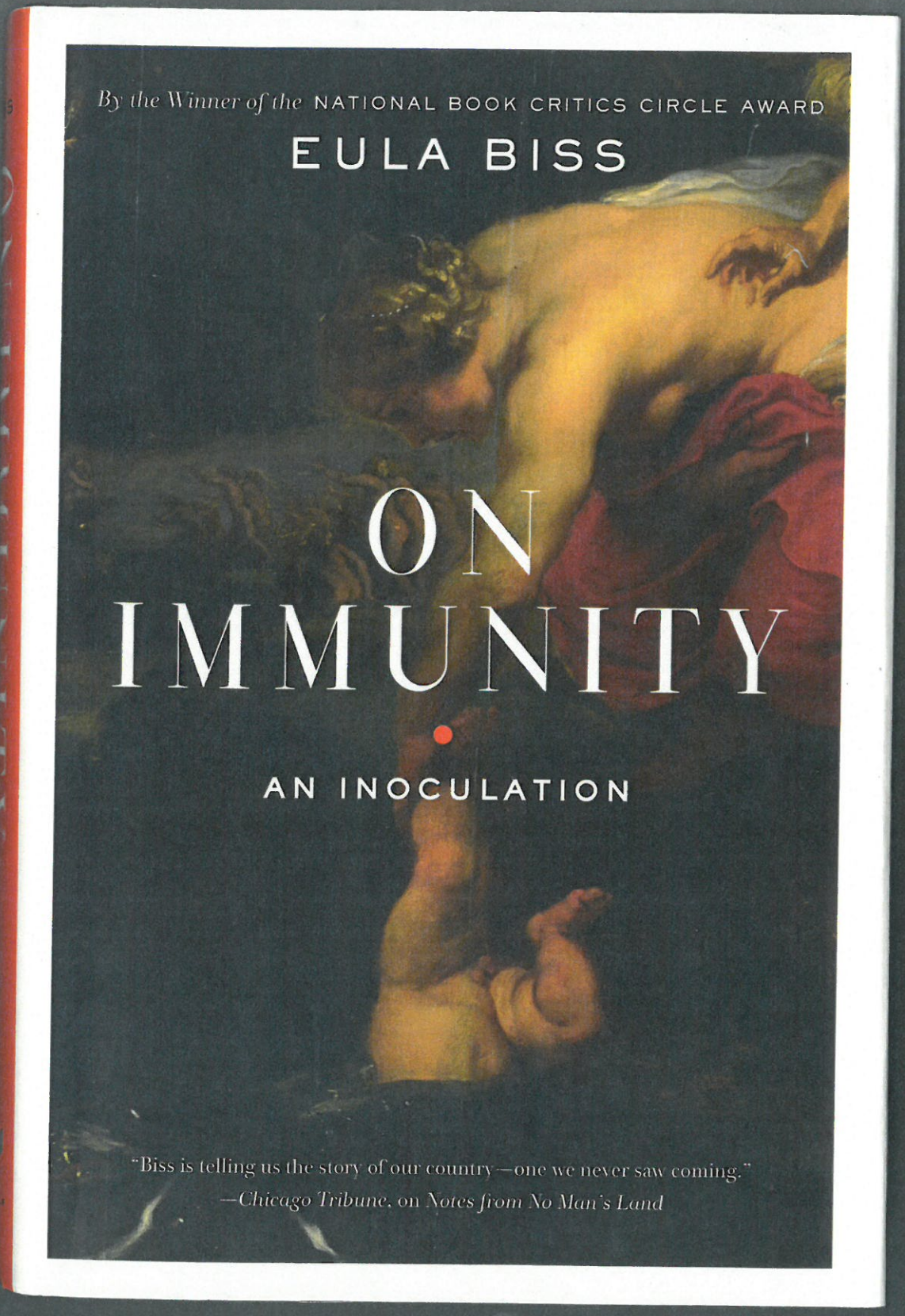
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EULA BISS
ON IMMUNITY
AN INOCULATION
"Biss is telling us the story of our country—one we never saw coming."
—Chicago Tribune, on Notes from No Man's Land

ON IMMUNITY

An Inoculation

Eula Biss

Graywolf Press

THE FIRST STORY I EVER HEARD about immunity was told to me by my father, a doctor, when I was very young. It was the myth of Achilles, whose mother tried to make him immortal. She burned away his mortality with fire, in one telling of the story, and Achilles was left impervious to injury everywhere except his heel, where a poisoned arrow would eventually wound and kill him. In another telling, the infant Achilles was immersed in the River Styx, the river that divides the world from the underworld. His mother held her baby by his heel to dip him in the water, leaving, again, one fatal vulnerability.

When Rubens painted the life of Achilles, the River Styx is where he began. Bats fly across the sky of that painting and the dead ride a ferry in the distance. Achilles dangles from his mother's hand by one plump leg, with his head and shoulders entirely underwater. This is clearly no ordinary bath. The three-headed hound who guards the underworld lies curled at the base of the painting where the baby's body meets the river, as if the baby is being plunged into the beast. Conferring immunity, the painting suggests, is a perilous task.

To prepare her children for the hazards of life, my own mother read Grimms' fairy tales aloud to us every night before bed. I do not remember the brutality for which those tales are famous as vividly as I remember their magic—the golden pears

growing in the castle garden, the boy no bigger than a thumb, the twelve brothers who became twelve swans. But it did not escape my notice, as a child, that the parents in those tales have a maddening habit of getting tricked into making bad gambles with their children's lives.

In one story, a man agrees to trade with the devil whatever is standing beyond his mill. He thinks he is giving away his apple tree, but to his dismay he finds his daughter standing beyond the mill. In another story, a woman who has been longing for a child becomes pregnant and craves a plant called Rapunzel that grows in the garden of a wicked enchantress. The woman sends her husband to steal the plant and when he is caught, he promises their future child to the enchantress, who locks the girl away in a tall tower with no door. But maidens locked in towers will let down their hair.

And so it was in the Greek myths my mother read to me later. A king who had heard an ominous prophecy could not keep his daughter childless by locking her in a tower. Zeus visited her in the form of a shower of gold that left her pregnant with a child who later killed the king. When the infant Oedipus, left on a mountainside to die, was saved by a shepherd, he was not saved from the prophecy that foretold he would kill his father and marry his mother. And Thetis, Achilles's mother, could neither burn nor drown his mortality.

A child cannot be kept from his fate, though this does not stop the gods themselves from trying. Achilles's mother, a goddess who married a mortal, heard a prophecy that her son would die young. She made every effort to defy this prophecy, including dressing Achilles as a girl during the Trojan War. After he took up a sword and was discovered to be a boy, his mother asked the god of fire to make a shield for him. This shield was emblazoned with the sun and moon, the earth and ocean, cities

at war and peace, fields plowed and reaped—the universe, with all its dualities, was Achilles's shield.

The story my father told me when I was young was not the myth of Achilles, he reminds me now, but another ancient story. As my father relates the plot, I understand why I confused the two. The hero of this story is made immune to injury by bathing in the blood of a dragon. But a leaf clings to his body while he bathes, leaving a small spot on his back where he is unprotected. After having been victorious in many battles, he is killed by one blow to that spot.

Immunity is a myth, these stories suggest, and no mortal can ever be made invulnerable. The truth of this was much easier for me to grasp before I became a mother. My son's birth brought with it an exaggerated sense of both my own power and my own powerlessness. I found myself bargaining with fate so frequently that my husband and I made a game of it, asking each other what disease we would give our child for prevention against another—a parody of the impossible decisions of parenthood.

When my son was an infant, I would hear many variations of "All that matters is that he is safe." I would wonder whether that was, indeed, all that mattered nearly as often as I would wonder if I could keep him safe. I was certain that I did not have the power to protect him from his fate, whatever it might be. But I was determined nonetheless to avoid the bad gambles of the Grimms' tales. I would not let my child be cursed by my own carelessness or cupidity. I would not accidentally say to the devil, *You may have what is beyond the mill,* only to discover that what is standing beyond the mill is my child.

THE DAY BEFORE MY SON WAS BORN was the first warm day of spring. In labor, I walked out to the end of the pier, where the morning sun was breaking up the ice floes on Lake Michigan. My husband held up a video camera and asked me to speak to the future, but the sound did not record, so whatever I said has been lost to the past. What remains evident on my face is that I was not afraid. During the long labor that followed that sunlit moment I imagined myself swimming in the lake, which became, against my will, a lake of darkness and then a lake of fire and then a lake without a horizon. By the time my son was born late the next day a cold rain was falling and I had crossed over into a new realm in which I was no longer fearless.

That spring, a novel strain of influenza would begin spreading from Mexico to the United States to the rest of the world. I did not register those early reports, as I was too busy listening to my son breathe at night. During the day, I was entirely preoccupied by how much he did or did not nurse, and how much he did or did not sleep. I cannot now decipher the entries I made in a notebook then—long lists of times, some of them only minutes apart. Obscure notations next to the times indicate, I think, waking, sleeping, nursing, and crying. I was searching for a pattern, trying to determine what made my baby cry inconsolably. What made him cry, I would learn much later, was

an intolerance to cow's milk. Offending proteins from the milk I drank passed through my milk to him—a possibility that had not occurred to me.

By the end of the summer, the evening news was running footage of people wearing white surgical masks in airports. The novel influenza virus was officially pandemic at that point. Churches were serving holy wafers on toothpicks, and airlines were removing pillows and blankets from their flights. What surprises me now is how unremarkable this seemed to me at the time. It all became part of the landscape of new motherhood, where ordinary objects like pillows and blankets have the power to kill a newborn. Colleges were daily sterilizing every "high-touch" surface, while I was nightly boiling every object my child put in his mouth. It was as if the nation had joined me in the paranoia of infant care. Like many other mothers, I had been informed of a syndrome affecting infants that had no warning signs and no symptoms other than sudden death. Perhaps this is why, despite everything, I do not remember feeling particularly scared of the flu—it was just one concern of many. There was lead paint, I knew, on my walls and hexavalent chromium in my water, and the books I was reading were telling me to run a fan while my baby slept because even stagnant air could suffocate him.

When I search now for a synonym for *protect,* my thesaurus suggests, after *shield* and *shelter* and *secure,* one final option: *inoculate.* This was the question, when my son was born—would I inoculate him? As I understood it then, this was not a question of whether I would protect him so much as it was a question of whether inoculation was a risk worth taking. Would I enter into a gamble, like Thetis dipping the infant Achilles into the River Styx?

The mothers I knew began debating whether or not to vaccinate our children against the novel influenza virus long before any vaccine became available to us. We were hearing that what made this particular strain of flu dangerous was that it was new to humans, like the virus that caused the Spanish-flu epidemic of 1918 in which more than 50 million people died. But then we were also hearing that the vaccine had been produced hurriedly and that it might not have been fully tested.

One mother told us that she had miscarried while she was sick with the seasonal flu and, being wary of any flu now, she planned to vaccinate. Another mother said that her child had screamed frighteningly all night following her first vaccination and she would not risk another vaccination of any kind. Every exchange about the new flu vaccine was an extension of the already existing discussion about immunization, in which all that is known of disease is weighed against all that is unknown about vaccines.

As the virus spread, a mother I knew in Florida reported that her entire family had just had the H1N1 flu and it was not any worse than a bad cold. Another mother in Chicago told me that her friend's healthy nineteen-year-old son had suffered a stroke after being hospitalized with the flu. I believed both of these stories, but they told me nothing more than what the Centers for Disease Control and Prevention already seemed to be trying to tell me—the flu could be harmless in some cases and serious in others. Under the circumstances, vaccination began to seem prudent. My baby was just over six months old and I had just returned to work at a large university where the majority of my students would be coughing by the last week of classes.

That fall, the *New Yorker* ran an article in which Michael Specter noted that influenza is regularly among the top ten

causes of death in this country and that even relatively mild pandemics of influenza have killed in the millions. "And, though this H1N1 virus is novel," he wrote, "the vaccine is not. It was made and tested in exactly the same way that flu vaccines are always made and tested." Some of the mothers I knew did not like the tone of this article. They found it insulting for the same reason I found it reassuring—it did not acknowledge any good reason for doubt.

The fact that the press is an unreliable source of information was one of the refrains of my conversations with other mothers, along with the fact that the government is inept, and that big pharmaceutical companies are corrupting medicine. I agreed with all these concerns, but I was disturbed by the worldview they suggested: nobody can be trusted.

It was not a good season for trust. The United States was engaged in two ongoing wars that seemed to be benefiting no one other than military contractors. People were losing their houses and their jobs while the government was bailing out the financial institutions it deemed too big to fail and using taxpayer money to shore up the banks. It did not seem unlikely that our government favored the interests of corporations over the well-being of its citizens.

During the initial aftershocks of the economic crash there was talk of "restoring the public's trust," though even then the emphasis fell more often than not on consumer confidence. I disliked the term *consumer confidence,* and I bristled every time I was encouraged to trust myself as a mother. I had little confidence, consumer or otherwise, but I tended to believe that confidence was less important than the kind of trust that transcends the self. Even now, years after my son's birth, I remain interested in the precise meaning of *trust,* particularly in legal and financial terms. A trust—in the sense of a valuable asset

placed in the care of someone to whom it does not ultimately belong—captures, more or less, my understanding of what it is to have a child.

By late October, the mothers who were still talking about the flu vaccine were mainly talking about how hard it was to get a child vaccinated. My son had been on a waiting list at his pediatrician's office for over a month. Other mothers were waiting in long lines outside community colleges and public high schools. While we waited, a mother who did not vaccinate her children mentioned that she had heard there was an additive called squalene in the H1N1 vaccine. No, another mother countered, squalene was used in flu vaccines in Europe, but it was not used here. The mother who had originally mentioned squalene was not so sure—the fact that US vaccines did not contain squalene, she said, had been disputed elsewhere. "Where exactly is elsewhere?" one of my friends wondered. *What,* I wondered, *is squalene?*

The women with whom I debated the merits of the flu vaccine possessed a technical vocabulary that was entirely unfamiliar to me at the time. They used words like *adjuvant* and *conjugate,* and they knew which vaccines were live virus vaccines and which were acellular. They were familiar with the intricacies of the vaccine schedules of other countries, and literate in an array of vaccine additives. Many of them were, like me, writers. And so it is not surprising that I began to hear metaphors behind the technical language and information we traded.

Squalene is found in a great many living things including the human body, where it is manufactured in the liver. It circulates in our blood and is left behind in our fingerprints. Some European flu vaccines do indeed contain squalene from shark

liver oil, but squalene has never been added to US-licensed vaccines. Squalene's presence in absence is something like the curious properties of thimerosal, the mercury-based preservative that was removed from every childhood vaccine except multidose flu vaccines by 2002. Well over a decade later, fear of mercury in vaccines persists.

My son finally got his flu vaccination in late November. We didn't know it yet, but the worst of the pandemic was already over—cases of H1N1 influenza had peaked in October. I remember asking the nurse if the vaccine my son was receiving contained thimerosal, but I was asking more out of due diligence than true concern. I already suspected that if there was a problem with vaccines it was not thimerosal, and it was not squalene.

"WHAT'S THAT?" WAS MY SON'S FIRST PHRASE, and for a long time it was all he could say. As he learned to talk, I learned, in naming the parts of things for him, how often our language reflects our bodies. "We give a chair arms, legs, a seat and a back," writes the poet Marvin Bell, "a cup has its lip / and a bottle its neck." The ability to make and understand basic metaphors of this kind arrives with language, which is itself made of metaphor. Plumbing most any word will reveal what Emerson called "fossil poetry," metaphors submerged below the surface of our current usage. *Fathom,* a means of measuring the depth of the ocean, now means *understand* because its literal origin, using outstretched arms to measure cloth from fingertip to fingertip, was once used as a metaphor for grasping an idea.

"Our bodies prime our metaphors," writes James Geary in *I Is an Other,* his treatise on metaphor, "and our metaphors prime how we think and act." If we source our understanding of the world from our own bodies, it seems inevitable that vaccination would become emblematic: a needle breaks the skin, a sight so profound that it causes some people to faint, and a foreign substance is injected directly into the flesh. The metaphors we find in this gesture are overwhelmingly fearful, and almost always suggest violation, corruption, and pollution.

The British call it a "jab," and Americans, favoring guns,

call it a "shot." Either way, vaccination is a violence. And when vaccination is intended to prevent a sexually transmitted disease, it seems to become a sexual violence. In 2011, Republican presidential candidate Michele Bachmann warned of the "ravages" of the vaccine against human papillomavirus and argued that is was wrong "to have innocent little twelve-year-old girls be forced to have a government injection." Her opponent Rick Santorum agreed, adding that no purpose was served by "having little girls innoculated at the force and compulsion of the government." The vaccine, some parents had already complained, was "inappropriate for girls of such a young age," and other parents feared it would encourage promiscuity.

Throughout the nineteenth century, vaccination left a wound that would scar. "The mark of the beast," some feared. In an Anglican archbishop's 1882 sermon, vaccination was akin to an injection of sin, an "abominable mixture of corruption, the lees of human vice, and dregs of venial appetites, that in after life may foam upon the spirit, and develop hell within, and overwhelm the soul."

While vaccination no longer leaves a mark in most cases, our fears that we will be permanently marked have remained. We fear that vaccination will invite autism or any one of the diseases of immune dysfunction that now plague industrialized countries—diabetes, asthma, and allergies. We fear that the hepatitis B vaccine will cause multiple sclerosis, or that the diphtheria-tetanus-pertussis vaccine will cause sudden infant death. We fear that the combination of several vaccines at once will tax the immune system, and that the total number of vaccines will overwhelm it. We fear that the formaldehyde in some vaccines will cause cancer, or that the aluminum in others will poison our brains.

It was "the poison of adders, the blood, entrails and excretions

of rats, bats, toads and sucking whelps" that was imagined into vaccines of the nineteenth century. This was the kind of organic matter, the filth, believed responsible for most disease at that time. It was also a plausible recipe for a witches' brew. Vaccination was fairly dangerous then. Not because it would cause a child to grow the horns of a cow, as some people feared, but because arm-to-arm vaccination could communicate diseases like syphilis, as some people suspected. In arm-to-arm vaccination, the pus from the blister that developed on a recently vaccinated person's arm was used to vaccinate another person. Even after vaccination no longer involved an exchange of bodily fluids, bacterial contamination remained a problem. In 1901, a vaccine contaminated with tetanus bacteria killed nine children in Camden, New Jersey.

Now our vaccines are, if all is well, sterile. Some contain preservatives to prevent the growth of bacteria. So now it is, in the activist Jenny McCarthy's words, "the frickin' mercury, the ether, the aluminum, the antifreeze" that we fear in our vaccines. Our witches' brew is chemical. There is not actually any ether or antifreeze in vaccines, but these substances speak to anxieties about our industrial world. They evoke the chemicals on which we now blame our bad health, and the pollutants that now threaten our environment.

An 1881 handbill titled *The Vaccination Vampire* warns of the "universal pollution" delivered by the vaccinator to the "pure babe." Known to feed on the blood of babies, the vampires of that time became a ready metaphor for the vaccinators who inflicted wounds on infants. Blood-sucking monsters of ancient folklore were hideous, but Victorian vampires could be seductive. The macabre sexuality of the vampire dramatized the fear that there was something sexual in the act of vaccina-

tion, an anxiety that was only reinforced when sexually transmitted diseases were spread through arm-to-arm vaccination. Victorian vampires, like Victorian doctors, were associated not just with corruption of the blood, but also with economic corruption. Having virtually invented a paid profession and being almost exclusively available to the rich, doctors were suspect to the working class.

Bram Stoker's Count Dracula is of the bloodthirsty bourgeois—he keeps dusty piles of gold coins in his castle, and gold coins pour from his cloak when he is stabbed. But it is difficult to read him as a vaccinator. Of all the metaphors suggested within the plentiful pages of *Dracula,* disease is one of the most obvious. Dracula arrives in England just as a new disease might arrive, on a boat. He summons hoards of rats, and his infective evil spreads from the first woman he bites to the children she feeds on, unwittingly, at night. What makes Dracula particularly terrifying, and what takes the plot of the story so long to resolve, is that he is a monster whose monstrosity is contagious.

Germ theory was widely accepted by 1897, when *Dracula* was published, but only after having been ridiculed earlier in the century. The suspicion that microorganisms of some sort caused disease had been around for so long that the theory was already considered outdated by the time Louis Pasteur demonstrated the presence of germs in the air with his corked and uncorked flasks of sterile broth. Among the vampire hunters who pursue Dracula, "sterilizing" his coffins so that he cannot take refuge in them, are two doctors, who initially disagree on their diagnosis. The younger doctor cannot bring himself to believe in vampires, despite the evidence, so the older doctor delivers an impassioned speech on the intersection of science and faith.

"Let me tell you, my friend," he says, "that there are things done today in electrical science which would have been deemed unholy by the very men who discovered electricity—who would themselves not so long before have been burned as wizards." He then goes on to evoke Mark Twain: "I heard once of an American who so defined faith: 'that which enables us to believe things which we know to be untrue,'" saying, "He meant that we shall have an open mind, and not let a little bit of truth check the rush of a big truth, like a small rock does a railway truck."

Dracula is as much about this problem, the problem of evidence and truth, as it is about vampires. In proposing that one truth may derail another, it invites an enduring question—do we believe vaccination to be more monstrous than disease?

DEEP WITHIN EVERY MAN there lies the dread of being alone in the world, forgotten by God, overlooked among the tremendous household of millions upon millions," Søren Kierkegaard wrote in his journal in 1847. That was the year he finished *Works of Love,* in which he insists that love is known not through words, but only "by its fruits."

I read the first fifty pages of *Works of Love* in college before giving it up out of exhaustion. In those pages Kierkegaard unfolds the commandment "You shall love your neighbor as yourself," parsing it almost word by word, so that after exploring the nature of love he asks what is meant by "as yourself," and then what is meant by "your neighbor," and then what is meant by "you shall." Overwhelmed, I stopped reading shortly after Kierkegaard asked, *"Who, then, is one's neighbor?,"* which he answered, in part, with, "*Neighbor* is what philosophers would call the *other,* that by which the selfishness in self-love is to be tested." I had read enough at that point to be troubled by the idea that one must enact one's beliefs, and perhaps even embody them.

From somewhere deep in my childhood I can remember my father explaining with enthusiasm the principle behind the Doppler effect as an ambulance sped past our car. When we watched the sun set over the river where we lived he described Rayleigh scattering, the removal of the shorter wavelengths of light by the atmosphere that results in reddish clouds and grass

that looks more intensely green at dusk. In the woods he dissected an owl pellet for me, and reassembled from it the tiny skeleton of a mouse. My father marveled at the natural world far more often than he talked about the human body, but blood types were a subject on which he spoke with some passion.

People with the blood type O negative, he explained, can only receive in transfusion blood that is O negative, but people with O-negative blood can give blood to people of any other type. That's why a person with Type O negative is known as a "universal donor." My father would then reveal that his blood type was O negative, that he himself was a universal donor. He gave blood, my father explained, as often as he was allowed because blood of his type was always in demand for emergency transfusions. I suspect my father may have already known then what I would only discover later—that my blood, too, is Type O negative.

I understood the universal donor more as an ethic than as a medical concept long before I knew my own blood type. But I did not yet think of that ethic as an ingenious filtering of my father's Catholicism through his medical training. I was not raised in the Church and I never took communion, so I was not reminded of Jesus offering his blood that we all might live when my father spoke of the universal donor. But I believed, even then, that we owe each other our bodies.

Every time my father went out in a boat, for my entire childhood, he took a life preserver with his name and "Organ Donor" printed hugely on it in permanent ink. It was a joke in which he believed quite sincerely. When he taught me to drive, he gave me this advice from his own father: you are responsible not just for the car you are driving, but also for the car ahead of you and the car behind you. Learning to drive all three cars was daunting, and inspired an occasional paralysis that plagues my

driving to this day, but when I earned my license I signed my name under Organ Donor.

The very first decision I made for my son, a decision enacted within moments of his body coming free of mine, was the donation of his umbilical cord blood to a public bank. At thirty, I had only donated blood once, back in college when I was reading Kierkegaard. I wanted my son to start his life with a credit to the bank, not the debt I already felt. And this was before I, a universal donor, would become the sole recipient of two units of blood in transfusion after my son's birth—blood of the most precious type, drawn from a public bank.

If we imagine the action of a vaccine not just in terms of how it affects a single body, but also in terms of how it affects the collective body of a community, it is fair to think of vaccination as a kind of banking of immunity. Contributions to this bank are donations to those who cannot or will not be protected by their own immunity. This is the principle of *herd immunity,* and it is through herd immunity that mass vaccination becomes far more effective than individual vaccination.

Any given vaccine can fail to produce immunity in an individual, and some vaccines, like the influenza vaccine, are less effective than others. But when enough people are vaccinated with even a relatively ineffective vaccine, viruses have trouble moving from host to host and cease to spread, sparing both the unvaccinated and those in whom vaccination has not produced immunity. This is why the chances of contracting measles can be higher for a vaccinated person living in a largely unvaccinated community than they are for an unvaccinated person living in a largely vaccinated community.

The unvaccinated person is protected by the bodies around her, bodies through which disease is not circulating. But a vaccinated person surrounded by bodies that host disease is left

vulnerable to vaccine failure or fading immunity. We are protected not so much by our own skin, but by what is beyond it. The boundaries between our bodies begin to dissolve here. Donations of blood and organs move between us, exiting one body and entering another, and so too with immunity, which is a common trust as much as it is a private account. Those of us who draw on collective immunity owe our health to our neighbors.

When my son was six months old, at the peak of the H1N1 flu pandemic, another mother told me that she did not believe in herd immunity. It was only a theory, she said, and one that applied mainly to cows. That herd immunity was subject to belief had not yet occurred to me, though there is clearly something of the occult in the idea of an invisible cloak of protection cast over the entire population.

Aware that I did not fully understand the mechanism behind this magic, I searched the university library for articles about herd immunity. As early as 1840, I learned, a doctor observed that vaccinating only part of a population against smallpox could arrest an epidemic in full. This indirect protection from disease could also be observed, temporarily, after large numbers of people acquired natural immunity from infection during an epidemic. In the era before vaccination against childhood diseases like measles, epidemics tended to come in waves followed by lulls during which the number of new children who had not been made immune by infection crept toward some crucial, but unknown, proportion of the population. Herd immunity, an observable phenomenon, now seems implausible only if we think of our bodies as inherently disconnected from other bodies. Which, of course, we do.

The very expression *herd immunity* suggests that we are

cattle, waiting, perhaps, to be sent to slaughter. And it invites an unfortunate association with the term *herd mentality,* a stampede toward stupidity. The herd, we assume, is foolish. Those of us who eschew the herd mentality tend to prefer a frontier mentality in which we imagine our bodies as isolated homesteads that we tend either well or badly. The health of the homestead next to ours does not affect us, this thinking suggests, so long as ours is well tended.

If we were to exchange the metaphor of the herd for a hive, perhaps the concept of shared immunity might be more appealing. Honeybees are matriarchal, environmental do-gooders who also happen to be entirely interdependent. The health of any individual bee, as we know from the recent epidemic of colony collapse, depends on the health of the hive. In *The Wisdom of Crowds,* journalist James Surowiecki details the sophisticated scouting and reporting methods honeybees use to gather nectar. The cooperative work of bees, Surowiecki suggests, is an example of the kind of collective problem solving our own society depends on.

While there are many well-documented instances of crowds making bad decisions—lynching comes to mind—Surowiecki observes that large groups routinely solve complex problems that evade individuals. Groups of people, if they are sufficiently diverse and free to disagree, can provide us with thinking superior to any one expert's. Groups can locate lost submarines, predict the stock market, and reveal the cause of a new disease. In March of 2003, after a mysterious respiratory disease killed five people in China, the World Health Organization arranged a collaboration between research laboratories in ten different countries to identify the cause of what would come to be known as SARS. The labs, themselves made up of teams, worked together, sharing information and debating their results in daily

conferences. By April, they had isolated the novel virus responsible for the disease. No one person had been in charge of the process, and no one person could claim credit for the discovery. Science, Surowiecki reminds us, is "a profoundly collective enterprise." It is a product of the herd.

My son is fully vaccinated, but there is one immunization on the standard schedule that he did not receive on time. This was meant to be his very first shot, the hep B administered to most babies immediately after birth. In the months before my son was born, while I was teaching at the university and hauling a used crib through the snow and moving bookshelves to make room for the crib, I began spending my evenings reading articles about immunization. I was already aware, before I became pregnant, of some fears around vaccination. But I was not prepared for the labyrinthine network of interlocking anxieties I would discover during my pregnancy, the proliferation of hypotheses, the minutiae of additives, the diversity of ideologies.

Finding that the reach of my subject had far exceeded the limits of my late-night research by the time my baby was due, I visited the pediatrician I had chosen to be my son's doctor. A number of friends had offered his name when I asked for a recommendation, and so had my midwife, who referred to him as "left of center." When I asked the pediatrician what the purpose of the hep B vaccine was, he answered, "That's a very good question," in a tone that I understood to mean this was a question he relished answering. Hep B was a vaccine for the inner city, he told me, designed to protect the babies of drug

addicts and prostitutes. It was not something, he assured me, that people like me needed to worry about.

All that this doctor knew of me then was what he could see. He assumed, correctly, that I did not live in the inner city. It did not occur to me to clarify for the doctor that although I live in the outer city of Chicago, my neighborhood is very much like what some people mean when they use the term *inner city.* In retrospect, I am ashamed by how little of his racial code I registered. Relieved to be told that this vaccine was not for people like me, I failed to consider what exactly that meant.

The belief that public health measures are not intended for people like us is widely held by many people like me. Public health, we assume, is for people with less—less education, less-healthy habits, less access to quality health care, less time and money. I have heard mothers of my class suggest, for instance, that the standard childhood immunization schedule groups together multiple shots because poor mothers will not visit the doctor frequently enough to get the twenty-six recommended shots separately. No matter that any mother, myself included, might find so many visits daunting. *That,* we seem to be saying of the standard schedule, *is for people like them.*

In an article for *Mothering* magazine, the journalist Jennifer Margulis expresses outrage that newborn infants are routinely vaccinated against hep B and wonders why she was encouraged to vaccinate her daughter "against a sexually transmitted disease she had no chance of catching." Hep B is transmitted not only by sex, but through bodily fluids, so the most common way that infants contract hep B is from their mothers. Babies born to women who are infected with hep B—and mothers can carry the virus without their knowledge—will almost certainly be infected if they are not vaccinated within twelve hours

of birth. The virus can also be passed through close contact between children, and people of any age can carry it without symptoms. Like human papillomavirus and a number of other viruses, hep B is a carcinogen, and it is most likely to cause cancer in people who contract it when they are young.

One of the mysteries of hep B immunization is that vaccinating only "high risk" groups, which was the original public health strategy, did not bring down rates of infection. When the vaccine was introduced in 1981, it was recommended for prisoners, health care workers, gay men, and IV drug users. But rates of hep B infection remained unchanged until the vaccine was recommended for all newborns a decade later. Only mass vaccination brought down the rates of infection, and it has now virtually eliminated the disease in children.

The concept of a "risk group," Susan Sontag writes, "revives the archaic idea of a tainted community that illness has judged." Risk, in the case of hep B, turns out to be a rather complicated assessment. There is risk in having sex with just one partner, or traveling through the birth canal. In many cases, the source of infection is never known. I decided, before I knew how much blood I would lose in childbirth, that I did not want my son to be vaccinated against hep B. I did not belong to a risk group at the moment he was born, but by the time I put him to my breast I had received a blood transfusion and my status had changed.

When the last nationwide smallpox epidemic began in 1898, some people believed that whites were not susceptible to the disease. It was called "Nigger itch," or, where it was associated with immigrants, "Italian itch" or "Mexican bump." When smallpox broke out in New York City, police officers were sent to help enforce the vaccination of Italian and Irish immigrants in the tenements. And when smallpox arrived in Middlesboro,

Kentucky, everyone in the black section of town who resisted vaccination was vaccinated at gunpoint. These campaigns did limit the spread of the disease, but all the risk of vaccination, which at that time could lead to infection with tetanus and other diseases, was absorbed by the most vulnerable groups. The poor were enlisted in the protection of the privileged.

Debates over vaccination, then as now, are often cast as debates over the integrity of science, though they could just as easily be understood as conversations about power. The working-class people who resisted Britain's 1853 provision for free, mandatory vaccination were concerned, in part, with their own freedom. Faced with fines, imprisonment, and the seizure of their property if they did not vaccinate their infants, they sometimes compared their predicament to slavery.

Vaccination, like slavery, raises some pressing questions about one's rights to one's own body. But as the historian Nadja Durbach has noted, antivaccinators were often more interested in abolition as a metaphor for individual liberty than they were in the cause as a shared purpose. It was not in the recklessly selfless spirit of John Brown, who was hanged with his sons for their doomed effort to free slaves, that white workers resisted vaccination. "Anti-vaccinators were quick to draw on the political, emotive, or rhetorical value of the slave, or of the colonized African," Durbach writes of the movement in Britain. "They were quicker still to claim that the suffering of white English citizens took precedence over that of the oppressed elsewhere." Their primary concern, in other words, was with people like them.

In her history of that movement, Durbach returns often to the idea that vaccine resisters saw their bodies "not as potentially contagious and thus dangerous to the social body, but as highly vulnerable to contamination and violation." Their bod-

ies were, of course, both contagious and vulnerable. But in a time and place where the bodies of the poor were seen as a liability to public health, as dangerous to others, it fell to the poor to articulate their vulnerability.

If it was meaningful then for the poor to assert that they were not purely dangerous, I suspect it might be just as meaningful now for the rest of us to accept that we are not purely vulnerable. The middle class may be "threatened," but we are still, just by virtue of having bodies, dangerous. Even the little bodies of children, which our time encourages us to imagine as absolutely vulnerable, are dangerous in their ability to spread disease. Think of the unvaccinated boy in San Diego, for instance, who returned from a trip to Switzerland in 2008 with a case of measles that infected his two siblings, five schoolmates, and four children in his doctor's waiting room. Three of those children were infants too young to be vaccinated, and one had to be hospitalized.

Unvaccinated children, a 2004 analysis of CDC data reveals, are more likely to be white, to have an older married mother with a college education, and to live in a household with an income of $75,000 or more—like my child. Unvaccinated children also tend to be clustered in the same areas, raising the probability that they will contract a disease that can then be passed, once it is in circulation, to undervaccinated children. Undervaccinated children, meaning children who have received some but not all of their recommended immunizations, are more likely to be black, to have a younger unmarried mother, to have moved across state lines, and to live in poverty.

"Vaccination works," my father explains, "by enlisting a majority in the protection of a minority." He means the minority of the population that is particularly vulnerable to a given disease. The elderly, in the case of influenza. Newborns, in the

case of pertussis. Pregnant women, in the case of rubella. But when relatively wealthy white women vaccinate our children, we may also be participating in the protection of some poor black children whose single mothers have recently moved and have not, as a product of circumstance rather than choice, fully vaccinated them. This is a radical inversion of the historical application of vaccination, which was once just another form of bodily servitude extracted from the poor for the benefit of the privileged. There is some truth, now, to the idea that public health is not strictly *for* people like me, but it is *through* us, literally through our bodies, that certain public health measures are enacted.