



Massasoit (c. 1581-1661)

Wampanoag Leader

Statue by Cyrus Edwin Dallin, 1920 (Plymouth, MA)

Survival of the Pilgrims: A Reevaluation of the Lethal Epidemic Among the Wampanoag

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Abstract: *The 1616-1619 epidemic among the Native Americans of coastal New England resulted in a highly significant depopulation. Although the microbial etiology of the disease has not been identified, its epidemiological characteristics of limited geographic distribution, restriction in time, and exceptionally high mortality are well-documented and known to be crucial to its historical impact. The epidemic resulted in the devastation of the Wampanoag while, remarkably, sparing their rivals, the Narragansett. The unique combination of the epidemic's timing, restricted location, and lethality forced Wampanoag leader Massasoit to enter into a treaty with the Puritans. Professor Booss argues that, despite the considerable yet inconclusive scholarly speculation about the exact nature of the disease, it was the highly unusual conjunction of epidemiological factors which drove the historical consequences. John Booss is a Professor Emeritus at the Yale University School of Medicine.¹*

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Without the lethal epidemic that took hold among the Wampanoag on the coast of New England from 1616-1619, the Pilgrims might not have survived. Relations between the colonists and Native Americans during this period were tense. There had been abductions and killings of Natives along the New England coast by European explorers, traders and fishermen who considered them inferior. For example, Tisquantum, popularly known as Squanto, whose subsequent services to the Pilgrims were said to be “almost beyond estimate,” had been abducted and sold into slavery by Captain Thomas Hunt in 1614.² In the words of Sir Fernando Gorges (c. 1568-1647), Hunt’s action resulted in “a warre now new begunne between the inhabitants of those parts and us.”³ As a result, Native Americans in the region would not have been peaceably disposed toward the Pilgrims and, absent the depleted state of the Wampanoag, might have refused to befriend them. It would not have been surprising if the Indians had simply ignored the starving colonists, or worse, after the deadly first winter of 1620-1621. In this case, the Pilgrims might not have survived to play a crucial role in the mythos of America. The thesis of this paper is that it was the unique epidemiological features of the 1616-1619 epidemic, conditioned by cultural factors, which made the Wampanoag particularly vulnerable.

Numerous attempts have been made to retrospectively identify the microbiological nature of the epidemic (whether it was the plague or some other specific infectious disease).⁴ Yet insufficient data exists to make a specific etiologic (causal) diagnosis. In contrast, the epidemiological characteristics of the disease are well-defined and historically critical: the epidemic was remarkably lethal, of limited duration, and geographically focused. In the absence of these characteristics, Pilgrim history would likely have evolved very differently.

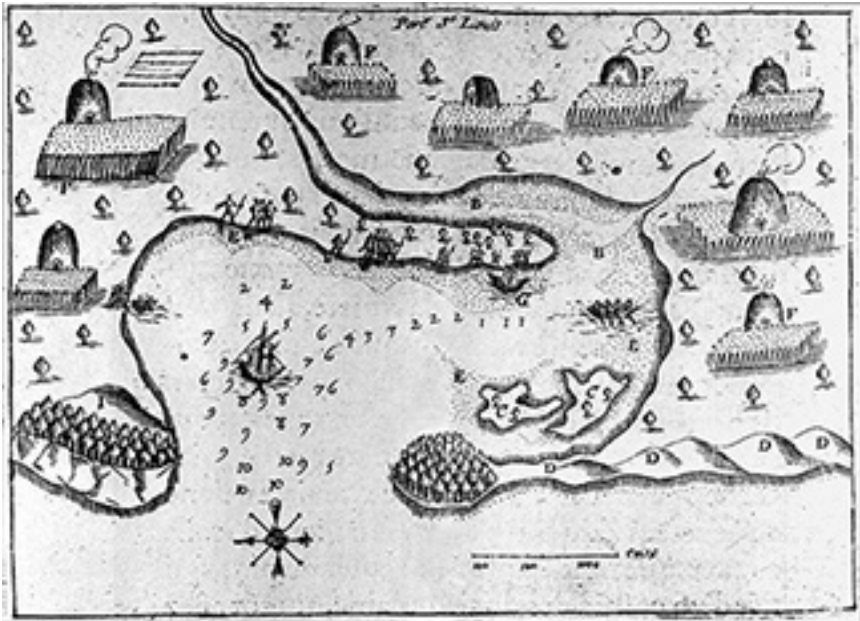
Mortality was extremely high, rising to more than 90% by some estimates, while its timing was narrowly confined to the years 1616-1619. The epidemic struck during the period immediately preceding the landing of the Pilgrims on Cape Cod and the subsequent establishment of the Plymouth Plantation at the site of the abandoned Wampanoag village of Patuxet in December of 1620. The epidemic’s location, and in particular the southern boundary, was sharply delimited, reaching only to the eastern and northern shores of the Narragansett Bay. The Wampanoag, who resided north and east of the Bay, were decimated, while the Narragansett, living south of the Bay, were left unscathed. Hence, the epidemic put the Wampanoag at the mercy of their traditional rivals, the Narragansett. The reasons for the sharp, almost surgically precise border of the epidemic may be due, in part, to Narragansett cultural beliefs and practices (to be described later). The remarkable difference

in exposure and impact on the two groups is uncontested. As a result, the Wampanoag needed an alliance with the Pilgrims to rebalance regional power relationships.

To fully appreciate the impact of the 1616-1619 epidemic on the fate of the Pilgrims, it is helpful to consider the background of English colonization along the eastern seaboard of North America, the establishment of the Plymouth Plantation, and the balance of power among the Native American groups in the region. We will then move on to the presumed origin of the epidemic and to explicit examinations of its microbial and epidemiological characteristics.

ENGLISH COLONIZATION

Until the founding of Plymouth by the Pilgrims in 1620, English colonists did not have a good record of working with the Amerindians. In a first attempt at founding Raleigh's so-called "lost colony," Roanoke, in 1585-1586, the colonists expected help from the Indians.⁵ However, they



Champlain's map of Patuxet (Plymouth Harbor)

This image shows people, habitations, and plantings prior to the epidemic of 1616-1619.

slaughtered the Indian's chief, Wingina, when his followers refused to provide food after a difficult winter. Consequently, the Indians withdrew from the colony and all hope for a good crop was lost. These first Roanoke colonists then beat a hasty retreat to England. A second settlement attempt in 1587 apparently foundered due to a lack of resources. When John White, the governor, returned in 1590 with needed supplies, the colonists were not to be found -- hence the moniker "the lost colony."

In 1607 an English colony in Maine, Sagadahoc at the Kennebec River mouth, was attempted but "within months" the settlers packed up and returned to England. That same year the English made another attempt at colonization near the Chesapeake Bay.⁶ A colony was established, Jamestown, next to a marsh on the James River. Both were named for King James I, who had ascended to the throne following the death of Queen Elizabeth I in 1603. The Jamestown colonists were sickened and died by the score from starvation, malaria, dysentery, salt poisoning, and typhoid fever. At the same time, their relations with the Native population were fraught. John Smith attempted to capture Chief Powhatan, but was in turn captured. According to Smith's account (which some contemporary scholars question), he underwent a mock execution and was saved by the intervention of the chief's daughter, Pocahontas. Relations with the Powhatan Confederacy remained rocky, as demonstrated by a 1622 attack led by the chief's brother, Opechancanough, which killed a third of the colonists. The crown assumed control in 1624, taking advantage of revenue from tobacco growth. Meanwhile, disease and warfare decimated the Algonquians in Virginia.⁷

THE PLYMOUTH PLANTATION AND THE WAMPANOAG

The Pilgrim story, well known to American school children, is virtually a founder's myth for the United States.⁸ Persecuted in England for their separatist religious beliefs, the Pilgrims fled to Leiden, Netherlands and settled for a dozen years. Fearing that their children would become Dutch and wishing to establish a society in which their Puritan beliefs could be exercised unencumbered, they dispatched a group of "saints" mixed with non-believers for the New World. After a leaky ship had to be left behind, they crossed the Atlantic in the *Mayflower*. Hitting land first at Cape Cod, they then established their plantation at the site of the former village of Patuxet on Plymouth harbor where, according to Puritan Edward Winslow, there was "a great deal of land cleared, and hath been planted with corn three or four years earlier."⁹

The Pilgrims met the Wampanoag in the spring. As noted, coastal New England Indians had been antagonistic toward Europeans who had demonstrated themselves to be unreliable, killing and abducting Indians into slavery or taking them as show pieces back to Europe. Significant among the latter was Squanto, or Tisquantum, originally from Patuxet. He came to play a pivotal role in the dealings between Massasoit (c. 1581- 1661) sachem (leader) of the Wampanoags, and the leaders of the Plymouth Colony.¹⁰

In his 1651 account, Puritan leader William Bradford wrote that the Pilgrims passed a miserable winter, subject to illnesses and exposure “being in the depth of winter, and wanting homes and other comforts; being infected with the scurvy and other diseases.”¹¹ They lost half of the original 102 settlers. The Wampanoag were themselves much diminished, having gone from an estimated 12,000 individuals with 3,000 warriors before the epidemic to a total of a few hundred warriors in several villages and tribes afterwards. They were led by Massasoit.

According to Bradford, Massasoit and his men spent three days in a swamp convening in a powwow to induce the spirits to get the white men to go:

they got all the Powachs [medicine men] of the country, for three days together in a horrid and devilish manner, to curse and execrate them with their conjurations, which assembly they held in a dark and dismal swamp.¹²

Unsuccessful and needing allies, Massasoit decided to meet peacefully with the Pilgrims. As a consequence, wrote Bradford, he sent Samoset, who could speak some English, to the Pilgrim settlement to make first contact: “a certain Indian came boldly amongst them and spoke to them in broken English.”¹³ Successful, Samoset left and returned with Tisquantum and Massasoit (who was also known as Ousamequin).

They drew up a treaty on March 22, 1621 in which the Wampanoag and the Pilgrims agreed to an alliance. Important among the terms were that the Wampanoag would not injure the Pilgrims, each group would come to the other’s aid in the event of an unjust war, and Massasoit would inform other native groups of their alliance.¹⁴ The agreement provided the Wampanoag with defense against its enemies, particularly the Narragansett, and the Pilgrims with protection against hostile groups. The alliance also ensured the Wampanoag would assist the Pilgrims in adapting to life in New England.

That the Pilgrims would want such an alliance is no wonder. They likely viewed it as yet another proof of God’s favor in this strange and fearsome land. However, the interest of the Wampanoags in a treaty, once a powerful

Treaty by Massasoit of the Wampanoag with the Pilgrims.

William Bradford described the Pilgrims' understanding of the treaty in his journal, *Of Plimouth Plantation*.

[T]heir great Sachem, called Massasoiet . . . about four or five days after, came with the chief of his friends and other attendance, with the aforesaid Tisquantum. With whom, after friendly entertainment and some gifts given him, they made a peace with him (which hath now continued this 24 years) in these terms:

I. That neither he nor any of his, should injure or do hurt to any of their people.

II. That if any of his did any hurt to any of theirs, he should send the offender that they might punish him.

III. That if any thing were taken away from any of theirs, he should cause it to be restored; and they should do the like to his.

IV. That if any did unjustly war against him, they would aid him; and if any did war against them, he should aid them.

V. That he should send to his neighbours confederates to certify them of this, that they might not wrong them, but might be likewise comprised in the conditions of peace.

VI. That when their men came to them, they should leave their bows and arrows behind them.¹⁵

and dominant people, was at first unclear. Early in the discussions between the Wampanoags with the Pilgrims it was revealed that a highly lethal epidemic had decimated their numbers three years earlier.¹⁶ Inexplicably, the epidemic had halted at the western shore of Narragansett Bay, the edge of the territory of the Wampanoags' enemies, the Narragansett.¹⁷ The epidemic left the Narragansetts unscathed, with an estimated 20,000 people and 5,000 warriors. The southernmost border of the Wampanoag was the eastern and northern border of the bay. This resulted in a great imbalance in populations and particularly of warriors and left the Wampanoags at risk of becoming tributaries of the Narragansetts. The Narragansetts' sachem, Canonicus, was an enemy of Massasoit. At one point Massasoit and a group of his men were forced to submit to the Narragansetts.

Thus, it was to redress the strategic balance of power among native groups that Massasoit was motivated to enter into a treaty with the Pilgrims. Yet not all Wampanoag leaders were in agreement, and the Pilgrims soon had



"Treaty of the Pilgrims with Massasoit"

On March 22, 1621, Governor John Carver and Wampanoag leader Massasoit agreed to a treaty of peace and mutual protection. Carver died the following month and William Bradford became governor. This fanciful rendition reflects the artist's nineteenth-century sensibilities. There was no grandfather clock at Plymouth in 1621; indeed, such a clock wasn't even invented until 1670. Nor would the structure in which they met have been so spacious and well-constructed with ceiling planks, a wooden floor, columns and crown molding. Unfortunately, we have no accurate drawings or images from the time. Nineteenth-century renditions remain popular, although they may have little historical accuracy. This image appears in many website searches using the terms "Massasoit" and "Pilgrims." It is from an 1885 engraving by Jeremiah Rea. Although this image is frequently reproduced, its source is rarely identified. Source: New York Public Library digital collection (Image ID 808090).

cause to live up to their side of the bargain.¹⁸ In 1621, for example, Miles Standish, guided by Hobamock, led a successful, commando style raid on Corbitant's group, thereby weakening the power of a rival Wampanoag village at Nemasket. As a result, Tisquantum and Tokamahamon, who had both been captured, were found safe and freed. The Pilgrims' show of force established fear and brought nine other sachems into the fold to sign a treaty on September 13, 1621, professing loyalty to King James. Standish also thwarted a purported plot by other Massachusetts sachems in 1623,

including Pecksuot and Wituwamat, whom Standish killed violently using a ruse. Standish's use of brutal force established fear among native groups, strengthening the alliance between Massasoit and the Pilgrims.

Over the next four decades, Massasoit maintained his friendly alliance with the Pilgrim leaders. At one point he was believed to be dying and Edward Winslow, a Pilgrim leader, went to him. Finding Massasoit feeble and not eating, Winslow "cleaned his mouth," cared for and fed him.¹⁹ Massasoit recovered and Winslow developed a reputation as a healer among the Wampanoag. The Pilgrims were essentially at peace with the Wampanoag and neighboring groups, including the Narragansett, for the remainder of Massasoit's life, until 1661. The Pequot War of 1636-38 did not involve Plymouth Colony.²⁰ The tragedy of King Philip's War (1675-76), misleadingly named after Massasoit's younger son, developed after Massasoit's passing.²¹

Without doubt, Massasoit was a great leader and a vital ally to the Pilgrims. One might even say, in an outburst of counter-factual history, that without Massasoit's decision in the swamp in 1621, the settlement of New England might have followed the models of Roanoke Island or Jamestown.²² In that event the Pilgrims would not have become the mythical founders of the American nation. Massasoit's decision was based on a consideration of the Native American balance of power. He had been forced into that position by the epidemic of 1616 to 1619 that took an estimated 90% of his people but left his enemies, the Narragansett, untouched.

ORIGINS OF THE EPIDEMIC

The epidemic is generally thought to have been imported from Europe by explorers, traders, or fishermen. Since at least the mid-1500s European fishing vessels regularly plied the Grand Banks of Newfoundland and the coasts of Nova Scotia and Maine. Part of the evidence in favor of an importation explanation is that Europeans seemed to be immune to the disease. Sir Fernando Gorges (1658) reported of his expedition that Richard Vines' men "lay in the cabins with those people that died. . . . not one of them ever felt their heads to ache while they stayed there."²³ This apparent European immunity was confirmed in *The Planters' Plea* of 1630 (see quote below).²⁴ The notion of its origin in Europe with devastating effects on Native Americans has been described by historian Alfred Crosby's concept of a "virgin soil epidemic," (1976),²⁵ characterized earlier as a virgin field epidemic by John Duffy (1951).²⁶ That is, a population previously unexposed to a microbial pathogen would have no acquired immunity, i.e., would be "virgin," and would thus be easily devastated by an infection tearing through

it. Crosby's theories were extremely influential in explaining the devastating effects of European microbes on native populations. The author of *The Columbian Exchange: Biological and Cultural Consequences of 1492* (1972) and *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (1986), Crosby offered biological explanations for why Europeans were able to succeed in conquering the New World.

Recent work by David Jones and others has disputed this formulation and has emphasized the importance of cultural factors and contingency in the outcome of Amerindians encountering waves of Europeans. In his article in *Beyond Germs: Native Depopulation in North America* (2015), Jones argues that there are "styles of historical explanation: one biological and deterministic, the other social and contingent."²⁷ Thus, famine, displacement, and social disruption have played major cultural roles in historical processes. It is worth noting that both biological and cultural processes are contingent on the interaction of various components and on each other. For example, the amount of infecting organisms interacts with the nutritional status of the infected individuals. Those who are malnourished become more susceptible to disease. Thus, biological and cultural factors are synergistic and contingent.

Apocryphal perhaps, but the story is often repeated in several primary sources of ship-wrecked Frenchmen in Massachusetts Bay who were either killed or taken as slaves.²⁸ One told his Native American captors that their God would kill them, to which they replied that their God could not kill them. Soon thereafter the native villages were devastated by epidemic. Yet there is no definitive proof of the epidemic having been imported from Europe. That is to say for example, that there is no record of a ship bearing specifically diseased immigrants to have delivered the illness to a specific place at a specific time in the New World. The task is made impossible because of the mystery of the nature of the disease itself. Certainly less likely was that the epidemic could have been a "spillover" disease from animals or a mutated indigenous infectious agent that could not secure a foot hold.²⁹ Spillover disease is rendered unlikely because of the absence of reports of an outbreak in animals simultaneous with the disease in Natives. The possibility of a mutated indigenous disease is rendered unlikely by the absence of a recognized similar, if less lethal, illness in the Native population that mutated into a lethal disease.

THE MICROBIOLOGY

The identity of the illness has perplexed scholars for centuries. A first problem is that modern concepts of infectious diseases stem from the second

half of the nineteenth century when Louis Pasteur in France and Robert Koch in Germany established the theoretical and practical underpinnings of germ theory.³⁰ They established that specific infectious organisms targeted particular tissues with a resulting set of symptoms. The manifestations of smallpox, chicken pox, and measles, for example, were evident on the skin. The 1616-1619 epidemic occurred almost two and a half centuries before modern concepts of infectious diseases were established. It was a time when supernatural concepts of illness still held sway.³¹ Shamanism was employed by New England Native Americans to deal with illness.³² A second problem is that the woodland Indians did not leave a written record so that the manifestations of the illness, its “signs and symptoms” in the parlance of present day medical practice, were rarely recorded. Information relayed to the English concerning the nature of the illness was either absent, vague, unrecorded, or lost.

These problems in disease identification are evident in contemporary attempts to identify the illness. Many discussions, such as that of Herbert U. Williams in his comprehensive 1909 article, “The Epidemic of the Indians of New England, 1616-1620,” have focused on semantic issues, e.g. whether it was “the” plague or “a” plague.³³ Williams notes that the term “plague” was used in twelve of the twenty-three, seventeenth-century primary source accounts and references that he was able to find. He concluded that many of “the original authorities on the epidemic among the Indians of New England, whether rightly or wrongly, considered that epidemic to be bubonic plague.”³⁴

However, historian William Cronon pointed out in his pioneering study, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (1983) that “although contemporary observers described it as ‘the plague’, New England lacked the rats and human population densities necessary to sustain the disease.” Cronon suggested that chicken pox “seems a more likely cause.”³⁵ Lacking specific identifying clinical features, the absence of rats as carriers, and the insufficient human population density, it would be reasonable to consider the term “plague” only in the generic sense of a severe illness.

There are precious few primary sources about specifics of the illness. Although H.U. Williams identified twenty-three primary sources, nearly all are second-hand reports conveyed to the author, rather than direct observations. Only one was a directly-observed account: the report of Captain Dermer. He noted in a letter to M. Samuel Purchas in 1619, “Their disease the Plague, for wee might perceive the sores of some that had escaped, who described the spots as usually die.”³⁶ Dermer’s report is unique in being



Bubonic plague as depicted in the Toggenburg Bible of 1411

The figure shows an astrological interpretation from the Middle Ages. Some have challenged the image as showing smallpox.

the only first hand observation report of the manifestations of the illness. The absence of rats and the failure of the disease to persist in the region, throw the specific diagnosis of plague into doubt. Dermer also commented on the lethality of the illness, "I passed amongst the Coast where I found some antient plantations, not long since populous now vtterly void; in other places a remnant remains, but not free of sickness". The report by Gorges of Vines and his men, noted above, while suggesting immunity of Europeans, does not describe the manifestations of the illness of the Indians with whom he stayed.

Half a century later, Captain Daniel Gookin wrote in 1674, providing another second-hand report five decades after the epidemic: "I have discoursed with old Indians, who were then youths, who say that the bodies all over were exceeding yellow, describing it by a yellow garment they showed me, both before they died and afterwards."³⁷ A number of hypotheses have been built on this single report which was given over half a century after the epidemic. In 1799 Noah Webster suggested that the purported "yellow" skin coloration was yellow fever. In their 1987 article, "New England Pandemic of

1616-1622,” archeologist Arthur E. Spiess and Professor of Medicine Bruce D. Spiess, suggested it was caused by a hepatitis virus.

However, one should view Gookin’s 1674 report as highly suspect since contemporary observers did not report skin yellowing at the time or afterwards and there was no reports of residium (persistent or residual signs of illness such as scarring after smallpox, or persistent skin yellowing in the present situation) in survivors. Moreover, Gookin’s was an isolated report based on memories half a century old. One is surprised by Webster’s conclusion, writing of Gookin’s report he concluded that: “This account may be relied on for its authenticity and it decides the question, that the pestilence was the true American plague, called yellow fever.”³⁸ Webster had cited Capt. Dermer’s report from 1619 of skin lesions but which had not made any mention of skin yellowing. Thus, Webster favored a half century old report based on memory over an eye witness report from the time. In contrast, in 1883 historian Charles Francis Adams Jr., in a thorough footnote to Morton, dismissed the possibility of yellow fever. He argued that since the epidemic appeared to have “raged equally in the depth of the severest winter as in the summer, this [yellow fever] could not have been the case.”³⁹

In a 2010 article titled “New Hypothesis for Cause of Epidemic among Native Americans, New England, 1616-1619,” John S. Marr and medical writer John T. Cathey offered another hypothesis to explain the alleged yellowed appearance. Marr is a physician and epidemiologist who has investigated and written widely about both contemporary and historical outbreaks. Marr and Cathey suggested that the yellow coloration that Gookin’s “old Indians” reported was due to leptospirosis (also referred to as infectious jaundice). The disease is often carried by rats which excrete the bacteria in their urine which then infects standing bodies of fresh water. While rats were not native to the New World, they were brought over on ships. Marr and Cathey speculate that cultural behaviors and habits might explain why Native Americans but not Europeans contracted the disease. Marr and Cathey speculate that these cultural practices included the fact that the Wampanoag would have been more exposed to contaminated water because they went barefoot, wore little protective clothing, canoed regularly, bathed more frequently than Europeans and picked cranberries in the bogs of Cape Cod.

Although this theory was widely reported in the popular press as a novel new explanation, many scholars have not been universally persuaded that the disease was leptospirosis.⁴⁰ As I argue above in relation to the plague, the absence of mentions of rats in most primary source accounts, along with the failure of the disease to persist in the region and the absence of yellowing in all

other accounts of the illness throw this recent hypothesis into doubt. Indeed, Marr and Cathey themselves write that, "Our hypothesis is not meant to be a definite answer but a heuristic for others to criticize and explore."⁴¹

Among those diseases which wreaked havoc on many indigenous peoples, smallpox stands out. In addition to its extremely high mortality, it leaves scarring and often blindness in survivors. Yet among survivors of the 1616-1619 epidemic, no such reports are found in any of the primary source accounts: Mourts' Relation, A History of Plimouth Plantation (1621), New English Canaan (1622), or Good News from New England (1622).⁴² It should be noted that Roger Williams reported that the Narragansett themselves clearly distinguished "The Pox" (Mamaskishauonck) from "The Plague" (Weshauashauonck).⁴³ Adams, in his thorough footnotes to Morton's New English Canaan, concluded: "It would seem that the pestilence of 1616-7 was clearly not the smallpox." The Narragansett would later suffer from smallpox, Winthrop noted in 1634 that "at Narragansett, by Indians report, there died seven hundred."⁴⁴ That was part of a clearly-identified smallpox epidemic of 1633-1634. In his seminal 1973 article, "The Significance of Disease in the Extinction of the New England Indians," Sherburne F. Cook characterized these features of smallpox as "so widespread as to become almost universal."⁴⁵ Taken together, the arguments against the plague, the apparently conflicting and inconclusive accounts of captains Dermer and Gookin, Adams' argument along with the absence of any reported residua of smallpox (i.e. persistent or residual changes such as scarring) noted in any of the reports soon after the epidemic make it very difficult to say with certainty what clinical illness afflicted the New England Indians in 1616-1619. The clinical data is simply insufficient for a definitive disease identification. As of yet, all attempts to identify the nature of 1616-1619 epidemic remain inconclusive.

Despite the much greater importance to the historical context of the epidemiological features, as I argue below, a number of puzzling facts might be explained if the nature of the infecting agent could be determined. For example, why were there no consistent Native American observations at the time which could have been told to the English to give clues as to the nature of the illness? We have discussed our reservations about Gookin's 1674 report of jaundice decades after the epidemic, and are puzzled by the lack of supportive comments to buttress Dermer's 1619 report of sores. Consistent reports of skin changes, as in smallpox, measles, or jaundice; diarrhea (such as bloody flux); or cough (such as with various types of pneumonia) would have provided later generations with helpful clues to the nature of the infection.

Perhaps there were no such unambiguous observations to be made because the infection did not have prominent or consistent observable

manifestations. Identification of the agent could also help explain why the epidemic failed to gain a foothold, to recur over several years, or to spread to other regions. Could it be that an epidemic agent transitioned into a sporadic agent, infecting one person at a time? Alternatively, might an illness present originally as an acute infection, which would have resolved within days or weeks, have become a chronic infection lasting months or years, over time? Still, another possibility is that the illness might have transitioned into a much less virulent form. These questions and others could only be addressed if the agent could be identified unambiguously.

The advent of technology that allows the identification of infectious agents by decoding the genetic blueprint has transformed the study of infectious diseases.⁴⁶ It has also allowed the identification of infectious agents in specimens of skeletal remains.⁴⁷ If skeletal remains of those Native Americans who had died in the 1616-1619 epidemic could be unambiguously identified and the samples were adequate for study, it might be theoretically possible to retrospectively identify the infecting agent. Yet whether this type of study of ancestors would be acceptable to the present day descendants would be a major consideration in determining whether such a study should even be contemplated.

Notwithstanding the considerable interest previously devoted to trying to identify the specific disease, I argue that the epidemiological features of the epidemic are of the greatest importance in the historical context. In contrast to clinical identification of the illness, the epidemiological features of the epidemic are well-known and were consistently described. These features include mortality, geographic location, and the time period of disease activity.

HIGH MORTALITY

In 1622 Thomas Morton wrote that “the hand of God fell heavily upon them, with such a mortall stroake that they died on heaps as they lay in their houses.”⁴⁸ John White confirmed the extreme lethality of the illness in his 1630 tract, *The Planters’ Plea*:

[T]he desolation happening through a three years plague, about twelve or sixteen years past, which swept away most of the inhabitants all along the sea coast, and in some places utterly consumed man, woman, and child, so that there is no person left to lay claim to the soil which they possessed. In most of the rest, the contagion hath scarce left alive one person of an hundred. And which is remarkable, such a plague hath not been known

or remembered in any age past, nor then raged above twenty or thirty miles up into the land, nor seized upon any other than the natives, the English in the heat of the sickness commencing with them without hurt or danger.⁴⁹

Puritan sources reported that Tisquantum, from the Wampanoag village of Patuxet, had returned from his European abduction “to find his village completely vacated. Most of its inhabitants had died.”⁵⁰ In his influential 1973 article, Sherburne F. Cook, a pioneer in Native American morbidity and population studies, argued that mortality was exceedingly high, over 90%.⁵¹ Despite the intense lethality of the illness, the disease seems neither to have gained a foothold in New England nor to have spread to other regions of the eastern seaboard. There are suggestions that the illness may have had two brief later appearances. An epidemic which appeared among the Massachusetts in November of 1622 might have been the same illness. In 1624, Winslow wrote, “they found a great illness to be amongst the Indians, not unlike the plague, if not the same.”⁵² In addition, in his 1651 work, *Of Plymouth Plantation*, Puritan William Bradford reported sequential epidemics among the native peoples of the Connecticut River Valley in 1633-1634, the first of which had very high mortality but was not further characterized. He concluded, “for it pleased God to visit these Indians with a great sickness” from which 950 of 1000 died. The second illness was smallpox.⁵³

Under “virgin field” epidemic conditions, an illness would be expected to continue to spread to contiguous, non-immune populations for years. But that did not happen. The illness, whatever it was, seemed to have disappeared. In *The Planters’ Plea* (1630) John White wrote that “such a plague hath not been known or remembered in any age past.”⁵⁴ Likewise, Sheldon Cook concluded that “the organism could not establish itself in New England environment. . . . Its introduction in 1616 must be regarded as a onetime event.”⁵⁵ There is precedent for this puzzling observation. For example, the epidemic outbreak of Encephalitis Lethargica at the time of the First World War has not reappeared in epidemic form since.⁵⁶ In that case as well, the cause has never been identified nor have the reasons for its disappearance been demonstrated. While there are other precedents for infectious diseases apparently disappearing, that phenomenon can be viewed as atypical in the historical record.



Captain John Smith

One of the Europeans who recorded the devastation wrought by the epidemic, from a book held by the Houghton Library at Harvard University.

EXQUISITE TIMING

The timing, which closely preceded the arrival of the Pilgrims, and the geographic location, which spared their enemies, the Narragansett, was critical for the Wampanoag. The first observations of the illness were made by Richard Vines (1585 –1651) in his 1616-1617 expedition to Maine, as reported by Sir Fernando Gorges. Vines is reported to have been a physician.⁵⁷ His writings, should they exist, such as reports or a diary, would shed a great deal of light, but none have been discovered. Captain John Smith referred to three plagues in three years.⁵⁸ Cook gives the dates as 1616-1619⁵⁹ and Williams as 1616-1620.⁶⁰ The Planters' Plea, published in 1630, reported a plague of three years duration, twelve or sixteen years previously.⁶¹ I have followed Cook's definition of the time period. In any event, the devastation of the Wampanoag took place just prior to the landing of the Pilgrims.

PRECISE AND LIMITED LOCATION

Concerning geographic location, there was an almost surgical definition of the southern boundary of the epidemic. There is agreement that the epidemic reached the eastern edge of the Narragansett Bay but did not cross to the western shore. This had enormous ramifications for the balance of power among native people in central and southern New England. The Narragansett were spared but their traditional enemies, the Wampanoags, were decimated. The eastern (northern) boundary was less precise. Gorges reported that Vines had seen it at Sagadahoc and Cook noted that it may have reached Penobscot Bay.⁶² Williams, quoting Drake, gives the easternmost extent as the Penobscot River.⁶³ According to John White in *The Planters' Plea* (1630) the inland extent was not more than 20-30 miles.⁶⁴

Geographical spread of an epidemic is dependent on multiple contingent biological and cultural factors. For example, it may follow the distribution of its vector. Marshland, ponds and other bodies of standing water favor the life cycle of species of mosquitoes, which serve to transmit certain pathogens.⁶⁵ Disease location is also influenced by the distribution of non-human hosts serving as reservoirs. Rats, for example, are integral to the spread of plague. While mice were said to be common in New England, the presence of the rat is not clearly documented. Sherbourne F. Cook quoted French explorer Marc Lescarbot (1612) as stating that rats came over on ships.⁶⁶ In contrast, historian William Cronon, citing Thomas Morton, concluded that they were not present [before Europeans].⁶⁷ Because Lescarbot wrote of New France, whereas Morton wrote of New England, I have relied on Cronon in my discussion above.



Narragansett and Wampanoag Territories

This map indicates the domains of New England's native inhabitants in 1670, a few years before King Philip's War. It clearly shows the Wampanoag and Narragansett on opposite sides of Narragansett Bay. Image source: Nikater; adapted to English by Hydrargyrum - Wikimedia Commons - Image:Wohngebiet_Südneuengland.png, as of 5 July 2006

A related concept, involving animal reservoirs, is that of "spillover." Thus a disease hitherto limited to animals can mutate and spill over into the human population.⁶⁸ HIV, for example, was limited to subhuman primates before spilling over to human hunters in Africa. However, whether or not the pattern of spillover from an animal population might explain the 1616-1619 epidemic in the New England indigenous groups is impossible to document in the absence of a pathogen identification.

CULTURAL EXPLANATIONS

In addition to strictly biological factors, explanations based in cultural patterns must be considered for understanding the extent of the epidemic. Trade and other patterns of human contact, such as exploration and conquest, are activities that influence the distribution of epidemics. Contact of coastal New England peoples with European fishermen, explorers, and

traders would fit the pattern of the limited inland extent of the epidemic. In his ground-breaking study, *Manitou and Providence: Indians, Europeans, and the Making of New England 1500-1643* (1982), historian Neal Salisbury suggested that indigenous contact patterns in response to French trading offer a potential explanation of the distribution of the epidemic.⁶⁹ That is, the afflicted groups traded with the French and among themselves.

In his insightful 1973 article on "Southern New England Shamanism," anthropologist William S. Simmons offers another possible clue. He discusses how the pawaw, or shaman, "functioned mainly as divine, curer, and sorcerer."⁷⁰ Shamans played a key role in the life of New England native peoples. They advised leaders on spiritual matters and performed rituals to influence their Gods.⁷¹ Simmons notes that the Narragansett performed a burning ritual, in which they threw their belongings into a great fire, which putatively protected them from the epidemic. Puritan Edward Winslow reported in 1622 in his *Good Newes from New England* that other Indians thought that "the plague hath not reigned at Nanohigganset [Narragansett] as at other places around them, they attribute to this custom there used."⁷² In addition, Simmons has speculated that "Narragansett pawaws may well have forbidden travel to Wampanoag lands by some oracular process."⁷³ Thus, several cultural factors may have been determinative in accounting for the limited geographical spread of the early epidemic.

CONCLUSIONS

The decisive limitation of the lethal epidemic at the Narragansett Bay spared the Narragansett and set in motion a realignment of balance of power with the Wampanoag. The geographical limitation likely reflects cultural factors, differences in patterns of trade and possible spiritual inhibitions exerted by Narragansett pawaws. Localization, in combination with the decisive timing of the epidemic, just prior to the arrival of the Pilgrims, and extremely high mortality was crucial. The microbiological nature of the epidemic is a fascinating conundrum but likely unsolvable at this juncture with the data presently available. The thesis of this article is that the specific epidemiological factors, including exceptionally high mortality, the exquisite timing in respect to the arrival of the Pilgrims, and the precise location of the southern border of the epidemic, were historically critical to the survival of the Pilgrims. We are left with a tragic and paradoxical conclusion: lethality in one population proved to be the means of survival of for another group. Without the intercession of a highly lethal, geographically focused and time

specific epidemic among the Wampanoag, the history of the Pilgrims, New England, and the mythos of America might have been very different.

HJM

Notes

1. I would like to thank and acknowledge the late Dr. William S. Simmons, who provided important insights concerning cultural characteristics of the epidemic. Dr. Simmons was one of America's pre-eminent anthropologists, specializing in myth, folklore and North American Indians. He received his Ph.D. from Harvard after graduating from Brown. He spent over twenty years at the University of California, Berkeley, including service as Department Chairman. He returned to Brown in 1998, where he served as Professor of Anthropology. His insights contributed significantly to the formulation of the arguments in this paper.

2. According to early historian Alvin G. Weeks, Tisquantum "was one of twenty-seven natives whom Captain Thomas Hunt had carried away and sold into slavery in 1614." See Weeks, *Massasoit of the Wampanoags* (Norwood, MA, The Plimpton Press, 1920), 148-151. See also Neal Salisbury, "Tisquantum: Last of the Patuxets," in *Struggle for Survival in Colonial America*, eds. David G. Sweet and Gary B. Nash (Berkeley: University of California Press, 1981), 228-246.

3. Gorges quoted in Salisbury, "Tisquantum: Last of the Patuxets," 234. Thus, Native Americans in the region would not have been peaceably disposed toward the Pilgrims and, absent the depleted state of the Wampanoag, might have refused to befriend them, if not sought to remove them.

4. Many works have taken up the task of trying to identify the responsible microbial agent or to make an argument for a particular agent. See, for example, physician Herbert U. Williams, "The Epidemic of the Indians of New England, 1616-1620: With Remarks on Native American Infections," *John Hopkins Hospital Bulletin* 224 (1909): 240-249; Sherburne F. Cook, "The Significance of Disease in the Extinction of the New England Indians," *Human Biology* 45 (1973): 485-508; Billee Hoornbeck, "An Investigation into the Cause or Causes of the Epidemic which Decimated the Indian Population of New England 1616-1619," *New Hampshire Archaeologist* 19 (1976-1977): 35-46; Neal Salisbury, *Manitou and Providence: Indians, Europeans, and the Making of New England 1500-1643* (New York, Oxford University Press, 1982), 101-105; Arthur R. Spiess and Bruce D. Spiess, "New England Pandemic of 1616-1622: Cause and Archeological Implication," *Man in the Northeast* 34 (1987): 71-83; Timothy L. Bratton, "The Identity of the New England Indian Epidemic of 1616-1619," *Bulletin of the History of Medicine* LXII 62 (1988): 351-383; Dean

R. Snow and Kim M. Lamphear, "European Contact and Indian Depopulation in the Northeast: The Timing of the First Epidemics," *Ethnohistory* 35 (1988): 15-33; John S. Marr and John T. Cathey, "New Hypothesis for Cause of Epidemic among Native Americans, New England, 1616-1619," *Emerging Infectious Diseases Journal* 16 (2010): 281-286.

5. Alan Taylor, *American Colonies: The Settling of North America Part II* (New York, Penguin Books, 2001), 116-137.

6. Taylor, *American Colonies*, 138-157.

7. Neal Salisbury, *Manitou and Providence: Indians, Europeans, and the Making of New England, 1500-1643* (New York, Oxford University Press, 1982), 93.

8. Nathaniel Philbrick, *Mayflower: A Story of Courage, Community, and War* (New York, Viking Press, 2006).

9. Edward Winslow, *Mourt's Relation*, Dwight B. Heath editor, (Corinth Books, New York, 1963), 41. This booklet was published in 1622 and had as its full title *A Relation or Journal of the Beginning and Proceedings of the English Plantation Settled at Plimoth in New England*. It was written primarily by Winslow, although William Bradford appears to have written parts of the first section. It describes in detail what happened from the landing of the Mayflower Pilgrims on Cape Cod through their eventual settling of Plymouth Colony and describes their relations with the surrounding Native Americans. It was first published in London in 1622 and is often erroneously cited as by George Morton, hence the title *Mourt's Relation*. Morton was an English Separatist who had stayed behind when the first settlers left for Plymouth, but he continued to orchestrate business affairs for their cause—presumably arranging for the publication of and perhaps helping to write *Mourt's Relation*. In 1623, Morton emigrated to the Plymouth Colony with his wife; he died the following year. Source: Wikipedia, accessed Jan. 30, 2018.

10. William Bradford, *Of Plymouth Plantation, 1620-1647*, ed. Samuel Eliot Morison (New York, Knopf, 2006), 80-81. Originally published in 1651, *Of Plymouth Plantation* was written over a period of years by William Bradford, the leader of the Plymouth Colony. It is regarded as the most authoritative account of the Pilgrims and the early years of the colony. The journal was written between 1630 and 1651 and describes the Pilgrim's story from 1608, when they settled in the Dutch Republic. It ends in 1647. The work was lost until the middle of the 19th century. The first chapter had been reprinted but it was not until the manuscript was discovered in the library of the bishop of London and finally published in 1857 that the U.S. recovered one of its chief founding documents. In 1897 it was deposited in the State House in Boston. Source: Wikipedia, accessed Jan. 30, 2018.

11. Bradford, *Of Plymouth Plantation*, 77.

12. *Ibid.*, 84.

13. *Ibid.*, 79.

14. Winslow, *Mourt's Relation*, 55-57.
15. Bradford, *Of Plymouth Plantation*, 80-81.
16. *Ibid.*, 87.
17. For more confirmation regarding the limit of the epidemic at Narragansett Bay, William Bradford reported that "the Narragansetts lived but on the other side of that great bay . . . and had not at all been touched by this wasting plague" (*Of Plymouth Plantation*, 87). See also Salisbury, *Manitou and Providence*, 102.
18. Winslow, *Mourt's Relation*, 73-76.
19. Edward Winslow, *Good Newes from New England* (Bedford, MA: Applewood Books, first published 1624), 33-34.
20. Alfred A. Cave, *The Pequot War* (Amherst, MA: University of Massachusetts Press, 1996), 137-139.
21. Douglas Edward Leach, *Flintlock and Tomahawk: New England in King Phillip's War* (Woodstock, VT: Countryman Press, 2009).
22. Taylor, *American Colonies*, 116-157.
23. H.U. Williams, "The Epidemic of the Indians," 344.
24. Rev. John White, *The Planters' Plea* (London, William Jones, 1630), found in 2 Thes. V.21, Chapter IV in *Colonial Tracts*, vol 2, no. 3, 15.
25. Alfred W. Crosby, "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America," *William & Mary Quarterly* 33 (1976): 289-299.
26. John Duffy, "Smallpox and the Indians in the American Colonies," *Bulletin of the History of Medicine* (1951): 324-341. Duffy wrote "as the wealth and resources of America offered unlimited opportunity for the whites, so their infections found a virgin field in the native population," 325.
27. David S. Jones, a Professor of the Culture of Medicine at Harvard University, provides an historical review of this debate, challenging the virgin soil perspective. He describes it as "a choice between styles of historical explanation: one biological and deterministic, the other social and contingent" (17). David S. Jones, "Death, Uncertainty, and Rhetoric," in C.M. Cameron, P. Kelton, and A.C. Swedlund, eds., *Beyond Germs: Native Depopulation in North America* (Tucson, AZ: University of Arizona Press, 2015), 16-49.
28. The oft-repeated story of the French sailors is described by H.U. Williams, who notes that "their sources differ considerably in details," in *The Epidemic of the Indians*, 346. Cook, *The Significance of Disease of the New England Indians*, 487; Thomas Morton (ed. C.F. Adams), 1883, *The New English Canaan*. Thomas Morton (c. 1579-1647) was an early American colonist famed for founding the British colony of Merrymount (today's Quincy, MA) and for his work studying Native American culture. In 1637 Morton became a political celebrity with the publication of his *New English Canaan*. Morton denounced Puritan government in the colonies and their policy of land enclosure and treatment of Native Americans, who were

described as a noble culture.

29. David Quammen, *Spillover: Animal Infections and the Next Human Pandemic* (New York, W.W. Norton & Co., 2012).

30. John Booss and Marilyn J. August, "Germ Theory," 3-8, in Chapter 1, *To Catch a Virus* (Washington, D.C.: ASM Press, 2013).

31. Charles-Edward Amory Winslow, Chapter I, "The World of Demons," and Chapter II, "The Wrath of God," in *The Conquest of Epidemic Disease* (Princeton, N.J.: Princeton University Press, 1943), 3-34 and 35-39.

32. William S. Simmons, "Southern New England Shamanism," in W. Cowan, ed., *Papers of the Seventh Algonquian Conference* (Ottawa: Carleton University, 1976), 239.

33. Williams, "The Epidemic of the Indians," 349.

34. *Ibid.*

35. William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York, Hill and Wang, 1983), 87.

36. Thomas Dermer, "To His Worshipfull Friend M. Samuel Purchas, Preacher of the Word, at the Church a little within Ludgate, London," in *Purchas his Pilgrimes*, vol. 4 (London, 1625), 251-258. Capt. Thomas Dermer (c. 1590 -1620) explored the eastern coastline of North America from 1614 to 1620. He is associated with Captain John Smith, Sir Ferdinando Gorges, Jamestown, and Plymouth. Dermer worked closely with Tisquantum and was instrumental in developing diplomatic relationships. Source: Wikipedia, accessed Jan. 30, 2018.

37. Quoted in H.U. Williams, *The Epidemic of the Indians*, 348.

38. Noah Webster, *A Brief History of Epidemic and Pestilential Diseases*, vol. 1 (Hartford CT: Hudson & Goodwin, 1799), 178.

39. Charles Francis Adams, Jr., ed., *New English Canaan of Thomas Morton* (New York, N.Y.: Burt Franklin, 1967), footnote 1 on 133-134. After dismissing smallpox as well as yellow fever, Adams agreed with Bradford's assessment of an "infectious fever" and ventured the suggestion of "some form of malignant typhus."

40. See Madeleine Johnson, "Leptospirosis and the Pilgrims: The Pilgrims Should Have Been Thankful for a Spirochete," published online in *Slate*, Nov. 20, 2012. Accessed Jan. 30, 2018.

41. Diseases suggested by skin yellowing: yellow fever. Noah Webster, 176-179 within which Gookin's report is described as "settling the issue," 178, and Dermer's firsthand report with no mention of yellowing is quoted on 176; hepatitis, Spiess and Spiess, "New England Pandemic 1616-1619"; leptospirosis, Marr and Cathey, "New Hypothesis." Capt. Daniel Gookin wrote two books: *Historical Collections of the Indians in New England* (completed in 1674, published by the Massachusetts Historical Society, 1792), and *The Doings and Sufferings of the Christian Indians* (completed in 1677, published in 1836). He wrote also *A History of New England*,

but only portions of this have survived.

42. Winslow, *Good News*. Published originally in 1624. Winslow's *Good News from New England* chronicles the early experience of the Plimoth colonists. For several years Winslow acted as the Pilgrims' primary negotiator with New England Algonquians, including the Wampanoag, Massachusetts, and Narragansett Indians. During this period he was credited by the Wampanoag as having cured Massasoit, one of the colonists' most valuable allies, of an apparently life-threatening illness, and he also served as the Pilgrims' chief agent in England. Winslow wrote *Good News* in an attempt to convince supporters in England that the colonists had established friendly relations with Native groups and, as a result, gained access to trade goods. Although Winslow masks incidents of brutality against Indians as well as evidence of mutual mistrust, in a recent annotated edition scholar Kelly Wisecup argues that Winslow drew from linguistic and rhetorical strategies of New England. He included Native voices, perspectives, and strategies. See Kelly Wisecup, ed., "*Good News from New England*" by Edward Winslow: *A Scholarly Edition* (Amherst, MA: University of Massachusetts Press, 2014).

43. Roger Williams, *A Key into the Language of America* (New York, N.Y., Cosimo Classics 2009; originally published in 1643).

44. James Kendal Hosmer, *Winthrop's Journal. History of New England.*"1630-1649. (New York, N.Y., C. Scribner's Sons, 1908), 118.

45. Cook, "The Significance of Disease," 491. Sherburne F. Cook (1896-1974) was well known in anthropology, particularly archaeology and physical anthropology, through his research interests in the physiology and morbidity of indigenous populations. He studied physiology at Harvard and became chair of the department of physiology at the University of California, Berkeley. He was a noted pioneer in population studies and in field methods and quantitative analysis in archaeology.

46. Booss and August, Chapter 9, "To the Barricades: The Molecular Revolution," in *To Catch a Virus*, 293-338.

47. Evilena Anastasiou and Piers D. Mitchell, "Paleopathology and Genes: Investigating the Genetics of Infectious Diseases in Excavated Human Skeletal Remains and Mummies from Past Populations," *Gene* 528 (2013):33-40.

48. Morton, *New English Canaan*, 132.

49. White, *Planters' Plea*, 14.

50. Salisbury, *Manitou and Providence*, 236.

51. Cook, *The Significance*, 497-498.

52. Winslow, *Good News*, 23, 25.

53. Bradford, *Of Plymouth Plantation*, 270.

54. White, *Planters' Plea*, 14-15.

55. Cook, *The Significance*, 491

56. Encephalitis Lethargica. "EL remains one of the most perplexing and distressing

biological puzzles of the last century. It is perplexing because we do not know what caused its intense worldwide dissemination or why it disappeared in epidemic form after a decade.” p. 155 in John Booss and Margaret M. Esiri, *Viral Encephalitis in Humans* (Washington, ASM Press, D.C., 2003).

57. Spiess and Spiess, *New England Pandemic*, 72.

58. Captain John Smith, *Advertisements for the Unexperienced Planters of the New England or Anywhere. Or, the Pathway to Erect a Plantation* (Boston, MA: W. Veazie, 1865 [1635]), 20.

59. Cook, *The Significance of Disease of the New England Indians*, 490.

60. Williams, *The Epidemic of the Indians*, 340.

61. White, *Planters' Plea*, 14.

62. Cook, quoting Gorges, 490; Cook, quoting Samuel Drake, 490.

63. Williams, *The Epidemic of the Indians*, p 347.

64. White, *Planters' Plea*, 15.

65. Booss and Esiri, Chapter 11, "The Arboviruses," in *Viral Encephalitis*, 163-189.

66. Cook, *The Significance*, 489. Marc Lescarbot (c. 1570–1641) is best known for his *Histoire de la Nouvelle-France* (1609), based on his expedition to Acadia and research into French exploration in North America

67. Cronon, *Changes in the Land*, 87.

68. Quammen, Chapter VIII, "The Chimp and the River," *Spillover*, 383-489.

69. Salisbury, *Manitou and Providence*, 102-103.

70. William S. Simmons, "Conversion from Indian to Puritan," *New England Quarterly* 52 (1979), 198.

71. William S. Simmons, Chapter 3, "Worldview," in *Spirit of the New England Tribes. Indian History and Folklore, 1620-1984* (Hanover, N.H., 1986). See also William S. Simmons, "Southern New England Shamanism: An Ethnographic Reconstruction," in W. Cowan, ed., *Papers of the Seventh Algonquin Conference, 1975* (Carlton University, Ottawa: June, 1976), 217-56.

72. Winslow, *Good Neues*, 60.

73. William S. Simmons, private communication by email, 9 September, 2015.