

Living and Dying with Fallout

Mary Dickson

“There is no danger.” —Atomic Energy Commission¹

“Going back to testing has nothing to do with a war on terror. It is terror itself.” —Darlene Phillips, downwinder²

LAST SUMMER, WHILE I WAS reading the *Salt Lake Tribune*, I stumbled across the obituary of a beautiful woman who looked uncannily like my older sister, Ann. That’s why I read her obituary. Only when I saw the list of Lisa McPhie’s survivors did I realize she was Lisa Lundberg, who had grown up with me on a quiet tree-lined street in Salt Lake City. Her older sisters were my best friends in junior high school. We were inseparable then. Thirty years later, Lisa, who watched our teenage escapades with a hint of bore-

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1. Voice-over narration, Atomic Energy Commission, *Atomic Tests in Nevada*, film, 1955; VHS tape of film in my possession.

2. Darlene Phillips, “Radiation Is Radiation,” letter to the editor, *Salt Lake Tribune*, January 26, 2004, A-6.

dom, was dead of a rare blood disorder that had defied diagnosis since she first became ill in 1985.

The same week she died, I learned that Terry Cantrell, another friend from our Canyon Rim neighborhood, had died of the brain tumor that plagued her since we were teenagers.

I added their names to the long list of my elementary school classmates, neighbors, and friends who have died or become ill over the last forty years. The list begins with Mr. Howell, who left behind a wife and five children when he died of a brain tumor at age thirty-nine. Next was ten-year-old Tammy Packard, whose head had been shaved before a futile operation to save her from a brain tumor when I was eight. Her younger brother died within a few weeks at age four and a half of testicular cancer, a rare cancer for a child so young. Tammy's devastated parents asked the pediatrician if it could be a coincidence that ten other people in the neighborhood also had cancers, including several brain cancers.³

The cancers took longer to grow in other kids my age. Quiet LaDawn Montague was twenty-nine and pregnant when she was diagnosed with a bone marrow-related childhood cancer rare in adults. She died in 1985, five days after her daughter was born. I remember it because it was the same year I was diagnosed with thyroid cancer. Like me, perky Janine Bush around the corner was in her twenties when doctors found nine malignant nodes on her thyroid. Joyce Rees, across the fence, has struggled for fourteen years with a primary immune deficiency disorder that has meant a lifetime of repeated infections. Her sister bore three children with birth defects. Her aunt, who lived next door to them, died of brain and ovarian cancer. Michael Hill, who lived down the street from my family, died of non-Hodgkins lymphoma. Gordon Hillier, who lived a few doors down, died of leukemia. Marcie Boley, one street over, has suffered for more than a decade with a malignant brain tumor. The cancer has now spread to her spine. No wonder our friend Murray Howell said he felt lucky to turn forty.

My sister Ann and I counted almost twenty-six people we knew of from our old neighborhood who died or became sick from various can-

3. Cathy Packard, Tammy's mother, says she was later asked to release her children's medical records to researchers. The request was made through the hospital. Packard was never told who the researchers were, what they were looking for, or what they found.

cers, autoimmune diseases, or rare blood disorders. Marilyn Rogers and Colleen Hill, who grew up with us, keep a list of their own. Colleen's brother died of lymphoma; her sister has lupus, an autoimmune disease; and Colleen was diagnosed in her twenties with primary immune deficiency disease.

Colleen was twice a patient at the UCLA Medical Center, where she was seen by a doctor who went to Chernobyl after the meltdown. "I always thought it was odd that they thought it was brought on by radiation exposure," she told me. "I told them I was never in Southern Utah during testing, but they kept insisting that something happened, that I got the exposure some place. They thought perhaps I just didn't remember being in Southern Utah on a childhood vacation. They kept saying the immune system doesn't just shut down without a reason, and that radiation exposure was one of the biggest." When she told her immunologist about all the cancers in her old neighborhood, he asked her where she grew up as "he wanted to make sure he didn't buy a house in that area."⁴

Colleen's list includes forty-two people, many of them my old schoolmates and their family members, whom I hadn't heard had died or were sick. They suffered from brain tumors, leukemia, lymphoma, thyroid cancer, breast cancer, ovarian cancer, pancreatic cancer, lung cancer, liver cancer, stomach cancer, neuroblastoma, lupus, multiple sclerosis, miscarriages, and birth defects. The list is still growing. Keeping it hasn't been easy. Many of our old neighbors have married, left the state, or moved on, taking their illnesses and their medical histories with them. I regularly read the obituaries, looking for others. Often, I find strangers on those pages who share an important connection: "'Kip' Riches. Born May 4, 1931. Died after a five-year battle with a bone marrow disease. He witnessed atomic bomb testing in Yucca Flat, NV."

Two years ago, I wrote my sister Ann's obituary. She was forty-six when she died after suffering for nine long years from lupus. Summing up her life in a few short paragraphs was the hardest assignment I ever had. After struggling for words to define her and the three children she left behind, I included one important line: "She was a downwinder." A simple declarative sentence, just as "He witnessed atomic bomb testing"

4. Except where indicated, the quotations in this article are based on personal interviews I conducted between February and December 2003.

was a simple statement of fact that belied the years of suffering and the human toll of four decades of nuclear testing.

I can't prove that our illnesses were caused by exposure to fallout from nuclear testing. Determining cause and effect is a problematic, incredibly complex business, made more difficult by notoriously incomplete record-keeping during the years of testing. But although direct cause is nearly impossible to prove, the data have led many researchers to conclude that there is a strong correlation between exposure to fallout and cancer. What I keep running up against in my search for answers is the dichotomy between the demand for conclusive scientific evidence and the undeniable evidence of human experience, and I'm led to ask why so many of my friends and neighbors got sick or died without explanation. There could be other causes for our illnesses,⁵ and I can't say for certain that they are radiation related, but it is true that for many years all of us lived downwind. There is no denying our experience. This much I have learned: No one can prove that exposure to radiation *didn't* make us sick.

How many others like us have there been? How many more will there be?

* * *

A war doesn't have to be declared for it to claim victims. In the name of protecting us from the threat of Communism, our own government conducted what amounts to a secret nuclear war, dropping more than a hundred atomic bombs on the deserts of Nevada from 1951 to 1962 and regularly exploding hundreds more underground until 1992. Those bombs, a quarter of them more powerful than the one dropped on Hiroshima, were exploded only when the wind blew eastward. An exaggerated fear of Communism led the U.S. government to be the first to develop and use weapons of mass destruction. They used those weapons against the civilians of Hiroshima and Nagasaki, killing an estimated

5. For decades, the U.S. Army also tested germ agents, nerve gas, and radiological weapons in Utah's west desert. Lee Davidson, "Can Utah's MS Rate Be Linked to Tests?" *Deseret News*, December 31, 1994, A-1, reported that 328 open-air germ warfare tests took place in Dugway, Utah; 1,174 open-air tests of chemical arms, mostly nerve gas; and 74 tests of weapons that spread radioactive particles in the wind.

220,000 people instantly and in the immediate aftermath.⁶ Then, for four decades our own government used similar nuclear weapons against us as part of the program of nuclear testing. No foreign enemy has done as much harm to American civilians as has our own government. "They done to us what the Russians couldn't do," one downwinder said.⁷

* * *

I did not always realize these connections. Growing up in Salt Lake City in the 1960s, I don't remember hearing about nuclear testing. We had bomb drills in grade school that sent Tammy Packard, LaDawn Montague, and the rest of us scurrying under our desks as part of the "duck and cover" defense which supposedly would keep us safe if the Russians dropped an atomic bomb. Or we shuffled off to the school's dark basement, toting our Clorox jugs of water, laughing about what we'd eat and where we'd pee if we were really trapped in that dirty basement. We greeted these drills more as unannounced recesses than serious preparation for possible disaster.

We watched films in school assemblies about what America would look like if the Communists took over. We heard about the "Red menace" and godless Communists, but we didn't hear about cancers or strange tumors or fallout. We drank our milk and ate our vegetables, assuming that, as the Mormon hymn told us, all was well. In the winter, we ate snow cones made from snow and sugar.

My father was a professor of meteorology at the University of Utah. He understood weather patterns and jet streams. Still, we didn't hear about how the winds carried radioactive fallout across the heartland and as far as the eastern seaboard. Our neighbors who could afford it were busy in those years building fallout shelters. When the Reds dropped atomic bombs, they'd be ready. My family couldn't afford to retrofit, so we settled instead for a well-stocked food storage room in our unfinished basement. Little did any of us know that the Department of Defense was

6. Arjun Makhijani and Stephen I. Schwartz, "Victims of the Bomb," in *Atomic Audit: The Cost and Consequences of U.S. Nuclear Weapons since 1940*, edited by Stephen I. Schwartz (Washington, D.C.: Brookings Institute Press, 1998), 396.

7. Elmer Pickett, quoted in Carole Gallagher, *American Ground Zero: The Secret Nuclear War* (Boston: MIT Press, 1993), 151.

bombing us regularly and that the fallout had already worked its way through our neighborhood and into our lives. Our concrete shelters and rows of canned beans were as useless as ducking under a desk or carrying a Clorox bottle of water to the basement.

In the spring before my thirtieth birthday in 1985, I was diagnosed with thyroid cancer. I had no symptoms other than the pea-sized nodule on my neck. The "Big C," as my uncle called it, was growing inside me for no apparent reason. My world lost its predictability with two words: "It's malignant." Facing surgery and radiation treatments, I didn't think it mattered how I got cancer. The only thing that mattered was to get rid of it. Friends and family gave me long, sad looks, as though they expected the worst. Unable to face me, my youngest sister left her favorite Madame Alexander doll on my desk with a note: "You have to be O.K. You're the only radical sister I have." Did she think I wasn't coming back? The day before surgery, I overheard a friend at the office whisper, "She's so brave," as I pounded away at the keys of my typewriter, trying not to think about my surgery the next day.

The surgeon cut out my thyroid gland and the lymph nodes around it. A few days later nurses gave me radioactive iodine, euphemistically called a cocktail, to drink. It was supposed to destroy whatever thyroid tissue may have escaped the scalpel. After I swallowed it, a nurse wheeled me back to my room in a high-backed wheelchair made of lead—to protect her from me. On the door of my room was a sign: "Caution! Radioactive Material." Stamped on my hospital bracelet was the same symbol. I was the radioactive material. Every day a radiologist opened the door to my room and pointed his Geiger counter at me to see how "hot" I was. Knowing it wasn't safe to enter the room, the nurses shoved trays of food under my door. I did nothing but drink water in a desperate attempt to flush out the radiation. I was isolated in my hospital room for four days until the reading on the Geiger counter was low enough that I could be around people again. When I left the hospital, they destroyed my clothes and everything I had touched.

After six weeks deprived of any thyroid hormone, I underwent a body scan. The doctor showed it to me. I saw the "hot" spots in my ovaries and on my bladder. They warned me not to get pregnant for at least a year. They cautioned that it was best for me not to be around babies or pregnant women for a few more days. Frightened by their warnings, my husband moved to the back room for several weeks. Like him, some peo-

ple felt it best to avoid me, whether out of fear of the radiation or because I was a reminder of the randomness with which misfortune strikes. If it could happen to me, it could happen to them. When I ran into an old acquaintance and told her why I'd been out of the office the last three months, she backed away from me as if my bad luck might be contagious.

She wasn't the only one I made nervous. My husband scolded me when, months after my surgery, my hand instinctively went to my neck, feeling for more lumps. "Stop looking for more," he cried, as if my vigilance would bring the disease back. "They said they got it all. Stop looking for more!" I'll never stop feeling for more.

"Since I've had thyroid cancer, does that mean I had my bout with cancer and I won't get any other kind?" I naively asked my doctor, desperate for reassurance. He smiled and said there are no guarantees of anything. What he did tell me was that I now had a "compromised immune system," meaning that I would be especially vulnerable to certain types of infection for the rest of my life.

After I recovered, I went back to coediting the *Desert Sun*, a newspaper that monitored the Nevada Test Site and carried stories about underground nuclear tests, leaks, and radiation. I knew about the 100 bombs exploded in Nevada during the twelve years of open-air testing.⁸ I knew about the mushroom clouds of deadly particles they spewed during the years I was growing up. I knew about the 804 underground tests conducted until 1992.⁹ I knew that the Department of Energy admitted that many of those tests leaked, or "vented," radiation, some of them at levels comparable to Chernobyl.¹⁰

I interviewed Chuck Mays, a University of Utah radio-biologist, who told me thyroid cancer was common among those exposed to radiation as children. Children, particularly girls, were most susceptible to the effects

8. Untitled reader's note, Nevada Division of Environmental Protection website, retrieved September 26, 2003, from <http://ndep.nv.gov/boff/photo01.htm>. See additional statistical information at the U.S. Department of Energy website, <http://www.nv.doe.gov/news&pubs/publications/historyreports/default.htm>.

9. Ibid.

10. These leaks are discussed in "The Radioactive Effluents Released from Announced U.S. Continental Tests, 1961 through 1988," DOE/NV-317. Washington D.C.: Department of Energy, 1990.

of radioactive iodine, one of the primary byproducts of nuclear fission, which was easily absorbed by the thyroid gland. He told me that the damage caused by radiation is not from what falls on us but from what we ingest. Fallout that fell on the plants was eaten by cows grazing in the fields, and children drank the milk from those cows. While radioactive iodine has a half life of eight days, it is concentrated in the thyroid gland, where it can have a more intensely focused effect. It can take twenty or more years for the resulting thyroid abnormalities like nodules and malignant tumors to surface.

I grew up drinking fresh milk delivered to us every morning by trucks from a local dairy. Still, I didn't think of my own cancer as anything but bad luck in a random universe. I grew up in Salt Lake City, 300 miles from the blasts of the Nevada Test Site. Like so many of us, I assumed radiation was something that only affected people in southern Utah, those who had the bad luck of living directly downwind of the blasts at the Nevada Test Site. They were the ones who got cancer and died. They were the ones the government finally had decided to compensate with the 1990 Radiation Exposure Compensation Act.

Then I met Carole Gallagher. She was a New York photographer who moved to Utah to document the effects of nuclear testing on people living downwind of the Nevada Test Site. She interviewed and photographed hundreds of people, collecting one horror story after another. Ordinary people from around the West recounted countless medical problems, unspeakable suffering, and always endless tales of death. They talked about playing in the fallout that landed like snow, of sand that melted like glass, of hair that fell out in clumps, of lambs born with hearts outside their bodies, of school children dying of leukemia, of entire families being stricken—all while the government assured them there was no danger.

The first time I interviewed Gallagher for an article I was writing, I mentioned my thyroid cancer. She latched onto the story of my disease and started grilling me about my life—when I was born, where I was raised, if I drank milk.

“Testing,” she said. “You got cancer from testing!”

“But I grew up in Salt Lake,” I protested.

She shook her head. “You people are so naive. You think fallout stopped at Richfield. It went everywhere.”

She showed me a map of the fallout. Utah and Nevada were blot-

ted out and the black ink spread as far north as Canada and as far east as New York. She explained how the jet streams spread silent poison that rained out on unsuspecting neighborhoods like mine. She told me how contaminated hay, milk, wool, wheat, and meat from Utah and Nevada had been shipped all over the country. Then Carole Gallagher asked to interview me.

When Gallagher's book, *American Ground Zero: The Secret Nuclear War*, was released nationwide in 1993, I reluctantly opened my copy. I read two stories before bursting into tears. I saw my face among the photographs of ranchers, teachers, and scientists, all of us downwinders. I had been lucky. Doctors pronounced me recovered. Other people in Gallagher's book were not so fortunate. Many have died.

I waited a few days before opening her book again. I read the list of diseases possibly related to radioactive fallout: cancers, heart disease, neurological disorders, reproductive abnormalities, sterility, birth defects, and immune system-related illnesses.¹¹ My sister's lupus was an autoimmune disorder. The multiple sclerosis that plagued several friends was a disease of the nervous system. Could there be a connection?¹²

* * *

Since Gallagher interviewed me, I've had another major surgery. In 1994, doctors opened me up to remove my reproductive organs. I remembered the warning during my bout with thyroid cancer not to get pregnant for at least a year after I drank the radioactive "cocktail." I never did get pregnant. After years of trying, I gave up. Tumors in my uterus and on my ovaries were to blame for that. What else might show up in years to come?

Meanwhile, more obituaries are being written, more cancers diagnosed—friends and neighbors, acquaintances, my Utah grandfather, a

11. Gallagher, *American Ground Zero*, xxxv.

12. I pose the question here because of the incidence of lupus and multiple sclerosis (MS) in our area. In Utah, unfortunately, there are many smoking guns, including other open-air testing by the U.S. Army at Dugway Proving Grounds involving nerve, chemical, and radiological agents, which constitute another form of bioterrorism to those of us who know what that means. Researchers for the National Multiple Sclerosis Society have asked if Utah's high rate of MS could possibly be connected to viral infections caused by decades of those tests.

cousin, co-workers, former colleagues, the University of Utah radiobiologist I interviewed, Carole Gallagher, and my coeditor at the *Desert Sun*. I get calls from strangers telling me about their cancers and the cancers that have claimed their relatives. They want advice, comfort, a sympathetic ear. An atomic veteran emailed me about his only child, born with birth defects, who died a few days later. A beautiful young mother who lived across the alley from me in Salt Lake City's Avenues came to my door in tears a few years ago to tell me she had been diagnosed with aggressive leukemia. The first thing her doctor asked her: "Did you grow up in Utah?"

A friend who recently underwent surgery for thyroid cancer recalled staring at a map of the United States as she lay on the table for her body scan. "All I could think of was that the place I loved had betrayed me." More recently, a reporter friend who works at the public radio station in my building, a lifetime Utahn, was diagnosed with multiple myeloma, the same disease that claimed Utah's former governor, Scott Matheson. My friend is undergoing chemotherapy and stem cell transplants that he hopes will give him a few more years with his family. He remembers finding a weather balloon as a child and bringing it home, where he played with it for days. He thinks the balloon may have been one released during tests at the test site to track fallout.

"There's my cancer," he told me in the parking lot one day. "My father-in-law who was with the FBI and worked at Los Alamos died of lung cancer. My wife's first husband was exposed to Agent Orange. Do you think my family's made enough sacrifices in the name of national security?" he asked.

A student of mine at the University of Utah looked at me the first day of class and said, "You have the smile." At first, I thought it was his embarrassing attempt at flirting. Then he pointed to the scar on my neck.

"I had thyroid cancer," I told him.

"Yeah," he said. "So did my sister and my girlfriend. We call that scar 'the smile.'"

"Where did you grow up?" I asked.

"Ogden." It is a city forty miles north of Salt Lake.

"Where in Ogden?"

"Ogden Canyon."

I asked him if he knew about fallout, if there had been other thyroid problems in his family. His sister was the first to get thyroid cancer, but both of their parents had had brain tumors. Had fallout slammed against

the canyon walls the same way that air pollution gets trapped there during winter inversions? According to a former AEC researcher, radioactive fallout can concentrate in “hot spots” such as canyons, which act as a natural reservoir.¹³

In 1954, John Wayne, Susan Hayward, Agnes Moorehead, Dick Powell, and the cast of *The Conqueror* were filming near St. George in Snow Canyon, Utah, 137 miles from the Nevada Test Site. Shot Harry and Shot Simon, two especially dirty tests detonated in 1953, had blanketed the canyon with fallout that remained radioactive. By 1980, ninety-one of the 220 cast and crew members had contracted radiation-related cancers. At least half of them, including Wayne, Moorehead, and Powell, later died of their cancers. Upon hearing the news, a Pentagon scientist from the Defense Nuclear Agency, said, “Please God, don’t let us have killed John Wayne.”¹⁴ Children who accompanied their parents to the set, including John Wayne’s sons Michael and Patrick, also developed cancer later in life. It was lupus, not cancer, that ultimately claimed Michael. In 1980, when the fate of *The Conqueror* cast was made public, the director of radiological health at the University of Utah said the “case could qualify as an epidemic.”¹⁵

I think of that cast, of my student, and of my neighbors on the canyon’s rim. Why did so many of us get sick? How many Americans could have been poisoned by the deadly winds of the Cold War? When the pink clouds of fallout drifted across the skies in all directions as I was growing up, no sirens rang out to signal the danger. We blithely went about our lives, assuming we were safe. We trusted our government to protect us.

* * *

I can’t prove that I got thyroid cancer from drinking the milk or

13. Dr. Robert C. Pendleton, former director of radiological health at the University of Utah and a former Atomic Energy Commission researcher, is paraphrased in Karen G. Jackovitch and Mark Sennett, “The Children of John Wayne, Susan Hayward and Dick Powell Fear That Fallout Killed Their Parents,” *People*, November 10, 1980, 44.

14. Unnamed Defense Nuclear Agency scientist, quoted in *ibid.*, 46. Norman Solomon and Harvey Wasserman, *Killing Our Own: The Disaster of America’s Experience with Atomic Radiation* (New York: Dell Publishing, 1982), 80-81.

15. Dr. Robert C. Pendleton, quoted in Jackovitch and Sennett, “The Children of John Wayne,” 42.

eating the vegetables. No one can tell me for certain how I got it. All these years later, after spending hundreds of millions of dollars on studies, scientists are still arguing about radiation levels and health consequences, cause and effect relationships, dose reconstruction, and health implications. Some studies say that cancer rates weren't significantly higher in downwind populations as a result of testing, while other studies find excess cancers in residents downwind of the test site. Some say the epidemiological proof is solid, impugned only by those in government who have consistently lied to the public. Sorting through conflicting reports can be confusing, but the most compelling research shows a definite link. That link is addressed in many forums, including a synopsis in Richard L. Miller's book, *Under the Cloud: The Decades of Nuclear Testing*.¹⁶ Miller is an industrial health specialist with field experience in onsite coordination of health and safety investigations. His major areas of focus have included efforts to determine population exposure to past radiological releases and clusters of disease that may have been caused by such exposures. He has researched the U.S. nuclear test program extensively.

Miller cites a 1984 article by Colorado physician and researcher Carl J. Johnson, published in the *Journal of the American Medical Association* entitled "Cancer Incidence in an Area of Radioactive Fallout Downwind of the Nevada Test Site." Johnson found a "startling increase" in cancer rates among residents living in an area of Utah downwind of the test site. Downwinders, he found, had significantly higher levels of leukemia, lymphoma, and melanoma, as well as cancers of the breast, thyroid, colon, stomach, and bone.¹⁷ How likely is it that these increased rates of cancer have occurred by coincidence?

Sadly, the burden of proof rests with victims. But proof dissipates and disappears, becoming one of the first things to blow downwind. Sci-

16. Richard L. Miller, *Under the Cloud: The Decades of Nuclear Testing* (Woodland, Tex.: Two Sixty Press, 1986), see esp. 379-89, "Evidence."

17. Carl J. Johnson, "Cancer Incidence in an Area of Radioactive Fallout Downwind of the Nevada Test Site," *Journal of the American Medical Association* 251, no. 2 (1984); quoted in Miller, *Under the Cloud*, 383-84. Miller reproduces Johnson's table showing how many times higher than expected cancer rates were between 1958-66 and 1972-80. Cancer of the bone (10 times and 12.5 times respectively) was the highest.

ence's demand for hard evidence overshadows the truth of our lives. My evidence is my body. What is written on my body is more important than any numbers or calculations written in a report or in a book. I have "the smile." This is what nuclear testing did to me. Like countless Americans affected by fallout, I have no recourse. Unless we lived within a narrow rural region around the Nevada Test Site, the government has decided that our cancers and illnesses aren't related to nuclear testing. We can never be adequately compensated. "We never asked for this mess," Colleen Hill told me. "And our government just won't or doesn't see the damage they did to us all."

In her book, Carole Gallagher reports the circumstantial evidence linking nuclear fallout to disease. Her work and the work of many others show that the government knew the facts—about fallout, about contaminated milk, about the susceptibility of children—and that they lied to the American people. People like me, my sister, my friends, and neighbors. They continued to tell us we were safe even when they knew how far the fallout went and how high its levels of radiation were. Norris Bradbury, who ran the testing program and served as director of the Los Alamos National Laboratory in New Mexico, knew the risks involved with fallout. While the government was trying to convince Americans that testing was safe, Bradbury warned his own family, who lived in southern Utah at the time, to leave the area. In a 1994 interview with ABC's Peter Jennings, Bradbury's former daughter-in-law says he told her, "This is a serious situation, and this is not a good place to be, and you ought to go somewhere else."¹⁸ Bradbury failed to provide a similar warning to other Americans.

The release of formerly classified documents reveals more disturbing facts. A 1997 article in the *Bulletin of Atomic Scientists* told what happened at the Eastman Kodak Company in Rochester, New York. In 1951, two days after the Atomic Energy commission began testing nuclear weapons at the Nevada Test Site, Kodak's Geiger counters detected high levels of radiation in the snow that blanketed the city. When Kodak complained that its film was fogging, the AEC agreed to provide Kodak and other photographic companies with advance warning of nuclear

18. "Cover-up at Ground Zero," ABC News: *The Turning Point*, February 2, 1994, Betsy West executive producer. Transcripts are available for purchase at ABCNews.go.com/Sections/Primetime.

tests so they could protect the film.¹⁹ The American people were never granted the same courtesy.

In conjunction with the Department of Defense, the Atomic Energy Commission sent planes to follow and track nuclear clouds as they crossed the continent. Colonel Langdon Harris of Albuquerque, New Mexico, flew some of those planes through fallout clouds to take samples with specialized equipment and track where fallout went. Carole Gallagher quotes him in *American Ground Zero* as saying, "There's not anyone who lived in the United States during the years of testing who is not a downwinder."²⁰

Plenty of evidence lends support to his claims. From 1951 to 1958 the Environmental Measurements Laboratory monitored fallout at one hundred sites across the country, using gummed-film collectors. Though incomplete, data from those collectors measured fallout more than 2,300 miles from the Nevada Test Site. A November 1990 EML report showed that Albany, New York, ranked third behind Salt Lake City and Grand Junction, Colorado, in total deposits of I-131 from all atomic bomb testing in Nevada.²¹ A 1996 Lawrence Radiation Laboratory report showed that, between 1952 and 1955, ten western states were "covered with relatively high doses of radiation from open-air nuclear tests and that a densely populated section of the Northeast, including Boston and Albany, received unexpectedly heavy doses of radiation" from some of the early atomic tests in Nevada.²²

Albany journalist Bill Heller spent fifteen years researching the fallout that doused upstate New York in the aftermath of one nuclear test detonated in Nevada on April 25, 1953. In his disturbing 2003 book, *A Good Day Has No Rain*, Heller presents compelling independent data documenting how an extremely violent storm on April 26 rained out excessive levels of radioactive fallout on the Albany-Troy-Utica area of New York. Had Geiger counters at the Rennselaer Polytechnic Institute in Troy not registered the radiation that day, the people of New York

19. Makhijani and Schwartz, "Victims of the Bomb," 422.

20. Gallagher, *American Ground Zero*, xxv.

21. Paraphrased in Bill Heller, *A Good Day Has No Rain* (Albany, NY: Whitston Publishing, 2003), 149, 153.

22. Paraphrased in Joe Costanzo, "Boston and Albany Got Fallout Dose, Too," *Deseret News*, February 2, 1979, A-1.

may never have known that radiation from Shot Simon was raining down on them. Initially, scientists suspected that something was wrong with their equipment because their readings were so abnormally high. But when other researchers in the area showed the same results, they called the Atomic Energy Commission with their findings, suggesting they might be connected to Shot Simon. The AEC waited five days to send its own scientists to take measurements. The levels the AEC officially reported were more than twenty times lower than what independent scientists in Troy had found. In his research, Bill Heller uncovered documents from a secret meeting of the AEC, which recorded much higher levels of radiation. The AEC kept those levels secret from the residents of upstate New York for more than twenty years, lest they “alarm the public.”²³ Not surprisingly, Heller also writes about the incidence of leukemia, cancers, and other illnesses suffered by the people of upstate New York in the aftermath of Shot Simon.

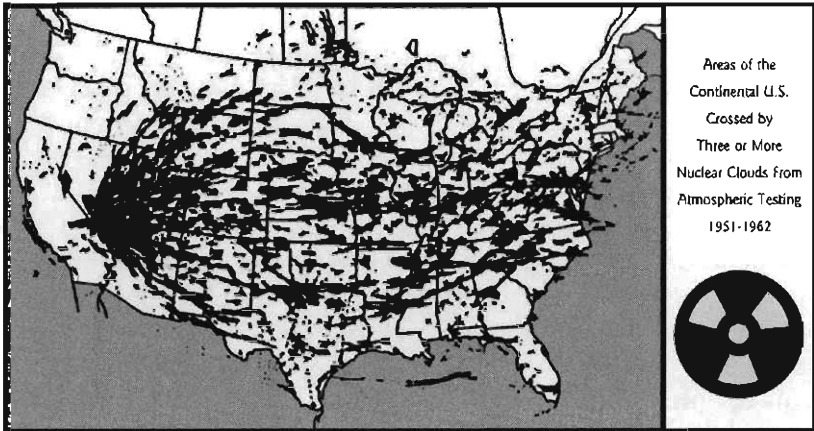
Richard L. Miller also writes about Shot Simon in *Under the Cloud: The Decades of Nuclear Testing*, noting that “an area thousands of miles from the epicenter [Albany] was hotter than some areas of the Nevada Test Site.” A government meteorologist, he says, cautioned that other areas, especially the Midwest, may have experienced much higher levels. “As far as fallout exposure was concerned,” Miller writes, “distance from the test site was of small importance. Towns and cities across the entire continent were at risk.”²⁴

We know the disturbing details of what Shot Simon did to New York because independent records were kept. What happened in other communities across America where such records were not kept?

I carry a credit card sized map in my wallet. It’s from Miller’s *Under the Cloud*, and it shows how far fallout from the twelve years of open-air testing was tracked. Miller, probably the country’s foremost researcher on charting fallout patterns from nuclear testing, compiled his map after collecting and analyzing data from the Atomic Energy Commission, the Defense Nuclear Agency, and the U.S. Weather Service. He put a black dot on any area of the country that was crossed three or more times by fallout clouds. His map, which he calls a “connect-the-dots” of fallout’s trajectory, is the powerful image that Carole Gallagher first showed me

23. Heller, *A Good Day Has No Rain*, 148.

24. Miller, *Under the Cloud*, 8.



“Areas of the Continental United States Crossed by Three or More Fallout Clouds,” from Richard L. Miller, *Under the Cloud: The Decades of Nuclear Testing*, 444. Reprinted by permission.

in 1989.²⁵ “Areas where fallout actually fell encompass a much larger area—the entire United States,” he says. I carry that map as a reminder, not so much to myself, but as a way of bearing witness and as a warning to remain vigilant. I don’t need any reminders of what fallout did to people living in those areas of black on Miller’s map, but a lot of other people, including those who govern us, need a primer.

Whether people live in Idaho, Missouri, or New York, they need to

25. While this map doesn’t show how much fallout was deposited at any one location, that information is revealed in the extensive data from the 1997 National Cancer Institute Study published online: *Estimated Exposure and Thyroid Doses Received by the American People from Iodine-131 in Fallout Following Nevada Atmospheric Nuclear Bomb Tests: A Report from the National Cancer Institute* (U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, October 1997), 120,000 pp.; available under that title on November 30, 2003, at <http://rex.nci.nih.gov/massmedia/fallout/contents.html>. I read and downloaded part of an executive summary with the same title from <http://rex.nci.nih.gov/massmedia/exesum.html> on November 30, 2003. Neither document was available in February 2004, although there were still links to them. Miller analyzes this data in *The U.S. Atlas of Nuclear Fallout 1951-1962* (Woodland, Tex.: Legis Books, 2000).

know about this country's nuclear history and its continuing consequences because some of those people, no doubt, are already suffering those consequences. I've shown Miller's map to people around the country, who are always shocked. Most of them had no idea that fallout may have drifted over their cities and towns or that rainouts were regular occurrences.

I have maintained correspondence with Richard Miller since I interviewed him in February 2003 for an article I was writing. He is generous in sharing his research in the hopes that it will help stimulate further research in the field. He has written that "millions of curies of radioactive isotopes were deposited across the country, making their way into the food chain and exposing several generations of Americans to radiation."²⁶

In July 2003, I asked Miller to send me a list of counties he identified—based on government data—that were especially hard hit by fallout. In addition to counties in Utah, Nevada, and "anywhere in upstate New York due to Shot Simon," his list included Des Moines, Iowa, and southern Iowa, which were hammered by Shot Tumbler-Snapper 7. Adair and Knox County, Missouri, were also hit hard by Shot Tumbler-Snapper 7. New Orleans was hit hard by the Plumbbob series of tests in 1957. Tumbler-Snapper 8 was detonated in advance of a cold front that brought down exceptionally hot rains on Southern Idaho, particularly Gem County. Also on Miller's list are counties in Colorado, New Jersey, Louisiana, Massachusetts, Arkansas, Kansas, Maine, and Tennessee. "In addition," he wrote me, "there's a raft of scientific papers studying Nebraska and, I believe, South Dakota farmers trying to figure out why the multiple myeloma rate is high there. . . . Missouri has a significant number of cancer clusters—some of which have been studied by the Centers for Disease Control. Missouri also is, largely, one huge fallout hot spot."²⁷

Miller reminds us that fallout is memorialized only if it is recorded; and many times, detectors, particularly those east of the Mississippi River,

26. Miller, *The U.S. Atlas of Nuclear Fallout, 1951-1962. Vol. 1: Total Fallout* (Woodlands, Tex.: Legis Books, 2002), vii. Since 1951, radioactive releases have emitted over 12 billion curies of radioactive material into the atmosphere. U.S. Congress Office of Technology Assessment Management, cited in "Human and Environmental Effects of Nuclear Testing: A Citizen Alert Factsheet," retrieved September 26, 2003, from <http://222.citizenalert.org/fctshts/humenv.html>.

27. Miller, email to me, July 9, 2003; printout in my possession.

were never turned on. In fact, record-keeping was woefully inadequate during the decades of nuclear testing. While the AEC knew that thunderstorms could rain out high levels of radioactive fallout, it made no effort to evaluate hot spots and rainouts downwind of the test site.²⁸ The agency did not conduct health assessments of those living downwind, nor did it evaluate potential links between fallout and radiation-related disease.

The only major study mandated by Congress was the fifteen-year investigation by the National Cancer Institute released in 1997: "Estimated Exposures and Thyroid Doses to the American People from Iodine-131 in Fallout from Nevada Atmospheric Nuclear Bomb Tests." As its rather long title says, it looked only at radioactive iodine and the link to thyroid cancer. But fallout contained more than 300 other radioactive isotopes,²⁹ many of them far more lethal and with much longer half-lives than I-131.

* * *

Richard Miller's map is just a piece of the story. It shows only the trajectory of fallout from open-air testing, not from thirty additional years of underground testing that ended only in 1992. Detonating nuclear bombs underground instead of dropping them from the skies did not make them safe. According to a Citizen Alert factsheet, every underground nuclear explosion in Nevada was associated with the risk of a major release of radioactivity beyond the test site's boundaries. In addition, deficiencies in monitoring systems mean that major releases could go undetected.³⁰

As a child, I remember going to a Saturday matinee called *Crack in the Earth*. The movie was about scientists who exploded a nuclear bomb

28. Miller, *The U.S. Atlas of Nuclear Fallout*, 1:vii.

29. Livermore physicist Harry G. Hicks calculated ratios for 128 radionuclides produced by every above-ground test detonated at the Nevada Test Site. Miller used these ratios in his work, noting that different nuclear tests produced different groups of radionuclides. *Ibid.*, 1:641-46.

30. According to Bernd Franke's 1987 "A Review of Off-Site Environmental Monitoring of the Nevada Test Site," as cited in "Human and Environmental Effects of Nuclear Testing: A Citizen Alert Factsheet," retrieved September 26, 2003, from <http://www.citizenalert.org/ftshts/humenv.html>: Deficiencies in the monitoring system mean that major releases of radioactivity "could go undetected."

underground to stop a crack in the earth. The explosion doubled the speed at which the crack spread, nearly wiping out life on the planet. I was only seven, but it made perfect sense to me that if you exploded a bomb underground, the earth would shift.

The earth shifted many times when atomic bombs exploded underground. When underground test Jangle: Uncle was detonated on November 29, 1951, it affected communities far from the Nevada Test Site. The explosion, set off 17 feet below ground, created a crater 260 feet in diameter and 53 feet deep and sent an 11,500-foot plume of radioactive dust soaring above the Nevada desert. The resulting cloud crossed into Utah, passed over Salt Lake City, and dropped fallout over Wyoming, Nebraska, South Dakota, Minnesota, Wisconsin, Michigan, Maine, and the Canadian provinces of Ontario, Quebec, and New Brunswick.³¹

The notorious Sedan Shot, detonated on July 6, 1962, from 635 feet beneath the earth, generated seismic energy equivalent to a 4.75 magnitude earthquake. It displaced 12 million tons of earth, creating a crater 1,200 feet wide and 300 feet deep. At 10,000 feet, the resulting cloud traveled over Utah and soon crossed Salt Lake City, taking fallout over Cheyenne, Wyoming; Pierre, South Dakota; and into southern Minnesota. At 16,000 feet, Sedan's cloud followed a path just south of Pocatello, Idaho; then over Casper, Wyoming; and between Sioux Falls, Iowa and Omaha, Nebraska, ultimately crossing Missouri, Kentucky, and much of Tennessee, making it, in effect, an atmospheric test.³²

Sedan, incidentally, was just one of five tests conducted at the Nevada Test Site that week. The resulting fallout exposure has led to what has been called "The Summer of '62." In *Killing Our Own: The Disaster of America's Experience with Atomic Radiation*, Norman Solomon and Harvey Wasserman tell the story of Dr. Robert C. Pendleton, former director of ra-

31. Miller, *The U.S. Atlas of Nuclear Fallout*, 1:89. A map, "Buster-Jangle, Uncle (11/29/51), Figure BJ/0/1," National Cancer Institute (NCI) Study website: retrieved November 27, 2003, from <http://www2.nci.nih.gov/1131/maps/bj/Bj06trg.gif>.

32. Miller, *The U.S. Atlas of Nuclear Fallout. Vol. 1: Total Fallout*, General Reader Edition (Woodlands, Tex.: Legis Books, 2000), 1:327. Another map is available at the National Cancer Institute study website, retrieved November 27, 2003, from <http://www2.nci.nih.gov/1131/maps/ue/Ue06trg.gif>. "Underg. Era, Sedan (7/06/62) Figure UE/6/1," shows both the 10,000 and 16,000-foot trajectories reaching the Atlantic Ocean.

biological health at the University of Utah. Pendleton was in Big Cottonwood Canyon with graduate students taking measurements of granite in the area with Geiger counters when Sedan went off on July 6, 1962. Those Geiger counters picked up the radiation. Pendleton then tracked the fallout to Salt Lake, the Uintah Basin, and across the entire northern section of Utah. When he reported his findings to the State Health Department, it defied the Atomic Energy Commission and pulled milk from the shelves in Salt Lake City. No milk was pulled from the shelves in southern Utah because northern Utah had been harder hit.³³ Mason City, Iowa; Minneapolis-St Paul, Minnesota; as well as Howard, Mitchell, and Worth Counties in Iowa were also hit hard by fallout from Shot Sedan, according to Miller.³⁴

The Baneberry Shot, detonated December 18, 1970, was buried 900 feet below ground but spewed a visible cloud of radioactive debris 10,000 feet into the atmosphere. Its trajectory meandered over Nevada, Oregon, Utah, and Colorado, heading through Arizona, Texas, and Louisiana. At higher levels, the cloud wandered over Nevada, then headed northeast over Idaho, Montana, North Dakota, and into Canada.³⁵ Preston Truman, director of Downwinders, Inc., told me that the hottest levels of fallout fell on Snyderville, Park City, and Heber City, Utah.³⁶

As recently as 1986 at the Nevada Test Site's Rainier Mesa, where the Defense Nuclear Agency conducts weapons effects tests, the Mighty Oak explosion resulted in a radioactive release 2,000 times greater than Three Mile Island. According to the Department of Energy's assistant manager at the Test Site, the accident was caused when rock beneath the Rainier Mesa caved in from the shock of the blast.³⁷

According to an analysis of the Department of Energy data conducted by Downwinders, 54 percent of all underground tests in Nevada

33. Solomon and Wasserman, *Killing Our Own*, 114.

34. Miller, *U.S. Atlas of Nuclear Fallout*, Vol. 1: *Total Fallout*, General Reader Edition, 1:340.

35. "Underground Era Test Series, Nuclear Test Baneberry," National Cancer Institute study website; retrieved November 27, 2003, from www2.nci.nih.gov/1131/intros/BK5.html. A map is available at <http://www2.nci.nih.gov/1131/maps/ue/Ue17trg.gif>; retrieved November 27, 2003, "Underg. Era, Baneberry (12/18/70) Figure UE /17/."

36. Truman, email, November 23, 2003.

37. James K. Magruder, assistant manager for operations, paraphrased in

did leak. Many of those were small puffs of radiation. The more dramatic, spontaneous releases like those from Shot Baneberry or structural releases like those from Mighty Oak were less common but resulted in consequences far beyond the Nevada Test Site.³⁸ So many underground tests leak that Miller says there is “really no such thing as a totally underground test.” He states, “Any test that produces measurable offsite radiation should be considered an aboveground test.”³⁹ As Dr. Anthony Robbins of the International Physicians for the Prevention of Nuclear War told *Newsday* in 1991, “Underground nuclear weapons tests must not be assumed to be safe.”⁴⁰ The National Cancer Institute’s fifteen-year study on estimated exposures of I-131 includes maps that show the trajectories for each nuclear test, including underground tests through 1970. Those maps are a stunning reminder of how far fallout is carried by the winds. Anyone with internet access can look up these maps at <http://www2.nci.nih.gov/I131/maps>.

* * *

What is so disheartening is that the government knew as early as the Kodak and Shot Simon incidents how far fallout went and how many Americans could be exposed, but it continued to test atomic bombs for four decades. Instead of warning us, the Atomic Energy Commission printed a pamphlet applauding families who lived near the test site for being “active participants in the nation’s atomic test program.” The pamphlets claimed that the radiation in bombs was no more harmful than

unspecified *New York Times* article, February 17, 1989; article quoted in “Human and Environmental Effects of Nuclear Testing: A Citizen Alert Factsheet,” retrieved October 16, 2003, from <http://citizenalert.org/fctshts/humenv.html>.

38. [No author], *Radiological Effluents Released from U.S. Continental Tests 1961 to 1988*, DOE/NV-317 (Washington, D.C.: Department of Energy, 1990). Downwinders analyzed data in this report in the early 1990s to arrive at the 54 percent figure, according to Steve Erickson of Downwinders, email to me, September 19, 2003.

39. Miller, interviewed November 21, 2003; notes in my possession.

40. Quoted in Heller, *A Good Day Has No Rain*, 156.

sunshine. "Fallout does not constitute a serious hazard to any living thing outside the test site," the pamphlet assured.⁴¹

In the heat of the Cold War, a desire not to alarm the public or spread panic was a common rationale used by government officials who manipulated data, minimized risk, and hid the truth about the potential danger to human health. In *A Good Day Has No Rain*, journalist Bill Heller writes about secret government discussions to establish a test site on U.S. soil. Worried that the Russians would use the nuclear weapons they were building, the government wanted to know what those weapons would do. An island off Alaska was a possibility, but Atomic Energy Commission officials chose a site in the heart of the West—Nevada. Heller quotes the AEC's Dr. Gioacchino Failla saying, "The time has come when we should take some risk and get some information. . . . If we look for perfect safety, we will never make these tests."⁴² In essence, Americans became unwitting test subjects in a secret nuclear war. *New York Times* correspondent Keith Schneider, in his foreword to Gallagher's book, calls testing "the most prodigiously reckless program of scientific experimentation in U.S. history."⁴³

The morality of such an experiment was lost in the hazy cover of national security. War is predicated on fear—real or manufactured. The fear of Communism enabled the government to justify poisoning its own people, just as that fear enabled the public to accept reassurances of safety without question. Communism, not fallout, was considered the greater threat. National security was paramount, not the welfare of the people in the nation. "Risk," writes Heller, "was something the AEC accepted on behalf of the American people—without telling them—when it began testing atom bombs." He quotes AEC Commissioner William Frank Libby, who said February 23, 1953: "People have got to learn to live with the facts of life, and part of the facts of life are fallout." In a secret meeting after Shot Simon, discussing fallout dangers, AEC Commissioner Thomas Murray said, "We must not let any-

41. Atomic Energy Commission, *Atomic Tests in Nevada* (Washington, D.C.: U.S. Government Printing Office, 1957), 2, 13.

42. Heller, *A Good Day Has No Rain*, 17.

43. Scheider, Foreword, to Gallagher, *American Ground Zero*, xv.

thing interfere with this series of tests.”⁴⁴ Nothing was going to deter the government from its course of testing nuclear weapons. Military and political objectives outweighed public health concerns. That’s how our government could bomb America more than any other nation has bombed us. Downwinders were casualties of war, collateral damage.

* * *

It’s discouraging that so many people think atomic testing affected only southern Utah. Radiation does not respect arbitrary lines on a map. No magic shield stopped fallout at county lines mid-point in Utah. Yet the federal government decided to compensate only those people living within one of twenty-two rural counties around the test site who had suffered from multiple myeloma, lymphoma, leukemia, or primary cancer of the thyroid, male or female breast, esophagus, stomach, pharynx, small intestine, pancreas, bile ducts, gall bladder, liver, lung, salivary gland, bladder, brain, colon, and ovary. In addition, the act compensates only those who can prove that they were physically present for at least twenty-four cumulative months between January 21, 1951, and October 31, 1958, or for the entire period beginning June 30, 1962, and ending July 31, 1962. Underground testing through 1992 is covered. “RECA [the Radiation Exposure Compensation Act] was political, not scientific,” says Preston J. Truman, director of Downwinders, Inc. “Continually insisting the problem belongs only to southern Utah, and keeping the issue and the whole compensation fight to a small isolated part of the entire fallout path truly aided the government in sweeping it under the rug.”⁴⁵

Using Miller’s data, Truman has shown that counties in northern Utah, Colorado, Iowa, and New York received levels of fallout as hot as, or hotter than, some of the “politically correct counties,” as Truman calls those counties eligible for compensation. One RECA county in Arizona, for instance, is 186 times less hot than the adjacent Mohave County, which is not eligible for compensation. Truman sent me maps he has designed which rank each county in the country according to the levels of fallout it received. They show how arbitrary RECA coverage is. RECA’s limited coverage is likely a very large part of the reason that the

44. Quoted in Heller, *A Good Day Has No Rain*, 156, 57.

45. Information RECA and claim forms are available at the U.S. Department of Justice website: <http://www.usdoj.gov/civil/torts/const/reca/>.

vast majority of downwinders in America don't understand they may be downwinders.

Because most Americans don't know they were at risk, getting them to care about this issue is a constant exercise in frustration, even in Utah where too many downwinders remain, oblivious to their own past. A neighbor who lost a sister and mother to brain and colon cancer blames the sun for their maladies. Some of those affected by testing can find convenient rationales. "It was a good job," was a common refrain Carol Gallagher heard from ailing test site workers and their survivors. "We could all be speaking Russian now," others whispered.

A friend of mine in the thick of alternative culture asked me why I bother dredging up America's nuclear past. "No one cares," she said. "It's an old issue." Her own cancer was not enough to make her wonder if the issue might have some personal relevance. Like so many Utahns whose obituaries I continue to collect, she preferred not to consider any connections.

Denial is a powerful force, particularly in a culture conditioned to believe that those in authority—whether it be government or ecclesiastical—will make wise decisions on their behalf. We adopt a quiet obedience to laws and leaders, both religious and civil. Why would we question a government that urged us to "participate in a moment of history"? Most of us do not ask questions when told we have nothing to fear, all is well. We do not resist, even when we suspect all is not well. We are too easily persuaded that questioning is impolite and protesting unpatriotic, a mind-set we see increasingly in America today, though anyone, particularly those convinced they are in danger, can develop an unconscious willingness to be deceived. Combine that universal tendency with a national predisposition for denial, a desire to demonstrate patriotism, and a refusal to reflect, and you don't find many Americans resisting plans by the Bush administration to usher in a new atomic age.

How many times, growing up Mormon, did I hear Primary, Seminary, and Sunday School teachers tell us that the American Constitution was divinely inspired? that God favors America? This is the same refrain we see plastered on bumper stickers now as terrorism strikes fear into the nation: "God Bless America." But a divinely inspired government doesn't poison its own citizens.

* * *

During a conversation about the health consequences of nuclear testing, a coworker racked by arthritis asked me, "What good will it do to show any links to health problems? You'll only upset people."

"I guess that's my job," I said, shrugging sadly. "To upset people. So they won't let it happen again."

If the good people of Utah—so many of whom have suffered the effects of fallout—are indifferent to the legacy and future of atomic testing, why would those beyond Utah's borders, who view themselves as far removed from this unpleasant business in the "hinterlands," be interested? To most Americans, atomic testing is something that happened long ago in a remote area of the country they probably couldn't place on a map. They may have heard that some sheep died or that some people in southern Utah died. But they think that was long ago and far away, that it doesn't have anything to do with them, and that if testing should resume at the Nevada Test Site, they'll be far from its effects. Sadly, however, the opposite is true, a fact confirmed for me constantly not only by my own experience but also by that of so many, many others.

* * *

During the years of atmospheric testing, there were an estimated 40 million cancer deaths in the United States; but the true health impact of nuclear testing is impossible to ascertain. The government estimated that only 11,000 of those deaths were related to fallout.⁴⁶ According to the Nuclear Regulatory Commission, as of 1967 between 35,000 and 85,000 people worldwide had been killed by nuclear testing.⁴⁷ They studied only deaths that occurred before 1968. A 1991 study by the International Physicians for the Prevention of Nuclear War said that fallout from worldwide atmospheric atomic bomb testing in the 1950s and 1960s could ac-

46. Christopher Smith, "Downwinder Studies at End," *Salt Lake Tribune*, February 12, 2003, B-1.

47. Cited in "Human and Environmental Effects of Nuclear Testing: A Citizen Alert Factsheet," retrieved September 26, 2003, from <http://www.citizenalert.org/fctshts/humenv.html>.

count for 430,000 cancer deaths worldwide by 2070.⁴⁸ Other estimates range from 70,000 to 800,000 people in the United States and around the world who have died or will die of cancer from atmospheric tests in the United States.⁴⁹

Perhaps we rely too much on numbers. Whether it was 11,000 or 800,000 people who were affected isn't really the main point. We focus too much on statistics and not enough on real people and their suffering. That's why the stories of my neighbors and the people in Carole Gallagher's book are so important and so powerful. It's impossible to ignore the faces and stories of real people who were victims of a military/political experiment I can only describe as misguided. We are a living—for now—testament of the tragedy of our nuclear past.

While we will never know how many cancers or other illnesses across this country were caused by fallout from four decades of nuclear testing in the desert of Nevada, we can be fairly certain that many more cases exist than the government has acknowledged.

John Gofman, M.D., Ph.D., was a former associate director of the Lawrence Livermore Laboratory. He codiscovered uranium 233 and isolated the first milligram of plutonium for J. Robert Oppenheimer during the Manhattan Project. He has written definitive works on the effects of exposure to radiation, including *Radiation and Human Health* and *Radiation-Induced Cancer from Low-Dose Exposure*. He is skeptical of government studies which, he says, consistently downplay the effects of radiation.⁵⁰ He believes that the government likely underestimated by more than twenty times the rates of cancer caused by nuclear testing. Based on Hiroshima findings, he estimates twenty-six fatal cancers for

48. Paraphrased in Heller, *A Good Day Has No Rain*, 156.

49. Makhijani and Schwartz, "Victims of the Bomb," 428–29. The authors note that these are fatalities and that the rate of cancer incidence is 50 percent higher than cancer deaths.

50. Quoted in Gallagher, *American Ground Zero*, xxvi, 326. Like Gofman, several interviewees in Gallagher's book, as well as sources quoted in Heller's book, expressed skepticism regarding government-funded or government-related studies and studies involving those with ties to the nuclear industry.

every 10,000 people and twice that number for non-fatal cancers.⁵¹ For a better estimate, researchers would need to know the dosage of radiation from each test and how many people received that dosage. Unfortunately, populations in areas of significantly high fallout were never evaluated for radiation-induced illnesses.

It's not in the government's interest to know how many victims nuclear testing created. The National Academy of Sciences in February 2003 said that detailed health studies on the extent of cancer risk to people living downwind are unnecessary. That was discouraging news to those of us who have lived with cancer, birth defects, and disabling diseases. The National Academy of Sciences stated: "Although a more detailed study is technically possible, neither the data nor the consequences appear to justify it."⁵² Ironically, the government continues to fund studies in Russia examining fallout risks to residents downwind of the 1986 nuclear reactor accident in Chernobyl. According to 1998 congressional testimony from Owen Hoffman, chief scientist for the International Atomic Energy Agency, the accumulated fallout exposure from the Nevada Test Site was three times as much as that from Chernobyl.⁵³

The National Cancer Institute's 1997 study shows that virtually all Americans were exposed to fallout and that up to 212,000 lifetime cases of thyroid cancer alone may be related to testing. When Dr. Richard Klausner, Director of the NCI, appeared before a Senate subcommittee on October 1, 1997, to discuss the study, he said, "Some radio-iodine was deposited everywhere in the U.S., with the highest deposits immediately downwind of the NTS."⁵⁴ Anyone with internet access can view this study at <http://www2.nci.nih.gov/fallout/html>, click on one's state and county, and type in one's birth date to see what one's exposure was. One

51. *Ibid.*, 326.

52. Smith, "Downwinder Studies at End," B-1.

53. Elaine Jarvik, "Cancer Gave Utah a Healthy Mistrust," *Deseret News*, February 15, 2001, online edition: www.deseretnews.com/dn/view/0,1249,250011091,00.html.

54. Dr. Richard Klausner, "Testimony before the Senate Appropriations Subcommittee on Labor, Health and Human Services, Education and Related Agencies on Estimated Exposures and Thyroid Dose Received by the American People from Iodine-131 in Fallout Following the Nevada Atmospheric Nuclear Bomb Tests," retrieved November 30, 2003, from <http://tex.nci.nih.gov/massmedia/klausnerreport.html>

can request the information by specific test, or by series of tests, including underground testing through 1970. More than 100,000 pages of data from that study are online.

Miller's five-volume *The U.S. Atlas of Nuclear Fallout 1951–1962*, correlates fallout levels with cancer levels county by county across the United States. He based his correlations on NCI data about radioisotopes and total fallout and on cancer rate data from a 1983 NCI survey and the Center for Disease Control's WONDER site, which assigns diseases an international classification code and shows the rates of the disease for every county in the United States.⁵⁵

Miller's study of these reports finds cancer clusters across the country in areas hit hard by fallout. These cancer rates, he says, are significantly associated with certain components of fallout. While he cautions that such associations do not prove fallout caused these cancers, he believes that the results warrant further study. He plans to do similar correlations for other diseases. Miller sees these findings as potential diagnostic tools for physicians. If physicians knew their cities and towns were hit by certain radionuclides from testing, they could provide screening within those populations for related cancer and disease.⁵⁶

"How many people were affected by fallout?" he asked in response to my question. "The answer is probably a simple one: all of us were affected. The question is, to what degree?"

Given the way radiation works, we have yet to see all the damage caused by fallout. At a certain level, radiation damages cells and alters genetic codes. But people don't always get sick immediately after exposure. It can take decades for radiation-related illnesses to manifest. Many cancers, for instance, don't appear until ten to forty years after exposure. As I've

55. Miller's sources are: (1) National Cancer Institute, "Estimated Exposures and Thyroid Doses"; (2) Harry G. Hicks's tables of radionuclides published as "Results of Calculations of External Gamma Radiation Exposure Rates from Fallout and the Related Radionuclides Compositions," July 1981; (3) National Cancer Institute, *U.S. Cancer Mortality Rates and Trends 1950–1979* (National Cancer Institute/Environmental Protection Agency, 1983); Center for Disease Control's Wide-Ranging Online Data for Epidemiologic Research (WONDER) website (<http://wonder.cdc.gov>), which shows the incidence of several diseases, including cancer, HIV/AIDS, and diabetes for every U.S. county from 1979 onward with a lag time of three or four years for collecting and compiling data.

56. Miller, Interview, February 2003, notes in my possession.

noted, the half life of radioactive iodine is eight days, but the latency period for the thyroid disease, tumors, and the cancer it causes can be twenty years or more. Cesium-126, with a half life of 29.1 years, lodges in the muscles. Strontium-90, which mimics calcium and lodges in the bone, teeth, and blood-forming tissue, has a half life of 30.1 years. It can remain in the bones for a lifetime, where it continues radiating surrounding tissue, which can lead to bone cancer, leukemia, and cancers of the soft tissue. Because it also concentrates in breast milk, it can lead to breast cancer. Carbon-14, which has a half-life of 5,730 years, can be incorporated into the DNA of cells, creating biological damage that can lead to birth defects, miscarriages, and hereditary defects. When you take into account the half life of radioisotopes, the latency factor of various diseases, and the genetic damage that can affect future generations, you realize that many fallout-related illnesses have yet to appear.

We will be living with the effects of fallout for a very long time.

* * *

And now, despite the terrible price we have paid for nuclear testing, our government is considering a revival of testing at the Nevada Test Site as part of the war on terrorism. The climate of fear that drove the Cold War is mirrored in the response to the terrorist attacks on the World Trade Center that extreme measures are necessary for our defense.

Even before 9/11, however, the Bush administration was making noises about nuclear testing. Shortly after taking office, the administration announced that it was going to withdraw from the Anti-Ballistic Missile Treaty, which arms control experts have described as the cornerstone of nuclear arms control for the past thirty years.⁵⁷

In late June 2001, three months before the 9/11 terrorist attack, the administration ordered nuclear weapons scientists to study a range of options to “reduce lead times” to resume nuclear bomb explosions at the Nevada Test Site, saying that testing would be necessary to ensure the reliability of our nuclear arms stockpile. Former defense official

57. Briefing: “The Bush Doctrine: New Nuclear Weapons for a New Nuclear Arms Race,” Green Peace Online Media Center; retrieved October 16, 2003, from <http://www.greenpeaceuse.net/media/publications/bushdoctrinetext.htm>.

Frank Gaffney said in May 2001, "We're going to have to resume on a limited basis underground testing of our nuclear arms."⁵⁸ (The first President Bush had declared a moratorium on underground testing that has been in effect since 1992.)

Then, in February 2002, just three months after the attacks, the administration delivered to Congress its controversial Nuclear Posture Review, which was basically a blueprint for overhauling the nation's position on nuclear weapons and a dramatic departure from the course taken by any previous administration. That review called for the research and development of new usable, preemptive nuclear weapons and shortened the timeline to start new nuclear tests in Nevada.⁵⁹

The new generation of nuclear weapons includes "mini-nukes" (fewer than five kilotons) and the Robust Nuclear Earth Penetrator, or "bunker buster," designed to destroy deeply buried underground bunkers. The ground-penetrating bunker buster could supposedly be used against underground bunkers of rogue nations and terrorist cells to destroy stockpiles of chemical and biological weapons that may be buried there. Neither of these weapons has been requested by the military.

At the urging of the administration in May 2003, Congress approved a partial repeal of the Comprehensive Test Ban Treaty as part of the massive Defense Authorization Bill, a move which would allow research and development of the new nuclear weapons.

In a Dr. Strangelove-like gathering in August 2003, 150 scientists, administration officials, arms experts, and planners met secretly at the Offutt Air Force Base outside Omaha, Nebraska, to discuss the Nuclear Posture Review, the next generation of nuclear weapons, and the possible resumption of nuclear testing. Troy Wade, a former Department of Energy defense chief and nuclear arms adviser, told a *Las Vegas Re-*

58. Steve Erickson and Preston J. Truman, "N-Testing to Resume?: Administration Preparing to Break Out of the Nuclear Weapons Testing Moratorium?" Downwinders website; retrieved November 17, 2003, from <http://www.downwinders.org/commentary.html>.

59. Ellen Tauscher, "Cold War Comeback? The Nuclear Threat from Within," *San Francisco Chronicle*, November 18, 2003, reprinted online at the WagingPeace website; retrieved December 18, 2003, from http://www.wagingpeace.org/articles/2003/11/18_tauscher_cold-war.htm.

view-Journal reporter, "You're going to have to do everything to know it will work. And the best way to ensure it will work is through a test."⁶⁰

Before the Thanksgiving recess last November, Congress passed two spending bills giving the administration almost everything it wanted in the nuclear arena, including authorizing approximately \$25 million on upgrading the Nevada Test Site so that it could be ready to resume testing within twenty-four months; \$7.5 million to study bunker busters; and \$6 million to research mini-nukes.⁶¹ A determined White House came back in February 2003, asking for \$30 million to increase test readiness and \$27 million for the bunker buster.⁶²

The wheels are being set in motion.

Representative Ellen Tauscher (D-California) is one of many critics who sees the Bush attitude toward nuclear weapons as a hypocritical move that undermines global nonproliferation efforts. "This is a major departure from where we were three years ago and deserves serious debate," she wrote in an op-ed piece for the *San Francisco Chronicle*. "Do we want a world in which the United States is spurring a new global arms race?"⁶³

Apart from what the administration's course says about our abandonment of hard-won nonproliferation treaties and testing moratoriums, logic would lead one to wonder about the scientific wisdom and military utility of creating and testing these weapons.

Princeton University physicist Robert Nelson, a senior fellow in science and technology at the Council on Foreign Relations, said that an explosion caused by bunker-busting devices would probably not destroy chemical and biological agents but would disperse them into the surrounding environment. In addition, even a very small bunker buster

60. Quoted in Keith Rogers, "Experts Say U.S. Should Consider Using Mininukes," *Las Vegas Review-Journal*, August 25, 2003, B-1.

61. William M. Adler, "Nukes Are Back!: The Bush Administration Plans for the Next (Little) Nuclear Wars," *Austin Chronicle*, January 16, 2004; retrieved January 17, 2003, from http://www.austinchronicle.com/issues/dispatch/2004-01-16/pols_feature.html.

62. Ian Hoffman, "White House Seeks More Nuke Funds," *Oakland [California] Tribune*, February 3, 2004, A-1.

63. Tauscher, "Cold War Comeback?"

could blow out a crater and send a huge cloud of radioactive dust and debris into the atmosphere.⁶⁴

Richard Miller says that some of the proposed nuclear bunker busters are supposed to have warheads three times as powerful as Shot Sedan. “There is no way a device like that can be field tested without producing a huge radioactive debris cloud,” he says. The November 1951 Jangle: Uncle shot, one of the dirtiest underground tests, was designed as a bunker buster. Miller says that testing new bunker busters will likely resemble the Uncle shots—small, but extremely dirty.⁶⁵

The whole proposition seems preposterous. How the issue will play out remains to be seen. Much depends on public and political response, as well as November 2004 election outcomes. If Bush is re-elected, we will likely see a continued push for the weapons and for test readiness. Miller’s outlook is bleaker: “We’re going to get nuclear testing. As we’ve seen, the Bush administration can do what it wants to.”⁶⁶

* * *

Writer Gore Vidal calls us “The United States of Amnesia,”⁶⁷ which seems to describe our attitudes toward nuclear testing. How can our government so easily ignore the legacy of our nuclear past, abandon test ban treaties, and usher in a new nuclear era? Where is the public outrage?

If Americans across this nation and their leaders don’t recognize that they could again be at risk, why would they resist the resumption of nuclear testing? If they don’t know what the declassified documents show, why wouldn’t they believe hollow assurances that limited underground testing, should it be deemed necessary in the war on terrorism, will be safe?

As a downwinder, I have earned the right to be outraged at the administration’s callous willingness to abandon the moratorium on nuclear testing. I am particularly dismayed that Utah’s Congressional delegation,

64. Quoted in Shawn M. Schmitt, “United States I: Nuclear ‘Bunker Busters’ May Disperse WMD Agents Not Destroy Them, Expert Says,” *Global Security Newswire*, August 11, 2003; retrieved August 17, 2003, from www.nit.org_newswire/issues/2003/8/11/4p.html.

65. Miller, Interviews, February 28, 2003, November 22, 2003; notes in my possession.

66. Miller, Interview, November 21, 2003.

67. Gore Vidal, *Perpetual War for Perpetual Peace: How We Got to Be So Hated* (New York: Thunder’s Mouth Press/Nation Books, 2002), ix.

which has battled for more compensation for downwinders, voted with Congress to pave the way for nuclear testing. Only Representative Jim Matheson (D-Utah), whose late father was a downwinder, has actively resisted such a plan, introducing legislation in February 2003 to make the resumption of testing more difficult. The rest of Utah's Congressional delegation betrayed me and my family, the families of LaDawn Montague, Colleen Hill, Lisa Lundberg, and countless others by voting to study employing first-use weapons and to clear the way for nuclear testing.

When a concerned group of Utahns met with Representative Matheson, he told us he was disheartened by how little those in Congress know about nuclear testing, as evidenced by debate during voting. It's obvious there is a lot of educating to do, even in my home state.

When I called Senator Orrin Hatch's office in May 2003 to help me understand his vote, the young man who answered the phone told me, "He's not just the senator of Utah, you know. He's a United States Senator. He has to look at what's good for the country."

What's good for the country. Is nuclear testing, with the fallout it could generate, good for the country?

Senator Hatch would do well to reread what he said on July 14, 1981, when introducing Senate Bill 1483, the radiation exposure compensation bill: "A great wrong was committed by the federal government in exposing thousands of Americans to radioactive fallout while simultaneously conducting a massive campaign to assure the public that no danger existed. . . . There are now many innocent suffering victims of the mistakes made by Government officials over two decades ago. . . . We must make sure that it does not happen again."⁶⁸

We must make sure it does not happen again.

In an interview with public radio station KUER in Salt Lake City, Senator Hatch claimed that underground testing isn't like atmospheric testing, that underground tests will be small with few, if any, serious consequences for public health.⁶⁹ Representative Rob Bishop (R-Utah) said in a January 10, 2004, town meeting that he would do anything to support

68. Quoted in A. Costadina Titus, *Bombs in the Backyard: Atomic Testing and American Politics* (Reno: University of Nevada Press, 1987), 137.

69. Orrin Hatch, interviewed by Dan Bammes, KUER-FM, May 23, 2003, Salt Lake City, audiocassette in possession of Dan Bammes.

the military, even if it meant testing nuclear weapons. He said, "We'll find a way to do it without harming citizens."⁷⁰

We've heard these assurances before. The experiences of Eastman Kodak, Shot Simon, Shot Sedan, and Shot Baneberry show just how far-reaching and unexpected the consequences of testing can be. Barton C. Hacker spent two decades writing and researching the history of radiation safety in nuclear weapons testing. In *The Atomic West*, he stressed "the uncertainty inherent in any test program and the impossibility of making safety the top priority."⁷¹ Princeton University physicist Robert Nelson reminds us that there is no such thing as a "clean" nuclear weapon.⁷²

If the administration resumes testing, Americans once again become expendable in the name of national defense. It strikes me as ironic that our government, under the pretext of securing our safety, is so willing to sacrifice it. Is the war on terrorism, like the war on Communism, worth sacrificing our own people again?

Perhaps it is a matter of perspective. We are at war because terrorists killed 3,000 Americans. How many more Americans did our own government kill with atomic testing? As Claudia Peterson, a downwinder in St. George, Utah, said in a *National Geographic* interview, "We've watched how quickly the government has put together compensation for 9/11 victims, and that has been a tough one to swallow. What happened that day was horrible, but they are so quick to recognize what someone else did and shove under the rug what they've done to their own people."⁷³

When bombs are exploded on the land of an innocent people, leading to sickness and death months or years later, is that not in itself an act

70. Quoted in Peggy Fletcher Stack, "Rep. Bishop Voices Concerns over New Immigration Proposals," *Salt Lake Tribune*, January 11, 2004; retrieved January 12, 2003, from <http://www.sltrib.com/2004/Jan/01112004/utah/127958.asp>.

71. Barton C. Hacker, "Hotter Than a \$2 Pistol," in *The Atomic West*, edited by Bruce Hevly and John M. Findlay (Seattle: University of Washington Press, 1988), 158.

72. Quoted in "Nuclear Bunker Busters: Unusable, Costly, and Dangerous," April 12, 2002, Council for a Livable World website; retrieved on September 30, 2003, from www.clw.org/control/nukebusters.html.

73. Quoted in Miki Meek, "Compensating Life Downwind of Nevada," *Weapons of Mass Destruction Online Extra*, *National Geographic Magazine*, Novem-

of terror, regardless of who detonates those bombs? Is nuclear testing less an act of terror because people do not die immediately? Do we need a reminder that America is the only nation ever to actually use nuclear weapons against human targets under the pretext of military necessity? President Harry Truman's own Chief of Staff, William D. Leahy, said, "In being the first to use the atomic bomb, we had adopted an ethical standard common to the barbarians of the Dark Ages."⁷⁴

After her book was first released, Carole Gallagher's photographs of downwinders were exhibited in several galleries around the country. The commentary from her book that accompanied the exhibitions drew a conclusion that seems especially pertinent today: "Deadened by 50 years of nuclearism, we may have mutated into a world unwilling to see. Out of this blind silence, a brief whisper of the voices of the living and the dead can now be heard. The nuclear war which claimed these gentle lives is no longer a secret. They leave their memories to us as a warning."⁷⁵

* * *

Before I got cancer, I always thought I led a charmed life, that things pretty much went my way. I eased my dark fears by convincing myself that really terrible things happened to other people in other places. I would be spared. I still feel lucky. But after being labeled "radioactive material," after watching my sister die, and after seeing too many friends fall ill, I realize that I and all those I love are just as vulnerable as anyone else. May our lives serve as warning. If we learned anything from being the unwitting subjects of the massive experiment of atomic testing, it is that we all live downwind.

ber 2002; retrieved August 31, 2003, from magma.nationalgeographic.com/ngm/0211/feature1/online_extra.html.

74. Quoted in Peter Scowen, *Rogue Nation: The America the Rest of the World Knows* (Toronto, Ont.: McClellan and Stewart, 2002), 41.

75. Gallagher, *American Ground Zero*, xxxiii.



This photo montage by downwinder and cancer survivor Mary Dickson, pictured here in 1962, is how she now views her childhood in Salt Lake City. Photo courtesy of Mary Dickson.