INTRODUCTION

The Big Picture

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CONTEXT

For those too young to have learned, or old enough to have forgotten, the Cold War was nasty, brutish, and long.[1] Historians disagree vehemently about its origins, about both who was responsible and when it began. But it was under way by 1947 at the latest, driven partly by conflicting ideologies among the victorious allies in World War II, partly by conflicting economic and political interests, and partly by a host of lesser considerations, including personalities, misunderstandings, and much else.

The Cold War fault lines derived from World War II. Its main theaters, Europe and East Asia, were the main theaters of World War II. On one side stood the Soviet Union of Joseph Stalin and the East European countries the Red Army had liberated (or conquered) in 1944–5 in the savage war with Germany. On the other side stood the United States and Britain, supported by dozens of allied countries, notably those liberated and occupied by Anglo-American forces in the last months of World War II. In East Asia, the defeat of Japan left a divided China, which embarked on a civil war between Communists, often but not always supported by Stalin, and nationalists, often but not unconditionally supported by the United States.

From 1948 to 1962, the Cold War featured a series of crises that threatened to convert it into World War III. The biggest shift in the balance of power came in 1949, when the Chinese communists under Mao Zedong's leadership won the civil war and drove the nationalists to the island of

1 A handy primer is David S. Painter, *The Cold War: An International History* (London, 1999). Readers familiar with the outlines of the Cold War may skip down a few paragraphs.

This book arose from a conference sponsored by the German Historical Institute in Washington, D.C. We wish to thank Christof Mauch, former director of the institute, for supporting the conference from the outset, and David Lazar of the institute for his sharp eye and firm hand in helping shepherd this volume into print.

Taiwan, and when the Soviet Union successfully exploded its first nuclear weapon. A full-fledged war in Korea (1950–3), uprisings among Soviet satellites in Eastern Europe (1953, 1956), and crises in Berlin (1958, 1961) and Egypt (1956) kept the great powers on edge and motivated dizzying arms races. The most dangerous moment of all came in 1962, when the United States persuaded the Soviets to withdraw missiles from Cuba, which had recently become a Soviet client state.

Meanwhile, the decolonization of the British, French, Dutch, and Portuguese empires in Africa and Asia enlarged the scope of the Cold War. Not only the United States and the Soviet Union but also China wished to secure allies and resources in the new countries. The United States gradually waded deeper and deeper into a conflict in Vietnam, trying to forestall communist expansion there. By the late 1960s, Vietnam had become a divisive and expensive problem for the United States, and escape from Vietnam seemed to require some relaxation of tensions with either the Soviet Union or China, or with both. Better relations with the United States, awkward as that might be in ideological terms, held a strong attraction for the two communist powers because they had had a falling out that led to border clashes in 1969. The Soviet invasion of its insubordinate satellite Czechoslovakia in 1968 further divided the communist camp. Thus, the table was set for negotiations and détente. The failure of the Soviet Union and China to maintain their alliance was another major shift in the balance of power during the Cold War.

The relaxation of tensions did not last long. A Middle East war in 1973 and the Soviet invasion of Afghanistan in 1979 ignited a new phase of intensified conflict and arms buildups. After Mao's death in 1976, China stayed mainly on the sidelines. The Soviet Union could not carry the burden, as its economy had proved far less flexible and productive than that of the capitalist world by the 1970s. By the late 1980s, under Mikhail Gorbachev, it gambled on desperate efforts to revitalize economy and society. The Soviets lost the resolve to clamp down on restive Eastern European populations, and in 1988–9, Eastern Europe – peacefully – escaped Soviet control. The Cold War was over, although the Soviet Union limped on until 1991.

By conventional reckoning, then, the Cold War lasted from the middle of the 1940s until 1991, pitting the material, cultural, psychological, and other resources of the United States and its allies against the Soviet Union and its bloc. The Cold War included shooting wars, often but not always fought by proxy forces, notably in Korea, Vietnam, Afghanistan, and southern Africa. It featured fluctuating tension and anxiety, which at many moments seemed likely to boil over into an atomic Armageddon. It incorporated almost the

entire world, directly or indirectly, and was bound up with the politics of nationalism and decolonization. There is much to reckon with within the conventional reckoning.

That reckoning still does not acknowledge that the Cold War was fought on Earth in the biosphere with repercussions that will last for perhaps a hundred thousand years. In some respects, the Cold War enlarged the human experience of the biosphere by encouraging research and explorations in previously neglected nooks and crannies, such as the polar regions, the ocean floors, and the upper atmosphere. The Cold War helped alter the human appreciation of the biosphere, spurring grand ambitions such as changing the direction of ocean currents and altering weather patterns. The stakes seemed so high to those in the corridors of Cold War power that drastic interventions in the workings of the biosphere were easily justified if they promised some advantage in the mortal struggle with the enemy. In countless ways, the Cold War altered the biosphere itself. This book explores those linkages between the Cold War on the one hand and the environment, environmental change, and human knowledge of the environment on the other. It seeks to bring together the concerns of environmental history and Cold War history.

Historians of the Cold War have kept themselves busy for about sixty years, chronicling and analyzing various aspects of the struggle. The occasional opening of a new archive or the release of a new set of documents has invited periodic revisions of reigning interpretations. So, unlike the Peloponnesian War or even World War I, about which no new documents are likely to challenge prevailing wisdom, Cold War historiography chases a moving target, repositioning and remaking itself at a rapid clip, like the study of human evolution (constantly revised by new archeological finds and genomic evidence) and cosmology (revised by new snippets of data from the far corners of the universe). Historians of the Cold War, despite their unflagging industry, their relentless curiosity, and their plentiful numbers, have not given much attention to the relationships between their chosen subject and its earthly context. Like those in the corridors of power whom they have so carefully studied, they have been too busy with more conventional matters.[2]

2 See, e.g., the three recent general treatments by leading Cold War historians: Odd Arne Westad, *The Global Cold War* (Cambridge, U.K., 2005); John Lewis Gaddis, *The Cold War* (New York, 2006); and Melvyn Leffler, *For the Soul of Mankind: The United States, the Soviet Union and the Cold War* (New York, 2007). None of these works considers environmental issues or contexts. A notable exception is Jeffrey A. Engel, ed., *Local Consequences of the Global Cold War* (Washington, D.C., and Stanford, Calif., 2007). Historians of war, for their part, have long been interested in environmental factors that might affect campaigns and battles or, in an older tradition, the character of peoples. But environmental

In the latter years of the Cold War, the historical profession developed a new wrinkle, environmental history. Although it has many roots and precursors, as a self-conscious enterprise, environmental history dates to the 1970s. It is concerned with relations between human society and the rest of nature. These can take any number of forms, such as human alteration of the environment, writing and thinking about the environment, and policies and politics concerning the environment. Environmental historians have probed several aspects of this relationship, from bodies and disease to industrial metabolism and environmental protest movements. But, by and large, they have been reluctant to consider the significance of war.[3]

At first glance, this is strange indeed. War has long been one of the classic subjects for historians. Even in the past forty years, when historians have stampeded in new directions, such as social and cultural history, most still attribute great importance to big wars and routinely use them in their periodizations. And there is good reason for this: wars, at least big ones, are important in the evolution of societies. Conceivably, the sort of historian attracted to consideration of the environment is normally repelled by attention to warfare. Or, perhaps, it is merely that environmental historians thus far have been too busy with other matters and have not yet gotten around to focusing their lenses on war. In any case, environmental historians and historians of war have almost completely ignored one another's work until very recently.

Stranger still is that Cold War historians and environmental historians have studiously ignored one another's work. The majority of inquiry in environmental history concerns the post-1945 world. Just as the Cold War played out against a backdrop of the changing biosphere, every environmental issue between 1945 and 1991 took place in an evolving geopolitical context dominated by the Cold War. Yet the two historiographies have been like two ships passing in the night, dimly conscious of one other but unable or unwilling to engage each other.[4] In this book, we aim to shine a

change and the possible impacts of war on the environment have yet to spark much interest among military historians. This stands in sharp contrast to the outlook of military planners today, many of whom have developed a keen interest in environmental change, especially climate change, which they foresee as possibly affecting their craft in fundamental ways.

3 There are some exceptions, such as Richard P. Tucker and Edmund Russell, eds., *Natural Enemy, Natural Ally: Towards an Environmental History of Warfare* (Corvallis, Ore., 2004); J. R. McNeill, "Woods and Warfare in World History," *Environmental History* 9 (2004): 388–410; Berthold Meyer, ed., *Umweltzerstörung: Kriegsfolge und Kriegsursache* (Frankfurt, 1992); and Charles E. Closman, ed., *War and the Environment: Military Destruction in the Modern Age* (College Station, Tex., 2009). For readers of Finnish, there is also Simo Laakkonen and Timo Vuorisalo, eds., *Sodan ekologia: Nykyaisen sodankäynnin ympäristöhistoriaa* (Helsinki, 2007), concerning recent warfare.

4 The chief exception to this general statement is the awareness in the historiography of the rise of modern environmentalism of the significance of anxieties arising from nuclear fallout.

searchlight through the fog, making it easier for those on one ship to take account of those on the other.

CONNECTIONS

Countless connections exist between the Cold War and the concerns of environmental history. This book explores a few but by no means all of them. Here are some reflections on some of the relevant themes – some represented, some not – in the chapters that follow.

The Environmental Effects of Proxy Wars

Greg Bankoff's chapter on Asian fauna in the Cold War, and especially in the hot wars of Korea, Vietnam, and Afghanistan, provides a glimpse into a fascinating and large subject. Proxy wars took place outside of Asia, too, of course, in Angola; Mozambique; Central America; and, in some people's estimation, in the Middle East. These were often guerilla conflicts, fought in remote rural landscapes by poor and hungry people. The destruction of crops, trees, animals, water supplies, and so forth – environmental warfare – had a strong logic where those resources were so desperately needed and where moral strictures against punishing civilian bystanders scarcely applied. The wars in southern Africa (c. 1960–90), where the Americans and the Soviets supported rivals seeking to supplant Portuguese colonial rule, serve as a fine example. The fragility of ecosystems, especially in semiarid areas of Angola and Mozambique, made ecological damage hard to repair, and the poverty of the affected populations made environmental warfare an especially effective political tool.[5]

The Vietnam War is the best-studied war from the ecological perspective, mainly because of the moral objections to the Americans' use of chemical defoliants such as Agent Orange. David Zierler's chapter explains some sides of that important issue. Other aspects of the environmental effects of combat, and of political struggle, in Vietnam have rewarded investigation.[6] Other Cold War theaters, from Central America to the Horn of Africa, deserve detailed attention, too.[7]

5 Emmanuel Kreike, "War and the Environmental Effects of Displacement in Southern Africa (1970s–1990s)," in *African Environment and Development*, ed. W. G. Moseley and B. I. Logan (London, 2003), 89–110.

6 David Biggs, "Managing a Rebel Landscape: Conservation, Pioneers and the Revolutionary Past in the U Minh Forest, Vietnam," *Environmental History* 10 (2005): 448–76.

7 On Central America, there is Daniel Faber, *Environment under Fire: Imperialism and the Ecological Crisis in Central America* (New York, 1992), but it is thinly researched.

Agriculture and the Green Revolution

The Cold War was a contest for the hearts and minds of millions around the world, but it could not have been won without successfully filling stomachs. Claims for the moral or practical superiority of communism or capitalism would ring hollow unless people were adequately fed. In the Soviet Union, this presented an acute problem in the aftermath of World War II because food production lagged well behind requirements. Famine stalked the land in 1946; Nikita Khrushchev's memoirs mention cannibalism in the Ukraine. Stalin, no friend of the peasant, responded with various efforts to squeeze more grain from the countryside and, in 1948, a comprehensive plan for the transformation of nature. The plan's central goal was to make the Soviet land more productive, to feed the population, and to allow grain exports that could serve political ends (during the 1946 famine, the Soviet Union exported grain to France in hopes of influencing election results). The plan had not progressed very far by the time of Stalin's death in 1953. Khrushchev, eager to distance himself from Stalin, followed with the Virgin Lands Campaign, which involved plowing up huge areas of steppe grassland in Kazakhstan and eastern Siberia and sowing them with wheat.

American authorities, meanwhile, were increasingly concerned about the problem of hunger, which, they feared, could threaten political stability and open the door to communist agitation, especially in Latin America and Asia. After flirting with ideas of land reform, they responded with a technical solution known as the green revolution. This was an agricultural modernization package of high-yield cereals (initially wheat and rice, carefully bred to carry a heavy, grain-packed head on a short stalk), combined with chemical fertilizer, pesticides, and usually new machinery and irrigation. As a production strategy, it worked: wheat and rice yields doubled and tripled where the new crop varieties flourished (e.g., Mexico and India).[8] The Chinese, too, pursued scientific crop breeding, but they also followed the Soviet strategy of plowing up semiarid grasslands for cultivation.

Both of these responses to the threat of hunger, intensification and extensification of agriculture, brought pronounced ecological effects. The green revolution loosed new chemicals on agroecosystems and the waters that drained them. Its machinery led to soil compaction and its irrigation to waterlogging and, in places, to salinization. Plowing up grasslands invited wind erosion and the rapid drawdown of soil nutrients. Hundreds of millions

8 A forthcoming book by Nick Cullather, *Parable of Seeds: The United States and the Green Revolution in Asia*, will illuminate the role of the green revolution in U.S. Cold War strategy.

of hectares of Earth's surface were fundamentally altered by agricultural initiatives spurred by the Cold War.[9]

Cold War Infrastructure

In Richard Tucker's chapter, the connections between Cold War geopolitical agendas and the spate of dam building around the world are laid bare. Dams had both practical and symbolic value in the Cold War struggle, as did other forms of large-scale infrastructure, such as roads and railroads. Like dams, such infrastructure was built for a host of reasons, not all of which involved the Cold War. But, as with dams, Cold War anxieties helped shape projects such as the U.S. interstate highway system and the Soviet Baikal-Amur Mainline (BAM) railroad.

In 1956, after years of political wrangling, the U.S. Congress succumbed to pressure from President Dwight Eisenhower and passed what is commonly known as the National Interstate and Defense Highways Act. Ike wanted a highway system that would stand the country in good stead in the event of war, that would allow rapid evacuation of major cities in the case of nuclear attack, and that would speed men and materiel to ports should conventional war break out. Its roadbeds, tunnels, and bridges were built to accommodate military vehicles. Its network served all of the roughly four hundred military bases in the (then) forty-eight states.

The Soviet leadership also had military priorities in mind when making transport-investment decisions during the Cold War. In contrast to the United States, however, the Soviet Union neglected roads and instead gave priority to railroads. One example is the long-delayed completion of the BAM line first begun in the 1930s but left languishing until geopolitical events in the 1960s – the Sino-Soviet border clashes and the Vietnam War – gave routes to the Soviet Far East and Pacific ports a new importance in the Kremlin's strategic thinking. The sole existing transport line linking the Russian heartland with Vladivostok was the old Trans-Siberian Railroad, which lay close to the Chinese border. The BAM line, well back from the border, offered welcome insurance against either Chinese incursion or American missiles or bombers.

These roads and railroads, like all transport infrastructure, helped redefine patterns of land use. They influenced settlement, the location of businesses,

9 John H. Perkins, *Geopolitics and the Green Revolution* (New York, 1997); Zhores Medvedev, *Soviet Agriculture* (New York, 1987); Nick Cullather, "Miracles of Modernization: The Green Revolution and the Apotheosis of Technology," *Diplomatic History* 28 (2004): 227–54; Martin McCauley, *Khrushchev and the Development of Soviet Agriculture: The Virgin Lands Programme, 1953–1964* (London, 1976).

and the economics of resource extraction. Logging, mining, and farming became practical in places previously inaccessible. The interstate highways also inhibited terrestrial wildlife migrations – as dams did aquatic wildlife.

Military Bases

The Cold War was a global struggle, especially after the Soviet Union made a commitment in the 1960s to foster communist revolution wherever circumstances seemed promising.[10] This meant that both the Americans and the Soviets built networks of military bases to house their forces, partly to keep local governments and populations loyal (or at least compliant) and partly to be prepared should a real war break out. By the mid-1960s, the United States had some 375 overseas bases. Sometimes these were sprawling establishments, as in the case of the Panama Canal Zone or Subic Bay in the Philippines. Normally, the bases were free from local laws and at least partially insulated from local pressures. This meant that military authorities could often use the environment of the military bases as they saw fit, with little or no restraint. They could, for example, dump millions of tons of toxic chemicals – mainly in fuel, lubricants, and ammunition – on soils and in waters without regard to the consequences. The pollution record of the Soviet military in Eastern Europe and the Baltic in this respect is especially egregious, an indication of the frictions felt between Soviet occupying forces and the unwelcoming populations. As the Soviet forces withdrew after 1989, they sometimes willfully polluted the bases they were turning over to Eastern Europeans. The Americans' slow withdrawal from the Panama Canal Zone after 1977 seems honorable in comparison – but only in comparison. Thus, the networks of bases were archipelagoes not merely of environmental nonchalance but sometimes of deliberate despoliation as well.[11]

Nuclear Weaponry

Far in the future, when none but the most encyclopedically informed historians has heard of the Cold War, the legacy of radioactive contamination from nuclear weapons programs will still haunt the biosphere. Most of the

10 See Vladislav Zubok, *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachev* (Chapel Hill, N.C., 2007), on Soviet adventures around the world.

11 Henri Myrttinen, *Base Conversion in East and Central Europe, 1989–2003* (Bonn, 2003), 12–13; José Carcione, Henryk Marcak, Geza Seriani, and Giorgio Padoan, "GPR Modeling Study in a Contaminated Area of Krzywa Air Base (Poland)," *Geophysics* 63 (2000): 521–5; Joseph Gerson and Bruce Birchard, eds., *The Sun Never Sets: Confronting the Network of Foreign U.S. Military Bases* (Boston, 1991).

environmental effects listed above were the result of Cold War conduct that was driven only in part by Cold War political agendas. In the case of nuclear weapons, although the United States first developed them in World War II, their mass production and frequent testing was explicitly a result of Cold War anxieties. The production, testing, and even decommissioning of nuclear weapons all made lasting messes. Paul Josephson's chapter gives a sense of the casual attitude toward nature and the anxious attitude toward security that characterized the Soviet nuclear weapons program. Mark Merlin and Ricardo Gonzalez's chapter illustrates some of the effects of American, British, and French nuclear testing in the Pacific. No one knows just what the environmental effects of Chinese testing at Lop Nor might be, as China maintains a thicker veil of secrecy around its nuclear weapons program than anyone else does. But whether in the Soviet Arctic, the atolls of Micronesia, the Xinjiang Uyghur Autonomous Region of China, or anywhere else, the radiation resulting from nuclear weapons production, testing, and (careless) disposal will be with our descendants, and indeed with all life forms, for tens of thousands of years to come. Historians will have to be at their best to explain to future generations how the pressures of the Cold War led responsible officials to make the choices that they did.[12]

Military-Industrial Complexes

At the end of his presidency, Eisenhower warned the U.S. public against the power of what he dubbed "the military-industrial complex." It was not a new threat. Britain and Germany had their own versions of military-industrial complexes in the nineteenth century, and every major combatant in the world wars either had one or had to build one. But in the course of the Cold War, the United States and the Soviet Union took the military-industrial complex to another level. According to some estimates, military goods accounted for 25–40 percent of all industrial production in the Soviet Union. In all Cold War powers, industries deemed vital to military preparedness were given tax breaks and subsidies, and afforded levels of secrecy unavailable to others. Military industries enjoyed privileged access to raw materials, particularly in the Soviet Union, and special powers in labor

12 Michele Gerber, *On the Home Front: The Cold War Legacy of the Hanford Nuclear Site* (Lincoln, Neb., 1992); Stephen I. Schwartz, ed., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons* (Washington, D.C., 1998); Arjun Makhjani, Howard Hu, and Katherine Yih, eds., *Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and Its Health and Environmental Effects* (Cambridge, Mass., 1995); Nikolai Egorov, Vladimir Novikov, Frank Parker, and Victor Popov, eds., *The Radiation Legacy of the Soviet Nuclear Complex* (London, 2000); V. I. Bulatov, *Rossia: Ekologiia i armiia* (Novosibirsk, 1999), 41–53.

relations, including, in the Soviet case, the provision of free gulag labor. Wherever possible, and in the Soviet Union this meant everywhere, they were exempt from pressures and laws to contain pollution. In the United States during the Cold War, environmental regulation more or less stopped at the doorstep of military industries, especially before the mid-1970s. As for the Chinese, after the Sino-Soviet split, they felt anxious about attack from both the Soviet Union and the United States, and consequently built a brand new military-industrial complex deep in the interior, mainly in Sichuan Province, polluting broad swaths of countryside that had formerly breathed easily.[13]

Military-industrial complexes reached beyond the borders of the leading geopolitical powers to a much greater extent during the Cold War than they had in earlier epochs. Strategic ores such as uranium, manganese, cobalt, and nickel meant a great deal to the Cold War powers, so they tried hard to maximize and monopolize production wherever they could. The United States tried to persuade its firms to mine strategic ores in places where the prospects for profits were usually insufficient to tempt businesspeople, such as in central and southern Africa. The Soviet Union tried to get as much ore, especially uranium, out of Eastern Europe as fast as possible, leaving a radioactive mess in the former East Germany and Czechoslovakia. Thanks to the pressures of the Cold War, mining operations took place around the world that otherwise would not have. And, of course, they had a range of environmental consequences, from the in-filling of streams and rivers to the creation of mountains of slag.

Respites for Nature

One of the more cheerful aspects of the relationship between the Cold War and the environment is the creation of de facto nature preserves in restricted military areas. Simply by preventing quotidian economic activity, restricted areas sometimes preserved ecosystems and species that would otherwise likely have disappeared. In some cases, decommissioned bases or artillery ranges have been converted to formal nature preserves, as with some of the former Soviet bases in Eastern Europe, the former U.S. Navy gunnery range at Culebra (an island off of Puerto Rico), and the former nuclear arsenal at Rocky Flats, Colorado (an official wildlife refuge since 2005).

Perhaps the best example, and a direct result of the Cold War, is the demilitarized zone (DMZ) spanning the waist of the Korean peninsula. Off-limits

13 Judith Shapiro, *Mao's War against Nature* (New York, 2001).

to civilian activity since the armistice of 1953, the DMZ is the final active front of the Cold War and today is the most heavily militarized border region in the world. The rest of Korea is densely populated and thoroughly used for economic purposes, but not the DMZ. As a result, over the past half century, the DMZ has become a wildlife preserve where species absent elsewhere can still be found, as Greg Bankoff shows in his essay. It is a way station for migratory birds, including some very rare species of cranes that are culturally prized in East Asia but nonetheless threatened with extinction. The DMZ is only about 2.5 miles wide and 155 miles long, but it includes wetlands, grasslands, and mountain ecosystems – a good transect of Korea's natural biomes. Most of it was farmed or logged or otherwise used before the Korean War, but in half a century of enforced neglect, the ecosystems have shown resilience and have reminded Koreans of what their peninsula once looked like.[14]

Cold War Environmentalism

Modern environmentalism has many parents and grandparents, but it is, among other things, a child of the Cold War. Perhaps the most direct connection is in the overlap between antinuclear and environmental protests. This was most pronounced in Europe, probably in West Germany and Britain above all, where several communities objected to the placement of American nuclear warheads in their vicinity. Often, the same people took part in both the antinuclear and the environmental movements.[15] Fears of radiation poisoning and nuclear-winter scenarios helped tilt popular culture in the direction of ecological thinking. The former also affected the conduct of politics and diplomacy in the case of the Partial Test Ban Treaty of 1963, as discussed in Toshihiro Higuchi's chapter. In the United States, the environmental movement of the 1960s and 1970s often appealed to the same segments of society that objected to the Vietnam War and viewed Cold War militarism with suspicion. Other segments of the population, more committed to vigorous prosecution of the Cold War, often viewed environmentalism with equal suspicion and, in extreme cases, viewed environmentalists as treasonous stooges of the Soviet enemy.

14 Ke Chung Kim, "Preserving Biodiversity in Korea's Demilitarized Zone," *Science* 278 (1997): 242–3; Kwi-Gon Kim and Dong-Gil Cho, "Status and Ecological Resource Value of the Republic of Korea's De-militarized Zone," *Landscape and Ecological Engineering* 1 (2005): 3–15.

15 Sandra Chaney, "For Nation and Prosperity, Health and a Green Environment: Protecting Nature in West Germany, 1945–1970," *Nature in German History*, ed. Christof Mauch (New York, 2004), 93–118; Jens Ivo Engels, *Naturpolitik in der Bundesrepublik: Ideenwelt und politische Verhaltensstile in Naturschutz und Umweltbewegung 1950–1980* (Paderborn, 2006), 322–76.

In the Soviet Union and several of its Eastern European satellites, environmentalism eventually served as one of the few – sometimes the only – permissible form of critique of the state and the Communist Party. When environmentalism began to gather momentum in the West, those in the Kremlin and their apparatchiks elsewhere initially welcomed it, seizing the opportunity to portray environmental degradation, pollution in particular, as characteristic of capitalism in its decadence. Some imaginative Polish theorists even briefly advanced the position that pollution was impossible under socialism. This was conspicuously at odds with visible (and smellable) fact, and gradually a critique emerged of communist regimes' failure to protect nature and human health adequately. Although those who made such views public were sometimes suppressed, as often as not, the authorities tolerated environmentalism within certain limits. As a result, it attracted adherents who could find no other way (that would not result in a spell in prison or worse) to express their frustrations and resentments toward the state. These movements peaked in the 1980s and played a modest role in shaking the foundations of the Eastern European satellites. In the Soviet Union itself, the political space accorded to environmentalism and its influence on high politics was smaller.[16]

Something similar could be observed in the People's Republic of China, according to Bao Maohong's account in this volume of Chinese environmental policies. After years of sacrificing environmental interests to forced industrialization, economic considerations of the costs of environmental destruction and growing international pressure helped develop a sensitivity toward environmental degradation. Environmental critique in Cold War China carried considerable risks to those who engaged in it, but it was safer than almost any other form of criticism of the state or Communist Party.

Environmentalism and Diplomacy

By the late 1960s, environmentalism had gained such importance in the West that it became part of international politics and was instrumentalized as a foreign policy tool. Many politicians became persuaded by the need for détente, and environmental issues, less contentious matters such as arms control, promised to help bridge the divide between East and West. International organizations such as the United Nations and the Conference on Security and Cooperation in Europe became prominent advocates for

16 Douglas Weiner, *A Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev* (Berkeley, Calif., 1999).

global approaches to environmental protection, even if the initiative for such international efforts often was rooted in national or regional interests, as Kai Hünemörder notes in his contribution to this volume. The ebb and flow of détente both shaped environmental politics and policies and in turn (albeit to a lesser degree) was shaped by them. Thus, the Cold War settings in which environmental issues were debated were never static but subject to political change.

Environmental History, the Cold War, and Science

Looking at the linkages between environmental history and the Cold War, the central role science played within this complex becomes apparent quickly, for both the environment and the Cold War are connected with science in multiple ways. The Cold War world was, in many respects, a scientific world – one in which political, social, and cultural problems were viewed through the lens of science and in which science was believed to offer solutions to the challenges both of everyday life and of international politics, including the Cold War itself. The towering influence of science today on nearly every aspect of individual and political life derives in large measure from the period between the end of World War II and the fall of the Berlin Wall.

To be sure, science – or rather, scientists – had been able to secure an important position for themselves many years before the beginning of the Cold War. During World War I, scientists had proved how relevant their knowledge was to winning increasingly modern (i.e., technically advanced) wars. Public belief in science continued to grow in the industrialized countries during the interwar period, as accelerating modernization processes seemed to require increasingly elaborate, rational, and efficient methods and solutions. Technocracy's breakthrough in the 1920s and 1930s paved the way for what was to become the most scientific war to date. World War II was fought on many fronts, prominently among them the front of science. The Western alliance's victory over Adolf Hitler owed much of its success to scientists' efforts to develop weapons that would destroy the German forces.[17] Those who had doubted the Allies' technological superiority were proved wrong by Hiroshima and Nagasaki. With the deployment of two atomic bombs, American scientists had shown the world that they were capable of ending wars and destroying fascism. What else would have

17 See Alex Roland, "Science, Technology, and War," in *The Modern Physical and Mathematical Sciences*, ed. Mary Jo Nye (Cambridge, U.K., 2003), 561–78.

granted scientists the extraordinarily privileged position vis-à-vis society and politics they acquired after 1945? If scientific knowledge could help to win a world war, it could surely help to contain totalitarianism and to prevent the Cold War from turning hot – a belief that fueled the Cold War logic of deterrence and the buildup of huge arsenals of ever-more-capable weapons of mass destruction.

Mobilizing Science, Mobilizing the Environment

Much has been written about the mobilization of science and the development of the so-called military-industrial-academic complex since World War II.[18] One thing most scholars agree on – apart from the fact that immense amounts of money helped to build a large, multifaceted apparatus of state-sponsored research facilities[19] – is the stability of the relationship between state and science, strategists and researchers. Whereas earlier studies tended to look on this relationship as a one-way street on which scientists followed political and military leads, more recent scholarship has made clear that the relation was an interdependent one, profitable to all parties, and that scientists were quite willing and able to shape it to serve individual and disciplinary interests.[20]

The study of Cold War science has blossomed over the past fifteen years, and its traditional focus on physics and engineering has widened to include the social sciences.[21] However, little has been written about the development and importance of the environmental sciences.[22] This is even more astonishing, as the latter owe their successful career to the Cold War in many respects. Actually, many Cold War strategists credited them with playing an

18 See, e.g., Leslie W. Stuart, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York, 1993); Michael Fortun and Sylvan S. Schweber, "Scientists and the State: The Legacy of World War II," in *Trends in the Historiography of Science*, ed. Kostas Gavroglu, Jean Christianidis, and Efthymios Nicolaidis (Dordrecht, 1994), 327–54.

19 See, among others, Daniel J. Kevles, "'K1 S2': Korea, Science, and the State," in *Big Science: The Growth of Large-Scale Research*, ed. Peter Galison and Bruce Hevly (Stanford, Calif., 1992), 312–33; Sam S. Schweber, "Big Science in Context: Cornell and MIT," in ibid., 149–83.

20 For example, see John Krige and Dominique Pestre, "Introduction," in *Science in the Twentieth Century*, ed. John Krige and Dominique Pestre (Amsterdam, 1997), xxi–xxxv, xxxiii.

21 For an overview, see Corinna R. Unger, "Cold War Science: Wissenschaft, Politik und Ideologie im Kalten Krieg," *Neue Politische Literatur* 51, no. 1 (2006): 49–68. On universities in the Cold War, see David C. Engerman, "Rethinking Cold War Universities: Some Recent Histories," *Journal of Cold War Studies* 5, no. 3 (2003): 80–95.

22 Exceptions are, among others, John Cloud, "Imagining the World in a Barrel: CORONA and the Clandestine Convergence of the Earth Sciences," *Social Studies of Science* 31, no. 2 (2001): 231–51; and Jacob Darwin Hamblin, *Oceanographers and the Cold War: Disciples of Marine Science* (Seattle, 2005).

important role in winning the conflict. Climate research, the topic of Kristine Harper and Ronald Doel's essay on the U.S. Defense Department's efforts to produce rain in India, probably would not have triggered such sincere interest or have received such generous support had atmospheric scientists not promised to help win the battle for democracy. The same holds true for those disciplines whose representatives made an effort to understand human behavior in different surroundings and to optimize it according to strategic demands, as Matthew Farish shows in his chapter. Demography and agronomy, water management, and botany might not have been at the forefront of strategists' minds at Potsdam in August 1945, but it soon became clear that the evolving Cold War was a most extraordinary, highly unconventional conflict and that its universal character – both from a spatial and from a politico-ideological point of view – demanded unusual approaches to winning it, among them environmental warfare. American military agencies seriously discussed the use of radiological, chemical, and biological weapons in the early postwar years, but bureaucratic and political difficulties prevented those ideas from becoming reality, as Jacob Hamblin argues in his essay.

Transnational Approaches

Studying the intersections of environmental and Cold War history offers an opportunity to approach twentieth-century world history from a transnational perspective. The environment is a transnational actor and setting per se, transcending all political and cultural borders, and environmental exchange and transfer, two of the central analytical categories in transnational studies, take place on a quite "natural" basis.[23] Similarly, the Cold War, by its very nature, transcended traditional borders. Its global dimension and the universalism claimed by its defining ideologies overcame former geographic divides and gave rise to the most unlikely alliances – sometimes with, but more often against the environment.

That neither the Cold War nor the environment was constrained by national borders holds two advantages for historians. First, it helps to complement the traditional view of the Cold War as a conflict fought by diplomats, intelligence agencies, and the military in Washington and Moscow by integrating the environment as an immensely influential factor and, in some respects, an agent. Second, it offers a key to unlocking the door to the Cold

23 This is not to suggest the existence of a time-transcending state of environmental harmony; such a romanticizing picture of the environment is surely inadequate, especially when set in contrast to the conflictual twentieth century.

War's periphery. It was there, in the so-called Third World that the Cold War's proxy wars were fought, and it was inhabitants of those countries who suffered most severely the immediate consequences of the struggle between the two blocs. Practices such as nuclear testing and the military use of defoliants were linked in one way or another to Cold War interests and strategies. Interventions into the environment as part of fighting the conflict between East and West may not always have qualified as warfare by traditional definitions but their aggressive, often-destructive character is very visible today.

Controlling the Environment

The fear of communism and its inherent threat to individual liberty, economic prosperity, and political freedom defined Western views of the environment to a large degree. The effort to stabilize one's individual and national standing vis-à-vis an apparently totalitarian enemy resulted in the attempt to exercise as much control as possible over all aspects of life – including the wild, unpredictable environment. This kind of applied fear management clearly depended on science's ability to understand the ways the environment worked, and once scientists had made this knowledge available, it seemed possible to influence even the behavior of the environment. Thus, one did not have to comply with the environment's supposedly atavistic forces any longer but could steer them according to political and economic needs and even use them as a weapon against the enemy. To be sure, such technocratic thinking was not new. Already in the 1920s and 1930s, the Soviet Union had proved one of its most loyal disciples, as described by Paul Josephson in his chapter here on Soviet environmental interventions. But the Cold War added a special urgency to the centuries-old effort to overcome humanity's subordination to the environment. Modern technology offered new, increasingly effective ways of doing so. Faith in science and technology, moreover, encouraged bold environmental interventions.

Scientific Experts and Environmentalism

The expert culture that arose from the political privileging of science remained powerful until the late 1960s. At that time, the liberal consensus and its national security dogma were coming under growing pressure from civic, mostly left-wing groups protesting Vietnam and other allegedly imperialist ventures by the United States, and the close collaboration among scientists, the state, and the military began to come under increasingly harsh

criticism. Scientists were accused of selling their knowledge for immoral causes and of sacrificing science's freedom for personal advantage. Some scholars joined the call for scientists to return to the ivory tower and to regain at least some of the freedom they had given up since the end of World War II.[24]

The technocratic view of the environment came under pressure for other reasons as well. Nuclear testing; the use of herbicides, pesticides, and defoliants; chemical and biological warfare – all of these were criticized by scientists, politicians, and ordinary citizens early on (see the chapters by Higuchi, Zierler, Deese, and Merlin and Gonzalez).[25] Although the groups and individuals involved often had a difficult stand vis-à-vis the military-industrial-academic complex, they succeeded in attracting growing attention and support. In some ways, their success was facilitated by the Cold War itself. Satellite photography, one of the most characteristic Cold War inventions, produced images of Earth that made evident both its coherence and its fragility; those images, in turn, fostered a rediscovery of organic thinking and the emergence of deep ecology.[26] Similarly, scientists' privileged status and prestige helped lend credibility to civic protests against the destruction of the environment and the risks the Cold War rivalry posed to humankind. As experts, scientists could make authoritative statements about the environmental effects of Cold War–related practices, and it was difficult for politicians and strategists to question those statements without risking their own credibility. Thus, in a dialectical sense, the Cold War, by conferring on scientists a special position within society, produced its own, severest critics.

A PARTING SHOT

It is important to recognize that some things happened during the Cold War years that had little or nothing to do with the Cold War. Some of the environmental changes that took place would have happened even had there been no Cold War. For example, the overfishing in many of the seas' richest fisheries owed little or nothing to the Cold War. The same holds for the

24 See, among others, Immanuel Wallerstein, "The Unintended Consequences of Cold War Area Studies," in *The Cold War and the University: Toward an Intellectual History of the Postwar Years*, ed. Noam Chomsky (New York, 1997), 195–231, 220–3; Ron Robin, *The Making of the Cold War Enemy: Culture and Politics in the Military-Intellectual Complex* (Princeton, N.J., 2001), 235–7.

25 Also see Christof Mauch, Nathan Stoltzfus, and Douglas R. Weiner, "Introduction," in *Shades of Green: Environmental Activism around the Globe*, ed. Christof Mauch, Nathan Stoltzfus, and Douglas R. Weiner (Lanham, Md., 2006), 1–12; Frank Zelko, "Challenging Modernity: The Origins of Postwar Environmental Protest in the United States," in ibid., 13–40.

26 See Denis Cosgrove, "Contested Global Visions: *One-World*, *Whole-Earth*, and the Apollo Space Photographs," *Annals of the Association of American Geographers* 84, no. 2 (1994): 270–94.

substantial deforestation of the moist tropical-forest belt that once ran across West Africa. The creation of this, that, or the other park or conservation refuge normally had nothing, or next to nothing, to do with the Cold War. Equally, the rise of modern science and the prestige and power enjoyed by scientists occurred in Finland and Switzerland as well as in the Cold War powers – although it took a rather different shape there.

Still, it is hard to find much of significance in environmental history during the Cold War years that did not have some direct or indirect connection to the Cold War. Some fishermen made use of satellite imagery to guide them in their quest for schools of fish, something that might not have happened or might have happened only later on a smaller scale, without the impetus the Cold War gave to space technology. Population growth lay behind West African deforestation (although, of course, other causes were involved, too), and to some extent that population growth depended on public health initiatives, food programs, and the like that sometimes derived, in part, from Cold War motives. And the fate of science and scientists unconnected to Cold War research was nevertheless indirectly linked, through exchanges of information, international collaborations, and so forth, to scientists at the Massachusetts Institute of Technology, Stanford, Los Alamos, Moscow State, Akademogorsk, and other centers of Cold War science. Thus, if one is prepared to follow the ligaments far enough, almost everything that happened during the years from 1945 to 1989 bore some connection to the Cold War.

In the pages that follow, we offer some examples of connections between environmental history and the Cold War. Some of those connections are indirect; others are clear and strong. All of them, we hope, will be of interest.