

Alexei Kojevnikov

# Plutopia forever



Reuters/Denis Sinyakov

## Inhospitable zone

The area around the Techa river in Russia remains radioactively contaminated decades after the nearby Maiak Combine's radioactive-waste facility overflowed.

## Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters

Kate Brown  
2013 Oxford  
University Press  
£16.88/\$27.95hb  
416pp 528pp

Kate Brown does research in places where most of her colleagues prefer not to travel. Her wonderful first book, *A Biography of No Place* (2005), explored the pre-Second-World-War history of the westernmost borderland of the Soviet Union, which was then home to a mix of ethnic minorities, including Polish, German, Ukrainian and Jewish. For her new book *Plutopia*, Brown visited two of the world's most radioactively contaminated regions: the areas near the Hanford Nuclear Reservation in Washington State and the Maiak Combine in the Ural Mountains, once the centres of plutonium production for the American and Soviet nuclear industries. Her primary interest lies in exposing the dark underside of their military-economic activities: the history of environmental pollution and the development of segregated "atomic cities" that provided privilege and better protection for the plants' permanent staff, but not for the "commoners" who lived and farmed just outside the fence.

Brown, a historian at the University of Maryland, Baltimore County, invented the word "plutopia" to characterize these cities, whose citizens were compensated for their risky work and diminished liberties with an abundantly consumerist lifestyle designed to ensure their loyalty and conformity. The city of Richland, near the Hanford site, began as an outpost of the Manhattan Pro-

ject, housing workers from the US plutonium-production facility in a racially segregated settlement. After the end of the Second World War, it evolved into a futuristic city that provided its residents – predominantly blue-collar workers – with privileged middle-class salaries and standards of living, including better housing, schools, policing and special healthcare services.

In the early years, Richland's Soviet counterpart, Ozersk, segregated its permanent civilian workforce from conscripted soldiers and prisoners, but motivated them with the sense of duty and self-sacrifice that came directly out of the wartime effort of saving the country from foreign invasion. Not only the rank-and-file, but also top scientists and generals, exposed themselves to high levels of radiation during work emergencies. By 1960, when the Soviet Union had achieved a modicum of security through nuclear deterrence, the city made a transition to a more peacetime mode and followed Richland in adopting a consumerist strategy. The concept of the "middle class" is not in a literal sense applicable to Soviet society, which did not permit the development of a truly rich, upper class. However, its elites were allowed a lifestyle that reminds Western observers of their own middle classes; just as in Richland, blue-collar workers in Ozersk received salaries and perks that would have been appropriate for

white-collar professionals in the rest of the country.

The litany of environmental crimes at both plutopia sites extends over decades. During the early years, in a hurry to produce plutonium, the plants often processed irradiated fuel without letting it cool down long enough for the most radioactive, short-lived isotopes to decay. And when the Maiak Combine's waste-storage facility overflowed in 1949, Soviet managers did not dare interrupt production. Instead, they decided to release radioactive liquids into the river Techa, contaminating its basin forever. That same year, their American counterparts ordered the so-called "Green Run" – a release of highly radioactive waste into the Columbia River that was, they claimed, a scientific experiment.

The waste facilities at both sites leaked and released isotopes into the air. Originally meant to be temporary, they were constructed upon a wishful assumption that science would eventually figure out how to dispose of radioactive garbage. In 1957 a storage container at Maiak overheated and exploded, producing Chernobyl-scale contamination in the Urals. Soviet authorities ordered the resettlement of villages from the most dangerous area along the Techa, but the resettlement took several years and was not even completed, leaving some inhabitants within the heavily polluted zone. In the US, special interests of land speculators ensured that areas near the Hanford site were irrigated and sold to aspiring farmers who were not informed of the risks.

Plant supervisors – whether appointed by Soviet atomic agencies or by corporate subcontractors such as General Electric or Westinghouse – established similarly styled regimes of corporate loyalty, secrecy, public assurances of safety and intimidation of whistle-blowers. In *Plutopia*, Brown gives voice to critics of the cover-up practices as she describes her travels to the polluted areas, interviews those who challenged the atomic establishment or were victimized by it, and reports stories of accidents, illnesses and genetic deformities possibly related to radioactive exposure.

Brown is aware that her informants are not always reliable sources. Indeed, many are prone to the sorts of rumours and conspiracy theories that are abundantly generated around all closed sites that place strict control over information. But at the same

time, they are also bearers and collectors of unique information that has often been ignored or overlooked. Overall, Brown does a careful and convincing job as a sceptical investigator. She reports personal stories and tries to independently verify and separate reliable from unconfirmed parts, while admitting that many questions remain unresolved.

One such unresolved problem concerns health risks associated with long-term exposure to radiation in relatively low average doses. In the early years, when radiation monitoring was restricted primarily to high-intensity gamma rays, workers at certain stages of plutonium production were often overexposed to other dangers. Having observed deteriorating health and some terminal cases among employees, Soviet doctors coined the term “chronic radiation sickness” and imposed limits on the overall time workers could spend in dangerous areas. Over the years, they treated about 1000 patients suffering from this disease, but their American colleagues have been reluctant to accept the diagnosis.

In the meantime, some medical crimes were also committed. During the late 1960s, US researchers used prisoners in Walla Walla, near the Hanford site, as experimental subjects and exposed their testicles to high doses of radiation. Soviet doctors did not deliberately set up conditions for human experimentation, but

they still engaged in what Brown calls “a crime of opportunity” by studying diseases and genetic disorders among villagers who had been left to live along the banks of the radioactive Techa for two generations. For the more dangerous work of cleaning up and containing accidents, both sites used so-called “jumpers” – workers conscripted or hired on a limited-term basis who were subsequently transferred elsewhere and no longer monitored for health effects.

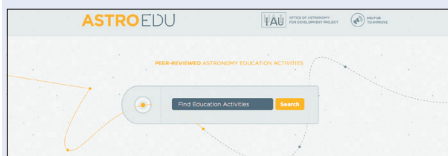
Brown visited contaminated villages on the Techa and talked to their residents, but could not get inside the security zone encircling Maiak and Ozersk. This leaves the Soviet side of her story somewhat lacking in primary accounts, especially for the chapters describing the early years of construction. To fill the gap, she uses narratives from the secondary literature about atomic spies. However, such literature is neither very reliable (when writing about spies, many authors feel entitled to embellish stories beyond reason), nor especially relevant to the topic (unlike Los Alamos, Hanford is not known to have leaked classified information to the Soviet side). At the same time, some very appropriate sources are missing. I was surprised to find no mention of Zhores Medvedev, who blew the cover of secrecy over the 1957 radioactive disaster in the Urals, or of Mikhail Grabovsky’s *Plutoniyaia Zona* (2002) and other quasi-

autobiographical books. Vladislav Larin’s *Kombinat Maiak* (2005), the most detailed existing account of the zone’s ecological problems, is used in a limited way. Insiders – residents of plutopia – could have provided more information, both in writing and in possible interviews.

The winding down of the Cold War left plutopia’s managers worried: what would happen to their cities and employees once plutonium was no longer a top priority for the government? As it turned out, pollution is a profitable business and cleaning it up guarantees an even more perpetual source of spending than the initial production of radioactive materials. Thus, even in the post-Cold-War world, grants continue to pour into the military-industrial complex of the atomic cities, and to the haves rather than the have-nots. In her conclusion, Brown hints cryptically that “We are all citizens of plutopia.” Her core metaphor may indeed be extendable to our increasingly segregated societies, to those living in gated communities or in states heavily guarded against immigration, and for whom the existence of such freedom-restricting boundaries is justified by the sense of entitlement, privilege and hierarchy created by the boundaries themselves.

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## Web life: AstroEDU



URL: <http://astroedu.iau.org>

### So what is the site about?

In the past few years, we’ve used this column to publicize many excellent teaching resources on the Web, including repositories for experiments on earth science (*Earth Exploration Toolbook*, March 2012, p65), quantum physics (*The Quantum Exchange*, March 2013, p61) and general science (*Science Buddies*, June 2011, p39). *AstroEDU* is a newcomer to the “online science activity database” category, having posted its first tranche of astronomy-themed projects in autumn 2013. But aside from its novelty and its focus on astronomy, what sets it apart is its commitment to peer review. In fact, all of the activities on the site have been vetted and approved by two reviewers – one astronomer and one educator.

### Who is behind it?

*AstroEDU* is managed by Edward Gomez of the Las Cumbres Observatory Global Telescope and Pedro Russo of Leiden University in the Netherlands, with support from the International Astronomy Union’s Office for Development. Both Gomez and Russo are also on the site’s 10-strong editorial board, which includes astronomers from Brazil, Nigeria, Japan, Australia, Canada and Europe.

### Can you describe some of the activities?

At the moment, *AstroEDU* is still a prototype, with only around a dozen projects in total. However, they are off to a promising start, with a pleasing range of activities suited to children of all ages and abilities. “Meet our neighbour: Sun”, for example, is designed to help mixed classes of sighted and visually-impaired primary-school children build and explore tactile maps of the Sun, complete with flares and sunspots. At the other end of the scale, an interactive Web app called “Star in a box” gives advanced students the chance to explore what happens as stars of various masses get older and age out of the Hertzsprung–Russell diagram’s “main sequence”.

### Anything else I should know?

Each activity comes with extensive documentation for teachers. Some also give information on how the activity could fit into particular science curricula; for example, “Model of a black hole” is judged appropriate for a UK year 5 unit on forces.

### How can I get involved?

Educators, astronomers and interested members of the public are welcome to upload their own astro-themed activities to the site and/or volunteer to act as peer reviewers for others’ submissions. Before doing so, however, *AstroEDU*’s managers recommend you read the site’s submission guidelines and notes on activity preparation, which contain advice on how to craft resources that teach scientific skills and attitudes, not just concepts. They also advise you to “Think about what you want your students to be able to do at the end of your resources” and urge you to incorporate elements of guided, enquiry-based learning into your activities. If that sounds like a lot of work, well, yes, it probably is. Did you think teaching was easy?