Pox Americana: The Great Smallpox Epidemic of 1775-82

The astonishing, hitherto unknown truths about a disease that transformed the United States at its birth

A horrifying epidemic of smallpox was sweeping across the Americas when the War of Independence began, and yet we know almost nothing about it. Elizabeth A. Fenn is the first historian to reveal how deeply variola affected the outcome of the war in every colony and the lives of everyone in North America.

By 1776, when military action and political ferment increased the movement of people and microbes, the epidemic worsened. Fenn's remarkable research shows us how smallpox devastated the American troops at Qu bec and kept them at bay during the British occupation of Boston. Soon the disease affected the war in Virginia, where it ravaged slaves who had escaped to join the British forces. During the terrible winter at Valley Forge, General Washington had to decide if and when to attempt the risky inoculation of his troops. In 1779, while Creeks and Cherokees were dying in Georgia, smallpox broke out in Mexico City, whence it followed travelers going north, striking Santa Fe and outlying pueblos in January 1781. Simultaneously it moved up the Pacific coast and east across the plains as far as Hudson's Bay.

The destructive, desolating power of smallpox made for a cascade of public-helath crises and heartbreaking human drama. Fenn's innovative work shows how this mega-tragedy was met and what its consequences were for America.

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Pox Americana
1VARIOLASeptember 28, 1751. Time has left the early pages of his diary so damaged that the exact date remains uncertain. But it was probably on this day that nineteen-year-old George Washington set sail from Virginia to the island of Barbados with his older half brother, Lawrence. If their departure date is unclear, the brothers' purpose is not: The trip was intended to ease Lawrence's persistent cough and congested lungs, symptoms of the consumption that was to kill him within a year. In the eighteenth and nineteenth centuries, travel abroad was a favored treatment for consumption, the contagious disease that today we call tuberculosis. Early Americans understood consumption to be an ailment of heredity and climate, alleviated by salt air, mountain breezes, or whatever atmospheric conditions best suited a particular patient's constitution. It was the Washingtons' hope that Barbados would suit Lawrence.The trip was difficult. Hurricanes regularly strafe the Caribbean in the early fall, and 1751 was no exception. The brothers and their shipmates endured a week of stiff gales, rain squalls, and high seas in late October, the effects of a nearby storm. They disembarked at Bridgetown, Barbados, on November 2, 1751. Although the purpose of the journey was to ease Lawrence's consumption, it was soon George who lay seriously ill--not from tuberculosis, but from smallpox.On November 3, the day after

landing, the two brothers begrudgingly accepted an invitation to dine at the home of Gedney Clarke, a prominentmerchant, planter, and slave trader with family ties to the Washingtons. "We went,--myself with some reluctance, as the smallpox was in his family," George wrote in his diary. His misgivings were justified. For a fortnight afterward, the two Americans plied the Barbadian social circuit, unaware of the virus silently multiplying in George's body. Then, on November 17, when the incubation period had passed, the infection hit hard. "Was strongly attacked with the small Pox," Washington wrote. Thereafter, his journal entries stop. Not until December 12, when he was well enough to go out once again, did George Washington return to his diary.The brothers' stay in Barbados was brief. "This climate has not afforded the relief I expected from it," wrote Lawrence. On December 22, the brothers parted ways, George returning to Virginia and Lawrence opting for the more promising climate of Bermuda. Lawrence's health was failing fast. He spent the spring in Bermuda and then hurried desperately to his home at Mount Vernon, Virginia, where tuberculosis took his life on July 26, 1752.1

On Sunday, July 2, 1775, a much-older George Washington stepped out of a carriage in Cambridge, Massachusetts, to take command of the Continental army, newly established by the Congress still meeting in Philadelphia. Already, an American siege of nearby Boston was under way. The standoff was the outcome of the battles of Lexington and Concord in April 1775, when an angry throng of New England militiamen had routed a column of British troops attempting to seize a stash of munitions at Concord. Exhausted and humiliated, the king's soldiers had staggered sixteen miles back to Boston under relentless American sniper fire. Here they were trapped. The armed patriots were to besiege them in the city for the next eleven months.By the time Washington arrived to command the American army in July, the confrontation had taken on an added dimension: It was not just military but medical as well. Smallpox was spreading through Boston. Washington knew how debilitating the disease could be, and he knew that the New Englanders who formedthe core of his Boston-based army were among those most likely to be vulnerable. It was a vulnerability they shared with a great many others in late-eighteenth-century North America.

When smallpox struck George Washington in Barbados in 1751, his diary entries stopped for twenty-four days. If this was not inevitable, it was nevertheless predictable. Rare was the diarist who kept writing through the throes of the smallpox. The void in Washington's diary is thus telling; its very silence speaks of a misery commonplace in years gone by but unfamiliar to the world today.Although the route of infection is impossible to determine, it is most likely that Washington picked up Variola through direct contact with a sick member of the Gedney Clarke household. The contagious party may have been Mrs. Clarke herself, who was "much indisposed" at the time of the brothers' visit. If Washington had a face-to-face meeting with her, he might have inhaled tiny infectious droplets or his hands might have carried the contagion to his mouth or nose. Such an encounter is the most likely mode of infection, but it is by no means the only one possible. Even scabs and dried-out body secretions can transmit smallpox. If someone had recently swept the floors or changed the bedclothes in a sickroom in the Clarke home, desiccated but dangerous particles may have circulated aloft. Finally, one last form of transmission bears mentioning. Variola can survive for weeks outside the human body. Carefully stored, it retains its

virulence for years.2 Thus it is conceivable that George Washington caught smallpox from an inanimate object (often cloth or clothing) contaminated with the virus.How do we know that Washington caught smallpox in the Clarke household? The acknowledged presence of the disease there is one clue. Timing is another. The incubation period for smallpox usually ranges from ten to fourteen days. A twelve-day incubation is most common, with the first symptoms appearingthirteen days after exposure.3 George Washington's case was thus fairly typical. He dined at the Clarke home on November 3, and according to his diary, his first symptoms appeared fourteen days later.We have no firsthand description of Washington's bout with the pox. But to judge by the experience of other victims, his early symptoms would have resembled a very nasty case of the flu. Headache, backache, fever, vomiting, and general malaise all are among the initial signs of infection. The headache can be splitting; the backache, excruciating. Lakota (Sioux) Indian representations of smallpox often use a spiral symbol to illustrate intense pain in the midsection. Anxiety is another symptom. Fretful, overwrought patients often die within days, never even developing the distinctive rash identified with the disease. Twentieth-century studies indicate that such hard-to-diagnose cases are rare. But eyewitness accounts suggest that in historical epidemics, this deadly form of smallpox may have been more common among Native Americans, who frequently died before the telltale skin eruptions appeared.4To judge by the outcome of his illness, George Washington's "pre-eruptive" symptoms were not nearly so grave. The fever usually abates after the first day or two, and many patients rally briefly. Some may be fooled into thinking they have indeed had a mere bout of the flu. But the respite is deceptive, for relief is fleeting. By the fourth day of symptoms, the fever creeps upward again, and the first smallpox sores appear in the mouth, throat, and nasal passages. At this point, the patient is contagious. Susceptible individuals risk their lives if they come near.The rash now moves quickly. Over a twenty-four-hour period, it extends itself from the mucous membranes to the surface of the skin. On some, it turns inward, hemorrhaging subcutaneously. These victims die early, bleeding from the gums, eyes, nose, and other orifices. In most cases, however, the rash turns outward, covering the victim in raised pustules that concentrate in precisely the places where they will cause the most physical pain and psychological anguish: The soles of the feet, the palms of the hands, the face, forearms, neck, and back are focal points of the eruption. Elsewhere, the distribution is lighter.If the pustules remain discrete--if they do not run together--the prognosis is good. But if they converge upon one another in a single oozing mass, it is not. This is called confluent smallpox, and patients who develop it stand at least a 60 percent chance of dying. For some, as the rash progresses in the mouth and throat, drinking becomes difficult, and dehydration follows. Often, an odor peculiar to smallpox develops. "The small-pox pustules begin to crack run and smell," wrote a Boston physician in 1722. A missionary in Brazil described a "pox so loathsome and evil-smelling that none could stand the great stench" of its victims.5 Patients at this stage of the disease can be hard to recognize. If damage to the eyes occurs, it begins now. Secondary bacterial infections can also set in, with consequences fully as severe as those of the smallpox.Scabs start to form after two weeks of suffering, but this does little to end the patient's ordeal. In confluent or semiconfluent cases of the disease, scabbing can encrust most of the body, making any movement excruciating. The Puritan leader William Bradford described this condition among the Narragansett Indians in 1634: "They lye on their hard matts, the poxe breaking and mattering, and runing one into another, their skin cleaving (by reason therof) to the

matts they lye on; when they turne them, a whole side will flea of[f] at once." An earlier report from Brazil told of "pox that were so rotten and poisonous that the flesh fell off" the victims "in pieces full of evil-smelling beasties."6Death, when it occurs, usually comes after ten to sixteen days of suffering. Thereafter, the risk drops significantly as fever subsides and unsightly scars replace scabs and pustules. After four weeks of illness, only the lesions encapsulated in the palms of the hands and soles of the feet remain intact. Unlucky sufferers whose feet have hardened from years of walking barefoot sometimes shed the entire sole of the foot at this time, delaying recovery considerably. But in most cases, the usual course of the disease--from initial infection to the loss of all scabs--runs a little over a month. Patients remain contagious until the last scab falls off.Although the timing and progress of George Washington's bout with smallpox appear typical, his infection may have been milder than most. According to one of his biographers, he escaped the disease with "only several very light scars on his nose."7 Most survivors bear more numerous scars, and some are blinded. But despite the consequences, those who live through the illness can count themselves fortunate. Immune for life, they need never fear smallpox again.

The case fatality rate of a disease is an indication of the number of deaths that occur among those who contract it. For the historical study of smallpox, these figures can be elusive, deceptive, and downright confusing. The reasons are various. For one thing, most twentieth-century surveys included both vaccinated and unvaccinated individuals. Because vaccinated persons tend to have mild forms of the disease if they catch it at all, studies that include them provide no usable comparison to mortality in the days before Edward Jenner's earth-shattering development of 1796. To confuse matters further, a new, much less virulent smallpox virus named Variola minor appeared in the 1890s, quickly supplanting Variola major in many parts of the world. This milder bug was not present in George Washington's day, and its emergence makes many twentieth-century studies unsuitable for assessing death rates in earlier times.Given these problems with relatively modern data, one might expect appraisals of epidemics in centuries past to be more helpful in assessing the historical impact of the disease. Unfortunately, this is not the case. In outbreaks of smallpox before the emergence of Variola minor and before the development of vaccination, case fatality rates appear to have fluctuated wildly. The differences could be due to the particular vulnerabilities of a given population,the changing virulence of the virus, the availability of nursing care, or even the widespread presence of immune systems compromised by such factors as famine.Despite these disclaimers and caveats, one historical trend is clearly identifiable in the documentary record. In general, Variola appears to have become more virulent in the three centuries leading up to 1800. In Florence, Italy, between 1424 and 1458, officials recorded only eighty-four smallpox deaths despite three epidemics of the disease in the same years. In mid-seventeenth-century London, the case fatality rate from Variola hovered around 7 percent. A famous outbreak in Boston, Massachusetts, in 1721 yielded a much higher rate of 15 percent. By 1792, in another outbreak in the same city, the rate reached 30 percent. A Scottish smallpox epidemic in 1787 also took the lives of a third of its victims. Just a few years later, a "virgin soil" epidemic--an outbreak in a population with no prior exposure to the disease--struck an isolated village on the Japanese island of Hachijo-Jima. Of the 86 percent of villagers infected, some 38 percent died. Finally, in what may be the only modern study with relevance for epidemics in the pre-Jenner era, an analysis of seven thousand unvaccinated

smallpox cases in Madras, India, during the 1960s revealed a frightening case fatality rate of 43 percent.8Another story lies beneath these broad, population-based figures. When attacked by Variola, certain individuals consistently fare worse than others. Here two recent studies are valuable. They show that the very old and the very young die in disproportionate numbers when smallpox erupts. The highest case fatality rates appear among those under the age of one and over the age of forty-five or fifty. The lowest rates occur in the five- to fourteen-year-old age group. The difference is dramatic: In one study, Variola took the lives of 29 percent of its victims under one year old and 32 percent of its victims over forty-five, but among five- to fourteen-year-olds, the case fatality rate was only 8 percent.9 Although both these studies included vaccinated individuals, there is no reason to think that similar age-related patterns (with highercase fatality rates) would not be detected in a wholly unvaccinated population.Pregnant women, like infants and the elderly, fare badly under Variola's assault. Here again, modern studies include both vaccinated and unvaccinated individuals. They nevertheless show that the impact of smallpox on pregnancy is dire. Of early-term pregnancies, almost 75 percent end in spontaneous abortions or stillbirths. Of late-term pregnancies, nearly 60 percent terminate in the same way. While some babies are born alive, 55 percent of them die within two weeks, usually within three days of birth. The maternal prognosis is similarly grim. In the prevaccination era, it is likely that half of all pregnant women infected with Variola developed what is called hemorrhagic smallpox, the most deadly form of the disease known, with a case fatality rate exceeding 96 percent. 10Finally, smallpox sufferers in the throes of famine not surprisingly do worse. Blindness in particular seems more common among malnourished victims, but other complications may occur more frequently as well. Ironically, because scarcity causes people to circulate broadly in their search for food, it may help spread contagious pathogens such as Variola. A recent study of America's northern plains Indians indicate...

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