



Plutonium samples trundled around Hanford, the world's first plutonium plant, in 1954.

## MILITARY HISTORY

# Dinner at the Fission Chips

Mark Peplow assesses a chronicle of the blighted US and Soviet communities that fuelled the nuclear arms race.

“We had only washcloths, buckets, and sometimes rubber gloves,” recalls Faina Kuznetsova, a lab technician who routinely dealt with major leaks at Russia’s first plutonium-manufacturing plant. “We mopped up the spills and poured them into big glass bottles. It was a very expensive compound and we were expected to recover every drop.”

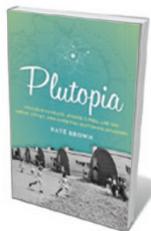
A multitude of such harrowing accounts fills the pages of *Plutopia*, a ‘hidden history’ of two communities — one American, one Soviet — that fuelled the nuclear arms race. Unusually, historian Kate Brown interviewed dozens of frontline workers for her meticulously researched account of how these two remote towns became indelibly linked by plutonium, and by catastrophic radioactive contamination.

Brown’s story begins in December 1942, when the Manhattan Project to build nuclear weapons was in full swing, and the crucial ingredients — enriched uranium and plutonium — were in short supply. The US Army selected Hanford in Washington

state as the site of the world’s first plutonium plant: it had plentiful water and hydroelectric power from the Columbia River, and the site covered 160 square kilometres of bare drylands.

The plant’s first reactor fired up in autumn 1944, blasting slugs of uranium-238 with neutrons to create plutonium-239. Less than a year later, on 9 August 1945, the Hanford plutonium found its target via ‘Fat Man’, the atomic bomb that destroyed Nagasaki three days after the less-advanced uranium fission bomb ‘Little Boy’ detonated over Hiroshima.

As weapons stockpiles grew, Hanford’s growing workforce was housed in Richland,



**Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters**  
KATE BROWN  
Oxford University Press: 2013. 416 pp.  
\$27.95, £17.46

one of Brown’s ‘plutopias’: a stage-managed American idyll where everyone was white, middle class and loved the bomb. Yet Richland’s chintzy Americana — the Fission Chips restaurant or the high school with the mushroom-cloud mascot — concealed a calculated programme to keep residents ignorant of the risks.

These were considerable. Hanford’s operators used the surrounding countryside as a vast dumping ground. They reasoned that dissipating the radioisotopes in river water, or the atmosphere, was the best way to dilute any danger. Radioactive waste poured daily into the environment, while hundreds of millions of ‘hot particles’ of radioactive metal fell like deadly snow across Richland. Meanwhile, the town grew into a corporate dictatorship, where plant managers controlled citizens’ lives in a way that would have made a Soviet general proud.

Time and again, official review committees denied the evidence. In the early years, site medics tested workers after long weekends, when most of the radioisotope contamination had already been urinated from the body. In 1958, the Atomic Energy Commission reported to Congress that from 1944 to 1958 there had been only one radiation-related injury at Hanford, out of 18,000 workers. In fact, by 1959, infant deaths in Richland were four times the state average.

A pivotal point was the physicist Ernest Sternglass’s 1963 paper in *Science* showing a link between maternal exposure to X-rays and child mortality from cancer, with implications of similar effects for radioactive fallout. Independent studies followed, and by 1966 the radioactivity in Richlanders’ bones had been found to be 50% higher than normal.

Meanwhile, the Soviet leaders had taken note, and in 1945 began building their own plutopia in the remote Urals. In what Brown describes as the “Bronze Age beginnings of the Soviet atom”, conscripted labourers endured terrible conditions to build the Mayak plutonium plant and the closed city of Ozersk. The first reactor produced enough plutonium for a bomb by 1949, but many of the fuel slugs, loaded with the Soviet Union’s entire stock of uranium, had cracked. So Mayak’s bosses ordered workers to unload and sort 39,000 irradiated slugs by hand, protected only by a fortifying glass of vodka.

Thousands of exposed workers routinely suffered nausea, nosebleeds and intense pain, followed by crumbling bones, cancers and death, Brown reveals. To quell the growing unrest, Ozersk was showered with cinemas and apartments filled with modern conveniences, and then touted as proof that Communism delivered prosperity — just as

federal dollars were shaping Richland into the very model of the American dream.

Soviet plant managers also copied, and surpassed, the Americans' approach to waste disposal. By 1951, 20% of the nearby Techa river was radioactive effluent from the plant, flowing through dozens of towns in which more than 124,000 people lived. Then, in 1957, an underground waste-storage tank exploded, belching forth a mushroom cloud that irradiated hundreds of thousands of people.

Ozersk's residents cleaned up the plant with wire brushes and hoses — almost certainly receiving severe radiation doses. There is no agreement on how many died as a result of their exposure. Today, the region is a vast radioactive swamp — yet Mayak continues to process radioisotopes, and managers plan to keep dumping radioactive waste into open reservoirs until at least 2018, Brown says.

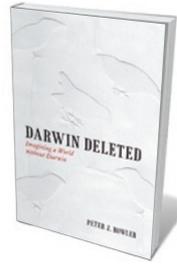
Back in Richland, whistle-blowers and investigative journalists picking away at the town's anodyne facade forced the US government to reveal the true scale of Hanford's contamination in 1986. Just weeks later, the catastrophic explosion at the Chernobyl nuclear power plant in Ukraine occurred. In the face of this double whammy, Hanford was slated to close. Together with the Mayak plant, it had released much more radioactivity into the environment than Chernobyl and the site will take half a century to clean up. Yet most Richland residents fought hard against Hanford's critics. They loved their town's social homogeneity, orderly management and relative prosperity, and feared that anti-nuke whiners would cost them their apple-pie lifestyle.

The only underwritten character in *Plutopia* is plutonium itself. Brown never explains why bomb-makers preferred plutonium over uranium (it is easier to purify, and requires a smaller critical mass), how it was processed or how fission works. And although radiation physics is swamped with confusing and archaic units, Brown fails to guide the reader through rems, rads, roentgens and curies, when a little context could help to make sense of the numbers.

Nevertheless, *Plutopia* has important messages for those managing today's nuclear facilities, arguing for caution and transparency. Highly subsidized communities are still a feature of civilian nuclear programmes in many countries, including Japan. It is no coincidence, Brown suggests, that the Fukushima nuclear accident in 2011 was characterized by poor safety protocols, official denials and a heavy use of underpaid workers to clean up the mess. ■

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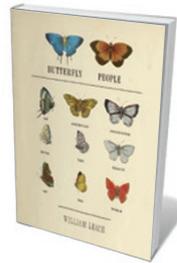
## Books in brief



### Darwin Deleted: Imagining a World Without Darwin

Peter J. Bowler UNIV. CHICAGO PRESS 336 pp. \$30 (2013)

Is there anything to add on Darwin and his work? In his 'counterfactual' history, Peter Bowler manages it neatly, wondering what might have happened had Darwin not published his theory of evolution by natural selection. Bowler argues that at the time, only Darwin had the originality and largeness of vision to craft his big idea, but its very boldness polarized thinking. The theory, Bowler surmises, would have emerged *sans* Darwin, but later — which, ironically, might have eased the broad acceptance of evolution.



### Butterfly People: An American Encounter With the Beauty of the World

William R. Leach PANTHEON 416 pp. \$32.50 (2013)

Butterflies in their thousands blanketed summer fields in nineteenth-century America. These 'flying jewels' drew a generation of amateur natural historians from the cultural chrysalis. Here, historian William Leach celebrates several — including Herman Strecker and Samuel Scudder — who created a home-grown field. Fed by Linnaeus, Darwin and crowd-sourced photographs and specimens, this scientific search for beauty collided early on, however, with the country's commercial drive.



### Picking Up: On the Streets and Behind the Trucks With the Sanitation Workers of New York City

Robin Nagle FARRAR, STRAUS AND GIROUX 304 pp. \$28 (2013)

Daily in New York city, around 9,000 people clear away 11,000 tonnes of household waste. In her 10-year, sometime-firsthand study of 'san man' crews, cultural anthropologist Robin Nagle shines a light on their invisible lives. She reveals them as agents of urban reform and public health; traces the history of sanitation in the city, starting with eighteenth-century reformer Cadwallader Colden's yellow-fever control; and evokes the physical and psychological toll of this dangerous, filthy, necessary work.



### Robot Futures

Illah Reza Nourbakhsh THE MIT PRESS 160 pp. \$24.95 (2013)

This glimpse into the future of robotics hums with enthusiasm. In his work, roboticist Illah Reza Nourbakhsh has created a raft of objects and capabilities, from robot three-dimensional visioning systems to a highly propulsive pogo stick. Here, prefacing each chapter with an imagined scenario, he forecasts how bots will invade commerce, the home and the human body. The possibilities — such as therapeutic, injectable robot colonies — are often provocative, but tempered by astute insights into the ethical and social implications of a roboticized world.



### Narwhals: Arctic Whales in a Melting World

Todd McLeish UNIV. WASHINGTON PRESS 216 pp. \$26.95 (2013)

The tusked, deep-diving, upside-down-swimming narwhal is a cetaceous enigma. Questions hang over its feeding habits, strange dental arrangements, population and migration. In this portrait of the species, Todd McLeish mixes research, observations from High Arctic trips and engaging detours into iceberg ecology and more. While the debates rage on — over the tusk as a sensory organ, for instance — many agree that the animal's adaptive capacity may not keep pace with the shrinkage of sea ice.