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INTO THE STACKS

Nuclear Accidents Will Happen

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In January 2018, the *Bulletin of the Atomic Scientists* (*BAS*) moved its Doomsday Clock closer to midnight: it now reads 11:58. The last time the minute hand was this close to the hour of Armageddon was 1953, just after the United States and Soviet Union tested thermonuclear bombs. Since then the stylized clock has ticked backward and forward, each year metaphorically registering civilization's proximity to global catastrophe. "To call the world's nuclear situation dire," the group warned in its January statement, "is to understate the danger—and its immediacy."[1]

The Doomsday Clock debuted in 1947. Today it is the most frequently visited item on the BAS website. The clock was designed not by the nuclear scientists who started the *Bulletin*, but by a graphic artist. Martyl Langsdorf grasped the need to translate the language of the nuclear physicists into the everyday, to make the abstract seem real. The clock was to be a concrete visual warning for a population generally disconnected from the new powers that science had unleashed. Langsdorf made the first clock bright orange. Tick-tock, tick-tock, how close are we to midnight? It is warning and opportunity. There is still time to make things right.

Langsdorf's simple design highlights a conundrum for anyone writing about nuclear weapons and war planning: How do you turn theoretical ideas and existential threats into practical knowledge? How do you make people pay attention to something that cannot be seen or heard? While writing about nuclear weapons and war was something of a cottage industry during the Cold War, the collapse of the Soviet Union deflated both scholarly and popular interest. Even the Doomsday Clock wound back to 11:43, suggesting that the world had stepped back from the brink.

Not so fast, says Daniel Ellsberg. In *The Doomsday Machine*, Ellsberg insists that nuclear weapons are the same "clear and present existential danger to the human species" as they were at the height of the Cold War. The only thing that has changed is people's attention. In *Command and Control*, Eric Schlosser, too, warns that each nuclear weapon is "a potential act of mass murder."[2] Given that the United States currently has at least 1,800 thermonuclear warheads deployed, that is a lot of potential. Enough, certainly, to turn the world into what Jonathan Schell once described as a "republic of insects and grass."[3] But it is not the numbers that interest Ellsberg and Schlosser; what keeps them up at night are the systems behind those warheads – the plans, machines, materials, and people. As Ellsberg and Schlosser see it, each one is an accident waiting to happen.

Catastrophic warnings aside, Ellsberg and Schlosser raise important questions not just about nuclear materials themselves, but about how we write and read about such materials. I am interested here in how contemporary nuclear studies grapple with the need to both inform and agitate in a world where concerns about nuclear Armageddon are frequently crowded

[1]Rachel Bronson, "Statement from the President and CEO," in John Mecklin, ed., "2018 Doomsday Clock Statement Science and Security Board," *Bulletin of the Atomic Scientists*, Jan. 25, 2018, https://thebulletin.org/2018-doomsday-clock-statement/ (accessed Sept. 12, 2018).

[2]Daniel Ellsberg, *The Doomsday Machine: Confessions of a Nuclear War Planner* (New York: Bloomsbury, 2017), 20; Eric Schlosser, *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety* (New York, 2014).

[3]Jonathan Schell, *The Fate of the Earth and the Abolition* (Palo Alto, CA, 2000), 65.

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out of the nightly news by other events. Schlosser, a journalist, admits that he was long ignorant of the subject. Not until he saw a missile launch in 1999 did he realize he had been living with "a false sense of comfort."[4] For both authors—and many more besides—the more they learn about the bomb, the more they want to make others aware.

Ellsberg is best known for leaking the Pentagon Papers in 1971. Less well known is that while he furtively copied those top-secret documents, he also stole a great deal more relating to nuclear planning. Ellsberg intended to release everything, but the nuclear files went missing. He had given them to his brother, who hid them in the town dump, which was later destroyed by a tropical storm. No amount of digging, even with a borrowed backhoe, could reclaim the papers. *The Doomsday Machine* is thus an effort to recreate what Ellsberg knew from those documents and from his own experiences as a nuclear strategist at the Rand Corporation.

The Doomsday Machine thus wants to be the something of a literary Doomsday Clock. Though the book ultimately does not provide much new information, Ellsberg convincingly shows how the U.S. nuclear complex he helped create became reckless, prone to deception, and largely unable to deal with the terror it threatened to unleash. Those same conditions exist today. The world is just a few steps from all-out thermonuclear war. A rogue nuke, a dirty bomb, an accidental detonation—these could all lead to activation of the U.S. war plan: Launch on warning. Lob everything you've got at the other side as quickly as possible.

More concerning, many purported checks to protect against failure and accident are, in fact, myths. For example, the U.S. president is not the only person who can launch a nuclear attack. In the 1950s, Eisenhower delegated such capabilities to his theater commanders, who sub-delegated. And so on. We do not actually know who has the authority to order a nuclear strike. We do know, however, that nuclear weapons are far from unusable. While most people think nuclear weapons are a deterrent force (that is, in fact, what we are frequently told), Ellsberg shows that the use of such weapons has been threatened repeatedly—at least twenty-five times—by the United States. American presidents have long kept the option of first use available. President Obama considered changing the policy, but did not. Little of this is widely known, Ellsberg admits, because of the layers of secrecy and obfuscation that shroud the nuclear world. Bureaucratic jealousies and personality clashes keep important information from being shared across federal agencies. In the early 1960s, the Joint Chiefs of Staff was able to keep its war plan a secret from the President. The coils of secrecy have wound so tight for so long, Ellsberg shows, that no one ever actually knows what is going on, where all the bombs are, or who is in charge.

Ellsberg's confessions are certainly terrifying, but this is not the book likely to inspire the "new level of pressure from American citizens" that he desires.[5] The book instead works best as a conversation with people already in the know. Ellsberg falls back on the language and expertise of a nuclear war planner, deploying terms, acronyms, and examples that will discourage most readers. It is a problem not uncommon to books on nuclear weapons. Indeed, Schlosser can be guilty of the same. *Command and Control* is really two books in one. Schlosser's main interest, and where he shines, is in reconstructing a Titan II missile accident in 1980. Surrounding and nearly suffocating this story, however, Schlosser includes a detailed history of the U.S. nuclear arsenal including topics that have been ably covered elsewhere. In both cases the drive to demonstrate mastery blunts the mission of raising alarms.

Where Ellsberg is the consummate insider with access to the top echelons of power and an intimate knowledge of the strategic theories and plans dreamt up by nuclear wizards, Schlosser is the outsider trying to peer into a confounding and new world. Yet each comes to strikingly similar conclusions. In his exploration of the Titan missile system, Schlosser uncovers a story of alarming carelessness. Bombs falling out of the sky, leaving giant craters; nuclear weapons lost

[4]Schlosser, *Command and Control*, 485.
[5]Ellsberg, *Doomsday Machine*, 346.

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at sea; the wrong switches thrown; safety warnings ignored; fires left to fester; nukes gone missing; propellants spontaneously igniting; computers gone berserk. You dream it and the problem probably has happened. Between 1950 and 1968 the armed services reported 1,200 accidents with nuclear weapons. In 2003, half of the Air Force crew members in charge of nuclear weapons failed their pre-planned safety inspections. The list goes on. Clearly complex systems are prone to error; small mistakes in one place can escalate quickly.

And so it was on the evening of September 18, 1980, at the Titan missile site in Damascus, Arkansas, where a routine maintenance operation led to nine hours of terror and, in the end, the destruction of a multi-million dollar weapon. Fortunately the Titan's nine-megaton warhead did not detonate. The cause: a technician dropped a socket wrench, which punctured a hole in the side of the missile. Fuel vapor poured out, quickly filled the silo, and set off alarms. No one seemed to know what to do. The commanding officers were far away, some new to the job. Others had no experience with the Titan system. Efforts to assess the damage at 3:00 the next morning triggered an explosion that killed one airman and flung the warhead 100 feet. Through interviews and archival research, Schlosser shows how small missteps snowballed toward catastrophe. Most tragic was the fact that many people who worked with the Titan system had been warning about the weapon's instability for years. It was a "disaster waiting to happen" but kept online as a bargaining chip in negotiations with the Soviets.[6]

How should scholars convey this largely inconceivable and often highly technical history? *Doom Towns: The People and Landscapes of Atomic Testing*, by the historian Andrew Kirk and the illustrator Kristian Purcell, suggests one evocative approach.[7] Like Schlosser's description of the Damascus accident, *Doom Towns* effectively captures the everyday nature of something that seems so far away. But it does it in a radically different form: graphic history. The format forces Kirk and Purcell to cut out all extraneous information; they do not have the space to replicate nuclear jargon or a lengthy backstory. At the same time, the format allows for some unlikely but compelling juxtapositions: the Apache people of New Mexico appear on the same page with Manhattan Project scientists as they contemplate where to test the first bomb. Later, school children under desks are surrounded by images of dying sheep and a formal meeting of the Atomic Energy Commission looking for answers on what went wrong during a particular test. Readers are thus invited to consider the various relationships between events and people at a particular nuclear facility.

The nine-chapter graphic history examines the people and landscapes of nuclear testing from the early years of the Atomic Age through the Nuclear Test Ban in 1963, and then briefly touches on the public agitation and outcry that led to the release of government nuclear files in the 1980s. The book offers a particularly chilling tour of the Nevada Test Site (NTS), which was established in 1951 little more than sixty miles northwest of Las Vegas to test new devices. The NTS was originally chosen not because it was foolproof but because it "most nearly satisfied all established criteria."[8] Everyone knew there were risks, some more obvious than others. The direction of the wind could change, the yield of a bomb was unpredictable, people and animals had a way of wandering where they were not expected. The U.S. government hoped to contain, not eliminate these hazards. Over time the testing program morphed from assessing the workability of nuclear devices to more sophisticated and somewhat bizarre demonstrations of survivability and technical prowess. A series of 1953 tests, named Operation Doorstep, was meant to study the effects of atomic weapons on civilization. Mannequins from the L.A. Darling Company were shipped to Nevada, dressed, and then placed in mock communities subjected to nuclear attack (Film 1). Real people came to watch—journalists, international

[6]Schlosser, *Command and Control*, 338.

[7]Andrew G. Kirk, *Doom Towns: The People and Landscapes of Atomic Testing, a Graphic History*, illustrated by Kristian Purcell (New York, 2016).

[8]Kirk and Purcell, *Doom Towns*, 47.

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Film 1. On March 17, 1953, the Federal Civil Defense Administration filmed the effects of a 16-kilaton nuclear explosion on mannequins, automobiles, and wooden houses at the Nevada Test Site. Still photograph from the U.S. Department of Energy.

observers, regular folks invited to take part – all lined up on bleachers and handed radiation badges. Later, during Operation Desert Rock, troops were sent directly into the blast zone. All the while scientists collected information on the types of weapons and their effects. Collateral damage was expected.

Doom Towns is a teaching text more than a call to arms; it is meant to engage students with primary sources and stories, not create a movement. But its focus on local histories is instructive. In trying to "reveal the more ordinary and everyday experience" of the bomb, *Doom Towns* is part of a recent wave of scholarship that uses community stories to explore the intimate connections between the nuclear world and the day-to-day.[9] Indeed, Kirk decided to write a graphic history after working on the Nevada Test Site Oral History Project, a rich repository of interviews, documents, and materials.[10] Similarly, recent community-based studies, such as Kate Brown's *Plutopia* and my own *The Missile Next Door*, have used interviews and oral histories along with traditional archival materials to uncover the experiences of people who lived and worked with the bomb.[11] Historians of the American West and environmental historians have been at the forefront of this sort of scholarship. But increasingly others, as well, are using local stories and diverse voices to rescue nuclear history from the walls of jargon and

[9]Kirk and Purcell, *Doom Towns*, xxi.

[10]Nevada Test Site Oral History Project, University of Nevada, Las Vegas, http://digital.library.unlv.edu/ntsohp/ (accessed Sept. 12, 2018).

[11]Kate Brown, *Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters* (New York, 2015); Gretchen Heefner, *The Missile Next Door: The Minuteman and the Arming of the Heartland* (Cambridge, MA, 2012).

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expertize that have so long characterized the field.[12] Perhaps nuclear studies can finally transcend the machines and their creators who have long been the center of atomic lore.

In January 2018, when the Doomsday Clock lurched toward midnight, the BAS editors explained some of the reasons: proliferation, the possibility of a new arms races, and "reckless language" by politicians, not least Donald Trump's "fire and fury" threats.[13] Ellsberg is slightly hopeful that this renewed global focus on nuclear weapons—even fear—will finally make people notice that the clock never stopped ticking. We are always just one accident away from midnight.

Gretchen Heefner is associate professor of history at Northeastern University. She teaches and researches the history of the U.S. in the world, with a focus on the Cold War, militarization, and the surprisingly intimate relations between national security regimes and the everyday. Her first book, *The Missile Next Door: The Minuteman in the American Heartland* (Harvard University Press, 2012), traces the deployment of nuclear missiles across the American heartland beginning in the late 1950s. She is currently writing a history of how U.S. military engineers encountered and accumulated knowledge about environments on the edge of human habitation from the late 1940s through today.

[12]John M. Findlay and Bruce Hevly, *Atomic Frontier Days, Hanford and the American West* (Seattle, 2011); Mark Fiege, "The Atomic Scientists, the Sense of Wonder, and the Bomb," *Environmental History* 12, no. 3 (July 2007): 578–613; Ryan Edgington, *Range Wars: The Environmental Contest for White Sands Missile Range* (Lincoln, NE, 2014). For international examples see Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA, 2012); Lauren Hirschberg, "Nuclear Families: (Re)producing 1950s Suburban America in the Marshall Islands," *OAH Magazine* 26, no. 4 (October 2012): 39–43.

[13]Bronson, "Statement from the President and CEO."

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