds and insects or by rearing plants. It is fortunate if he can do both these agreeable things. When the habit of taking an account of that most important part of the world which is immediately about him has been developed in the student, he may profitably proceed to acquire the knowledge of the invisible universe which has been gathered by the host of inquirers of his race. However far he journeys, he should return to the home world that lies immediately and familiarly about him, for there alone can he acquire and preserve that personal acquaintance with things which is at once the inspiration and the test of all knowledge.

Along with this study of the familiar objects about us the student may well combine some reading which may serve to show him how others have been successful in thus dealing with Nature at first hand. For this purpose there are, unfortunately, but few works which are well calculated to serve the needs of the beginner. Perhaps the best naturalist book, though its form is somewhat ancient, is White's *Natural History of Selborne*. Hugh Miller's works, particularly his *Old Red Sandstone* and *My Schools and Schoolmasters*, show well how a man may become a naturalist under difficulties. Sir John Lubbock's studies on Wasps, and Darwin's work on *Animals and Plants under Domestication* are also admirable to show how observation should be made. Dr. Asa Gray's little treatise on *How Plants Grow* will also be useful to the beginner who wishes to approach botany from its most attractive side--that of the development of the creature from the seed to seed.

There is another kind of training which every beginner in the art of observing Nature should obtain, and which many naturalists of repute would do well to give themselves--namely, an education in what we may call the art of distance and geographical forms. With the primitive savage the capacity to remember and to picture to the eye the shape of a country which he knows is native and instinctive. Accustomed to range the woods, and to trust to his recollection to guide him through the wilderness to his home, the primitive

man develops an important art which among civilized people is generally dormant. In fact, in our well-trodden ways people may go for many generations without ever being called upon to use this natural sense of geography. The easiest way to cultivate the geographic sense is by practising the art of making sketch maps. This the student, however untrained, can readily do by taking first his own dwelling house, on which he should practice until he can readily from memory make a tolerably correct and proportional plan of all its rooms. Then on a smaller scale he should begin to make also from recollection a map showing the distribution of the roads, streams, and hills with which his daily life makes him familiar. From time to time this work from memory should be compared with the facts. At first the record will be found to be very poor, but with a few months of occasional endeavour the observer will find that his mind takes account of geographic features in a way it did not before, and, moreover, that his mind becomes enriched with impressions of the country which are clear and distinct, in place of the shadowy recollections which he at first possessed.

When the student has attained the point where, after walking or riding over a country, he can readily recall its physical features of the simpler sort, he will find it profitable to undertake the method of mapping with contour lines--that is, by pencilling in indications to show the exact shape of the elevations and depressions. The principle of contour lines is that each of them represents where water would come against the slope if the area were sunk step by step below the sea level--in other words, each contour line marks the intersection of a horizontal plane with the elevation of the country. Practice on this somewhat difficult task will soon give the student some idea as to the complication of the surface of a region, and afford him the basis for a better understanding of what geography means than all the reading he can do will effect. It is most desirable that training such as has been described should be a part of our ordinary school education.

Very few people have clear ideas of distances. Even the men whose trade requires some such knowledge are often without that which a little training could give them. Without some capacity in this direction, the student is always at a disadvantage in his contact with Nature. He can not make a record of what he sees as long as the element of horizontal and vertical distance is not clearly in mind. To attain this end the student should begin by pacing some length of road where the distances are well known. In this way he will learn the length of his step, which with a grown man generally ranges between two and a half and three feet. Learning the average length of his stride by frequent counting, it is easy to repeat the trial until one can almost unconsciously keep the count as he walks. Properly to secure the training of this sort the observer should first attentively look across the distance which is to be determined. He should notice how houses, fences, people, and trees appear at that distance. He will quickly perceive that each hundred feet of additional interval somewhat changes their aspect. In training soldiers to measure with the eye the distances which they have to know in order effectively to use the modern weapons of war, a common device is to take a squad of men, or sometimes a company, under the command of an officer, who halts one man at each hundred yards until the detachment is strung out with that interval as far as the eye can see them. The men then walk to and fro so that the troops who are watching them may note the effects of increased distance on their appearance, whether standing or in motion. At three thousand yards a man appears

as a mere dot, which is not readily distinguishable. Schoolboys may find this experiment amusing and instructive.

After the student has gained, as he readily may, some sense of the divisions of distance within the range of ordinary vision, he should try to form some notion of greater intervals, as of ten, a hundred, and perhaps a thousand miles. The task becomes more difficult as the length of the line increases, but most persons can with a little address manage to bring before their eyes a tolerably clear image of a hundred miles of distance by looking from some elevation which commands a great landscape. It is doubtful, however, whether the best-trained man can get any clear notion of a thousand miles—that is, can present it to himself in imagination as he may readily do with shorter intervals.

The most difficult part of the general education which the student has to give himself is begun when he undertakes to picture long intervals of time. Space we have opportunities to measure, and we come in a way to appreciate it, but the longest lived of men experiences at most a century of life, and this is too small a measure to give any notion as to the duration of such great events as are involved in the history of the earth, where the periods are to be reckoned by the millions of years. The only way in which we can get any aid in picturing to ourselves great lapses of time is by expressing them in units of distance. Let a student walk away on a straight road for the distance of a mile; let him call each step a year; when he has won the first milestone, he may consider that he has gone backward in time to the period of Christ's birth. Two miles more will take him to the station which will represent the age when the oldest pyramids were built. He is still, however, in the later days of man's history on this planet. To attain on the scale the time when man began, he might well have to walk fifty miles away, while a journey which would thus by successive steps describe the years of the earth's history since life appeared upon its surface would probably require him to circle the earth at least four times. We may accept it as impossible for any one to deal with such vast durations save with figures which are never really comprehended. It is well, however, to enlarge our view as to the age of the earth by such efforts as have just been indicated.

Chet Raymo Science Musings Sunday, November 06, 2005

There's a wonderful story the 19th-century paleontologist Nathaniel Southgate Shaler tells in his autobiography about his undergraduate experience at Harvard. His teacher was the great Swiss-American natural historian Louis Agassiz. The newly-matriculated Shaler sat down at his lab bench and Agassiz placed in front of him a tin pan containing a fish. "Study it," said Agassiz. The boy was not talk to anyone or read anything about fishes until Agassiz gave him permission to do so. "What shall I do," asked the bewildered student. "Find out what you can without damaging the specimen," said Agassiz.

In the course of an hour Shaler thought he had seen everything there was to see about the fish, but Agassiz ignored him -- for the rest of the day, the next day, and the next. "At first, this neglect was distressing," writes Shaler; "but...I set my wits to work...and in the course of a hundred hours or so thought I had done much -- a hundred times as much as

seemed possible at the start. I got interested in finding out how the scales went in series, their shape, the form and placement of the teeth, etc."

At length, on the seventh day, Agassiz approached the bench and asked, "Well?" For an hour, Shaler disgorged what he had learned, as Agassiz stood puffing his cigar. At the end, the professor departed with a curt, "That is not right." Shaler went at the task anew, discarding his first notes, and, he tells us, "in another week of ten hours a day labor I had results which astonished myself and satisfied him."

A good science education teaches one how to pay attention and to see what is there to be seen, rather than what we expect to see. Each of us walks through the world in a wrap of preconceptions and prejudices, some perhaps genetically disposed, others imbibed from family, teachers, and friends. The beginning of a mindful life, it seems to me, is to make one's self transparent to the world beyond the self -- and for this a scientific education is a useful training.

MVTimes April 13, 2006

Paul A. Silva

Paul Arthur Silva, a lifetime resident of West Tisbury, died Monday, March 27 at the Windemere Nursing and Rehabilitation Center in Oak Bluffs, after a long illness. He was born on Seven Gates Farm on Feb. 27, 1932, and lived on the farm with his grandparents until his family moved to the village of North Tisbury.

Paul's grandfather Manuel Silva [Manuel Machado Azevedo] was the second Portuguese citizen to settle in Chilmark. He left St. George, Azores, on a whaler and soon after entered the employ of the late Prof. Nathaniel S. Shaler at Seven Gates. Throughout Paul's early years his little hand would often reach up to his grandfather's for guidance and security. His family, including his mother Anna, grandmother Rita, and uncles Arthur and Antone watched too, as the little boy enjoyed life on the large estate. The dairy farm produced milk, cheese, and butter; and there was gardening, haying, horseback rides and cart rides, and also trucking stone to make the Vineyard Haven breakwater.

After the death of his grandparents, his mother and uncles bought the land abutting the Baptism Society and moved the family to the North Tisbury village. In 1944, while the family was living next to the old Baptist Church building, it was torn down and transported to Vineyard Haven and recycled. The bronze bell which had been cast by Paul Revere was donated to the Millbrook School. Paul's playground expanded to North Tisbury where he rode his bicycle, fished, trapped, hunted, and had a paper route. One day when he was on his paper route Mr. Adams give him a lamb, and soon the lamb, Snookie, had a bicycle ride, and was made cozy behind the kitchen stove. Another of his pets was a calico cat named Buttons. He went to Ole Borgen's for ice cream and candy and listened to him play the accordion.

Paul needed to help with the family income and at an early age he became employed at Seven Gates Farm. His journey back on his bicycle took him along the North Road, by the Old Mill, and rounding the corner he passed through one of the stone gates that gave the estate its name. Stretching out before him was the vast field and off in the distance the woods climbed the hills. Unspoiled trees, arched and twisted by time and growth, grew by the roadside and he could hear brooks gurgling. The dirt roads were endless, taking one to places with such intriguing names as Little Old Lady's Cellar, Goat Rocks, Witch Brook, Salt Works, Hickory Hollow, and Ram's Hill. Paul's bicycle ride was nearing the end when "The

Big Barn," the dairy, silos, and other buildings were before him. He had arrived to work as his grandfather had done for 40 years.

Later, when he got his driver's license he drove the farm truck into Vineyard Haven to pick up supplies and make other necessary stops.

He never forgot the farm and was heard to say that he was "the last person born on the Seven Gates Farm."

"Root Beer" as he was called, was a friendly and giving person and liked to wave and visit with his friends. He would bring flowers, a pie from Blake's, and at holiday times a fruit basket. He was delighted to see your reaction when you thanked him. Along the Island roads he could be seen driving his gray Chevy truck, doing his care-taking or rubbish pick-up and making his favorite stops, Dippin' Donuts, Up-Island Cronig's , Menemsha, Linda Jean's, or Roger Blake's.

He also was employed at Up-Island Auto and retired as a self-employed house painter. He attended the West Tisbury and Tisbury Schools. He was a member of the West Tisbury Fire Dept. Before entering Windemere, Paul was lovingly cared for by his family, Robert Maciel Sr., Robert's wife Barbara, and their family. He is survived by many relatives and close friends. Memorial gifts may be sent to The West Tisbury Firemen's Association, P.O. Box 278, West Tisbury, MA 02575. A graveside service will be held Saturday, April 22 at 11 am, at the West Tisbury Cemetery on State Road, with the Rev. George Eli officiating. Arrangements are under the care of the Chapman, Cole & Gleason Funeral Home, Oak Bluffs.

From MV Gazette editions of March, 1937:

Now the last resident of Christiantown is gone. No Indians have lived in that almost deserted village of old times for some years; indeed, no strangers would recognize in the few scattered houses, gray of shingle, with wild roses and bayberries encroaching upon the unused yards and fields, and with oaks and maples growing tall, any village at all. But one of the houses has been occupied by Miss Marion Hamilton Carter, who, alone, knew the traditions of long ago and kept alive the spirit of times now forgotten.

In the 1870s Miss Carter came to Cottage City as a girl, and went to Christiantown for picnics. She was fascinated by the countryside; indeed, the fascination is as great now as it was then to anyone who knows the sunlit days and the moonlit nights in that quiet place, the brooding quietness, the fertility of soil cultivated long ago, the shadow forms of the praying Indians still felt though all unseen. Soon she visited the Indians and became friendly with the families then living, and later she purchased the property where, for many years, she had dwelt alone in a life of seclusion but of rich and rewarding satisfactions.

Even before Professor Shaler founded what was to become the beautiful estate of Seven Gates, she looked forward to visits to her home at Christiantown. But she was no summer visitor in spirit, and when she found it possible she moved to the Island for good and never cared to go elsewhere.

Now that the last house is closed, and there is no glow at the window pane in the dusk, and the whippoorwills will have no company this year when they come to sing and dance about on the gray boulders in the moonlight. Others will live in the houses of Christiantown, but they will be of a new generation which knows not the mystery nor carries within itself the love and knowledge which Miss Carter drew through many years from the soil of that magic place.

MVGAzette Oct 18 2012

This is, of course, not the first change to affect the West Tisbury library and community support has been a defining characteristic of the library since its inception. The second oldest library on the Vineyard, the West Tisbury Free Public Library was founded in 1891 by Nathaniel Southgate Shaler of Harvard University, also the founder of Seven Gates Farm, West Tisbury Congregational Church pastor William Rotch, Judge Everett Allen Davis and wife Georgianna Davis, Capt. Cyrus Manter and William B. Mayhew.

REPORT ON THE GEOLOGY OF MARTHA'S VINEYARD By NATHANIEL SOUTHGATE SHALER

As the larger part of this district shows only deposits of the glacial age, the material of these inquiries principally concerns the work of the ice sheet of that epoch.

Although the periphery of the island is simple, this simplicity is in good part due to the action of the sea, which by a system of barriers has masked the irregularities of the shore line.

It is worth while to note that on the plain district of the island there is nothing which deserves the name of a brook and on the gravel hills east of this Tertiary district there is not a single stream that is large or constant enough to have received a name. The western part of the island has a number of large and constantly flowing streams, two of which afford good mill power. This difference is clearly due to the presence in the Chilmark district of impervious layers of clay belonging to the Tertiary deposits, which arrest the downward movement of the rainwater and compel it to find its way to the surface before it attains the level of the sea. On the sandy southeastern part of the island the rainwater sinks at once into the ground and enters the ocean in the form of a broad, subterranean sheet which creeps through the interstices of the sand and escapes unnoticed between high and low tide.

The aspect of the two islands differs greatly on account of the peculiarity of the vegetation. Nantucket is essentially treeless, while the greater part of Martha's Vineyard is forest-clad. This difference is probably owing to the greater exposure to the sea winds suffered by Nantucket, which is due to its smaller size and greater distance from the shore. In part the deforested condition of Nantucket may be attributable to the fact that for nearly two centuries its fields were used as open sheep pastures and the young trees were constantly browsed down by the flocks. Martha's Vineyard, on the contrary, has held

its woods; only a small strip on the southern shore shows any tendency to become sterilized in respect to forest growth by the action of the sea winds. On the sand plains the woods are of stunted oaks and other dwarf varieties of trees, but the growth is vigorous enough to give a wooded aspect to the surface and thereby to distinguish it in a very marked way from the neighboring and otherwise similar island of Nantucket.

We turn now to the frontal and till-like drift which exists in the northern part of the island between Menemsha Pond and Chappaquonsett or Tashmu Pond. The greater part of this section evidently lies on top of the Tertiary beds; only that part which lies west of Indian Hill is unsupported by this pedestal.

The evidence which serves to establish the hypothesis that these deposits are frontal moraines pushed forward by an ice sheet is as follows: First, the ridges are steep on the iceward and seaward faces; secondly, there is a distinct alignment in these numerous detached ridges; thirdly, this alignment is at right angles to the course of the glacial stream; fourthly, these ridges are in great part composed of large blocks of syenite and other rocks derived from the mainland, which could only have been brought to their present position on the top of the Tertiary beds by the shoving action of an ice sheet. These evidences are sufficient to establish the conclusion that the accumulation of drift on the northwestern face of the island marks the place occupied by the ice front for a considerable period.

Owing to the fact that the surface of this plain, which occupies the central part of Martha's Vineyard, is covered with a dense growth of scrubby woods, these depressions in good part escape the eye, but if they are closely examined they are seen to have a continuity not indicated on the excellent chart of the Coast Survey, which is the basis of the maps contained in this report.

Their valleys, often several hundred yards in width, do not present the smooth downward grade so characteristic of ordinary valleys; their floors are generally more irregular than those of any ordinary stream could be. Nor do they have the distinct banks common to all land streams. The only explanation which can be given of these troughs is that they were the channels through which the subglacial streams found their way seaward.

These clays are particularly well shown in the western part of Chilmark or Weyquosque Cliffs, where they appear commingled with occasional beds of sands and gravels in the manner indicated in the diagram. As shown in the Weyquosque Cliffs, these beds exhibit many remarkable small contortions and plications which may possibly be due to the sliding of the faces or to the pressure of the advancing glacial sheet; it may be, however, that they are due to the more general conditions of pressure which have flexed the Vineyard series.

Shaler - from Vineyard Gazette Files - Repeated in Conservation

3 photos of the Bungalow overlooking vineyard Sound “residents of the late Nathaniel

Southgate Shaler of Harvard University” Note says secretary of Ag David F. Houston will spend summer there.

February 18, 1949 Vineyard Gazette
Shaler recalled as the “prophet of soil conservation”

May 10, 1857

Vineyard Gazette reprint

1907

Shaler estate has most extensive water system on island – new system for 6 houses & barns with 800 gallon reservoir
Shaler hated thistles

June 25, '65 Vineyard Gazette Nathaniel Southgate Shaler
Close friends – Oliver Wendell Holmes, Wm James, James Russell Lowell, Thomas Huxley

bought 50 farm steads

Came first on a geological excursion in college

Wanted to create and conserve a civil wilderness

Planted trees throughout – planted nuts w/ crow bar

Wife planted daffodils.

“no other landscape known to me has so many contracted slopes in an equal amount of profile; the result is the impression of height & dignity totally disproportioned to the actual attitudes; nowhere else in this country do I know anything like the vanity of scenic effect that is exhibited in this hundred square miles”

July 20, '51 Vineyard Gazette Joseph Chase Allen

Knew Shaler as small boy

Harvard Camp – at Nahum Norton Farm – Sold to Nathaniel Southgate Shaler by Norton

- Between Paint Mill & Leavitt Estate at Seven Gates Farm

Camp filled the meadows with white tents; local farmers brought food in wagons

Note in Nathaniel Southgate Shaler file **on Fisher VG Files**

Ann O'Brien worked for Daniel Fisher when the mill was working. John Dunham would bring grain wagon and Daniel Fisher would have him fed. Their house went to Nathaniel Southgate Shaler

Seven Gates Farm Envelope - VGazette

Torn article about Seven Gates Trout Club, started by Willoughby Webb. To fish, conserve the trout of Martha's Vineyard.

Photo of Model Dairy where butter is made for the Chevy Chase Club

May 11, 1945 Seven Gates Farm has added Poll-Angus cattle. Black Hornless

December 9, 1949

Letters to editor Percy Burt South up to Seven Gates Farm

Seven Gates Farm does not allow public hunting but does allow invited guests – ever increasing number of deer, area menace. Seven Gates Farm has given up all but one small house garden due to the impact of the deer.

1976 Vineyard Gazette article on 1100 acres restricted for conservation at Seven Gates Farm. No public access, 10 more house lots

Clipping: Progressive Architecture June 1966

Seven Gates Farm: An exclusive community of large estates was started in 1888 when Professor Nathaniel Southgate Shaler, a noted Harvard geologist purchased the property. Lots are carefully planned so that each resident has total privacy.

December 12, '69 Seven Gates Farm sold 32 ac – first sale of land in 20 years.
Indian Hill Road up both sides of Christian Town Road ~ 900ft & nearly to Up Island Super Market, was Harry Peake Woodlot.

Article goes on to say: “In the early days, each house holder found it essential to have his own wood lot to supply him with winter fuel. Similarly, the Indians required wood lots, and much of the Indian Hill area was so classified. The nearby land now belonging to Amos J. Amaral, for example, was once at Indian wood lots.”
Percy Burt bought what is Arrowhead Farm – sold it to Ronald D. Silva

February, 25, 1994 Land Bank bought 21.3 ac from Seven Gates Farm links Waskosim’s and Mill Brook Woods Preserve. \$1758 (much reduced form original sales price discussed)

January 28, 2009 Seven Gates Farm land reclassified under G1A and B
930 ac of Common Land; 112 ac under G1A; 820 ac Under G1B

Brendan O’Neil is Farm President, explained need to lower taxes; ~ 48 homes
Reduces West Tisbury tax base by \$25 million; ~\$100K/year reduction in tax revenue
\$8 million is the assessment of the common land

Ralph Packer has cattle on Seven Gates Farm paddocks
Alan Cottle & David Douglas do hay on the big fields.

The Atlantic Monthly Volume 34, Issue 206 (December 1874)

“The archipelago bears the name of Elizabeth, but the separate inlands have Indian names: Naushon, Pasque, Nashawena, Pekinese, Cuttyhunk, all picturesque names and well suited to the savage front the islands present to us. Culture has taken no hold on them. They lie the same rude moraines the ancient glacier left them. Their heaps of massive stones, only half concealed by the mantle of vegetation, look like the ruins of Cyclopean architecture.” Page 732

[Vineyard Sound] “The view is full of life; there is always a cloud of sails along the horizon, marking the course of the shipping from Europe to all our ports south of Boston, and *in the* nearer distance shoals of fisherman and yachts vie with the gulls in their effort to vary the sober beauty of the sunlit water.” Page 733

“All the plain is wrapped in a dense mantle of forest and grass, for, unlike most land that faces the sea, Martha’s Vineyard retains its foliage, despite the ruthless fashion in which man has repeatedly swept the forests away.” Page 733

“The village of Holmes’s Hole, or Vineyard Haven, as it has been renamed in deference to modern euphuism, is charmingly placed at the foot of the green slopes on the west side of the haven. It is one of those accidental villages of our shore with none of the premeditation

belonging to the towns which have straight streets and well aligned houses. Each house-builder has set his home to please himself; there is in almost all of them an evident desire to face the sea; almost every house has some one window so placed that its owner can watch the varying scene of the harbor. This effort to face the sea has resulted in giving a look of size and density to the place, as we approach it, quite unsupported by the straggling town.” Page 733

“The trim little boxes of the sea-faring class will soon be overshadowed and blighted by the ambitious houses of the summer visitors, who have just begun to find out the attractions of this shore. So far the new-comers have displayed the admirable lack of discrimination so characteristic of those who haunt the shore in summer; there are two or three great resorts for summer visitors growing up on the low shore of the eastern end of the island, whose interminable sand — its barrenness scarcely veiled by a thin copse of scrubby oaks — is engaged in a give-and-take struggle with the sea. Oak Bluffs, where oaks and bluffs are both on the average less than ten feet high, has grown to be a pasteboard summer town capable of giving bad food and uneasy rest to twenty thousand people. We want the good reader to have the best opinion of Martha’s Vineyard, so we will turn ourselves away from the huddled roofs of the new-made town which looks out of the bushes, the aforesaid ‘oaks’ of the name, and journey towards the central part of the island.” Page 734

“As we rise from the village we pass through no intermediate zone of cultivated land, but come at once into the forest which covers the great level region of the western half of the island. This woodland is the growth which has sprung up since the pine forests which originally covered nearly the whole island were swept **away by** the ax. Now a pine is a rare object; **we** may ride ten miles without seeing a specimen. But in the mysterious succession of the forest, there *has come an* amazing variety of oaks. The trees are all young; in most cases, from the saddle or carriage seat the eye ranges above their tops for miles over **a** billowy sea of the deepest green.”

Page 734-735

“The extent and unbroken character of the forest is amazing; in one direction **we** may journey through the woods for ten miles without a trace of habitation or culture. Through it runs a maze of old paths made before the rich foliage could bar the way. The oak seems to disdain to grow wherever a wheel has run, so the disused wood-roads remain unencumbered, though for years without **a** track upon them.”

Page 735

“There is an indescribable charm in the monotony of these woods; an acre would be tiresome, but the whole has the charm which comes from the limitless.” Page 735

“This ten miles of growing forest is, for us fortunately, a waste in the eyes of the good cits who crowd its eastern border, and, as such, shunned. It has no stage effects to tickle their dulled perceptions; besides, they get lost in it. One wight told me a doleful tale of his having driven six hours at high speed to get through it, to find himself back at his starting-point at the end. Land-lubbers can get to sea even in the woods, so they keep to their plank and asphalt walks, and leave the woods to us.”

Page 735

“In our drive of half a day through deep, cool, overarched lanes or open, new-felled woods where the fresh growth of trees only brushed their tops against our wheels, we did not meet man or woman, and passed but one house, and that was a deserted ruin.” Page 735

“Finally we emerged from the enveloping woods into the central valley of the island, where lie the villages of North and West Tisbury. It is a beautiful valley, of broad grass and grain fields with overgrown hedge-rows and fences covered with vines. On the east is the interminable

forest; on the west and north a range of hills rugged with the vast piles of huge, gray boulders, and dotted with *pastures* and forests. At times the moraine heaps they bear look like the utter ruin of some ancient building that once had covered them. To the south the valley sinks in widening fields that merge in a vast open wold. The beautiful brook which gathers its pure waters in the hills to the westward, and becomes in a few miles a little river, expands into a great pond with irregular shores and a narrow channel, through which it escapes into the sea”.

Page 735

“From all points this island is more like the Isle of Wight than things are often like each other in this world.”

Page 735

“The village of West Tisbury is much like that of Holmes's Hole in all its important features, if a hamlet of thirty houses can be said to have important features.”

Page 736

“A little mill sits astride the dancing **brook** with a business-like air, but the grass and bushes of many years growth gathered around its doors suggest anything but work. The little houses are old-fashioned, and in a certain way picturesque, or at least quaint.”

Page 736

“The **people** get a comfortable subsistence from the broad pastures, well stocked with cows and sheep, and the rich meadows beside the stream. The land is of an excellent quality, quick to answer any legitimate demands upon it, and not readily worn out. Some of the fields of maize and wheat are as good as one finds in the Connecticut Valley. I have never seen better ground for the gardener. Strawberries grow as in southern France; roses have a glory unattainable anywhere else in New England.”

Page 736

Yet agriculture here, as everywhere else in Massachusetts, is in decay. One never sees a field newly won from the forests, while on every side are signs of the gain of the woods on the fields. There are many deserted houses and every little while there is a little pile of crumbling brick, or an old well, to mark where once stood some house which has been pulled down for other uses.”

Page 736

“Along the south shore there is a number of great ponds, with vast reaches of upland plain by their side; these were once cleared and cultivated, but now the fences are falling away, and a few sheep that browse on them are all there is to mark the presence of man.”

Page 736

“At first sight it is hard to explain this neglect of the industry of the land, but the observer can easily see that there are few children, and very few of the men of the active time of life. The youth born on this island have enough of the old Viking blood in them to make them natural wanderers. While they went out for fortune on the sea, they came back here to rear their children and leave their homes in their native soil. But the paths of the land do not all lead home again, so the old people are left to live and die alone. The old, old houses, once strong, now worn, thin by the beat of the weather, the crazy out-buildings and fences, with two old, weather-worn people, form the sad homes on many of the little farms. Passing one of these as a storm was coming, we saw a painful scene. On a little grassy hill-side sloping up from the door, was a tiny harvest of hay, a few hundred pounds at most. Up the slope, dragging a little sled, toiled a bent old man. His once powerful limbs were huddled together by contracting tendons until he rose scarce half his height. On that sled he was to carry the hay to the house before the storm. Age without its rightful support of youth is the common result of the insane wandering spirit of our time.”

On the main-land this goes on just as it does here, but the tide of immigration recruits the ranks so that there is no great lack of population, except in some country villages. But here, where

Irish and Canadian-French have not found their way, the old folk die and leave empty houses. Page 736

“Besides this, the island is an oasis of salubrity in our New England bad climate. Its average warmth is at least two degrees above Boston and all the region north of the Cape; and all this gain is on the winter half of the year. The thermometer in the summer heat of the redoubtable hot term of July, 1872, when we had six days of succession above ninety, never came above eight-four degrees in Tisbury. The winter average is probably at least ten degrees above the mean of Massachusetts Bay.”

Page 737

“The difficulty with our climate arises from the unbroken mass of land, which becomes the storehouse of heat during the summer and of cold during the winter season. Those who seek a change from its conditions should get as far from its influence as they may be able. To do this without perching one’s self on some inhospitable rock, like the Isles of Shoals, or getting into the remote summer climate of Florida, is impossible except on either Nantucket or Martha’s Vineyard. Of these, the latter is very much the better, as it gives a rich soil, beautiful drives, brooks, and woods, features denied to its bleaker sister to the east.” Page 737

“It is worth another ride over the eighteen miles of road along the south shore to see the pretty village of Edgartown, at the easternmost end of the island. In a commercial sense it is a place far advanced in decay: of all its whale-ships, which got from the sea the hard-earned fortunes of its people, there is but one left. This lies upon the ways, stripped of its rigging, looking like a mere effigy of a living craft.” Page 740

“These comfortable homes, like those of New Bedford, mark a period of prosperity which has passed never to return.” Page 740

“As soon as a mariner comes to fortune his first effort is to get a comfortable home, a big, square roomy house, which shall always be ship-shaped and well painted. I never thought so well of white paint before I saw these handsome houses, actually resplendent with a hue which is so often merely garish in such uses.” Page 740

Quotes from: Shaler, N. S. 1898. *Geology of the Cape Cod District*. Extract from the 18th Annual Report of the Survey, 1896-97.

“The pre-Glacial topography of Marthas Vineyard has been but little disturbed either by glacial erosion or by the resulting drift coating.” Page 515

“. . . a close inspection makes it evident that all of the brooks of considerable size follow at the present time the channels they had before the ice came.” Page 515

“This is shown by the occurrence at various points of submerged forests, as in Nantucket, and in the marshes bordering the harbor of Holmes Hole, Marthas Vineyard. The amount of this recent downward motion is not known, but it may have been sufficient to obliterate the land connection which united the islands of Marthas Vineyard and Nantucket with the mainland.” Page 521

“The reason for supposing a connection between these islands and the mainland is found in the substantial identity of their faunas and floras. . .” Page 521

“I have elsewhere urged this slow rate of northward march of the heavy-seeded trees as an argument against the hypothesis that the close of the glacial advance, when the ice lay at the southernmost point it had attained, was not more than from 10,000 to 20,000 years ago. If the argument be valid, the return of the oaks to southern New England, after their expulsion to regions farther south, must have required somewhere near 200,000 years.” Page 522

“At other points, especially in the middle portion of the belt, on the estate known as ‘Seven Gates,’ the deposit constitutes a very characteristic morainal belt, with numerous large kettle holes and with bowlders in such abundance that the masses appear like ruined cyclopean masonry.” Page 556

“Of these the most striking is the case of the northern moraine of Marthas Vineyard, where the bowldery deposit descends into a valley about the headwaters of Witch Brook. In this relatively low place, which still is about 70 feet above the sea, the moraine becomes somewhat scattered. It is, in effect, a rather flat, very stony field, in place of the well-defined accumulation exhibited on the higher ground on either side.” Page 557

“The plain exhibits broad, irregular channels which lead down to the sea. These scour ways do not appear to have been at any time occupied by open-air streams, but rather to have been excavated on a water-covered surface.” Page 563

“. . .wherever we find a place in which the water table is retained sufficiently near the surface to permit the tilled zone to be moistened by capillary attraction from below, there we find excellent ground for tillage; moreover, wherever the plan of plowing in green crops is followed, the results show that the soil needs only suitable treatment to give excellent returns. A considerable personal experience in tilling such soils as the sandier kinds of Cape Cod enables me to say that where they can be irrigated and where they are provided with nitrogenous matter by the inexpensive plan of plowing in crops of peas, clover, or other leguminous plants, they can be made to yield profitable crops.” Page 573

“It is particularly desirable to have the treatment of these soils of southeastern Massachusetts made the subject of a special and well-directed inquiry. In this district we have an aggregate area which may be safely reckoned at not less than 150,000 acres whereon all efforts at tillage have ceased. The region was once fairly well wooded, but the forests have long since been cut away and their regrowth is prevented by the

numerous fires which sweep over them and which still further reduce the amount of vegetable matter in the soil. These fields, when unwooded, are sold, in the rare transfer which are effected, at from 50 cents to about \$3 an acre; in the present neglected condition they are really not worth any price. In view of their nearness to rail and water transportation they should invite the attention of persons who are willing to take the pains necessary to learn the most economical methods of bringing them into tillage. Sixty years ago the swamps of this district were even more unpromising fields for agriculture than these sand plains and hills, yet at the present time, in their condition as cranberry bogs, they are worth on the average more than \$100 an acre over and above the expense of bringing them under cultivation.”

Page 573

“The morainal fields afford excellent ground for culture of forests; several species of trees do well on this bowldery earth, among which may be mentioned the white pine and the Scotch larch, both of which grow rapidly and are free from diseases. In the occasional swamps, so placed that they can not be used for cranberry culture, the swamp cedar, which affords with a rapid growth valuable timber, may be advantageously grown.”

Page 573

“The shipping which annually passes through Vineyard Sound on this voyage is said to be greater than that which traverses any like width of water in the world. From an early day there have been projects for cutting through the cape, making use of some one of the several channels—rivers so called—which nearly intersect the peninsula.” Page 574

“The most available of these shelters—that at Vineyard Haven—is often very much crowded, so that if the outer most ships should drag their anchors a great catastrophe would be likely to occur, in which scores of vessels might be lost.” Page 576