

LEYA KAMINSKY • VANESSA NAKATE • PRINCESS DIANA'S RPM
OCTAVIA BUTLER'S LUMINOUS ACORNS • 400,000 BABY TEETH

ORION

40 YEARS

NATURE AND CULTURE

Microcosms...



*Reading the miniature
worlds around us*

SLOW MOTION

THE STUDY inspired numerous copycat studies around the world. In New York, Dr. Stephen Jay Gould started his own Tooth Fairy Project. Public health advocates in Flint, Michigan, recently announced their own "Tooth Fairy Project" to study the effect of lead poisoning on Flint's children. These studies take decades, a lifetime, to complete. By then, however, the number of outside factors has grown exponentially, making causation more and more difficult to establish. Crimes unfolding in slow motion. So slowly, it is extremely difficult, but not impossible, to see them.

Fallout as a cascade. Like the poisoning of the human and animal biome described in *Silent Spring*, one must be able to see across ages, in stereoscope, to understand even a fraction of the damage done. Adults who donated their teeth to science in Dr. Reiss's pioneering study suffer abnormally high rates of cancer and thyroid diseases. It's possible their children do too. The American government is still quietly settling cases with downwinders, as they call themselves, people who grew up as far away as Montana and Wyoming, who aim to demonstrate that radioactive dust can be carried hundreds of miles on the wind.

Fallout as madness. The mother's irrational fear that the air, the ground, and the water might poison her baby. He comes into being seemingly untouched (in the world, but not of it). For the first three months, his feet barely touch the ground. He is passed hand to hand. Protected. Slowly, the world enters him, and the mother fears this, knows it is not just dirt he takes into his mouth, but also mortality.

Fallout as constant fear: a dull, persistent hum.

Great Falls, Montana, 1958. Just outside the Malmstrom Air Force Base. A prime target if nuclear war comes. My mother is eight years old, crouching under her tiny desk, arms wrapped around her head.

Brooklyn, New York, 2022. My six-year-old son hides under the classroom table during a simulated lockdown. In another corner, children gather, turning their faces to the wall. Some hold comfort items: tiny

stuffed animals, granola bars, notes from their parents: "I love you. Be brave. Be quiet."

Rocky Flats nuclear weapons production facility, outside Boulder, Colorado, 1988. I am nine years old, at a protest with my parents. They are artists and writers, marking the tenth anniversary of the "truth force" protesting nuclear proliferation and radiation poisoning along with Allen Ginsberg, Anne Waldman, and many others. In 1979 the government was forced by a FOIA (Freedom of Information Act) request to release documents that showed they had known, but suppressed information about, the dangers of weapons development. The land around the protesters looks empty, flat, the mountains dim in the distance. A man beats a drum, a monk chants for peace. "People can change this country," he tells them, "with a nonviolent movement." It is rumored he has been fasting for fifty days. The protesters bow toward him. Flags crack in the wind, people bury their hands in coat pockets. There are children and dogs, lots of hugging and chatter. A countdown. The crowd releases orange balloons tied to acid-yellow fliers bearing the radiation symbol, the strings catch and tangle in traffic lights but some rise like flares in the darkening sky. For more than a decade, protesters continued to arrive at Rocky Flats. They fasted and chanted for weeks straight, staying out in all weather. Sometimes workers at the plant and people driving by shouted insults at them. Police made arrests, the handcuffed protesters walking slowly, now white-haired. Two of the protesters requested that their ashes be scattered here. After more than a decade of widespread protest, the facility was finally shut down in 1994. But Rocky Flats did not disappear, it became a superfund site, its nuclear waste stored here indefinitely, upwind from a new housing development, a children's playground, with nothing to indicate what's buried there. A sign describes the site as the "Rocky Flats National Wildlife Refuge."

Nevada, 1953. The mushroom cloud as spectator sport. Families packed picnic baskets and drove to nearby lookout points to watch planned nuclear tests. "Atomic tourists," the newspaper called them.

Afterward, they lingered and ate egg sandwiches in a drifting cloud of radioactive dust. The sunsets must have been spectacular.

Seven

JUNIOR SCIENTIST

The boy wears a crisp white T-shirt and leans against a bright white wall, hands behind his back. He has dark, straight, close-cropped hair. His face radiates light. He is around six years old. Someone to the left of the camera has made him laugh, showing all his teeth. His two front teeth are missing.

Should we start with Ken Ogawa? Or with Ozymandias?

"My name is Ozymandias, King of Kings; Look on my Works, ye Mighty, and despair!" read the words carved into the pedestal, the statue shattered, "two vast and trunkless legs" in the desert.

We take photographs to resist death. We have children to cheat death. We make great works to inscribe our names in the book of ages. Yet sand, wind, and water erode our great statues. Our children only seal our pact with mortality. Photographs never tell the stories they were meant to tell.

In 1950 Alfred Carlton Gilbert, creator of the best-selling Erector Set, released the Gilbert U-238 Atomic Energy Laboratory, the "Junior Scientist," containing small jars of uranium ore, a handbook for the aspiring uranium prospector, and a Wilson cloud chamber that fired charged particles through an "alcohol-heavy atmosphere" where they formed droplets, "leaving cloud-like trails."

"That was the fancy set," Ken laughs, when I ask if he played with radioactive toys at home. "I had the three-panel set," he says, unfolding an invisible triptych. "That set had five." His Gilbert chemistry set included powerful chemicals too, which as a child he used to make things sparkle and change color. (He later graduated to stink bombs and flash powder.) Becoming one of the Baby Tooth Survey participants, he now thinks, helped him become "a science kid." He would eventually attend medical school and become a dentist.

Ken grew up in St. Louis. His mother and father met at a lab where his mother was working as a tech and his father was studying dentistry. When Ken was young, the family moved to Japan for a few years, where his Japanese American father worked as a dentist for a military base. They moved back to St. Louis a few years later.

Ken was around six years old when he participated in the Baby Tooth Survey. There was that "really cool button" kids got for sending their baby teeth to the study: I GAVE MY TOOTH TO SCIENCE. Ken wore the button every day to school and even brought it with him to college. The study, he explained, made him more aware of the dangers of atomic bombs. His parents were politically active against the Vietnam War, and Ken later joined the Union of Concerned Scientists and actively protested nuclear proliferation.

One of the goals of the Baby Tooth Survey was to educate children and parents about the dangers of nuclear radiation while remaining as "politically neutral" as possible. Ken's family discussed the study at home. "My dad was pretty tuned in to what the goals of the project were. He explained it to me, even using strontium as a word, what they were doing with the teeth, and why it was important. And so that sort of stuck with me—being a kid that age, watching Sunday afternoon movies with all that sort of nuclear fear stuff."

Eight

OPERATION TOOTH CLUB

MY MOTHER is about the same age as Ken Ogawa, and both grew up practicing duck-and-cover drills. My mother's hometown of Great Falls, Montana, the home of the Malmstrom Air Force Base, housed the Minuteman ballistic missiles that would be used in case of a Soviet attack. Many children, however, realized that the duck-and-cover drills were worthless. "They were a bit of a joke," recalls Laurie Post, whose mother, the peace activist Yvonne Logan, was a director on the Baby Tooth Survey.

Negative capability, according to the poet John Keats, is the ability to hold two conflicting truths in



*"If there is an attack, go toward the light.
You don't want to survive nuclear war."*

one's mind at the same time, "being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason." Keats argued that this state of uncertainty is essential for the poet, and pointed to Shakespeare as a master practitioner. He did not describe, however, the immense energy required to live in this state of uncertainty, to have one's life circumscribed with the unreasonable and absurd without being able to do anything about it.

Louise Reiss and her husband, Eric, were straightforward with their son about the goals of the survey. They discussed radioactivity and strontium-90 at the dinner table, and talked passionately about the dangers of nuclear proliferation. Eric Jr. recalls a poster of an atomic bomb from an exhibit about nuclear war that hung over his bed.

Children hiding from nuclear war under desks. Children asked to prepare for something they can't possibly prepare for.

By donating teeth to the study, at least, children could do something. "I sat at the table and unwrapped these bloody teeth," Laurie Post remembers sixty years after she became possibly the survey's youngest volunteer. "They were wrapped in gauze. It was kind of gruesome actually." She was the youngest of four, and not yet old enough to go to school. Her mother, Yvonne Logan, worked as the survey's director of collections, and brought Laurie with her to help catalog the teeth sent in from all over St. Louis and beyond. Yvonne traveled across the state with her daughter, passing out information about the study to schools, pediatric offices, dentists, and parents.

Later a prominent peace activist and president of the U.S. branch of the Women's International League for Peace and Freedom, Yvonne was a commanding and convincing advocate. She was college-educated, well-spoken, and moved with the ease and confidence of a born athlete. She was also stunningly beautiful, with long tawny hair she coiled up at the back of her head and a frank, assessing gaze. Her daughter clocked all this. Laurie disliked the attention her mother received for her looks. As if beauty were an invitation not only to comment but also to lay claim to a woman's attention.

Women largely ran the Baby Tooth Survey. They were the volunteers and the directors. The first director of the study, Dr. Louise Reiss, was an internist who worked with children in St. Louis. Her son, Eric Jr., remembers that before they rented an office, the survey headquarters was the Reiss living room. There, women sat at the table and organized the little envelopes of teeth, wrote the newsletter, designed the pamphlets, and strategized about how to get even wider involvement in the study.

The teeth, still bloody at the root, were cataloged and then shipped to a lab, where, before being tested, they had to be ground to powder.

Nine HALF-LIVES

SIXTY YEARS after the Baby Tooth Survey, participants like Julie Fix Meyer are still waiting for answers. Julie has lost family to cancer. Her teeth were used in the original study, though until now she never knew what the results were. She is not surprised when I tell her that the results, published in 1963 but not disseminated to the participants' families, revealed that children growing up in St. Louis from 1953 to 1961 were exposed to more than fifty times the normal amount of strontium-90 from the fallout of atomic bombs tested miles away in Nevada.

And yet this was not enough to establish causation. Critics of the study argued that there were too many "environmental factors" in a person's life to definitively establish that high levels of a cancer-causing agent had actually caused a person's cancer. The burden of proof falls on the victims instead of on an organization hoping to test weapons, open a chemical processing plant, or embark on any project where the environmental destruction and burden to human health are unknown. The regulations against dumping industrial waste, controlling the amount of pollution and carbon dioxide a company can release into the atmosphere, have been steadily rolled back since Nixon and the EPA first put them in place in the early 1970s.

At Harvard, Dr. Marc Weisskopf has resurrected the Baby Tooth Survey. He is using the teeth now cared for by Joe Mangano (who was invaluable to both the study and this story). For decades, Joe was the steward of the remaining baby teeth, storing more than 100,000 of them in his Park Slope apartment. The hundreds of shoeboxes, thousands of envelopes with children's names written on little cards stapled to each envelope, are thanks to a grant now housed in a storage unit in New Jersey and fully cataloged for the first time, their data ready to be put to use. They are priceless sources of information for researchers, offering a way to measure longitudinal health impacts on a large scale.

Weisskopf received a grant from the National Institutes of Health to study cognitive decline like Alzheimer's and heavy metals in the teeth, but as he collects death data, health records, and other information about the survey participants, he is also collecting data that could be used in a new study on the long-term effects of fallout. He tells me he would like to continue the study that Louise Reiss and others began. His interest is personal as well as professional. Marc's grandfather, Victor Weisskopf, was one of the scientists who worked on the Manhattan Project, believing (erroneously) that the Germans were close to acquiring a nuclear weapon. After the war, however, Weisskopf, like many scientists who had worked to develop the bomb, became an advocate for nuclear disarmament.

More and more, time seems to break into before the bomb and after the bomb. An existential crisis.

In a World War II museum in New Orleans, soldiers' artwork is on display, the paintings done after the war as a kind of art therapy. The work is mostly portraits, self-portraits, and pastoral scenes of the French and English countryside. There's nothing explicitly antiwar about it, but notably missing is any whiff of the military heroic. Instead, as in the artwork of the children who survived Hiroshima and Nagasaki, there is no longer an agreed-upon reality. Faces slide sideways. Perspectives are flattened as if the artist were held down under tons of force. The center cannot hold.

After Hiroshima and Nagasaki and the arms race that followed, Americans and citizens the world over realized that science is not neutral. It is an Ozymandias-like power that could both save and destroy. Scientists themselves, once heralded as near gods, were waking up from a dream of pure reason to a reality of cascading effects whose end was nowhere in sight.

Ava Helen Pauling tells her husband, Linus, that he must become involved in the antinuclear peace movement. After all, she asks him, what good is physics if there is no world?

The challenge of nuclear technology was both practical and philosophical. How were Americans to protect themselves now that they had helped unleash this world-ending technology? How could we live forward into time when time itself, as humankind experienced it, could become irrelevant?

Ten

I DIED FOR BEAUTY

A NEW MOTHER'S anxiety can escalate beyond what seems possible to bear. She struggles to impose rationality on the world and is met by chaos at every turn. Perhaps this is because, by having children, we have sealed our pact with mortality: stepping into the role of our own parents and, psychologically at least, one step closer to death. We have created a being whose mortality haunts our dreams. We fear poison in the water, in our food, in the air we breathe. Fallout. And yet. Without better protections, without ironclad agreements backed by real consequences, our fears are not irrational; they reflect, rather, a clear and present danger. A crime in slow motion. This slowness makes the crime so difficult to see. As if we are putting together the pieces of a puzzle, groping in the dark toward the final picture.

Many years after the Baby Tooth Survey, Louise Reiss is still haunted by questions about what mankind can and cannot accomplish. She thinks about her own legacy, but also about creative energy; what it does and what it undoes. It is autumn. She stands in her yard, looking

at the unraked leaves, undone by wind. She has been thinking of Emily Dickinson's poem "I died for Beauty," in which two corpses—one who died for beauty, the other for truth—are laid side by side in a tomb. One corpse turns to the other: "He questioned softly 'Why I failed?' / 'For Beauty,' I replied— / 'And I—for Truth.'" The bodies have no answers, only more questions. "We talked between the Rooms— / until the Moss had reached our lips— / and covered up—Our names." ○

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