Laura Sewell Matter

Hell and Reason

IN February 1943, as a boy just shy of his eighteenth birthday, Charles Fisk wrote home to his parents in Massachusetts: "The work I am doing means nothing to me. That is, I don't understand what the object of it is. Of course, the principle of the whole thing is secrecy, and I am just as much in the dark about the project as you are. My official status is 'Lab helper in the Metallurgical Lab of the University of Chicago.' Metallurgy and the University of Chicago have about as much to do with the project as a baby elephant."

Mostly Charlie was pushing a soldering iron around. He could interpret the schematic diagrams given to him by his supervisor and construct the electrical circuits that were needed, but their intended use was a mystery. Charlie's uncle, Joyce Stearns, had gotten him the job. Uncle Joyce apparently knew what was afoot, though he never spoke of it in any but the vaguest of terms, even in his family's apartment after Charlie arrived and took up temporary residence on their pull-out couch. Of course, Charlie knew it was war work—that was the whole point. If he was not doing this job, he would likely be drafted and handed a gun when his eighteenth birthday arrived; he could have been Panzer fodder. Instead, he was soldering.

Charlie's relief was tinged with guilt when he considered that many of his classmates from high school were now finishing their military training and preparing to deploy. At least he had a war job. There was dignity in that, even if he had to take the virtue of this work on faith. He wouldn't learn the object of his labors, first in Chicago and later in Los Alamos, until weeks before the rest of the world: to create the world's first atomic bomb.

Charlie's uncle was in the inner circle of scientists and administrators on the Manhattan Project. Joyce Stearns had earned his PhD in physics at the University of Chicago under Nobel Laureate Arthur Compton in the late 1920s,

then gone on to head the physics department at the University of Denver. Stearns and Compton were about the same age, well-matched at tennis, and had sons born the same year. Beyond a traditional mentor-student relationship, they developed an enduring friendship.

In 1940, Compton was tapped by a newly formed government agency to head a secret laboratory where the possibility of creating a controlled nuclear chain reaction could be explored. The military applications were obvious to him; so, too, were the moral implications. Compton had been raised by a Presbyterian pastor father and a Mennonite missionary mother who preached pacifism, but he also recognized the danger posed by the Nazis, and he believed in the righteousness of the war in which the country was about to become engaged. He felt a duty to support it: "As long as I am convinced that there are values worth more to me than my own life," he wrote, "I cannot in sincerity argue that it is wrong to risk death or inflict death if necessary in the defense of those values." Such feelings could coexist in his mind, if uneasily, with his parents' religion. Niels Bohr, the Danish physicist who also contributed to the Manhattan Project, regarded Compton with exasperation for his belief that there *was* a higher power not subject to certain scientific phenomena, such as Heisenberg's uncertainty principle. But even then, across the ocean, Bohr's former student Werner Heisenberg himself was overcoming his personal reservations to help the Third Reich in its quest to develop nuclear weapons.

Stearns was among the first of the trusted colleagues Compton called upon to join him in Chicago after the bombing of Pearl Harbor. Initially, Compton asked Stearns to be the director of personnel for the so-called Metallurgy Laboratory. Stearns was a competent physicist, but his expertise did not closely align with the work in Chicago. By his own modest description, his best trait was his "Irish sociability," which translated into a sort of genius for managing people and projects. With humility and humor, he dealt diplomatically with famous scientists whose egos were as outsized as their intellects. Stearns quietly supported the efforts of expatriate European physicists such as Enrico Fermi and Leo Szilard, who laid the theoretical groundwork for the experiments that led to the world's first controlled nuclear reaction and the first chemically isolated sample of plutonium. Stearns recruited American scientists and technical support staff—the least of whom, really, was his seventeen-year-old nephew.

Charlie had the skills to make a legitimate contribution to the work, honed through a childhood of tinkering with electromechanical devices, but

Stearns had not sought him out for any exceptional technical qualifications. Charlie was family. A large percentage of those American boys who turned eighteen in 1943 would be drafted and shipped overseas, as part of a surge to enlist ten million men in military service beginning that year. This job at the Met Lab could qualify Charlie for an occupational deferment. Stearns's own son, Brenton, was just a few years younger, and if the war could be over before *he* turned eighteen, so much the better. Joyce would keep the boys out of danger as long as it was within his power.

After the bright and lethal flashes that occurred in August 1945, protecting our boys—i.e., saving American lives—would become one of the most oft-cited arguments in defense of the use of atomic bombs on Japan. Conveniently, no single human being has ever been required to shoulder the entire burden of responsibility for this decision. President Harry Truman may come closest, because he alone might have prevented it with an authoritative word, but even Truman didn't specifically order the use of the atomic bombs on Japanese targets in 1945. He had only learned that the bombs existed a few months earlier when he became president upon Franklin Roosevelt's death. A year before that, Truman had been a senator eager to combat government waste on lavishly funded secret projects in Oak Ridge, Tennessee, and Hanford, Washington, where, unbeknownst to the senator, weapons-grade uranium and plutonium were being produced. When Truman set out to establish a Congressional investigation of these expenditures, he was called off by the secretary of war, Henry Stimson, who would only assure him that there was an excellent reason why these projects must remain secret. By the time Truman assumed the office of president, the plan was already in motion to drop an atomic bomb on one of America's adversaries, and Stimson was one of the most passionate advocates of this plan. As General Leslie Groves, head of the Manhattan Project, wrote in his memoirs: "As far as I was concerned, [Truman's] decision was one of noninterference—basically, a decision not to upset the existing plans." The closest Truman came to giving an actual order to use nuclear weapons on Japan was his authorization of the official White House press release that was written in anticipation of the event by a phone company executive named Arthur Page, sometimes acknowledged as "the father of corporate public relations"—and a friend of Stimson's. The target city was left blank on the press release, and not even the pilot of the plane was certain where he would drop his payload when he took off on the morning of 6 August; such details were still dependent on

contingencies of weather and war. Truman's press release is the most concrete documentary evidence we have of his implicit consent to the bombing of Japan. In it, Truman became the first to trot out publicly the arguments that remain in circulation today: the Japanese had drawn us into the war by bombing Pearl Harbor, and once they had been so brutally repaid, they would imminently surrender, thus ending the long and gruesome war.

Truman's press release provides a layman's introduction to the technology of the bomb, and a context for its development. In 1939, the scientific cognoscenti thought it highly probable that a nuclear weapon could be built in the immediate future. There had been good reason to fear the Nazis might do this first, since much of the fundamental science had been developed in Germany, and the impact of that would have been catastrophic for the Allies. The press release echoed the famous letter that had started the project, a letter conceived by three expatriate Hungarian physicists (Leo Szilard, Edward Teller, and Eugene Wigner), then signed and delivered by one expatriate German (Albert Einstein) to the American president (FDR) in August of 1939. The European scientists who wrote the letter were Jewish, and as well acquainted with Nazi anti-Semitism as they were with the physics behind their proposal. Fear had spurred them to urge Roosevelt to authorize and fund agencies that could, first, ensure the procurement of uranium, and second, accelerate the pace of research into nuclear fission. The president was persuaded. The Manhattan Project was born. The bomb was built. Two Japanese cities—and then the world—would soon feel the impact.

When Barack Obama became the first sitting U.S. president to visit Hiroshima in May of 2016, he sympathized with the victims but did not apologize for or condemn the use of the atomic bomb upon that city. His speech began, "Seventy-one years ago, on a bright cloudless morning, death fell from the sky and the world was changed. A flash of light and a wall of fire destroyed a city and demonstrated that mankind possessed the means to destroy itself." He then situated these unfortunate circumstances in a progression of human violence stretching back to the dawn of history—when that violence was committed with blunt stones—without so much as hinting at the nationality of those who opened the bomb-bay doors from which "death fell." As for the destruction, light and fire were responsible. Obama's elegantly oblique rhetoric avoids highlighting America's role in the lamented deaths. The buck stopped with Harry Truman, who owned the deed without protesting the myriad ways in which he himself was a minor party to the decision. No American leader

since has been so explicitly willing to claim our nation's unique responsibility for unleashing nuclear weapons on the world. Truman's ghostwritten press release was crystalline in its directness: "an American airplane dropped one bomb on [_____]," and thus "we"—the people of the United States of America—"added a new and revolutionary increase in destruction to supplement the growing power of our armed forces." We also harnessed "the basic power of the universe." Light and fire, take note: America is in charge.

Six months after Obama's visit to Hiroshima, Japanese Prime Minister Shinzo Abe visited Pearl Harbor. He offered condolences (like Obama, stopping short of apology) to the "souls of those who lost their lives," and he reminded listeners, "We must never repeat the horrors of war again."

The same week, and in contrast to these seasoned statesmen, our president-elect Donald Trump tweeted "The United States must greatly strengthen and expand its nuclear capability until such time as the world comes to its senses regarding nukes." These words were issued in response to a pronouncement by Trump's frenemy Vladimir Putin earlier that same day that Russia would seek to strengthen its nuclear capabilities. The specter of another Cold War, or another hot war, flickered into public view.

In a way, nothing has changed since the day in August 1945 when the French philosopher and novelist Albert Camus learned the first atom bomb had been dropped on Hiroshima, then wrote an editorial for the French resistance newspaper *Combat* of 8 August. Though the full extent of the damage wrought by the bomb could not yet be assessed, the searing images were already imprinted in people's eyes and had triggered the onset of an existential crisis for humankind, though some people felt this more acutely than others. Camus framed the future of our species as a choice between "collective suicide and the intelligent use of scientific conquests." But, as he concluded, this is scarcely a real choice. "Peace is the only fight worth engaging in. This isn't a plea any more, but an order that has to rise up from peoples to governments, the order to choose once and for all between hell and reason." Surely no one would *choose* hell. And yet, another bomb was dropped on Nagasaki the next day.

Many of the retrospective arguments for and against the use of atomic bombs at the end of World War II have relied on a combination of utilitarian philosophy and statistics. The bombs were used in the sixth year of a conflict that had taken the lives of fifty million people in order to kill tens of thousands more. We can grapple with the premise that if fewer lives were lost in the

bombings than would have been lost by our failing to carry them out, then the bombings were justified. We can frame this as a math problem, calling it moral calculus if we will, but in truth it is lower math.

X people were killed by the atomic bombs dropped on Hiroshima and Nagasaki, where *X* is an actual number that is likely between 150,000 and 350,000. A precise determination of the value of *X* is dependent on a variety of factors, including how the deaths of affected persons that occurred years later and miles distant are factored in by historians and statisticians who vary in their temperaments, politics, and methodologies.

Y is the total number of people who would have died in the war in the period from 6 August 1945 through the cessation of hostilities at an unknown date, probably within a year, by which time there might have been a land invasion and further conventional fire-bombings of Japan, had the atomic bombs not been dropped. The value of *Y* is somewhere between, say, 1,000 and 1,000,000, give or take an order of magnitude, depending on just how imminent or hard-won the Japanese surrender might have been. Opinions differ, but it is generally acknowledged that hindsight has been a great aid in formulating many of these opinions. People who believed one thing in 1945 sometimes believed otherwise later.

If $X < Y$, then the use of atomic bombs saved lives, and can be justified. If $X > Y$, then the bombs cost more lives than they saved, and cannot be condoned. Solve for truth.

Though psychologists now know that statistics are an ineffective means of changing people's minds, we have worked this problem over and over again for seven decades. Our answers may forever be irreconcilable. We do the math anyway because we are reassured by being able to formulate a concrete number that corroborates what we feel.

Math was never Charlie's best subject. He had not yet learned calculus when he arrived in Los Alamos in July 1944—as a member of the Army's Special Engineering Detachment, thanks to strings pulled by Uncle Joyce after the initial draft deferment plan hit a snag—but he began taking a correspondence course that fall. A few evenings a week, he worked on his calculus homework. Always a good student but never intrinsically interested in math, Charlie was motivated to learn it now. He knew that if he wanted to understand the physicists around him he had to speak their language. Their chalkboards full of equations might as well have been written in kanji for all the sense he could

make of them. So he studied, and he mailed his weekly assignments back to Chicago for assessment by an overworked adjunct who apparently leavened this duty by drawing smiling faces on all the papers he graded, irrespective of quality (which seemed wildly eccentric to Charlie, two decades before a Massachusetts ad man hired to improve the morale of insurance company employees developed the iconic yellow smiley face graphic that is the basis of the now all too familiar emoticon). Charlie also took advantage of the fact that plenty of people right there in Los Alamos knew a thing or two about higher math, and someone was always willing to help him. Though he progressed through his course more slowly than he hoped, this was mostly because his job kept him so busy that he didn't have as much time for study as he wished.

Charlie's long workdays were frequently spent soldering pre-amp after pre-amp—a component within the electronic sensors that his group used when they went out on the mesa to test their detonators. He worked with about twenty people who were headed by Darol Froman, another physicist who had once studied under Compton, and one of Uncle Joyce's old friends. Froman was a self-described "gadgeteer" who had grown up fixing farm equipment in Alberta, Canada. Charlie got on well enough with Darol to picnic with his family on weekends, but not well enough to ask about the nature of the gadget in question. (Technicians had been told not to ask.) It had become obvious to Charlie that their detonator was going to be part of a new kind of explosive weapon, but he didn't understand why it had to implode in a perfect sphere. He knew only that a spherical implosion was what their sensors were trying to detect, and without whys or wherefores he helped make electronics to do that job. One day's handiwork was blown up the next, while Charlie crouched in a nearby bunker with his colleagues. And then it was back to the soldering iron.

Once, Robert Oppenheimer himself came out to witness the some of their experiments. Charlie knew how trivial his own contributions were, but even so, he was awed to feel the intensity of their leader's attention for a moment, as another bit of his handiwork was blasted away. Oppie was admired even by the other geniuses and respectable scientists who abounded thereabouts.

Charlie wanted to be one of them. He had decided that when the war was over and he finally got to college, he would become a physicist. This was the main reason for him to get his calculus up to scratch: an understanding of mathematics was the foundation for an understanding of physics, and the first step toward grasping exactly what was going on around him on the scientific frontier.

As noted at the start, Charlie did not know about the atomic bomb as such before the summer of 1945. The revelation came months after his twentieth birthday and months before the final results of his math course were in.

Charles Fisk's U.S Army ID from 1945. Image courtesy of C. B. Fisk, Inc.

Had Charlie known when the revelation of the project's objective was coming, he might have delayed his request for a furlough, instead of planning it for the middle of July 1945 when the Trinity Test took place. Many of those working in Los Alamos traveled to the expanse of white sand wilderness near Alamogordo for the occasion; Charlie spent the week mowing grass and listening to records on his homemade amplifiers at his parents' house in Massachusetts. When he got back to New Mexico at the beginning of August, he must have been the last soul on the Hill to learn what they had at last accomplished: an explosion so large that it was seen and heard hundreds of miles away. He had guessed it would be big, but he was still amazed to think that he could have been there in the desert, shielding his eyes on the side of a distant slope because it was impossible to actually behold this new wonder. They said it was literally blinding.

Robert Oppenheimer's muttered response to the Trinity Test has become legend. With his first breath, he celebrated the fact that it had worked. With his

next, he recalled the *Bhagavad Gita*: "Now I am become death, the destroyer of worlds." Like so many of the other scientists who had worked on the atomic bomb, Oppenheimer was, in a sense, bereft once they had solved the technical problem that had absorbed their attention for so long, and whose disposition they could no longer control. Since the day in 1942 when the military assumed administrative control of the Manhattan Project, or perhaps even since the project began by executive order of the nation's chief executive, it had been apparent that the scientists' ethical opinions about how the bomb should be used would not be privileged in the ensuing discussions where generals, cabinet members, and ultimately the president held sway.

Two months before the Trinity Test, the Target Committee met in Los Alamos. It was 11 May 1945—one month after the death of President Roosevelt, and just three days after the German surrender. At this meeting the committee was presented with a list of five cities, at least one of which would soon be marked for imminent destruction: Kyoto, Hiroshima, Yokohama, Kokura Arsenal, and Niigata. The names would be subject to debate and revision. Nagasaki would leapfrog Niigata. Kyoto would be pardoned out of respect for its "culture," if not the lives of the people who gave rise to it. Fate, in the form of weather, would have its say as well, contributing to the sense held by some horrified observers of the bombings that the target was arbitrary, and there was no reason to it after all.

Officially, there were three logistical criteria for target selection. To quote the now declassified memo from the meeting, they sought "targets possessing the following qualifications:

(1) they be important targets in a large urban area of more than three miles in diameter,
(2) they be capable of being damaged effectively by a blast, and
(3) they are unlikely to be attacked by next August.

On top of this, there were two psychological factors to be considered:

(1) obtaining the greatest psychological effect against Japan and
(2) making the initial use sufficiently spectacular for the importance of the weapon to be internationally recognized when publicity on it is released.

There is no aspect of the Manhattan Project that is more controversial than the target selection criteria. Only the first of the psychological factors—"obtaining

the greatest psychological effect against Japan"—seems to have anything directly to do with compelling surrender and ending the war, and perhaps saving lives and justifying the endeavor by utilitarian logic. The second psychological factor was aimed at intimidating Stalin and the Soviet Union, whose postwar aspirations were already suspect. Those who supported the "spectacular" publicity criterion believed this was the key—not only to ending the present war, but also to preventing future ones by making it clear that the cost of hostilities in the just-born nuclear age was simply too high. Such supporters were, you could say, taking the long view.

The thing that still rankles about the selection criteria is that they are, among other things, parameters for controlling a science experiment. Dropping the bomb on a previously untouched urban area would yield interesting empirical data by which to understand the weapon's power, calculated in the sheer breadth of destroyed infrastructure, and in the quantity and particular quality of human casualties. In an era and at a moment when the doctrine of total war held sway—when both sides had already struck civilian targets, from London and Stalingrad and Nanjing, to Hamburg and Dresden and Tokyo, to say nothing of the millions of people who were summarily killed in concentration camps built for that purpose; when the worldwide sum of casualties was fifty million and counting; when the French, for their part, had come up with the pithiest idiom to encapsulate the numbness and weary expectancy of dysfunction that one begins to feel in the face of relentless death and destruction, "*c'est la guerre*"—any means of ending the global conflict could be morally justified. But could a lethal science experiment with unwitting human subjects be justified, if it was not necessary to end the war? This was a dicier moral proposition. Even in 1945.

Among the physicists who had created the bomb, few supported such experimentation for the sake of science. "The opinions of our scientific colleagues on the initial use of these weapons are not unanimous," wrote the panel—composed of Enrico Fermi, Arthur Compton, Ernest Lawrence, and Robert Oppenheimer—who were asked to represent the scientific perspective to the president's advisers in May 1945. Ultimately, their panel supported the bombings of Japan, with reservations, which in some cases would later metastasize into grave regrets. Even those who supported bombing a Japanese city understood that the justifications for doing so were less scientific than symbolic: the goal was to generate images *so* graphic, and *so* novel, and *so* deeply disturbing that they would have the power to do what empirical data cannot: change people's minds about war, present *and* future.

To name the five target cities was a weighty burden for the people involved, and the man responsible for drafting the list, according to the memos from the Target Committee meetings, was "Dr. Stearns." No first name is given, but in General Leslie Groves's memoir, *Now It Can Be Told,* published years after the fact, the man in question was identified as "J. C. Stearns." In other words, Uncle Joyce.

Joyce Stearns never mentioned this duty to his family. And certainly, it would be an unusual assignment for a scientist and lab administrator. Joyce had remained in Chicago to manage the Met Lab while other scientists decamped to New Mexico. Since 1943, he had served as director of the physics division, and in 1944 he became director of the whole Met Lab. Amidst a host of other duties, he'd overseen the training of people who were sent on to the facility in Hanford, Washington, where plutonium production was underway.

As Arthur Compton said of him later, "Stearns was one of the invaluable men who without consideration for their own personal interests would put their full effort on the tasks that needed most to be done." But did that really include target selection? Some historians have concluded it is more probable that the Dr. Stearns in question was Robert Stearns, a military veteran and the president of the University of Colorado, who consulted with the Air Force generals on "operational" matters. In his memoir, Groves states that J. C. Stearns was affiliated with the Air Force—which was true of Robert Stearns. Groves either made an error with the initials of Dr. Stearns or with the affiliation. Because Groves was a general, his words may ring irrefutable, but it seems he must have been mistaken about one particular or another in this case.

Robert Stearns was more likely the man who generated the list of five Japanese cities and presented them to the Target Committee, but Joyce Stearns has taken the historical rap for it. Joyce's name is more often cited in books. Few besides the scholars who have scrutinized the archival documents surrounding these events have heard of him, but Joyce Stearns is still occasionally identified in pieces like the 2015 *Atlantic* article by Paul Ham, "The Bureaucrats Who Singled Out Hiroshima for Destruction." The author's use of the unflattering epithet "bureaucrat" is predictive of the article's stance, connoting a person stripped of personal autonomy whose humanity has been sacrificed at the altar of procedural correctness. Graphically, we may envision a person who stands behind his desk, and who has abdicated his noble and terrible free human will to merely represent the agency by which he is employed. Joyce Stearns is remembered as such a bureaucrat.

Joyce Stearns may not have participated in the Target Committee, but he did join another committee at the Met Lab, one that would be named after its chairman, James Franck. The members of the Franck Committee were not officially privy to any of the deliberations of the military or political leaders who would decide how the bomb was to be used; instead, the committee formed to express objection to the trajectory of events that they could now so readily foresee.

Stearns, Szilard, and a handful of other prominent physicists participated in the secret nighttime sessions. The Franck Report concluded that the development of nuclear power created grave political, ethical, and economic problems for the nation, and it predicted the impossibility of keeping the technology secret indefinitely, and the consequent inevitability of a nuclear arms race. The report urged that military expediency in ending the war with Japan was ultimately less important than establishing trust between nations as a defense against future wars, arguing that if building trust between nations was impossible, the only possible strategic defense against nuclear weapons would be the dispersal of industries and population centers around the country, so there would be no viable target that fit the sort of criteria the Target Committee had set forth for Japan. In earnest desperation, the Franck Committee advocated for a public international demonstration of the bomb's power in an uninhabited area, rather than an unannounced attack on a populous city, so as to achieve the desired psychological effects without sacrificing the prospect of international trust by needlessly taking so many human lives.

The Franck Report was completed in June 1945, one month before the Trinity Test and two before the eventual bombings. Stearns and six other scientists signed. When James Franck and Leo Szilard traveled to Washington to deliver their report to the secretary of war, Stimson's assistant told them (perhaps untruthfully) that Stimson was not in. After waiting for hours, Franck and Szilard had to leave the document with the assistant rather than handing it to the Secretary. Stimson may or may not have read it. Whether or not he was in that day, it is clear in retrospect that government leaders like Stimson were not interested in hearing arguments against the political expedience of their plan from a bunch of scientists. When in 1946 one of the authors of the Frank Report, Eugene Rabinowitch, petitioned to have the document declassified, the government released a censored version, cutting lines that did not compromise technical secrets, but that were politically critical. For example, they cut the sentence: "If we consider international agreement on total preven-

tion of nuclear warfare as the paramount objective, and believe that it can be achieved, this kind of introduction of atomic weapons to the world may easily destroy all our chances of success." Over such objections, the attacks proceeded as planned.

After the Franck Report was "filed," but before the bombs were dropped, Joyce Stearns left the Manhattan Project. Once again he followed Compton, who became the chancellor of Washington University in St. Louis in the summer of 1945, when the end of the war was clearly approaching. One of Compton's first decisions as chancellor was to appoint Stearns his Dean of Faculty. Stearns held this job for only a few years, then died of colon cancer in 1948, when he was fifty-six years old. Stearns did not live long enough after the war to talk to the scholars of nuclear technology and policy who began cropping up when the events had receded far enough into the past to count as history, and when information was being declassified and those who had taken part were permitted to speak. Stearns was never able to give his own history, or even to look back with retrospective clarity through the Cold War years at his contributions to the fate of mankind. His alleged contributions to bureaucracy—as a person who attended meetings, and wrote memos, and named five Japanese cities—are his legacy, as far as the historical record is concerned.

Stearns's son Brenton, who turned twenty the year his father died, was no historian. He was a kid when these things happened—a kid who had occasionally been asked to watch the younger Fermi children in an upstairs bedroom, but sometimes sat at the top of the steps and listened to the murmurings and bursts of laughter from the architects of a weapon and a new world order as they drank cocktails below. Brenton would eventually become a professor of physics like his father, and a recreational participant in church choirs and community theater troupes. In Brenton's later years, just before his own memory began failing, he wrote a biographical play about his father's role in the decision to drop the bomb, *I Could Be Shot*. The script is of debatable value as history; it cannot be relied upon as a source of fact, though it is rooted in Brenton's earnest recollections of things his father said and did, and in his assumptions about the things his father could not say. The play's hero—Joyce Stearns—is a man with a sense of humor that teeters in opposition with a sense of dread. He is *not* a faceless bureaucrat. From that, we can say at least this much with certainty: Joyce Stearns produced a son who was of a temperament, intellect, and moral disposition to wish that his father would be remembered for the

fact that he said, "Please don't do this" in 1945, and for the fact that he taught his children to hope, "Never again."

Uranium-235 (the fissile isotope used in bombs) has a half-life of 704 million years. Plutonium-239 has a half-life of 24,000 years. As most of us learned in school, all radioactive elements have a half-life—the average time it takes for half of the atoms in a specimen to decay. Invisible particles fly from their nuclei, and the isotopes decay into more stable isotopes of the same element, or sometimes, another element entirely. Every atom craves stability, though arriving at that state can take a very long time. Some isotopes are so unstable that their half-life is measured in tiny fractions of a second; other half-lives are measured in billions of years. The by-products of radioactive decay can act upon living beings in ways both murderous and therapeutic. With each encounter, we too are changed.

Perhaps all stories have a half-life, too, affecting us to varying degrees and for varying lengths of time. It is safe to say that we—as in *we, the members of the human race*—have told precious few stories that stand a chance of outlingering our stock of U-235, but we have produced many venerable narrative specimens. There are stories that stay with us, stories that we keep revisiting, stories that become archetypal.

The images of mushroom clouds that accompanied the news of August 1945 introduced the story of the bomb to the world audience *in medias res*. The images announced a narrative that was, at once, both old and new. On one hand, we had never seen anything like it before. After a long war in which the conventional ways of meting out death had been executed with greater intensity than ever before, we had mounting statistics—but statistics merely tell, while stories show. ("Show don't tell" is the familiar phrase used by instructors in introductory creative writing classes. It is founded on the same wisdom that both Stalin and Mother Teresa were drawing upon when they expressed the sentiment, in different terms and for different purposes, that a single death is comprehensible as a tragedy, while a million deaths are a sad fact without the same power to spur us.)

The bomb killed hundreds of thousands, so in that sense, its use was something more or less than a tragedy. In literary terms, the bomb more closely resembled an eschatological myth.

The idea of the apocalypse is nothing new. We knew these images—if not the precise form of the mushroom cloud, then at least its function—from

stories of old. The breaking footage suggested that these ancient stories could soon be actual news reports. It was a reminder of our sins and a prophecy of the fires that could await. But even if you don't believe in hell literally, here was an end to the world as we knew it. And it had already happened.

The father of corporate public relations—Henry Stimson's friend, Arthur Page, who penned Truman's press release—set the world spinning in the aftermath, and still we go round. The weapon itself had only the power to destroy a city and its inhabitants; the stories we tell about it, to ourselves and to each other, have the power to control its influence on future events.

Novels and nonfiction narratives were long the primary influence on my own understanding of these events. John Hersey's Pulitzer-winning work of journalism, first published in the *New Yorker* in 1946 and reprinted as a slim book simply titled *Hiroshima*, showed me the image of a woman clutching the body of a baby that had been dead for two days while she searched the ruins of the city for her husband, who was undoubtedly also dead, his remains blasted into a thermodynamic afterlife of pure energy, where they would remain unfindable. Hersey's account follows five specific survivors, and powerfully explores the impact of the bombing by describing their lives in the aftermath. I have read nothing else which so viscerally demands my empathy for the victims of warfare. However, Hersey's decidedly anti-bomb work did not force me to recalibrate my pre-existing belief that to focus on the specific technology that caused the destruction is not the most productive way to judge such events or prevent future horrors.

Previously, I had also read Kurt Vonnegut's *Slaughterhouse Five*, a radically different sort of war writing—a satiric novel that is not about nuclear weapons at all. The protagonist is a chaplain's assistant, Billy Pilgrim, who lugs a portable field organ through training exercises that leave him ill-equipped for what lies ahead. Shortly after he is sent to the front, Billy is taken prisoner by the Germans, sent to Dresden, and held in a slaughterhouse. The city is firebombed while he shelters in an underground meat locker; afterward, he is sent out to dispose of the bodies.

This plotline is interspersed with Billy's delusions about space-time travel among extraterrestrials, and his fantasy relationship with a porn star, which largely displace any explicit description of the horrors Vonnegut actually witnessed as prisoner of war who sheltered in a meat locker in Dresden when it was firebombed to the brink of oblivion. That is to say, I suppose *Slaugh-*

terhouse Five is also a book about PTSD. Had I not read it, I would not have looked up the statistic of 90,000 people (plus or minus 70,000, depending on your choice of sources) who died in Dresden as a result of the Allied firebombings in February 1945. And what I concluded from Vonnegut's work and the ancillary research it inspired was that the precise mechanism of slaughter is less important than the result.

Violent and untimely deaths are categorically bad. We seem to have an irrationally magnified fear of bloodless weapons, things that kill us from the inside out, but bullets and shrapnel are no kinder than noxious gases. Dying or becoming debilitated in a firebombing raid is just as gruesome as dying or becoming debilitated in a nuclear explosion. Because of *Slaughterhouse Five*, I could imagine a book as searing as Hersey's *Hiroshima* but entitled *Dresden*. If the bomb has a virtue, in comparison to a firestorm, it is that it makes people stop and protest the act of mass killing with more conviction.

Other stories have been told. Consider the Q&A section of the Hiroshima Peace Memorial Museum's English-language brochure, which I picked up when I visited Hiroshima in 2004. It begins:

> [Q] Why Did the U.S. Develop the Bomb?
>
> [A] The United States began studying the atomic bomb when World War II began in 1939. In August 1942, the U.S. launched a development program called the Manhattan Project. The bomb was successfully tested on July 16, 1945.

Note: the answer given here does not address *why* the U.S. developed the bomb, as the question purports, but *when*, and to a lesser extent *how*. *Why* is not acknowledged, any more than the reasons why the Nazis invaded the Belgian Congo in 1940 are mentioned in the pamphlet. (The Congo was the world's best-known source of uranium.) In the absence of context, none of these events appears to have any possible justification, moral or even coldly political. In response to the question of *why*—which by definition interrogates causality—the pamphlet gives not an answer, but a "story" in the disparaging sense once defined by the English novelist E. M. Forster: "the chopped off length of the tapeworm of time." Forster distinguished *story*, in this sense, from *plot*, by way of a famous example. "'The king died and then the queen died' is a story. 'The king died and then the queen died of grief' is a plot. The time sequence is preserved but the sense of causality overshadows it. . . . A plot demands intelligence and memory also."

We need what Forster would call a plot—intelligence and memory—to make sense of what happened in 1945. What he calls a story—a mere sequence of events—will not do; we need the narrative sensibility that explores questions of motivation and acknowledges that the events constituting a plot are not merely an arbitrary succession of happenings.

People do things for reasons. Our reasons are not always grounded in virtue, but they are reasons nevertheless. We are people. And that is why we need narratives and novels about *why* people do things, which can train the vectors of our empathy in new directions and can help us distinguish what is right from that which is merely self-righteous. Beyond and between and around the dualities of right and wrong is where we find ourselves, and all the other human beings.

Charlie used simple arithmetic on 12 August 1945 when he set out to make a precise reckoning of his guilt, as measured in Japanese fatalities. He wrote to his parents, "With only two bombs we have killed between 250,000 and 300,000 Japanese people. Divided evenly over the number of people on the project, each member is responsible for the death of four Japanese. I cannot count this as an honor."

Something seems terribly naïve to me about this arithmetic. I grant that any citizen of a democracy with nuclear capabilities would be irresponsible not to count herself in some way complicit and to take action (if only rhetorically) to see that those weapons are responsibly used—or *not* used, in the preferred case. On one hand, then, it seems unreasonable to count only those who worked on the Manhattan Project as the parties responsible for those Japanese deaths. On the other hand, if one thinks it justified to count only those who secretly turned the screws that brought this terrible technology into being before the rest of us knew about it, then one must stop and question the reasonability of counting those as lowly as Charlie, who turned only literal screws while unaware of the metaphorical screws turning around him.

Charlie recounted in that 1945 letter to his parents what Oppenheimer had told the assembled members of the project after the bombings:

> He said, "I know that all of you are thinking very much about what we have done, and that you are asking yourselves whether there is justification. I want you to go on thinking about this, for this is the only way this can ever become a good thing."

To this, Charlie added:

> As for myself, I see no reason why you should not tell people of my association with this project. Despite all the foregoing, there has been introduced into our lives an element of pride, the pride that accompanies the success of a mission. I think I can look a combat soldier in the eye now. If you feel like being a little proud too, that's OK. But bear in mind that this is not basically something to be proud of, and if you feel like offering a prayer for the human race, now is a good time.

Charlie went on thinking—not least about becoming a physicist. After the war, he got his undergraduate degree in physics at Harvard and then worked for a year as a researcher at Brookhaven National Laboratory, studying cosmic rays just as his Uncle Joyce (who had died by then) had done before the war. Next, Charlie began a PhD in physics at Stanford—but he lasted only six weeks before he dropped out and apprenticed himself to a pipe organ repairman. The reasons, he would later say, were "spiritual."

Charlie was not like J. S. Bach, who signed his work "*soli Deo gloria*"—for the glory of God alone. Charlie was not even a devout Christian in his youth, though he was a long-time enthusiast of certain aspects of the Episcopal liturgy. But he found, in the technology and in the sound of the organ, a religion. The organ was the altar itself.

By the early 1970s, Charles Fisk had established himself as the foremost American organ builder of his generation. His instruments would be known for the way they blended the practices of old European masters with a brand of practical ingenuity that some like to think of as distinctly American. Charlie's personal association with the Manhattan Project receded into the past, and became a detail of his early life that was not secret, but was not often spoken of until the late 1970s and early '80s—when the Doomsday Clock still wavered between seven and four minutes before midnight, and when Charlie's own death was looming, thanks to an autoimmune disease that affected his liver. Then, there was a flurry of media interest in his youthful adventuring in physics and his subsequent reinvention. Charlie became the subject of a spate of human-interest pieces on television shows such as NBC's *Today Show* and CBS's *Sunday Morning with Charles Kuralt*. He was also featured on Paul Harvey's NPR show *The Rest of the Story* and profiled in magazines as diverse as *Technology Illustrated* and *Blair & Ketchum's Country Journal*. After his death, there would even be a literary novel entitled *The Organ Builder*, by Robert

Cohen, inspired by the description of Charlie's life's work that appeared in his *New York Times* obituary. And so on.

The common thread in these stories is a fascination with Charlie's radical change of profession, freighted by others with symbolic significance he himself was reluctant to acknowledge. Most of the radio and television pieces share a common formula: Begin with a depiction of organ building, letting the reverential rasp of hand tool on wood and the sounds of the finished instruments convey the transcendent nature of the work. Then introduce Charlie.

Charles Fisk at work in the Fisk shop in the 1970s. Image courtesy of C. B. Fisk, Inc.

Use labels like "mild" and "scholarly," perhaps mentioning that he's a Harvard man. Next, suggest psychological conflict by cutting abruptly to the image of a mushroom cloud before alluding to the fact that Fisk worked on the Manhattan Project in his youth. No detailed description of his role on the project is necessary—he helped build the bomb, the mushroom cloud as a backdrop sums it up—but brandish words like "genius," because after all he was a kid working in Los Alamos in 1945. Then come back to the organ and the humble manual labors that bring it into being. Let the organ reverberate with symbolism, as the antithesis of the bomb. Imply or state a theory of causality that turns this story

into a plot, renders this sequence of events into the stuff of literature: Charles Fisk wanted to make up for the bomb by making something beautiful. His is a story of atonement and redemption.

The Paul Harvey radio piece was the most exaggerated in its use of this angle. It was subsequently adapted and included in an anthology of "All New! All True!" stories, entitled *Destiny*—a word we invoke when we want to give an aura of inevitability if not magic to our decisions, or when we wish to emphasize the external rather than the internal factors that drove us to them. In the Harvey piece, Charlie is described as "a proud reactionary [who] devoted his life to showing us why not all we call progress is progress . . . as though purposely averting his gaze from some terrible vision—as though attempting to atone for a past unpardonable sin."

The words "as though" are critical; without them, this good plot isn't quite accurate. Charlie never owned the parable of atonement. Nor did he disavow it. When he explained his motives for becoming an organ builder, his account was more nuanced, less conducive to the seven-minute human-interest piece. His brief past as a physicist, and before that as an electronics technician, had not left him saddled with guilt that he was trying to expiate by making instruments. When asked by the reporter from the Charles Kuralt show, he said he was not "incensed" by the bomb at all, but "awed." But, even so, Charlie was conscious of the risk that as a physicist he might again be involved in something that could hurt people. An organ wouldn't hurt anyone unless it fell over on top of them—or unless it bored someone to death, as he sometimes joked. The tellers of the seven-minute human-interest piece would let that stand, as if he now aspired only to harmlessness.

But Charlie had grander creative aspirations. To a receptive audience he could wax on about his musical ambitions for every organ he built. Truly, his career choice was more positive (to build better organs) than negative (to renounce physics). His reasons were as idiosyncratic and as ordinary as most: a combination of desire, opportunity, aptitude, and chance. His genius might be much more legitimately debated on the basis of his organ building achievements than his youthful soldering exercises in Los Alamos, but the earlier part of Charlie's story was emphasized by the human-interest pieces. Organs, frankly, are less interesting to most people than the bomb.

Charlie went along with the media coverage to a point—free publicity is good for business, and organ building has slender financial margins—but he began to tire of it. When his teenaged daughter Miranda joked with him about

his newfound celebrity in 1980, he dismissed the stories that were granting him a humble sort of fame. He was proud of the organs he made, which were products of his vision and his doing, but he no longer felt pride, exactly, for his participation in the Manhattan Project. Unlike his twenty-year-old self, he was no longer self-conscious about the dumb luck and nepotism that had allowed him to make minor contributions to an event of epochal importance. He didn't need to speak of his involvement to prove his worth to classmates who actually saw war. He would rather be remembered for what he *had* done with his life: build excellent organs.

The most honest and nuanced accounting among the stories that proliferated near the end of Charlie's life was in the 1979 *Country Journal* profile written by a young freelance reporter named Keith Yocum who got his scoop when he went to buy a used motorcycle from an employee of the C. B. Fisk organ shop. During the transaction it came up that the boss had worked on the Manhattan Project, and Yocum was intrigued. He was a product of the war, in a way, himself. His father had been an American serviceman at an Allied submarine base in Western Australia, a man who first fell ill and then fell in love with a nurse; marriage and children ensued. And Yocum grew up around military bases, leaning personally toward literature and philosophy. His keenest interest as a writer, and the core subject of the novels he would one day author, was the mark left by wars on the people who lived through them.

After Yocum interviewed Charlie for the initial article, he came back and interviewed him again, thinking perhaps of writing more. He would hold on to these tapes for decades, never quite finding an appropriate use for them, and finally—years after Charlie's death—giving them back to the organ shop for its archives.

When Charlie agreed to these interviews, he was fifty-four. He had been sick for almost thirty years with a condition that the doctors only diagnosed as sclerosing cholangitis in the last years before it killed him. (There is no scientific evidence linking this disease to radiation exposure, but that would not stop Charlie and many who knew him from wondering if the correlation was simply as yet undiscovered, given the rarity of the condition.) Charlie had known since the early '70s that he faced long odds against seeing sixty. Though he had grown tired of bomb-based publicity and the obtuse angle it usually took, he would be gratified to give a more in-depth interview to someone who might set the record straight.

Yocum asked Charlie—in his full maturity—what he had felt about the bombings when they happened. Charlie made no mention of his youthful arithmetic, as that reckoning was more or less obsolete. "It didn't really matter," he said. He had concluded, perhaps, that it was grandiose to apportion himself that much blame—the gesture seeming too much like taking personal credit for something that was not his doing. But sensing that "it didn't matter" was also an inadequate thing to say about something so immense and so terrible, he kept talking for a long time:

> I don't know enough about Hiroshima and Nagasaki to know what was lost there, culturally, but I know what was lost in some of the big cities in Europe, which seems much more tragic to me right now. For instance, I can't get over what an incredible tragedy existed in one particular place: Katharinenkirche—St. Catherine's Church—in Hamburg, where there was an organ that Bach played, that was just perfect. . . . The joys that could have come out of that one particular instrument were such that. . . . I just think of what was lost.

I cringe at the way that a mere thing—a musical instrument—took a privileged place over human lives in his late calculations. I cringe at the way that Asian culture is so lightly set aside, as the unknown, while he speaks rapturously of his favorite artifacts of Western culture. But I know, too, that he was human. We can only mourn what we can imagine. We can only sorrow for what we can actually feel. By the end of his life, Charlie lived inside pipe organs. It was easier for him to wistfully imagine the sound of the pipes than the lives of the unknown boys who once pumped the bellows while Bach sat at the keyboard—to say nothing of the sounds of music made by unfamiliar musicians on unheard instruments on the far side of the earth. Empathy is fundamentally an act of imagination: we imagine variations on what we know, and so it was the loss of the organ that Charlie most keenly felt.

Charlie's innocence was long gone by the time of Yocum's interview, but that innocence had not been vaporized by the explosions in 1945. This is clear from Charlie's 1979 recollection of how things went for him, personally, after the news of the bombings first broke in Los Alamos. Finally, he said, he could understand why it had been so important to create a perfectly spherical implosion. Though in the course of his work he had never seen the core of plutonium that would fit within the detonator, he now knew that they had been trying to compress that sphere, forcing the atoms into each other, to create a nuclear

chain reaction. Without an even application of force by the imploding detonator, the core would not have achieved critical mass, and the reaction would have fizzled. The Fat Man bomb that was dropped on Nagasaki would have fallen flat.

On the day of the Nagasaki bombing or shortly thereafter, amidst the scientists' jubilance—genuine, equivocal, and wary—Charlie discussed the bomb design with a physicist of his acquaintance. (Charlie would not name this friend during the Yocum interview, perhaps not wanting to implicate him in something that was so clearly, in retrospect, inadvisable.) The physicist mentioned to Charlie that another plutonium core still remained at Los Alamos. The scientists knew that if Japanese surrender was not imminently forthcoming, it could be used like its predecessors, but for now it was stored in the tech area where the physicist worked. He suggested that Charlie and another curious technician of their acquaintance could have a look at it, if they wished.

The secret was out, and the work was essentially done, although the results of those science experiments so recently begun in Hiroshima and Nagasaki that would confirm the dangers of radiation were not yet complete. "Who knew about plutonium then?" Charlie said, looking back. He and his fellow technician accepted the offer. The physicist led them to the room with the safe and unlocked it. He brought out two solid metal hemispheres, each the size of a halved orange, with a pit in the center, like the place where the stone of an avocado might grow. The halves were stored separately, but when placed together they would form a sphere with the power to reshape worlds. Charlie and the other technician took turns holding each half.

About a week later, this particular lump of plutonium would be involved in the first of two "criticality accidents" which killed Los Alamos scientists with radiation poisoning. After the second, in May 1946, the scientists began calling the sphere the Demon Core. In July 1946, it was detonated over Bikini Atoll in a test. You cannot exorcise radiation, but you can disperse it, and that's what they did—over the Pacific Ocean.

But when Charlie grasped that mass of plutonium in August 1945, those events were still in the future. His first thought was of just how remarkably heavy it was, its density as palpable as it was unfathomable. He was not immune to the swelling of pride—pride in his proximity to these historic events, and pride that he held, literally, a fraction of the power and responsibility for them—but he was reasonable enough to know, even then, that what he *ought*

to feel next was horror. He could never *just* put the sphere back in the safe. Nobody could. We might all like to get on with a life in which such things have no place outside of myth. But here we stand, still, with the immense and terrible weight in our hands.

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