

NOAH WEBSTER: EPIDEMIOLOGIST

Everyone is familiar with the lexicographer Noah Webster, but few know much about the man or his work other than his famous dictionary. By no means was that his only literary work and among his miscellaneous contributions was a two volume book published in 1799 titled *A Brief History of Epidemic and Pestilential Diseases with the Principal Phenomena of the Physical World, Which precede and Accompany Them and Observations Deduced From the Facts Stated*. Although little remembered today, during the 19th century this book was a standard text in American medical schools and William Osler called it “the most important medical work written in this country by a layman.” (1902) Pathologist Aldred.S. Warthin (1923) suggested that the book “might well entitle Webster to be designated “the father of American epidemiology.

Noah Webster was *not* a man of few words. His dictionary attested to that; indeed this “brief” history of epidemic and pestilential diseases totaled 709 pages! The title page noted that he was “Author of Dissertations on the English Language and several other Works” but why did this obsessive wordsmith spend three years writing a history of epidemic diseases about which he had no more than a layman’s knowledge? Before I attempt to answer that question, a truly brief review of salient features of his biography may be useful.

Born in West Hartford, Connecticut in 1758, Noah graduated from Yale in 1778. He passed the bar examination but finding himself unable to find work as a lawyer, he opened a private school and wrote a series of educational books. In 1793, Alexander Hamilton recruited Webster to move to New York City where he became an editor for a Federalist Party newspaper and published newspaper articles, political essays, and textbooks. Webster returned to Connecticut in 1798 and eight years later published his first dictionary, *A Compendious Dictionary of the English Language*. The following year, he began work on a more comprehensive version.

From 1812 to 1822, Webster and his family lived in Amherst, Massachusetts where he was one of the founders of what would become Amherst College. Living largely off the income from his published schoolbooks, Webster farmed, served in the Massachusetts legislature and continued work on his expanded dictionary that finally was published in 1828. While working on a second volume he died in 1843 at age 85, and the rights to the dictionary were acquired by George and Charles Merriam. Some have called Noah Webster the "Father of American Scholarship and Education", but what does any of this have to do with epidemiology? I'll let the great man speak for himself and what follows next is extracted from the Introduction to Volume One.

A publication on the subject of diseases from the pen of a man who has never before turned his attention to medical science or to chemistry is a circumstance, which, if it does not require an apology, demands at least an explanation....

The prevalence of the catarrh, commonly called influenza in the years 1789 and 90, fully awakened my curiosity on the subject of epidemic diseases. A journey which I made in October 1789 from Hartford to Boston, and another in March 1790 from Hartford to Albany, led me to observe the progressiveness of that disease, with its other phenomena.....A slight attack which my own children suffered, in May following, together with a similar attack of many other children in Hartford, and its more violent effects some months after, convinced me that the epidemic was progressive in malignancy, as well as in regard to place.

Had no other epidemic appeared, my curiosity would probably have subsided and been extinguished. The malignant fever in New York in 1791 had excited alarm in that city and was a subject of notice in Hartford where I then resided, but no idea had been conceived, that it was connected with a pestilential state of the air, in the United States, which was afterwards to produce more ferocious and general calamities.

In autumn of 1793 however that pestilential state of air arrived to its crisis in Philadelphia, where the mortality occasioned by the yellow fever spread destruction and dismay from August to November. The fatality of the disease spread consternation thro the United States and excited apprehensions in Europe.

No American citizen could be indifferent to the prevalence of this disease in his own country. Still it was conceived that the distemper might have been produced from imported infection and that a more rigid execution of the laws relating to quarantine might prevent a repetition of the calamity.

But tranquility was of short duration. The appearance of the same disease in New Haven in 1794, and in New York, Baltimore and Norfolk in 1795, revived my curiosity, with double zeal to search out the causes of these phenomena, so unusual in this country. The facts which had come to my knowledge relating to the origin and propagation of this disease led me to suspect the common theory of infection to be ill-founded.

But as a preliminary to all other enquiries, it appeared necessary to settle the controversy relative to the imported or domestic sources of the distemper for without a decision of this question, legislative and police regulations for preventing a return of the evil, or mitigating its severity, would probably be fruitless. The question appeared to be extremely important and the differences of opinion on the subject among medical gentlemen seemed to preclude the possibility of a decision among them that would silence doubts in the public mind.

In this situation of the controversy, I resolved to make an effort to obtain evidence which might decide the point, in one way or the other, and as facts only can be relied on as a sure basis of principles and theory, I determined to make a collection of facts from all parts of the United States where the yellow fever or other malignant fevers have prevailed during the preceding years.....

When I began my enquiries into the origin of yellow fever in 1795, I had no preconceived system to maintain. My view was to collect facts and from them to deduce TRUTH. It is not my intention to advance theory over fact but as far as just philosophy and sound logic will permit, draw theory demo facts and, if possible, by fair reasoning, from the uniform operations of nature, to arrive at fixed principles... (I, iii-xi)

The remainder of the two volumes was devoted to a meticulous description of plagues and pestilences from ancient times to his own. Webster was skeptical of conventional medical wisdom and always his emphasis was on the association of diseases with climatologic or celestial events.

The ancients derived most of their knowledge from personal observation as they had few books and aid from their predecessors....Modern philosophers and physicians, on the other hand, unable to account for pestilence on the principle of extraordinary seasons and disdaining to admit the influence of the planets to be the cause, have resorted to invisible animalcule, and to infection concealed in bales of goods or old clothes, transported from Egypt or Constantinople and let loose at certain periods to scourge mankind and defolate the earth...

In both periods of the world, the common mass of people, usually ignorant and always inclined to believe in the marvelous, have cut the Gordian knot of difficulty by ascribing pestilence to the immediate exercise of divine power, under the impression that the plague is one of the judgements which God, in his wrath, inflicts on mankind to punish them for their iniquities.....Without deciding on the comparative merit of these respective opinions, it is sufficient to observe that they are all probably incorrect, and altogether inadequate to explain the origin of pestilential Epidemics.

Noah Webster's skepticism of received wisdom and his zeal to seek answers for himself was admirable. He insisted that facts are "the only genuine source of knowledge" but his conclusion that "visible and remarkable" phenomena were the

culprit was seriously flawed. Of course, he lived nearly a century before the advent of germ theory.

Noah began his research by writing to physicians and scholars throughout the country, but their understanding of pathophysiology was as mistaken as his own. The most famous of them all, Philadelphia's Benjamin Rush, strove to eliminate bad humors by aggressively "bleeding, blistering, purging and puking." Historians refer to that approach as "heroic medicine" but the true heroes were Rush's patients whose teeth fell out from mercury toxicity and suffered more from the treatment than the disease. Next Noah haunted libraries in New York, Philadelphia and Boston and the result of all his labors was a voluminous (not "brief") history of plagues and pestilences from earliest times until his own.

What Webster called his "general pestilential principle" was that epidemic diseases frequently resulted from extremes of weather and/or natural occurrences as floods and fires, earthquakes and volcanic eruptions and, especially, passing meteors and comets. Such natural events caused fetid air or miasma (from a Latin word meaning noxious vapors) which, in turn, caused illness. "Infection is capable of all degrees of activity and force, from a slight impurity of air, which affects no person in health, to that virulent state of air which will produce vomiting in a person suddenly exposed to it." (I, xi)

For support he cited the ancients:

Hippocrates, the father of medical science and a man of very acute observation considered pestilence as the effect of particular seasons and winds. A pestilential state or constitution of air he describes as occasioned by a continuation of southerly winds and a warm, humid, clouded atmosphere. Galen followed the same theory. He says that pestilent disease arise from the putridity of the air and, in another place, from the state of the air or weather.

Although untrained in medical science, Noah Webster was a keen observer. Note how he anticipated the future field of immunology:

Small pox and measles can never act but once in the same person. Its first operation destroys the capacity of receiving it a second time. The exceptions to this rule are too few to deserve consideration. Totally different is the effect of the plague and dysentery for instead of fortifying the body against a second attack, these diseases debilitate the animal powers and render the patient more susceptible of the contagion in a subsequent year. (II, 146)

He ended Volume One with this disclaimer:

This is the best statement of facts I have been able to make from fifteen months of investigation. It is not improbable that some mistakes have occurred which more time and more ample materials would enable me to correct. But I trust that the substance of the statements is accurate and that no error of consequence will be found to result from them to impeach the general principles suggested in this work. (I,

While Noah Webster was developing his general theory, most of his contemporaries suspected that periodic plagues were brought to American shores by sea travelers from afar. Among those who held such a view was Ezra Stiles, president of Yale, who documented the fevers and plagues that swept through New Haven during his tenure (1778-1795) in a Literary Diary. During an outbreak of scarlet fever in 1794, about two thirds of the students were stricken and classes were suspended for nearly two months. Those who remained in town were offered tutors but three months after the fever finally abated, [although “yet extant”] another plague swept through New Haven:

The yellow fever brot in by a Vessel here...now proves dreadful. Sixteen or eighteen deaths out of twenty patients at least. More mortal than the small pox, tho less contagious....Hitherto I have believed that by the care & vigilance of the Authy [Authorities]...its progress [might be] checked as we could trace all the Instances; but now they begin to be lost and bewildered. I

*begin to give up the possibility of preventing its spread, and to be discouraged and to wish my family out of town.**

At the end of 1794 President Stiles calculated the year's grim total: out of a student population of about 3,500, 50 had died of scarlet fever, 63 of yellow fever and 70 either of other sicknesses or had "died at sea."

Perhaps medical historian George Rosen described Webster's "sally into the arena of medical disputation" the most vividly.** Dr. Rosen mused "Whether Webster is depicted as a swashbuckling scholar making a strike into foreign territory or as an absentminded professor who lost his way and wandered into strange fields, a somewhat perplexed attitude is implied in both." Perplexing seems an apt description. Exasperating might be another. So why take the time now to recall this attempt by a sincere but misinformed non-scientist to make sense of the still undiscovered world of microbes?

I suggest that it's because in some respects there is an uncanny similarity to current events, including daily exhortations by scientists to rely on proven facts rather than on half-baked ideas and wishful thinking. A caveat is that "facts" sometimes can deceive and, alas, that was the fatal flaw in Noah Webster's erroneous attempt to understand the mystery of epidemics and pestilences. Good try Noah!

*J.A. Schiff. "Remembrance of plagues past." *Yale Alumni Magazine*. May/June, 2020. p. 27

**George Rosen. "Noah Webster - Historical Epidemiologist." *Journal of the History of Medicine and Allied Sciences*. 1965