

1 Introduction

Tracing the Atom. Nuclear Legacies in Russia and Central Asia

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“It was not just one nuclear power station that exploded, but that whole complex of irresponsibility, lack of discipline and bureaucracy,” wrote the Belarusian writer Ales’ Adamovich in a letter to Mikhail Gorbachev in 1986.¹ During the Perestroika period, the conflictual nature of the nuclear legacy became openly apparent and contributed to the disintegration and end of the Soviet empire. While, in the international public, Ulrich Beck referred to the Chernobyl accident of 1986 as an “anthropological shock”² within the Soviet Union, the explosion of the nuclear reactor provided the impetus for criticism of the ruling system: the cover-up and downplaying of the nuclear accident and the delay in taking countermeasures by the Soviet authorities mobilized large sections of the population, particularly in Ukraine. Chernobyl awakened an ecological awareness that became an important element of the political opposition. Already in the final years of the Soviet Union, the question of reparations for the victims of the Chernobyl disaster moved onto the political agenda in Ukraine as well as in Belarus. Chernobyl subsequently became a kind of “social catalyst,” forcing politics and society alike to rethink their positions and, at least in the first decade after the disaster, fostering the emergence of civil society involvement.³

In Ukraine and Belarus, the Chernobyl movement became an important part of the national movement. Representatives of the Ukrainian and Belarusian national movement even regarded the Soviet Chernobyl policy as “genocide” against their people.⁴ The uncovering of the Chernobyl disaster also encouraged revelations about previous nuclear accidents inside the Soviet Union: in the Chelyabinsk region of Russia, a public debate on the 1957 nuclear waste accident and its consequences became possible for the first time, and the environmental activists became part of a broader regionalist movement. In Semipalatinsk, Kazakhstan, a critical examination of the nuclear legacy of decades of atomic bomb tests began, which was also taken up by representatives of the movement for independence.

The change of concept from perestroika to “catastroika,” which goes back to the famous Russian dissident Alexander Zinov’ev, expressed the attitude toward life of many contemporaries who were overwhelmed by the increasing revelations about environmental disasters and the general problems of the

transformational period.⁵ After the end of the Soviet Union, however, the environmental movements lost their social significance again in the second half of the 1990s, and attention to the problematic nuclear legacy of the Soviet era faded into the background in the face of other colossal transformational tasks. But the era of “catastroika” is far from over and there are many signs that the issue of how to deal with the nuclear legacies of the Soviet period will become one of the central issues of the twenty-first century.

This volume historicizes the legacies of nuclear weapons programs by focusing on the long-term consequences of nuclear programs, many of them tied to atomic weapons development. Their very epistemologies and material legacies have remained with us, even where disarmament and decommissioning have been more successful or were reintroduced. In terms of production infrastructures and nuclear supply chains, military and civil uses of nuclear power have been closely intertwined. Nuclear operations, for energy or military purposes, demanded a vast infrastructure of production and supply chains that have transformed entire regions. In foregrounding and following the material traces of the atomic programs, contributions in this volume pay particular attention to the memorialization of nuclear legacies and memory practices in a broader sense. We focus on the interrelations of legacies and transitions, sociotechnical imaginaries, memory practices, and heritage making in order to shed light on how modes of knowing intersect with livelihoods, politics of transitional justice and compensation, and historiography. Broadening the existing studies of nuclear history,⁶ this volume centers on radiation knowledge, institutional responses to nuclear legacies, and on how various communities, scientists, and artists articulated their concerns over nuclear issues. In what follows, we conceptualize an approach to studying the temporalities of the Cold War nuclear and discuss what the concepts of tracing, heritage, and legacies entail to this end. In following nuclear matters at different scales, chapters of this book examine the role of radiation expertise within specialized research institutes in Soviet and international settings as well as variegated modes of living with the political, legal, and epistemic endurances of the atom.

Nuclear Fission and the Supply Chains of the Soviet Atomic Programs

Nuclear operations, for energy or military purposes, have always demanded a vast technopolitical infrastructure of mining, processing, and handling of nuclear materials. The development of nuclear fission technologies goes back to the 1930s with the race for a nuclear weapon between the allied forces and Nazi Germany of the late 1930s and 1940s during World War II. Nazi Germany’s nuclear program was pursued at the institutes of the Kaiser Wilhelm Gesellschaft in Berlin. In the United States, research into nuclear fission had begun to form in 1939, when the core agencies that led to the Manhattan Project were formed. Military researchers involved in the Manhattan Project

conducted the first nuclear detonation in the Alamogordo desert in New Mexico on July 16, 1945, later known as the “Trinity test.”⁷ Trinity was followed by the two disastrous nuclear bomb attacks on the Japanese cities of Hiroshima and Nagasaki in August 1945, at the end of the war, already after Nazi Germany was defeated. After World War II, nuclear weapons programs and civil nuclear technologies were pursued on both sides of the iron curtain, with large-scale testing projects occurring in the global south. In the decades that followed, the United States and Union of Soviet Socialist Republics (USSR) established and ran large-scale nuclear programs with both civic and military components. While these programs included nuclear weapons development and testing, civil use of nuclear energy was pushed despite public controversies. This also increased the demand for uranium ore globally, with the United States, Canada, Congo, and East Germany as the main mining sites. But in addition, there has been smaller-scale mining in Central Asia since the 1940s, including Kazakhstan (which, since the massive development of uranium mining, has been the world leader in uranium exports since 2009), Kyrgyzstan, and Tajikistan (Roche).⁸ In Japan, however, there has been a strict separation of the promoted nuclear energy usage and anti-nuclear weapons stances by its government, which only after the 2011 Fukushima nuclear disaster had become connected in the public discourse and this connection became one of the key arguments of the protesters against nuclear energy in the wake of the Fukushima triple disaster.

During the Cold War, the extended production and supply chains have irreversibly transformed large areas, not least for their enduring material legacies, given the long half-lives of the radionuclides of technologies that cannot be contained in time. These massive infrastructures have operated within a deferred temporality – the handling of nuclear waste was optimistically deferred to technoscientific futures that were expected to solve the issue. Along the entire nuclear supply chains, radiation expertise was needed and developed. At the beginning of the nuclear fuel cycle is uranium mining, which provides the materials that are needed for nuclear fission: Roche gives an ethnographic account of an understudied site of nuclear mining in Leninabad/Khujand (Tajikistan), which was one of the first smaller scale uranium mining sites in the USSR from the early 1940s.⁹ Particularly, the largest site of nuclear processing, the plutonium production facility at Mayak (the Hanford, United States and Sellafield, United Kingdom counterpart) figures prominently in the nuclear infrastructure. The nuclear programs extended to entire professions during the Soviet time, ranging from expert scientists and bureaucrats dealing with everyday radiation risks and radiation protection issues (Nikonova, Sembritzki) to policies of compensation (Penter). Several contributions focus on the development of nuclear expertise, involving various professional groups in physics but also in medicine and the life sciences more broadly. Just like in the western biomedical sciences, the nuclear programs transformed and shaped the formation of fields from radiation biology, health physics to medical radiologists and ecologists in the USSR. These

took shape between civilian and military pursuits of nuclear technologies – well between precarious working conditions and little occupational hazards response and a technoscientific nuclear utopia of a nuclear-powered and thus energy-abundant urban landscape (Guth). At the nuclear processing facilities such as in the Southern Urals, professionals in radiation protection, medical staff, and scientists were dealing with everyday burdens and damage and had to come up with ad-hoc responses in case of minor and major radiation accidents in the plutonium plants (Nikonova, Sembritzki). The testing of a total of 715 nuclear devices continued until 1989, mainly at the two nuclear test sites near Semipalatinsk and in Novaya Zemlya.¹⁰ Especially the above-ground nuclear explosions between 1949 and 1965 deposited local and global fallout leading to persistent anthropogenic traces in the environment (Bauer).

With this volume we zoom in on the Soviet atomic programs during the Cold War and beyond, focusing on nuclear sites that are much less known, compared to the more broadly researched Chernobyl accident of 1986 or the Fukushima–Daiichi disaster of 2011.¹¹ This book brings to the fore nuclear infrastructures, from uranium mining and the envisioned nuclear fuels cycle, as well as its visions to fuel socialist modernity and a military complex justified as a requirement for peacebuilding. In line with nuclear modernity's visions of energy abundance, the Soviet civil nuclear energy program launched a nuclear-powered model city of Shevchenko/Aktau in today's Republic of Kazakhstan (Guth). For four decades, the Soviet atomic weapons program conducted nuclear testing near Semipalatinsk/Semey in the eastern region of today's Kazakhstan (Bauer).

Indeed, the supply chain of nuclear projects in the USSR starts with uranium mining. In addition to Central Asian sites such as Leninabad/Khujand in Tajikistan and Mailuu Suu in Kyrgyzstan, the USSR obtained uranium from the Wismut sites in East Germany, and from Czechoslovakia and Bulgaria as early as 1949–1951, before the first nuclear reactor for energy opened in Obninsk (110 km south-west of Moscow) in 1954.¹² A key part of the nuclear supply chain was channeled through the Southern Urals nuclear weapons complex, including the Mayak plutonium production plants (Nikonova, Sembritzki). Following the production chain, this volume addresses the uranium processing and plutonium production sites and pertinent radiation expertise at the Southern Urals nuclear facilities. The enriched uranium and plutonium from these facilities were then, after warhead design and assembly in Arzamas-16 (Sarov),¹³ brought to the nuclear test sites in Kazakhstan and Novaya Zemlya, where they were “tested” and detonated. Nuclear test explosions, especially atmospheric nuclear tests as conducted between 1949 and 1963, led to heavy local radioactive fallout, but also contributed to significant global radioactive fallout as well. Outside the two major test sites, so-called civil nuclear explosions were carried out; these included at least 15 sites in Russia, Ukraine, Kazakhstan, and Uzbekistan. Sometimes these “peaceful nuclear explosions” were used in mining, oil and natural gas industries, to create underground storage and crush ore, and even used to extinguish

gas torches, as conducted at the Urta-Bulak gas field in Uzbekistan in 1966.¹⁴ Nuclear politics – on both sides of the iron curtain – can only be understood when attending to the infrastructures of the large-scale atomic technology programs during the Cold War. This volume extends histories of the atomic age to include its negotiation and shaping through visual culture, literature, and the arts (Kaibach, Castringius).

Contributions in this book follow these nuclear trajectories and further address the consequences and policies of compensating for radiation exposure situations in the USSR and in post-Soviet states, their regimes of compensation, their Soviet style, and situate these in transitional and environmental justice literature (Penter). Beyond the nuclear medical expertise, nuclear production and its lingering legacies gave rise to literary accounts in the USSR, which reflected on the conditions of nuclear modernity in their own ways (Kaibach). This also includes the long shadow of Hiroshima and Nagasaki that has been part of the popular and artistic production in the atomic age and beyond. Seminal photographers have taken up the very materiality of radiation photography, making visible radiation in the aftermath of the Hiroshima and Nagasaki atomic bombs (Castringius).

Studying the Post-Nuclear: Traces, Heritage, Legacies

As part of the atomic era, radioactive isotopes have been extensively used as tracers in the life sciences and became a core technique in biomedical research.¹⁵ While the traceability of radioactive materials has shaped the Cold War life sciences, this book takes its cue in the humanities and social sciences to re-examine the Cold War nuclear. In following some of the material traces of things nuclear, the contributions of this volume attend to memory practices as they encounter and address nuclear legacies. Practices around memorialization are an important recent field of study, especially in post-Soviet states, which saw tremendous shifts and a complete remaking of their own historical narratives. This included a realignment of the past, culminating in the post-Soviet nation states as well as new futures articulated as a shared goal. Time and temporalities are already present in the very materiality of the nuclear – half lives, long and short, the long-term of nuclear remainders, waste issues and long-term exposure effects, or the biological half-lives of radionuclides in the human body – as well as the memorialization of war, of the nuclear bombs, paraphernalia, popular culture, and literary engagements with the nuclear weapons complex (Kaibach).

During the 1980s and 1990s – the years of glasnost and perestroika and the end of the Soviet Union – new approaches and perspectives in social science research emerged. Important strands of work have been conducted by Galina Komarova from the Institute of Ethnology and Anthropology of the Russian Academy of Sciences who very early on studied the everyday life at the banks of the river Techa, an area of extreme exposure, with soils, water, and bodies impacted by plutonium production in Southern Urals. As one of the pioneers

who carried out extensive field research and interviews in the 1990s, she paid special attention to the socio-cultural consequences of radioactive contamination, in particular, the livelihoods of various ethnic and religious groups, including the nutritional traditions of the population, as well as everyday life and socio-cultural practices in the zone of increased radiation. Her surveys from 1993 and 1998 revealed that despite the fact that the residents of the Techa river villages had already been informed about the danger of contamination with radionuclides, the Techa river and especially its floodplain were actively used by the local peoples. Moreover, the fish of the river, an everyday food supply, were a significant source of radionuclide intake into the human body. During the economic transition crisis of the 1990s, people turned to traditional practices of natural resource use, including fishing. Komarova's 1998 survey showed that a majority of the inhabitants of the contaminated area organized their diet, relying mainly on their own farms, as the purchasing power of most of the local people was so low that they were barely able to acquire the minimum of what they needed.

As Komarova has described, social and cultural dimensions can affect the conditions of radiation exposure: in specific conditions that are equally dangerous to all residents, the commitment to different cultural and religious norms can be an ecologically significant factor that, to some extent, improved or aggravated the psychological and physical wellbeing of the residents of the area, prevented or provoked radiation-related illnesses, i.e., served as a dose-forming or dose-decreasing factor. With their work since the end of the Soviet Union, social anthropologists like Komarova have laid important foundations for public debates on societal issues as well as on environmental justice and compensation policies. In this way, ethnographic research became both social science and civil rights activism; ethnographic research aimed to foster literacy as to radiation and health by working with the local population and to improve general living conditions in the Techa river villages. Last but not least, Komarova's studies take into account gender perspectives and showed how women dealt with the challenges of nuclear legacies.¹⁶ The work by Galina Komarova and other scientists in the 1990s has sharpened our awareness of how people's everyday practices are an important yet neglected part in the social and historical studies of Cold War nuclearity.

The concept of "legacy" of the nuclear age has been used frequently for example for the transformed landscapes after nuclear testing in the Pacific and Central Asia as well as in the environmental justice literature.¹⁷ The atomic age has recently featured prominently in studies of the sociology and history of the atomic age as well as in Cold War studies as legacy has been a core concept also used widely in the public sphere, such as in UN documents and NGO reports. Legacies are often invisible but can linger and imply "slow violence."¹⁸ Invisibility has been central to studies of science and technology studies (STS) and social studies of radiation.¹⁹ Social scientists and historians have recently proposed "atomic heritage studies" as a broad and open engagement of interdisciplinary scholarship in social and cultural studies,

building to some extent on museology and more broadly on studies of popular culture.²⁰ Nuclear heritage studies encompass the broader atomic cultures, including imaginaries, artifacts, architectures, and institutions. As research from the emerging field of nuclear cultural heritage studies has pointed out, the relevance of atomic heritage becomes visible in its material, relational, and representational features.²¹ This opens up for the study of entangled histories and relational networks – from situated technologies, planning, modes of governing, and expertise to everyday practices. Such a more plural approach to things nuclear allows different actors, social groups, and publics to engage with matters kept secret during the Cold War era and, in parts of Central Asia and Russia, subject to secrecy again after a short opening during the 1990s and early 2000s.

The chapters in this volume show how the heritage of the atom in the former Soviet space has become manifest in urban planning (Guth) and public monuments (Bauer), museums, and literature (Kaibach), artistic productions (Castringius), archival documents, legal legacies (Penter), specific stocks of medical knowledge (Sembritzki), and everyday practices (Roche). Moreover, memory work also takes place through the very scientific data labor aimed at documenting the impact of nuclear testing, including the work to navigate the layering of open and secret materials for risk assessment and mitigation of radiation effects (Nikonova, Bauer). Especially given the decades of secrecy and an “information boom,” followed again by new restrictions for many of these sites, we believe it is worthwhile to probe both the concept of heritage and legacies. The latter can function as generative heuristics to examine the heterogeneous assemblages of the post-Soviet nuclear complex.

For this volume, the concept of legacy allows us to render visible and articulate concerns linked to lingering shadows of the past, hauntings that might have been secret, covered up, or forgotten over time, but which can still materialize quite violently in the present and/or the future. Heritage, in contrast, denotes an active seizing, interpreting, or configuring of the past. As Gisela Welz notes (in her study of heritage and food in Cyprus), “heritage does not exist prior to preservation,” but rather is “the result of purposeful action.”²² Often this is guided by standards that are external to the context and developed along with heritage making. This approach builds on studies of value and valuation as well as on studies of heritage production.²³ It offers an interesting mode of connecting the chapters in this volume – from where they were situated in the nuclear production, supply, and usage chain in the first strand to the question of how they feature if we place them on a continuum of legacy and heritage – when we define legacy as the uncanny, uncertain consequences of the nuclear industries and heritage as the purposeful production of memory and memorialization of an era of the past or the active shaping of products for the future. Here, for instance, the atomic landscape gardens of urban planning in Aktau/Shevchenko (Guth) would feature into an account of the heritage of modernist utopia, while the shadow

photography (Castringius) and the traces of the nuclear after Semipalatinsk (Bauer) would address the uncanny, unknown, but incorporated traces of radioactivity in the human body. Kaibach reflects on the literary expressions of physicists dealing with experiences of working in the midst of technologies and dark knowledge of nuclear war and scientists' responsibility.²⁴ Sembritzki and Nikonova show how the radiation expertise attempts to balance some of these dimensions by producing knowledge and attempts of monitoring and controlling the radiation exposure to workers, patients, and populations. Pentec then addresses the efforts to confront and mitigate the long-term exposure through policies of documentation and compensations of the harm these populations experienced. The larger part of the essays in this volume deals with legacies – that, even if reconfigured as heritage in artistic and literary productions, showcase the catastrophic and the yet unknown shadows that accompany the nuclear matters under secrecy. While much of the nuclear programs were under strict secrecy on both sides of the Iron Curtain, there have been windows of accessibility to sources and documents, including for historians and social scientists. Scholars working on these matters have often seen these windows opening and closing again. This implies that nuclear memorabilia of all kinds often cannot be easily converted into a more pluralistic public heritage. Much remains under state control that is becoming tighter and more restrictive again after 2010, which researchers need to reflect on in their accounts and seek new methodological pathways. Consequently, this volume foregrounds archival projects, ethnographic engagements, and reflections on interdisciplinary research, thereby endeavoring into nuclear politics. This contributes to an understanding of how conditions of invisibility and secrecy have shaped the ways in which local communities are living with legacies of the atomic age.

Together, taking their cue in nuclear technopolitics, the essays assembled in this volume engage with the complex temporalities encountered in things nuclear. They address temporalities in terms of legacies, regulatory matters but also the very materialities, such as half-lives and radionuclide decay. The approach of thinking legacies, transition, imaginaries, memory, and heritage together will contribute to our understanding of how these multiple temporalities intersect in the knowledge that shape what is at stake for livelihoods, politics, and historiography. In these multiple intersections, the specific characteristics of Soviet nuclear modernity and post-Soviet temporalities become visible.

Contested Historiographies and the Politics of the Nuclear

Post-Soviet historiographies and cultures of remembrance have developed differently in the successor states of the Soviet Union and today there is no common narrative on the history of the Soviet era. In Russia and beyond, Putin is increasingly acting as the country's "chief historian" in this process.

The fight against “falsification of history” and for the “preservation of historical memory” has even been included in article 67 of the new Russian constitution.²⁵

Today’s historians have to assert themselves against two different trends: on the one hand, against attempts by governments to control the field of historiography and history politics more strongly by passing appropriate laws and creating institutions, such as the Institutes of National Remembrance in Poland and Ukraine, and the suppression of the development of pluralistic historical narratives. On the other hand, growing democratization and differentiation in dealing with history can be observed in Eastern Europe “from below,” which is characterized by the fact that new actors beyond the field of specialist science occupy the field of history and history politics: while the younger generation in particular is involved in the heated online memory wars on Twitter and in social networks,²⁶ private regional initiatives for the exhumation of mass graves from World War II are often the concern of the older generation. At the same time, these developments are accompanied by an archival revolution (e.g., in Ukraine) that now also includes the opening of the former secret service archives and provides a completely new source base for future research.

When the 100th anniversary of the Russian Revolution was celebrated in 2017, the conflicts of memory came to the fore, and it became clear that in the various successor states of the Soviet Union, there has long been a lack of agreement about what the revolution was and how it should be remembered today. In Russia, the revolution was more an object of forgetting and official silence, and the Russian government tried to wrap the memory of the revolution in anti-revolutionary messages. The most important slogan of the commemorative year was issued by President Putin: “The revolution must not be repeated,” combined with warnings against opposition and protests. In the president’s view of history, the revolution was a dangerous chaos that had led to defeat in the World War I, the collapse of the empire, and civil war.²⁷ Putin had already criticized the Bolsheviks several times before in his politics of history, speaking of the “national treason” of the Bolshevik leaders who were responsible for Russia’s defeat in World War I.²⁸ In the wake of the Ukraine crisis in 2014, he had also criticized the Bolsheviks’ demarcation of the borders (between Soviet Russia and Soviet Ukraine) during the founding phase of the Soviet Union.²⁹

For many Ukrainians, the revolutionary year of 1917 is associated above all with the traumatic experience of a failed state foundation. According to the presidential decree, the “National Ukrainian Revolution” was to be celebrated in 2017, with the national movement of the Ukrainian people and the struggle for the founding of the state at its center.³⁰ Georgia, too, did not celebrate the anniversary of the revolution, but rather the 100th anniversary of the founding of the Georgian nation state in 2018.³¹ In authoritarian Belarus, on the other hand, the old myth of the “Great October Socialist Revolution” persists to this day, with minor adjustments to the requirements of current politics.³²

In Central Asia, the memory of the great armed uprising of the Muslim population in 1916, which was sparked by the planned conscription of Muslims for military service and quickly expanded into an anti-colonial uprising, dominates the memory of the revolution. Several hundred thousand people, mostly Central Asians, had died during and after the uprising.³³ In Tajikistan, the 100th anniversary of the revolution in 2017 received no attention at all and simply passed by without a sound, whereas the end of World War I was mentioned in the government press and a government delegation traveled to Paris especially for the celebrations.³⁴ Tajikistan's post-Soviet historiography has reinterpreted the historical narratives of the Soviet era, in which postcolonial interpretations of the Russian imperial and Soviet history of Central Asia have recently gained in importance.³⁵ New spaces of memory have emerged, which shed light on the Russian imperial conquest of the Central Asian steppes. Especially the Ferghana valley and its agricultural history and cotton plants are a case in point to ask for the limits of the proclaimed decolonization during the early Soviet period.³⁶

In the post-Soviet era, governments drew on pre-Soviet colonial histories in order to shape nationally anchored historical narratives. When the newly independent states of Central Asia rebuilt their national historiographies, they rejected some but kept large parts of Soviet historiography – for instance in the memory of World War II, which continues to be a uniting moment. Moreover, Soviet Central Asia had built on local elites as well as institutions and the leaders of the new independent republics (except for Kyrgyzstan) continued to mainly come from these local party elites established during the Soviet era.³⁷ The modes of nation-building and geopolitics of the new independent states differed substantially across Central Asia. To varying extents, the 1990s gave rise to a revived traditionalism that also drew on various Islamic traditions in Central Asia.³⁸ Kazakhstan was the only Central Asian country to build on a pre-Soviet national movement – the Alash Orda that was in government before the 1917 revolution.³⁹ These different strategies of renewal also included the management of nuclear legacies – both in national regulatory policies as well as in their international relations.⁴⁰ Institutional continuities in terms of administrations in post-Soviet governments persisted, but also as for nuclear weapons testing in Kazakhstan, international and UN bodies were called to assist with dealing with legacies and creating a nuclear weapons-free zone in Central Asia.⁴¹ Here, the end of nuclear weapons testing in Kazakhstan's north-east was aligned with the new nation-building. At the same time, however, the government began to embark on massive uranium mining projects in southern Kazakhstan.

Since the 1990s, some of the successor states of the Soviet Union have made great efforts in the field of “transitional justice” to document not only the crimes of Stalinism but also those of the National Socialist occupation and to give recognition and support to the numerous victims.⁴² The end of the Soviet Union was accompanied by the extensive uncovering and documentation of the crimes of the past hand in hand with an erosion of old Soviet

patriotic memory and the development of a new culture of remembrance. The victims of nuclear accidents and radioactive contamination played a central role in the nation- and state-building processes in some of the successor states of the Soviet Union (Penter). The process of coming to terms with the experiences of Soviet rule after the end of the Soviet Empire therefore has a strong ecological component, which requires that approaches to transitional justice and environmental justice be thought of as interconnected. More recently, this process has also taken on a European dimension, manifested in a growing number of appeals to the European Court of Human Rights (ECHR) by post-Soviet environmental victims.

In the future, the nuclear legacies could become even more of an object of post-Soviet memory conflicts, because the achievements of Soviet nuclear modernity are by no means undisputed in the successor states of the Soviet Union. The answers to what the nuclear legacy meant for the successor states of the Soviet Union vary today, with the nuclear shield in the Cold War era and the accelerated progress of industrialization and modernization being weighed against nuclear accidents, gigantic environmental and health damage, and social conflicts.

While the acknowledgment of victims of radioactive contamination played a central role in the nation-building in Ukraine, Belarus, and Kazakhstan since the 1990s, this was not to the same extent the case in the Russian Federation or in Tajikistan. In Russia, the nuclear victims were not perceived as victims of an inhuman Soviet system, but rather as individuals who happened to be in the “influence zone of unfavorable factors.” This might be due to still prevailing views that these inhabitants were bearing the consequences of the Soviet nuclear shield, thus protecting Soviet citizens as a whole. This idea of a peace-building effect in nuclear weapons is also held by local scientists working at the Semipalatinsk nuclear test site during Soviet time. However, in the Semey region and, to some extent in Kazakhstan as a whole, a public debate followed the information boom on nuclear test activities of the late 1980s and early 1990s, which went together with state research and compensation programs.⁴³ In Tajikistan, no critical debate has yet begun about the nuclear legacy of the Soviet era and its victims (Roche).

A future conflict could revolve around the Soviet legacy of nuclear waste. It has been apparent for some years now that the legacy of uranium mining is one of the most important long-term problems facing Kyrgyzstan and Tajikistan and that these states are completely overburdened with the disposal of radioactive waste.⁴⁴ Around the densely populated Ferghana Valley, in the border region between Kyrgyzstan, Tajikistan, and Uzbekistan, there are several highly dangerous uranium waste repositories with millions of tons of toxic radioactive waste, which need urgent remediation. If released, this material would massively affect all three neighboring countries and fuel old conflicts among the Central Asian states. According to many experts, the question is not whether this will happen, but rather when, as earthquakes, floods, and

landslides regularly occur in this region.⁴⁵ International conflicts over nuclear legacies could also become even more significant in the future.

In Russia, where since the 1980s and 1990s, thanks to *perestroika* and *glasnost*, small “corners of freedom” for environmental activists have developed, which allowed them to make a first inventory of improperly stored nuclear waste in the Soviet Union, the Russian Government has reintroduced the old Soviet practices of concealment and secrecy for the nuclear sector. As Tatiana Kasperski has stated, the general attitude of the government toward the problem of nuclear waste has changed significantly. Russian politicians and even some scientists no longer see the contaminated sites as the terrible legacy of a Soviet regime, which irresponsibly dumped waste, thereby damaging the environment and people, but as the glorious heritage of the military and industrial strength of a superpower. While environmental activists have once again come under the general suspicion of the Russian government and have been accused of being and labeled as “foreign agents,” the local residents affected must continue to live in the nuclear-contaminated environments.⁴⁶ In today’s Russia, the memory of Soviet nuclear modernity seems to again be unbroken, shaping the social reality and everyday practices of many people.

Incidents in international affairs, such as the United States’ withdrawal from the Intermediate-Range Nuclear Forces Treaty in 2019, demonstrate the continuing relevance and novelty of the nuclear legacies from the Cold War until today, both in the post-Soviet space and globally. What had begun in 1982, the Strategic Arms Reduction Talks (START) and its agreements of nuclear disarmament, came to halt, when on August 2, 2019, the US administration’s withdrawal from the Intermediate-Range Nuclear Forces treaty became effective.⁴⁷ This put an end to more than 50 years of nuclear arms control efforts and, when it comes to the relations between Russia and NATO, politicians and political analysts already refer to the increasing tensions as a “new Cold War.”⁴⁸ Disarmament of nuclear weapons began in the 1970s after two decades of Cold War between the United States and USSR, when Strategic Arms Limitation Talks began between the then two superpowers. Limiting, reducing, banning, keeping, and modernizing nuclear arsenals has remained an important issue in international relations since efforts against nuclear testing commenced in the wake of global fallout from the many atmospheric nuclear tests during the 1950s and 1960s. The first limited ban on atmospheric nuclear testing was issued in 1963. Until the present, however, the ratification of a comprehensive test ban on underground nuclear tests is still ongoing.⁴⁹ Nuclear disarmament has been subject to movements, controversies, rationalities of changing character, and configurations. The ratification of a Comprehensive Nuclear Test Ban Treaty lacks several countries – including the United States, Israel, India, and Pakistan, who have not ratified the treaty.⁵⁰ Despite large global movements and efforts for a UN Treaty prohibiting nuclear weapons, such as the International Campaign to Abolish Nuclear Weapons (ICAN),⁵¹ recipient

of the Nobel Peace Prize in 2017, nuclear weapons have become a neglected topic on the agenda in a world shaped by reemerging nationalisms and increasing uncertainty.

By bringing together researchers across disciplines for in-depth investigations into the complex entanglements of the nuclear past and present, this volume offers a beginning in recalibrating our thinking around nuclear legacies, which all too often finds itself entrenched in Cold War paradigms.

Notes

1. Ales' Adamovic, "Nicht nur ein AKW. Ein Brief an Michail S. Gorbačev," *Osteuropa*, 56, H.4 (2006): 19–22.
2. Ulrich Beck, "Der anthropologische Schock. Tschernobyl und die Konturen der Risikogesellschaft," *Merkur*, 40, 8 (1986): 653–663.
3. Melanie Arndt, "Einleitung. Ökologie und Zivilgesellschaft," *Politik und Gesellschaft*, ed. Melanie Arndt, 10–24, here: 16–17 (Berlin: Links, 2016).
4. Astrid Sahn, "Atomenergie nach Černobyl und Fukushima," *Osteuropa*, 63, 7 (2013): 101–121; Tatjana Kasperski, "Nation versus Gedächtnis. Die Nationalisierung kollektiver Vorstellungen über Tschernobyl als Faktor zum Vergessen der Katastrophe," *Politik und Gesellschaft*, ed. Melanie Arndt, 152–181 (Berlin: Links, 2016).
5. Klaus Gestwa, "Von der Perestroika zur Katastroika. Michail Gorbatschow und der Zerfall der Sowjetunion," *Einsichten und Perspektiven*, 1 (2016): 22–33; 2 (2016): 4–25.
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