

THE
PANIC
VIRUS

*A True Story of Medicine,
Science, and Fear*



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CHAPTER 2

MILKMAID ENVY AND A FEAR OF MODERNITY

By the time the United States Constitution was adopted in Philadelphia in 1787, the benefits of inoculation were clear: When naturally occurring, smallpox was lethal up to a third of the time; when the result of variolation, that ratio dropped to under 2 percent.⁸ At the time, there was only a vague understanding of precisely why inoculation was so effective. Today, that process is much better understood. As soon as the immune system realizes the body has been attacked by a foreign body, a type of white blood cell protein called an antibody jumps into action. After identifying the interloper, the antibody carefully traces its contours in order to manufacture an exact mirror image of the invader's perimeter. Once this has been completed, the immune system is able to disarm the antigen by enveloping it in much the same way that a lock envelops a key. (Strategically, antibodies are more generals than front-line troops: They enlist a specialized type of white blood cell for these nitty-gritty, surround-and-destroy missions.) What makes this defense system so effective is that antibodies have an excellent "memory": Once they've successfully defeated a pathogen, they retain their operating instructions so that they are ready to spring into action if the same disease returns. It's an elegant system that beautifully demonstrates the sophistication of the human organism, but there is a rub: Because the body must get sick before it can produce antibodies, variolation carried with it the risk of death from the very disease it was meant to protect against.

The discovery that essentially benign viruses could spur the production of antibodies that protected against lethal diseases changed that calculus dramatically. Like so many history-changing scientific breakthroughs, this one came about through the examination of a seemingly prosaic fact of ordinary life. For centuries, people had observed that milkmaids almost never came down with smallpox. (One popular rhyme played off the fact that virtually everyone else had been scarred by the disease: "Where are you going to, my pretty maid? I'm going a-milking sir, she said. What's your fortune, my pretty maid? My face is my fortune, sir, she said.") It wasn't until the eighteenth century that gentlemen farmers across Europe began more actively exploring the reasons why this might be the case. An English scientist and naturalist named Edward Jenner, among others, speculated it could have to do with the milkmaids' frequent contact with open blisters on the udders of cowpox-infected cows.

In 1796, Jenner enlisted a milkmaid named Sarah Nelmes and an eight-year-old boy named James Phipps to test his theory. Jenner transferred pus from Nelmes's cowpox blisters onto incisions he'd made in Phipps's hands. The boy came down with a slight fever, but nothing more. Later, Jenner gave Phipps a standard smallpox inoculation—which should have resulted in a full-blown, albeit mild, case of the disease. Nothing happened. Jenner tried inoculating Phipps with smallpox once more; again, nothing.⁹

The implication of Jenner's work was momentous. If cowpox-induced antibodies protected against smallpox—and if cowpox could be transferred directly from person to person—an all-powerful weapon against one of the most ruthless killers in history was suddenly at hand. What's more, if vaccination were not limited to those who could afford to convalesce while receiving high-quality medical care, preventive health measures could be practiced on a much more egalitarian basis.

These new realities not only exponentially increased the number of people who could be vaccinated, they also opened up the possibility of “herd immunity,” a mechanism whereby individuals for whom a given vaccine does *not* work are protected by the successful immunization of those around them. (There are a number of reasons vaccines might not be beneficial to an individual. The main ones are limitations of the vaccine itself—no vaccine is effective one hundred percent of the time—and specific reasons a patient is unable to receive a vaccine, such as poor health or a preexisting immune deficiency.) Herd immunity occurs when a high-enough percentage of a population has been successfully vaccinated to create a barrier in which the immune members of society protect the unimmunized by making it impossible for a virus to spread in the first place. It is like a herd of buffalo encircling its weakest members to protect them from predators.

The relative safety of the cowpox vaccine also made state-sponsored immunization drives more appealing. Spain instituted mass vaccination programs in its colonies as early as 1803, and the Netherlands, the United Kingdom, and parts of the United States soon followed. Initially, with smallpox's deadly power still fresh in people's minds, these efforts were widely accepted, but over time, as the disease began to be perceived as less of a threat, resistance to vaccination grew. By the middle of the century, compliance had dropped to the extent that laws mandating vaccination were being passed in the U.K. and in a number of the American states. These compulsory vaccination programs, in turn, fueled even more impassioned resistance, creating a vicious cycle that continues to this day.

Looked at in a vacuum, it's remarkable how static the makeup, rhetoric, and

tactics of vaccine opponents have remained over the past 150 years. Then, as now, anti-vaccination forces fed on anxiety about the individual's fate in industrialized societies; then, as now, they appealed to knee-jerk populism by conjuring up an imaginary elite with an insatiable hunger for control; then, as now, they preached the superiority of subjective beliefs over objective proofs, of knowledge acquired by personal experience rather than through scientific rigor.

But if we think about vaccine resistance as prompted by what Harvard history of science professor Anne Harrington calls the feeling of being “broken by modern life,” the parallels are less startling. Two hundred years ago, in the early stages of the Second Industrial Revolution, there was growing anxiety throughout the Western world about the dehumanizing nature of modernity. In the United States, the American Revolution's promise of a country where every person would be free to pursue the good life had been replaced by the reality of fetid, squalid cities where horse carcasses rotted in open-air sewers and newly arrived immigrants were crammed together in abasing, lawless tenements.

One manifestation of this widespread disillusionment was the flowering of all manner of utopian and spiritualist movements, ranging from Idealism and Occultism to Swedenborgianism and Transcendentalism. By celebrating individualism and holding intuition above empiricism, these philosophies promised a more authentic and meaningful form of existence amid a harsh, chaotic world. Alternative medical practitioners—who proselytized that physical suffering was a symptom of spiritual disorder and implied that anyone opposing their methods did so because he believed in a “one size fits all” approach to medicine—were able to exploit these conditions with particular effectiveness. (The apotheosis of this approach came in 1866, with Mary Baker Eddy's founding of Christian Science, a religion that eschewed medical interventions in favor of prayer-induced psychosomatic cures.) When the American Medical Association was founded in 1847, a hodgepodge of newly marginalized “irregular physicians” gravitated toward the Eclectic Medicine movement, which embraced everyone from homeopaths to hydropaths, mail-order herbalists to Native American healers.

Today, a similarly colorful collection of practitioners has seized on the anxiety created by the bureaucracy of managed care and the generally effacing qualities of modern society in order to peddle a brand of medicine whose primary appeal lies in its focus on the patient as a whole person. Defeat Autism Now! (DAN!), a group that accredits doctors who want to treat patients according to its nontraditional protocols, typifies a medically permissive movement that lists the AMA and the AAP among its primary bogeymen. (A recent DAN! conference included exhibits and presentations by mail-order herbalists, energy healers, and

purveyors of home purification systems and hyperbaric oxygen chambers.) As was the case a century and a half ago, a distinct advantage of this avowed break from the mainstream is the built-in defense it offers from accusations of misconduct: Any criticism can be dismissed as a power play by the medical establishment against alternative practitioners who challenge it.

The person who best embodies the philosophical continuity of vaccine resistance movements is the early twentieth-century activist Lora Little, whom journalist and author Arthur Allen described in his book *Vaccine* as a “granola-belt Mother Jones who promoted whole foods and naturopathy and denounced . . . white male medical practitioners before it was fashionable to do so.” According to Little, vaccines (along with mechanization, Western medicine, establishment doctors, processed foods, and white sugar) contributed to most modern ills. During her anti-vaccination campaigns, Little passionately decried the alienation brought about by the efficiencies of industrialization. Speaking of New York City, which even then was the prototypically modern city, she said, “Every doctor there has become a cog in the medical machine. And once the machine gets its grip on you, you cannot escape, you are drawn in and ground through the mill.”

Little also predicted the current-day conspiracy theories that lash together doctors, government officials, and vaccine manufacturers in their quest for riches. In her 1906 tract “Crimes in the Cowpox Ring,” Little wrote:

The salaries of the public health officials in this country, reach the sum of \$14,000,000 annually. One important function of the health boards is vaccination. Without smallpox scares their trade would languish. Thousands of doctors in private practice are also beneficiaries in “scare” times. And lastly the vaccine “farmers” represent a capital of \$20,000,000, invested in their foul business.

Substitute “measles” for “smallpox” and that same paragraph could appear in pamphlets put out by groups like the National Vaccine Information Center (NVIC) or the Australian Vaccine Network. Here’s Barbara Loe Fisher, the founder and president of the NVIC, talking about pharmaceutical companies in a 2009 speech in which she compared the United States government’s vaccine policy to medical experiments conducted by Nazis during World War II:

They make trillions of dollars in the global market. . . . Literally, every known disease that you can imagine, there’s a vaccine being created for it. Their intention is to have laws passed requiring businesses to use it because that’s how they make their money. So, what is the situation on the

ground, with parents . . . who take their children to expensive pediatricians whose practices are economically heavily dependent on the [vaccine] schedules? . . . Pediatricians are now saying children must get forty-eight doses of fourteen vaccines by age six.

For all the tactical and rhetorical similarities, the most poignant link between early activists such as Little and their modern-day descendants is their tendency to locate the cause of their personal tragedies in some larger evil. For Little, that tragedy was the death of her seventeen-month-old son, who, according to his medical records, suffered from simultaneous measles and diphtheria infections. Little was convinced the cause of his death lay elsewhere. Her son, she decided, could not have been the victim of the vagaries of human existence; that would be too senseless. Instead, as she told thousands of people over the years, he was killed by the smallpox vaccine. For Fisher, a television program about vaccines that she saw a year and a half after her own son received a combined diphtheria-pertussis-tetanus (DPT) shot convinced her that his physical and developmental difficulties began the very day he had been vaccinated.

Despite her popularity, Little's fears were hardly representative of the general mood during the first half of the twentieth century, when science notched one victory after another in what had been previously a one-sided fight between bacteria and viruses and the human beings they attacked. At times, it must have seemed as though scientists needed only identify the cause of a disease in order to cure it: In 1910, Paul Ehrlich discovered that an arsenic-based compound could wipe out syphilis; in the 1930s, sulfur-based medicines were proven to be effective against everything from pneumonia and puerperal sepsis to staph and strep; and in 1941, Howard Florey and Ernst Boris Chain showed that humans could use penicillin without fear of death.

The implications of these medical triumphs were stunning. Even as deadlier weapons were being created, warfare was becoming safer: In the Spanish-American War in 1898, thirteen soldiers fell ill for each combat-related death. By World War I, that ratio was 1:1; by World War II, it had fallen to 1:85. Between 1920 and 1955, the lifespan of an average American increased by more than 25 percent—an increase that was primarily due to fewer young people dying of disease. Over that same span, California went from having 110,000 cases of diphtheria and seven hundred deaths annually to forty-two cases and two deaths a year. By mid-century, the notion of a world free of infectious diseases seemed, for the first time in human history, to be a possibility and not a pipe dream.

These victories led to a transnational excitement and pride. In the 1930s, after

witnessing state-sponsored institutes in Europe and Asia make one breakthrough after another, the American government for the first time assumed a central role in funding and conducting medical research. Doctors and scientists were repeatedly cited as among the most trusted members of society. It was perhaps inevitable that the march of accomplishments led to the scientific establishment's growing increasingly mesmerized by its own power. Vaccine proponents, be they doctors, politicians, or self-styled intellectuals, held fast to their own credo and accused their opponents of taking part, as a *New York Times* editorial put it, "in a futile attempt to head off human progress." This smug sense of superiority was mixed with a condescending bewilderment at what physician Benjamin Gruenberg described as the hoi polloi's insistence "upon the right to hold opinions (and to act according to these opinions) upon such highly technical questions as the efficacy of vaccination, the value of serums, or the causation of cancer."

One of the most shocking examples of this hubris occurred during the early years of World War II. Even before America's involvement in the conflict, the public health infrastructure in the United States had set in place a plan to give yellow fever vaccinations to any troops headed to tropical climates. By the time the country joined the Allied cause in late 1941, some high-ranking military officials had become so overwrought about the threat of biological warfare that they decided that *all* troops should be vaccinated, regardless of their assignment. The resulting scramble to develop vast quantities of the vaccine—at one point, the Rockefeller Foundation was producing tens of thousands of doses every week—led, not surprisingly, to shoddy quality control. Within months, large numbers of troops were showing signs of jaundice; eventually, up to 10 percent of soldiers in the most severely affected units were hospitalized. It turned out that batches of the vaccine had been contaminated with hepatitis B. By the time the vaccinations were halted, 300,000 troops had been infected and more than sixty had died.

The entire yellow fever campaign was, as Arthur Allen wrote, a dark page in the history of public health: "None of the 11 million Americans vaccinated against yellow fever during the war got yellow fever. Then again, none was challenged with yellow fever. [The] fear of biologically trained killer mosquitoes was not realized. It was somehow all in vain."

Amid the killing of World War II, the deaths of five dozen soldiers from hepatitis B did not attract a lot of notice. In the 1950s, the fight to conquer polio made vaccines one of the biggest news stories of the decade. Here, the threat was real and the potential victims came from all parts of society. The result was an unprecedented campaign with almost universal support—and a case where

national exuberance led health officials to forget everything they should have learned about the risks of poor oversight. This time the ensuing tragedy wouldn't escape the public's attention.

8 The actual differences in these ratios, while significant, were likely not quite so stark: People were usually inoculated when they were in good health and could receive adequate medical care, thus increasing their chances of survival.

9 Nelmes was infected by a cow named Blossom, a saintly contrast to Mrs. O'Leary's Cow, the purported protagonist of the Great Chicago Fire of 1871. To this day, Blossom's hide hangs on the library wall in St. George's Medical School, where Jenner studied. Phipps and Nelmes were, thankfully, allowed to rest in peace.