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Milton Leitenberg
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Milton Leitenberg: Pioneering Work on Weapons of Mass Destruction, Wars and Arms Control

Preface by Judith Reppy and Matthew Evangelista



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Epitath (Dedication)

David Koplow to David Hoffman:

“Do you know Milton?”

David Hoffman to David Koplow:

“Yes I know Milton well.

I fear and admire Milton.

And so would Socrates.”

A Short Note by the Author

I came to Stockholm in January 1968 as the first American to be recruited to join a new institute whose work would concern arms control and disarmament. The institute was SIPRI, the Stockholm International Peace Research Institute, established by the Swedish government. Its mandate did not concern studying “peace,” but weapons of mass destruction: nuclear, chemical, and biological weapons, the lesser “conventional” weapons, and the international negotiations that attempted to control them. I had already begun research on these subjects before I came to SIPRI, and my writing on these issues has continued to the present day in 2025. In 1975 I also began to study and write about ongoing wars and conflicts taking place across the globe. All of those subjects are heavily represented in the contents of this book.

By the end of the 1970s, it became obvious that an entirely different subject was becoming of immense importance. It is what we now know as “Global Warming,” or “Global Climate Change.” Because nations did not modify their patterns of energy production and use, primarily dependent on the use of fossil fuels, it seems very likely that the effects on global stability and sustainability will be catastrophic in a very short time to come. This will not be the result of short-term risky behavior or “accidents” in the way nuclear-weapon states have willfully behaved with nuclear weapons (see Chaps. 12, 20, 38 and 39 in this volume). Because states worldwide refused to alter their behaviors that affected carbon dioxide and methane emissions into the upper atmosphere, by 2025 it appears certain that the situation is no longer redeemable or reversible.

The First Assessment report by the United Nations Intergovernmental Panel on Climate Change (IPCC) appeared in 1990 and was followed by innumerable reports from IPCC working groups, other international panels, research institutes and governmental bodies. The first warning to United States government agencies by James Hansen, the legendary NASA scientist, was made in 1988.¹ In 2010 a journal article

¹ James Hansen, “Statement of Dr. James E. Hansen, Head NASA Goddard Institute for Space Studies before the Committee on Governmental Affairs, United States Senate,” July 18, 2001, <https://www.hsgac.senate.gov/wp-content/uploads/imo/media/doc/hansen.pdf>.

referred to Global Climate Change as the “Challenge of the Century,”² and in 2013, writing in a book review, Nobel laureate Paul Krugman referred to it as “Gambling with Civilization.”³ In its 2014 report, the IPCC warned that the effects of Global Climate Change were already felt, but “the worst is to come.”⁴ The Fourth Assessment Report of the IPCC in 2007 ended with the following remark: “A technological society has two choices. First it can wait until catastrophic failures expose systemic deficiencies, distortion and self-deceptions. [...] Secondly a culture can provide social checks and balances to correct for systemic distortion prior to catastrophic failures.” Not only has the second choice not been made but the self-deceptions of the first choice were on magnificent display in 2025 with the withdrawal of the United States from the 2016 Paris Climate Agreement by a new US administration. At a time when nations will be struggling to find the means to deal with the consequences of Global Warming here on earth, there are proposals to initiate a program of manned spacecraft to Mars, which could consume \$10 or \$15 trillion.

Although the book does not include anything on this subject, it is at the moment the one concern that is the most critical for the future of the world.

January 2025

Milton Leitenberg

² Alex Bowen et al, “Challenge of the Century,” *Finance and Development* 47, no. 1 (March 2010): 24–25.

³ Paul Krugman, “Gambling with Civilization,” *New York Review of Books*, November 7, 2013.

⁴ Justin Gillis, “Panel’s Warning on Climate Risk: Worst Is To Come,” *New York Times*, March 31, 2014.

Preface by Matthew Evangelista and Judith Reppy



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In a career that stretches back to the 1960s, Milton Leitenberg has contributed to public knowledge of a wide range of security issues, with an emphasis on biological weapons, nuclear weapons, and arms control, but also including papers on economic aspects of military programs and on humanitarian issues. Throughout, he has been committed to gathering as much factual information as possible on important policy issues and refusing to alter his findings for political reasons. Lawrence Freedman wrote, at the end of his foreword to Milton Leitenberg's book *Soviet Submarine Operations in Swedish Waters, 1980–1986*:

Leitenberg's record is such that no one can dismiss him as an anti-Soviet propagandist. One of the benefits of a free society is that academics and other commentators can be irresponsible in the best sense of the word by bringing to the surface unpalatable truths and drawing awkward conclusions. The great value of this book is that it leaves us not only better informed but also less comfortable.⁵

⁵ Lawrence Freedman, foreword to *Soviet Submarine Operations in Swedish Waters, 1980–1986*, by Milton Leitenberg (Praeger, for the Center for Strategic and International Studies, 1987): ix.

Milton pioneered the method of producing knowledge and analyses of international security issues—which are often shrouded in secrecy—through extensive gathering, cross-referencing, and “triangulation” of open sources. As part of his *modus operandi*, he has maintained numerous collections of books, government and contractor reports, professional journal and news articles, and other publications for many topics and has been generous in sharing them with other scholars and activists.

Milton did not set out to become an international policy analyst, although from childhood he followed the news in the daily newspapers. Instead, he embarked on academic studies in biochemistry and was successful in gaining admission to graduate school and winning grants to support his research. This was the mid-1950s, however, and developments in nuclear weapons and arms control increasingly came to demand Milton’s attention. After several years of combining research and teaching positions with time spent on organizing against the US war in Vietnam and the nuclear arms race, he set aside his academic career to devote his full attention to security issues, particularly in the field of nuclear and biological weapons. Over the years, he would occasionally return to university teaching to take up visiting positions in the emerging field of security studies in the United States and Canada.

There was no established path then (or since) for people outside the academy to combine scientific research with political activism. Milton was fortunate to win the backing of two notable scientists involved in issues related to arms control—MIT physicist Bernard Feld and Harvard biologist Matthew Meselson. When the Swedish government established the Stockholm International Peace Research Institute (SIPRI) their support was instrumental in Milton being recruited as the first American researcher at SIPRI. In January 1968 Milton moved to Stockholm. While his role at the institute was primarily to write about nuclear weapons, his responsibilities also included work on nuclear weapon testing and chemical and biological weapons. He also had much to do with establishing the research methodology that SIPRI would use for all its publications, which was essentially to write papers the way scientists wrote papers, with full references and documentation.

Nuclear Weapons

At SIPRI, Milton’s work on nuclear weapons, particularly in the context of the US-Soviet arms race, contributed not only to providing data on numbers and characteristics of weapons (often disparaged as “bean counting”) but also a method of gathering and assessing such information that subsequent researchers adopted. Ultimately the analysis of the data produced a narrative about the nature of the weapons competition and a criticism of the emerging process of strategic nuclear arms control. The basic argument was that the primary public understanding of US and Soviet nuclear arsenals—as a means of deterring a nuclear strike by the other side by threatening retaliation in kind (“mutual assured destruction”)—was not reflected in the two countries’ configurations of weapons or their strategies. The numbers of weapons and their technical characteristics suggested purposes beyond basic deterrence of

nuclear attack. The analysis by Milton and other scholars of the “nuclear balance” made it clear that the vaunted stability of mutual nuclear deterrence was anything but stable.

This analysis held implications for the bilateral negotiations on arms control that got underway in the late 1960s. In his study of the Strategic Arms Limitation Talks (SALT) for the SIPRI Yearbook, and in articles in various publications, Milton pointed out that the terms of the emerging treaties were contributing neither to disarmament—the agreed ceilings on weapons were higher than the existing arsenals—nor to stability.⁶ There were no constraints put on the developing, testing, or deployment of new technological advances, and both sides continued to pursue them as part of their war-fighting, “counterforce” strategies. If the nuclear powers had agreed to a comprehensive test ban, another issue to which Milton devoted considerable research, they would have impeded the development of new warhead designs. Milton’s analysis reflected the widespread dissatisfaction with the SALT process as a codification of the ongoing arms race. One indirect result was the popular movement for a bilateral nuclear weapons freeze, proposed by another former SIPRI researcher, Randall Forsberg.

The popular counterpart to the US freeze campaign was the European Nuclear Disarmament (END) movement. Mobilized initially in the late 1970s, in opposition to US plans to deploy enhanced-radiation weapons or “neutron bombs” with its nuclear forces, antinuclear activists became particularly alarmed by the deployment of new Soviet SS-20 missiles targeted against Europe and at the response of the North Atlantic Treaty Organization (NATO) to deploy new US Pershing II ballistic missiles and ground-launched cruise missiles, ostensibly in response. Milton’s work for SIPRI provided the basis for his analyses of these intermediate range nuclear forces (INF), as they became known, as well as the neutron bomb. Particularly important was the 1978 SIPRI publication *Tactical Nuclear Weapons: European Perspectives*, to which Milton contributed the main background chapter and provided the detailed appendices of data on specific weapons.⁷

Unfortunately, the SIPRI volume—recently reissued—has not lost its relevance, decades after the end of the Cold War. In the wake of Russia’s 2022 invasion of Ukraine, for example, Vladimir Putin claimed to have deployed tactical nuclear weapons to neighboring Belarus, and the United States is upgrading its B61 bombs based in Europe, with speculation that it will be reintroducing nuclear weapons to Britain for the first time in 15 years. Among Milton’s other nuclear-related studies that retain their relevance in the circumstances of renewed US-Russia tensions are his publications on nuclear weapon accidents and nuclear crises involving the United States and the USSR.

⁶ See, e.g., Stockholm International Peace Research Institute, “The Strategic Arms Limitation Talks” (co-author), in *SIPRI Yearbook of World Armaments and Disarmament, 1969/70* (Almqvist & Wiksell, 1970): 38–64; Milton Leitenberg, “SALT II: The Race to Oblivion,” *Bulletin of the Atomic Scientists* 30, no. 7 (September 1974): 8–20.

⁷ Milton Leitenberg, “Background Information on Tactical Nuclear Weapons (Primarily in the European Context),” with appendices, in *Tactical Nuclear Weapons: European Perspectives*, Stockholm International Peace Research Institute (Taylor & Francis, 1978): 3–136, 342–358.

Biological Weapons

Drawing on his postgraduate research in biochemistry and neurochemistry, Milton was well suited to contribute to SIPRI's work on biological and chemical weapons. He continued working on biological weapons well into the 21st century, producing a book published by the Swedish National Defense College⁸ and monographs published by the US Army War College⁹ and the University of Maryland School of Public Affairs,¹⁰ along with several dozen journal publications. In 2012 he published (with Raymond Zilinskas) the authoritative study *The Soviet Biological Weapons Program: A History*, the culmination of decades of research.¹¹ After 2001 he was also able to obtain classified Soviet Central Committee documents that dealt with the Soviet biological weapons program and was able to carry out multiple extensive interviews with former participants in the Soviet program. John R. Walker, the former director of Britain's Arms Control and Disarmament Unit in the Foreign and Commonwealth Office, wrote: "Undoubtedly, *The Soviet Biological Weapons Program: A History* will be the standard and definitive reference source on this issue for years to come."¹² Much of this work was carried out at the University of Maryland School of Public Affairs, with which Milton has been affiliated since 1989.

Milton's perseverance in tracking certain developments stems from outrage about governments' secrecy and their deception about their and other states' weapons programs and from a compulsion to reveal the truth. This was certainly the case with the Soviet biological weapons program, whose existence was long denied by the USSR, even during the reformist era of Mikhail Gorbachev and then also by Boris Yeltsin, the post-Soviet Russian president. Another issue that Milton doggedly pursued from 1969 to 2016 is China's false claim of US use of biological weapons during the Korean War. Although Milton again cites formerly secret Soviet Central Committee documents attesting to the falsity of the charges, these regularly reappear in anti-US propaganda, and they have stimulated his recent publications in a related area of increasingly relevant research: tracing the sources and dissemination of Russian, Chinese, and other biological weapon disinformation, which greatly increased in magnitude after 2020 in the circumstances of the Covid-19 pandemic and the February 2022 Russian invasion of Ukraine.

⁸ Milton Leitenberg, *The Problem of Biological Weapons* (National Defense College, 2004).

⁹ Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat* (US Army War College Press, 2005), https://drum.lib.umd.edu/bitstream/handle/1903/7879/assessing_bw_threat.pdf.

¹⁰ Milton Leitenberg, *Biological Weapons Arms Control*, Project on Rethinking Arms Control, PRAC Paper no. 16, May 1996 (Center for International and Security Studies, University of Maryland, 1996), <https://drum.lib.umd.edu/bitstream/handle/1903/7878/prac.pdf>.

¹¹ Milton Leitenberg and Raymond Zilinskas, *The Soviet Biological Weapons Program: A History* (Harvard University Press, 2012).

¹² John R. Walker, *The Leitenberg-Zilinskas History of the Soviet Biological Weapons Programme*, Harvard Sussex Program Occasional Paper no. 2, December 2012 (Harvard Sussex Program, University of Sussex, 2012), http://hsp.sussex.ac.uk/new/_uploads/hspop/HSPOP_2.pdf.

Military Research and Development

One of the major findings of Milton's research is that most of the developments in military technology stem from just a few countries—notably the United States and the Soviet Union, but also several other producers of modern weapons, such as the Federal Republic of Germany, Sweden, and Israel. In studies for SIPRI and the Swedish Ministry for Foreign Affairs, for example, he argued against the so-called technological imperative, and found instead that military advances depended on designated funding by governments intent on producing new weapons technologies. The book-length study for the Swedish Ministry for Foreign Affairs began with a detailed explanation of how military research and development (R&D) is actually carried out and was followed by case studies of the US antisatellite weapon program, the MIRV warhead, biological weapons, and military weather modification. Although this report is unpublished, it is available on the website of the Federation of American Scientists.¹³

Milton's work on military R&D was followed by studies of the prospects for conversion of military industry to civilian production and the links between military research and spending and development in low- and middle-income countries.

Genocide and Humanitarian Intervention

Another topic of, unfortunately, enduring interest is the risk of mass killing and genocide. Milton put his data-gathering skills to work at estimating deaths from violent conflicts and in studying particular cases that he characterized as genocide—in Rwanda, Burundi, North Korea, and the former Yugoslavia, for example. In his study *Deaths in Wars and Conflicts in the 20th Century*,¹⁴ in order to represent more accurately the human costs of organized violence, he included mass killings and genocides as a corrective to previous work that had counted only “battle deaths.” He also devoted several works to analyzing the prospects for the use of military force to prevent or punish genocide, a practice typically known as humanitarian intervention; one of these works was written under a MacArthur Foundation writing award. This, too, is now available on the Federation of American Scientists website, together with a large number of related studies.¹⁵

¹³ Milton Leitenberg, “Studies of Military R&D and Weapons Development,” unpublished manuscript prepared for the Swedish Ministry for Foreign Affairs, 1984, <https://man.fas.org/eprint/leitenberg/military-research>.

¹⁴ Milton Leitenberg, *Deaths in Wars and Conflicts in the 20th Century*, Occasional Paper no. 29, 3rd ed. (Peace Studies Program, Cornell University, 2006), <https://ecommons.cornell.edu/bitstream/handle/1813/69395/29-Leitenberg-Deaths-in-Wars-3ed.pdf>.

¹⁵ Milton Leitenberg, “Humanitarian Intervention and other International Initiatives to Enforce Peace,” draft manuscript, Center for International and Security Studies, University of Maryland, February 1993, <https://man.fas.org/eprint/leitenberg/war-conflict/humanitarian.pdf>. Related materials may be found at <https://man.fas.org/eprint/leitenberg/war-conflict/index.html>.

Summing Up

As the chapters of this volume testify, Milton's contributions have ranged across a broad swath of international security issues, always informed by a respect for data and a healthy skepticism about the motives of actors who would exclude "inconvenient" information from public discourse. His influence goes beyond his analyses of specific topics to include the demonstration of effective techniques in collecting data from public sources and his willingness to share his findings with other researchers.

Cornell University
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Milton Leitenberg would also like to note his appreciation to the institutes at which he worked between 1968 and 2025: the Stockholm International Peace Research Institute (Sipri); the Center for International Studies, Peace Research Institute, Cornell University; the Swedish Institute for International Affairs; and the Center for International and Security Studies, School of Public Affairs, University of Maryland.

Introduction: The Road from Truth and Justice to Weapons of Mass Destruction Arms Control

Two early formative influences were critical to Milton Leitenberg's legacy of scholarship. Two principles were rooted in his upbringing within an intellectual, ethically minded, and socially active community in the Bronx, New York. Milton's father had one fiercely strong ethical principle that he lived by: justice. In addition, as a youth, Milton had a Jewish teacher who taught his students that "a Jew must never lie." Both concepts had a profound, formative influence on him. Abhorrence for lying and deceit and a desire to pursue truth and justice were embedded in Milton's consciousness at a young age. At the age of 11, he was one of two students selected by his public school principal to participate in an extracurricular program named "The Youthbuilders," established by the New York City Board of Education during World War II. Students from a limited number of elementary schools were given special instruction in the civil and social operation of the city by being taken on monthly visits to courts, legislators, a facility for children with severe cognitive neurological disorders, a union leader, a sanitation facility, and other municipal institutions. They also tutored adults to prepare them for citizenship literacy tests, and they assisted in wartime blood drives. Learning in 1946 of his father's loss of 34 immediate family members in the World War II Holocaust in Poland was also a profound influence.

His concerns about war and weapons of war solidified subsequently when he was a college student, at the same time as he loved and pursued a career in science. When Milton was in college, some of his friends nicknamed him "Diogenes," after the Greek philosopher who walked the earth with a staff and lamp looking for someone who told the truth. Many years later a colleague at the Stockholm International Peace Research Institute (SIPRI) remarked that Milton "always told the truth."

Milton's introduction to science also began quite early. He was fortunate to grow up directly adjacent to Bronx Park, which was still partly wild in the 1930s and 1940s. After exploring the park for several years, at age 12 he brought a seed collection to the conservatory building of the New York Botanical Garden to try and get some of the seeds identified. As a consequence, he was given free access to the scientific staff at the garden, its library, and a two-person microbiology laboratory. He was allowed to store his seed collection for two years under the desk of a kind botanist,

Dr. Naylor. On a later visit, he brought a bread mold that he had cultured on an agar plate and was sent to show it to the Nobel laureate, B. O. Dodge.

Milton took and passed the entrance examinations for the Bronx High School of Science. During his senior year, he carried out an independent Westinghouse project on the subject of mouse leukemia at the Sloan Kettering Institute for cancer research, Department of Experimental Chemotherapy. This earned him an award from the New York Biology Teachers Association given to two New York City graduating high school seniors per year.

There was no early indication that Milton would spend his life working on issues of war and weapons of war—he started out as a scientist. His realization of the dangers of nuclear war and its potential equivalence to the Holocaust disturbed him sufficiently during graduate school that he decided to give up a scientific career path and pursue nuclear arms control work modeled on the Manhattan Project nuclear physicist Leo Szilard. It took 10 years, however, before a way could be found to make that happen.

Milton started out as an activist: when he was a first-year graduate student, he helped gather signatures for the petition against nuclear testing that Nobel Prize-winning scientist Linus Pauling created. Milton later used this experience to initiate the petition in 1966 for scientists against the US use of chemical and biological agents in Indochina. The petition garnered 5,500 signatures, including those of 28 American Nobel laureates and members of the National Academy of Sciences. The petition was sent directly to the president of the United States. This activist orientation is one that has also characterized his scholarship—Milton often conducts research and writes on topics that he thinks have not been adequately studied or which have been publicly portrayed in a manner that he considers to be misleading or false.

This characterizes the legacy of his scholarship across disparate topics. For example, Milton documented the massive buildup of US and Soviet military arsenals; researched to produce an accurate body count for deaths from wars and conflicts; and repudiated scores of lies, misinformation, and cover-ups in the policy arena. Milton's internalized beliefs in truth and justice served as the catalyst for an extensive body of work that would normally take several people to produce—just peeking at his CV in this volume gives one an appreciation for the extent of the work that he has produced throughout his 65-year career as a scientist and peace and arms control researcher. Milton produced 21 books and book-length monographs and a plethora of journal publications, policy commentaries, and op-eds. Moreover, his CV is not able to capture the volume of work that he produced often with no formal recognition, nor that of various researchers who were either directly or indirectly mentored or inspired through his body of work. Milton has conducted significant empirically driven inquiries on many of the pressing international security issues of the 20th and 21st centuries, as well as on many issues that were not regarded that way at the time but should have been. But it is not just quantity that characterizes Milton's work: it is also the mark of excellence that he brings to every piece of research and writing. Milton's scholarship is marked by many "firsts": the first to organize a special journal issue on chemical and biological weapons (also writing parts of it); the first to publish a comprehensive study that recorded nuclear weapon accidents by both the Soviet

Union and the United States; the first to write the definitive history of the Soviet biological weapons program—among others. Because of this excellence, Milton's work has been highly regarded and sought after by US and foreign governments, including their intelligence services.

In the peace research and arms control world, Milton pioneered a method that is now called open-source intelligence (OSINT). He launched this first at SIPRI in 1968, where he was the first American recruited among a small number of initial researchers hired for the newly created institute. Milton's insistence on sourcing of information at SIPRI, as well as the quality and volumes of work he and his colleagues produced, were instrumental in making SIPRI recognized and accepted worldwide for being an honest and reputable research institution that far surpassed many other international research institutes. Using the term OSINT does not imply that Milton had access to classified information. In fact, all of Milton's work was based on open-source, publicly available information. Many have been surprised that Milton has never held a security clearance throughout his career. In a private 1970 communication to Milton, Harvard University microbiologist, Professor Bernard Davis, commenting on the paper reprinted in Chap. 1 of this volume, wrote: "I marvel at how much information you have been able to collect in a classified field." Later in 1970, at a congressional hearing on science and astronautics, presidential science advisor Franklin Long stated that no paper like Leitenberg's paper on the evolution of the Polaris submarine-launched ballistic missile (Chap. 2 in this volume) had ever before appeared outside of the classified literature. Milton served on a high-level expert/advisory panel in which he was the only person without a security clearance.

In the days before artificial intelligence, big data analytics, and the dark web, how did Leitenberg find and amass data for his work? The Leitenberg method of OSINT is simple, yet profound: "gather and read every piece of paper in every language I could find." I was able to obtain a page of Milton's detailed notes that he had made regarding his research method at SIPRI that included a systematic inventory of a dozen specific topics that he would monitor, all with a table to check off which ones had been done. During his first year at SIPRI, in 1968, he scanned and extracted relevant articles in *every single issue* of 40–50 journals dating back to the 1950s. According to Milton, "You dig, and dig, and dig ... you collect every single paper that you could find in the public domain and read them ... and you take them all, aggregate and analyze them ... if you can't read the language, find somebody to translate." Milton also has a gifted ability to recall information—he can still today accurately describe discussions that took place in conferences and meetings 50 years ago.

Milton also cultivated personal relationships over the years with US and foreign policy officials, intelligence officers, defectors, journalists, and archivists who trusted him and served as informants or granted him access to documents that were not publicly available. For example, for the SIPRI study on the alleged Egyptian use of chemical weapons in Yemen against insurgents fighting the government of Yemen, he met with a very senior official of an international agency who gave him the confidential detailed reports from doctors in Yemen working in the villages in which

the alleged chemical bombs were being used. These reports contained on-site, real-time verification that chemical agents were being used. In other cases, documents (such as the Soviet Central Committee documents discussed in Chap. 29 of this volume) were provided to Milton because people who had read his work understood that he would find them useful. At times this led to the production of books and monographs that grew to be hundreds of pages long and took far longer than expected to produce—often to the distress of the sponsors of his work (as, for example, with Chap. 23 in this volume). But, at the end of the day, his work has often served as the reference point for other scholarship and has stood the test of time.

If you look across his body of work, Milton uses his research methodology and writes for a specific set of reasons: (1) because it is an important issue on which he has something to say; (2) to educate; (3) to expose and to counter lies or misinformation; (4) to fill gaps or holes in what is known. Milton has spent much of his career fighting and debunking disinformation campaigns in various forms—a fight that continues to this day (as with Chaps. 43 and 44 in this volume). And, often Milton's work has pointed out that what experts or governments are most focused on and worried about—from bioterrorism (Chaps. 32, 33, and 40 in this volume) to *accidental* nuclear war (Chap. 38), for example—are the wrong things to be focused on.

Regarding the audiences for his work: Milton has had the keen attention of US and foreign intelligence. In 1989, during an invitation-only arms control seminar in Washington, DC, the then national intelligence officer for strategic intelligence at the Central Intelligence Agency (CIA) informed Milton that agency officers read his publications. He added, "Keep it up. You're doing great work." Later in 1996, the CIA bought 40 copies of Milton's University of Maryland monograph, *Biological Weapons Arms Control*, with the explanation that it was using them to instruct its new staff. In 1974 Milton also got the attention of Soviet intelligence, who sent a KGB officer from Moscow to SIPRI to get a copy of Milton's 1967 paper on biological weapons (Chap. 1 in this volume). Subsequently, the Soviets classified the six SIPRI volumes on chemical and biological weapons (CBW), volumes produced by a group of SIPRI researchers including Milton. This was confirmed when a US government official found copies of the SIPRI CBW books with classification markings during the decommissioning of a Soviet chemical weapons facility.

However, there were years when Milton was treated as *persona non grata* because of his publications. Whether for better or worse, he has been an equal opportunity offender—both US government and Soviet officials were offended by his publications. This also led in some cases to lost work opportunities or invitations to meetings. For example, in 1966, before he had written anything about chemical weapons, the deputy director of the Hudson Institute interviewed Milton for a research position. The institute had many government contracts, and at the end of the interview he said, "Milton, what can I do with you? You are a non-negotiable commodity. If I hire you and you write a report for us on chemical weapons, we will never get another contract from the US Army again about chemical weapons." Milton's work has often been a lightning rod to those inside and outside government who have agendas—because he is writing from where the data and truth take him, which can be contrary to the status quo or the establishment viewpoints.

There is a choice statement in the UK Ministry of Defence archives written by Major General R. E. Lloyd, head of UK weapons of mass destruction (WMD) intelligence assessments. General Lloyd's trip report, after attending a 1968 SIPRI conference on chemical weapons for which Milton served as the moderator, ended with the observation, "The one to watch is Leitenberg. By his own accounts a highly qualified biochemist. From my observation a brilliantly quick brain which loses control over the owner's emotions: difficult to control as a subordinate." Milton has always been his own person and an independently minded scholar with confidence and clarity about what he believes to be right.

Early on in his career, during another job interview with the Research Analysis Corporation (RAC), the US Army's version of the RAND Corporation, Milton was offered the position of advisor on biological weapons in Vietnam to General William Westmoreland. Although many would have jumped at the chance to have served in such an influential position, Milton declined but suggested that he would be happy to join the staff of RAC and write reports on biological weapons. The interview was abruptly terminated. Milton is not afraid to buck conventional thinking or ruffle a few feathers—either within the United States, with our allies, or our enemies.

In Milton's very first month at SIPRI, Soviet officials—knowing that no Soviet citizen could be sent to work abroad without being a member of the KGB—tried to get him fired from SIPRI for being a "CIA spy." Ironically, following the publication of the first two SIPRI Yearbooks, a senior US Department of Defense official visiting Stockholm in 1970 offered the SIPRI director a replacement for Leitenberg: Walter Rostow, President Lyndon Johnson's national security adviser. However, Milton's self-proclaimed Croix de Guerre was a Soviet declaration in 1984 that "Milton Leitenberg is an enemy of the Soviet Union." The Soviet embassy in Stockholm convened a brief meeting of its Warsaw Pact allies and read a formal declaration to that effect. As best as can be understood, the reason for this was three Leitenberg publications in the 1980s. One is Chap. 21 in this volume; a second is Chap. 22. The third is a sister publication to Chap. 17. Milton considered these to be his honors and compliments.

But Russian officials were also very interested to obtain Milton's work. Milton's writings appear to have been required reading for those involved with managing the Russian bioweapons complex. In 2016, an American researcher found a document in Russian archives in Moscow. In September 1994, P. P. Sutykin, the acting chair of the Russian presidential commission on the biological and chemical weapon conventions, had forwarded to four of his senior colleagues the following message: "I forward to you, for use in your work, a translation of the article by M. Leitenberg, 'The Conversion of Biological Weapons Research and Development Facilities for Peaceful Purposes,' published in SIPRI no 15, 1994." The paper concerned the Soviet and Russian biological weapon programs. The four Russian officials were the chief of the Russian general staff, General M. P. Kolesnikov; deputy foreign minister G. Mamedov; head of the Federal Counterintelligence Service V. A. Sobolev; and the director of Biopreparat, General Y. T. Kalinin. Twenty years later, after Milton's congressional testimony in 2014 on the Soviet and Russian biological weapons program (Chap. 35 in this volume), Russian embassy officials in Washington, DC were sent to the US Department of State to complain about his testimony. Milton has

been a trailblazing scholar, often writing ahead of his time, and prescient of times to come. His works on nuclear, chemical, and biological weapons treaties, strategic and tactical nuclear weapons, military research and development (R&D), and disin-formation campaigns are as timely today as they were back in the 20th century. What is old becomes new again. Milton's work provides a method and roadmap for the scholars of today and tomorrow to uncover truth by understanding the fundamentals of knowledge creation and, in doing so, better assessing what is happening in wars, weapons of war, and other security matters.

Writing this introduction and working on this book has been a labor of love. I first came to know Milton when I was a freshly minted postdoctoral associate at Cornell University's Peace Studies Program. One of the founders of the program, Judith Reppy, was my mentor at the time and was always eager to help me professionally—such as connecting me with relevant individuals in the peace studies and arms control world. After reading some of my draft papers relating to biological weapons, Judith told me, as I recall: "I must introduce you to Milton Leitenberg." I remember being interested to meet Milton because I had already heard about some of his work debunking the US hysteria over bioterrorism in the late 1990s. I welcomed this perspective that matched with my own skepticism based on my experience working with biological materials in the laboratory. I remember we had an initial phone call and I found Milton to be very open, but also *exacting*. After that initial call, I ended up being the recipient of many things that Milton would send me over the years dealing with biological weapons issues. As the subject matter of my own research changed over time, the items he would send reflected these changes, to include bioethics, big data/AI, military R&D, and human trafficking. I always valued his perspective and his ability to push me to clarify what I was trying to say. Milton was also willing to offer criticism, as any good mentor should.

I have been very fortunate to know Milton; the international scholarly and policy community has greatly benefited from his life's work. This volume is a fitting representation of the many research contributions throughout his career: Milton Leitenberg is a true pioneer of peace and arms control research.

Chapter Summaries

In consultation with Milton Leitenberg, Nicole Ball and I chose some selections from publications spanning his career for this book. If you consult his CV, however, you will see that there were so many works that we did not have the space to include in this volume or could not secure permissions from the publishers to reprint. We encourage readers to also look at additional items listed in the CV if they are interested in more work related to those published here. Below you will find a short summary of each chapter in the book, with some interesting background notes on why the pieces are significant.

Chapter 1 (1967): "Biological Weapons" not only provides important historical detail of the US offensive biological weapons (BW) program, but years later also

led to surprising Soviet intrigue. At the time of the article's publication, Leitenberg was employed as scientific director of the Scientists' Institute for Public Information (SIPI), a collective of over 20 groups located at US colleges and universities, which was affiliated with the American Association for the Advancement of Science (AAAS). The lead organization in this collective published a journal, *Scientist and Citizen*. Leitenberg proposed that the journal produce a special issue dealing with biological and chemical weapons, and this paper was one of those in the special issue. This article was the first journal publication to explain the US offensive BW program, from its inception in 1943, during World War II, up to early 1967. Although all the information in the paper was based on open sources, the paper got the attention of the Soviet intelligence services, who, in the early 1970s, sent a KGB assistant working for the deputy chairman of the Soviet Interdepartmental Scientific-Technical Council for Molecular Biology and Genetics, Dr. Igor Domaradski, from Moscow to SIPRI to obtain a copy of the paper. In 1999, Domaradski told Leitenberg that he and his council designed the research program of a branch of the new Soviet offensive BW program, Biopreparat, to replicate the advanced research methods that the US offensive bioweapons program had been engaged in during the early 1960s, which Leitenberg had described in the *Scientist and Citizen* paper. Leitenberg was horrified that the Soviets had used his work to aid their design of the covert Soviet offensive bioweapons program. Leitenberg later learned that, as noted above, the USSR had classified as secret the six SIPRI volumes on the history of chemical and biological warfare produced by a group of SIPRI researchers, including Julian Perry Robinson and Leitenberg, for the use of Soviet government agencies.

Chapter 2 (1968/69): "The Technological Arms Race: Submarine-Launched Ballistic Missiles" describes the development of the US submarine-launched ballistic missile (SLBM) in the progression from the initial Polaris A-1 to the A-2 and A-3 and, finally, the Poseidon missile, involving thousands of technical adaptations. The paper was designed to educate the public and members of government about what military R&D means, what technical improvements in weapons systems mean, and how these weapons systems are developed through various choices that governments make. The chapter demonstrates that the US SLBM served a "counterforce" mission, targeting Soviet military assets, not just a "countervalue" one, targeting Soviet cities. This chapter was based entirely on open-source information available in military journals and annual US congressional hearings and reports. As noted above, Frank Long, a member of the President's Science Advisory Council (PSAC), stated in congressional testimony shortly after it was first published that no such paper existed outside of the classified literature.

Chapter 3 (1968/69): "Nuclear Weapon Testing Program" details the nuclear weapons tests conducted by the United States and the USSR even after both countries had signed the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (1963), more commonly known as the Partial Test Ban Treaty (PTBT) or the Moscow treaty. As Leitenberg documents in this examination of nuclear testing, the treaty actually represented the failure of the United States and the Soviet Union to agree a comprehensive nuclear test ban treaty that would also have banned nuclear weapon tests carried out underground. As the paper discusses, (1) the

total numbers of nuclear tests were not publicly available; (2) the yields and magnitude of underground tests had increased severalfold since the signing of the treaty in 1963; (3) it became possible to conduct underground tests of nuclear weapons and components which were as effective as those previously conducted in the atmosphere; (4) since the Moscow treaty, some of the tests had vented radioactive material which crossed international borders, a technical violation of the treaty. Leitenberg derived the data for this paper from published open-source materials and journal articles, as well as information obtained from published congressional hearings in Washington, DC, and interviews with officials at the US Arms Control and Disarmament Agency (ACDA). It is significant to note that there was more information available about the US nuclear weapons testing program than the Soviets' program. A table listing all publicly identified US and Soviet aboveground and underground tests was included in the paper. At the time, the data were available and aggregated by several governments, but not published. This article was written to educate the interested public, such as newspaper journalists, newspaper editors, and diplomats. SIPRI continued to publish updated versions of the table for many years.

Chapter 4 (1970): "World Stockpile of Nuclear Material" is a catalogue of fissile nuclear material produced around the world, based on published sources prior to 1970; this information had been closely guarded by nuclear weapon states. Leitenberg used several different indicators to arrive at the size of the nuclear weapon stockpiles: (1) stocks of fissile material; (2) estimates of the number of nuclear warheads; (3) estimates of the total megatonnage of weapons. This data provided an indication of the extent of the US-Soviet nuclear arms race at the time. After an estimate of the total megatonnage had been arrived at, the editor of the SIPRI Yearbook wanted to know what quantity of TNT per person in the world this amounted to. A simple calculation produced the estimate that the worldwide stock of fissionable material would yield the equivalent of 15 tons of TNT for every person in the world. After the 1970 SIPRI Yearbook was published, this number ended up on the front page of newspapers worldwide. It should be noted that, decades after this paper was written, precise numbers of nuclear weapons by year became available for the United States, and total numbers for the USSR. The UK and France released figures closely approximating the numbers of nuclear weapons that they held. To this day, no precise numbers are available for the other nuclear weapon-possessing states: China, India, Pakistan, North Korea, and Israel.

Chapter 5 (1972): "The Present State of the World's Arms Race" was written to inform the public in general and the peace research community in particular. Since the League of Nations and the pre-World War II period, there had been no single volume which produced an account of recent trends in world military expenditures, the state of the technological arms race, or the success or failure of recent attempts at arms limitation or disarmament. Such material had never been available in one place either to the public or to the academic community. In 1969 and 1970, however, the newly established Stockholm International Peace Research Institute (SIPRI) published the first two editions of its *Yearbook of World Armaments and Disarmament*, a series that would continue annually and aggregated an enormous amount of information. This paper begins by listing the 14 different varieties of

nuclear weapons deployed by the United States and the Soviet Union. It then notes developments in military capabilities since the end of World War II in 17 areas. The paper then discusses the role of military R&D in the weapons acquisition process and, finally, reviews disarmament proposals and negotiation efforts between 1950 and 1972. An earlier version of this paper appeared in *Cooperation and Conflict: Nordic Studies in International Politics* in 1971.

Chapter 6 (1971): “The Classic Scientific Ethic and Strategic Weapon Development.” Competent estimates at the time of writing placed combined US and Soviet nuclear weapons at perhaps 50,000 to 60,000 megatons and around 100,000 individual nuclear weapons. By 1970 the world had been living with the threat of nuclear war for nearly 25 years. This paper begins by pointing out one major factor contributing to why negotiations between the two great nuclear powers to control the strategic weapons race had failed. It explains how the classical ethic of science, the pride of scientists, to continue research in an unconstrained manner had been a contributing factor in permitting the nuclear weapon problem to attain its present dimensions. This paper was originally written for a Pugwash meeting. A representative from UNESCO attended the meeting and invited Leitenberg to publish this paper. At the time, some peace researchers blamed scientists for driving weapons development. The point of this article is to argue that is not correct. Actually, it is governments that create research programs and institutes for weapons development and hire scientists with specific mandates for research. The discussion at the time of “scientific ethic” arose from ongoing discussions about the need for an oath or code of conduct for scientists engaged in or considering careers in weapons development. Despite the nuclear weapons treaties negotiated between the United States and the USSR from 1972 to 1976 and again from 1987 to 1991, this essential problem remains today.

Chapter 7 (1972): “Non-seismic Nuclear Detection.” At the time, in relation to underground tests, the US and Soviet negotiators disputed the level of the nuclear test yield that could be detected—and, more importantly, identified. At issue was the ability to differentiate between an earthquake and a nuclear weapon test. The ability to make this distinction depends on the analysis of several different types of seismic waves produced by earthquakes and nuclear explosions. This paper demonstrates that this dispute was essentially spurious. At the time that this paper was published, the subject was considered classified and would remain so for nearly 10 more years. The paper discusses the non-seismic methods that could be used to detect and identify nuclear tests using satellites and electronic intelligence (ELINT). It summarizes publicly available information on ground-based and satellite-borne detection methods for nuclear weapons tests in all environments: underground, in space, or in the atmosphere. The paper was written to demonstrate that the United States did know how to detect and identify nuclear tests, not just detect them at levels much lower than publicly claimed.

Chapter 8 (1972): “Memorandum: International Level of Funding for Military Research and Development.” In the early 1970s, as the period of “détente” between the United States and the USSR was initiated, there were attendant suggestions that the great powers should reduce their military expenditure by a specified

percentage and the reduction be applied to development assistance for the less developed nations. When this suggestion received essentially no response, officials at UNESCO and other interested parties suggested a variation on the original proposal. This time it was suggested that the reduction should come from the fraction of US and Soviet military expenditure devoted to R&D, and that the reduction should amount to 5%. UNESCO officials requested that Leitenberg prepare a background paper for a meeting of economists and development specialists, explaining the levels of military R&D expenditure in the world. The paper in this chapter was prepared in response to that request. The major problem was that the Soviet Union's report of the level of its annual military expenditure was not considered to be credible, and its level of military R&D expenditure was not known. Nevertheless, various small groups continued to advocate for the proposal until the United Nations Special Session on Disarmament in 1978. After that it disappeared: no nation was willing to act on it, either unilaterally or multilaterally.

Chapter 9 (1974): "The Conversion Potential of Military Research and Development Expenditures." This paper examines the reasons for proposals advocating a conversion of military R&D: (1) to halt or impede the arms race; (2) to obtain the talents of the scientific personnel performing military R&D and the funds allotted to them for other necessary purposes; (3) to benefit the least developed nations in particular by the redirection of R&D efforts and funds to problems faced by these nations. This paper was written during a time when the US Department of Defense thought they would have to reduce the US defense budget. As a result, a variety of questions arose about the implications of these cuts for the US economy and US workforce. At the time there was a series of publications that were making incorrect claims about the potential for conversion, and so this paper was written as a corrective.

Chapter 10 (1974): "SALT II: The Race to Oblivion." The original title of this paper was: "Developments in US and USSR Strategic Nuclear Weaponry since SALT-I, May 1972." The paper, written for a Pugwash conference held in the spring of 1974 in Kraków, Poland (which the Swedish Pugwash group sponsored Leitenberg to attend), included a section on developments in US strategic nuclear weapons programs and, as far as was possible, a parallel section on Soviet strategic nuclear weapons programs. The paper was later published in the *Bulletin of the Atomic Scientists*, and it led the *Bulletin* to move the hands of its renowned Doomsday Clock—symbolizing when a nuclear war might take place—one minute closer to midnight. The developments described in this paper strictly pertain to the United States and the Soviet Union: this is not a matter of "East" or "West" (i.e., NATO or the Warsaw Pact).

Chapter 11 (1976): "Problems of Environmental Warfare: Weather and Climate Modification, the Evolution of an R&D Program into a Weapon System" was written for another Pugwash meeting, held in India. It explains the path from basic science to military science to a weapon of war. It describes the historical development of methods of weather modification, from its first military use in World War II. In the summer of 1972, it was reported that the United States had been using weather modification techniques in the Indochina War, from 1967 through 1972, in an effort to increase rainfall as an adjunct to military operations.

The first disclosures of these operations had occurred in 1970 in the Pentagon Papers. With these events as stimuli, weather and climate modification and environmental warfare became subjects of international concern. They also quickly became a matter for international negotiations, leading to the international treaty against such usage, the Environmental Modification Convention, which entered into force in May 1977. This chapter provides a case study of how a scientific experiment and a small piece of technology evolved into a weapon of war. The chapter also discusses how weather modification came to be a matter of dispute between states in peacetime.

Chapter 12 (1977): “Accidents of Nuclear Weapon Systems” This paper provides the first attempt at comprehensive data on the occurrence of accidents involving nuclear weapons. It is clear that accidents and incidents involving nuclear weapons are frequent, occurring on worldwide average perhaps once every few months. There is no public record of what may be even more routine minor incidents on military installations, in transport, overhaul, training, and so on. In US military terminology, “broken arrow” designates events in which major destruction or damage to the nuclear weapon or its carrier takes place, and “bent spear” is the designation for less serious “incidents.” Tables in this chapter include, as of 1976: (1) 32 US “broken arrow” major nuclear weapon accidents; (2) 12 additional possible “broken arrows”; (3) 59 “bent spear” nuclear weapon incidents; (4) 6 Soviet major nuclear weapon accidents (all reported by Western sources); (5) 16 Soviet nuclear weapon incidents; (6) 8 British nuclear weapon incidents; and (7) 4 French nuclear weapon incidents. Limited and/or poor data existed on the Soviet, British, and French nuclear weapon accidents and incidents. In the roughly 140 or more nuclear weapon accidents and incidents that occurred between 1945 and 1976, there was no nuclear weapon detonation, but there was very extensive radioactive contamination in several instances. A new aspect, the possibility of weapon capture and terrorism, received increasingly serious attention in several government and international agencies by the mid-1970s.

Chapter 13 (1978): “Military Expenditures of Underdeveloped Countries as a Proportion of State Budgets.” This paper was prepared for the Swedish Ministry for Foreign Affairs and served as part of the supporting documentation for the submission by Sweden of a proposal to the United Nations for a Special Session on Disarmament. For many decades the military burden of states was expressed as the percentage of their gross national product (GNP) devoted to military expenditure. The same measure was used for the most powerful states in the world—the nuclear weapon states, their Warsaw Pact and NATO allies, all with large standing armies and the latest military equipment—as well as for developing nations. This measurement was, however, extremely misleading for small developing nations. These nations may not have had large GNPs in absolute terms, nor large annual budgets, but a military expenditure of 2% of GNP could translate to 20% of a developing nation’s annual budget. Measuring military spending as a share of national budget provides a much clearer picture of what the military expenditure of developing nations means in terms of competing with expenditure for health, education, infrastructure development, and so on. It was therefore more meaningful to express military expenditure as a percentage of annual state budget rather than GNP, most particularly for developing

nations. This paper was written for the simple purpose of providing the two forms of data for a large number of nations and making the case that military spending as a share of national budget should be adopted when discussing developing nations, rather than military expenditure as a percentage of GDP. It provides a much clearer picture of government priorities. The paper was intended to correct a universally used but misleading index.

Chapter 14 (1977): “Disarmament and Arms Control Since 1945.” This paper summarizes the international arms agreements that were successfully negotiated as of the beginning of 1977. There were 7 multilateral treaties and 11 bilateral treaties between the United States and the Soviet Union in this period, as follows. The multilateral treaties: Antarctic Treaty (1959); Partial Test Ban Treaty (1963); Outer Space Treaty (1967); Latin American Nuclear Free Zone Treaty, also known as the Treaty of Tlatelolco (1967); Nuclear Non-proliferation Treaty (1968); Sea Bed Treaty (1971); and the Biological Weapons Convention (1972). The bilateral US-USSR agreements or treaties: “Hot Line” Agreement (1963); “Hot-Line” Modernization Agreement (signed and in force, 1971); Nuclear Accidents Agreement (1971); High Seas Agreement (1972); SALT I Anti-Ballistic Missile Treaty (1972); SALT I Interim Offensive Arms Agreement (1972); Protocol to High Seas Agreement (1972); Nuclear War Prevention Agreement (1973); SALT II Anti-Ballistic Missile Treaty (1974); SALT II Threshold Nuclear Test Ban Treaty (1974); and SALT II Interim Offensive Arms Agreement (1974). The three Salt II agreements, signed in 1974, never came into force. The postwar history of arms control efforts can be divided into a series of stages, or phases. The first of these was the 1946–1949 period of the Baruch Plan, a unilateral American plan that proposed international control of nuclear weapons. A second phase began in the early 1950s and came to a climax in August 1955. The third phase saw the relinquishing of discussions about “general and complete disarmament” (GCD) and the initiation of moves for “limited measures.” The fourth stage began in the late 1950s, with negotiations for a comprehensive nuclear test ban. The paper was written to provide a survey of arms control developments for the general public.

Chapter 15 (1979): “The Concerns of Developing Countries: I. Measure of Structural Violence, Nuclear Weapon Equivalents of Deaths in Developing Countries” (with Charles Zimmerman). Dom Helder Camara was a Brazilian archbishop in the impoverished northeast of Brazil, a leader of the liberation theology movement among Catholic priests and a member of the SIPRI advisory council. After the 1970 SIPRI Yearbook chapter on nuclear stockpiles was published (Chap. 4 in this volume), Camara asked if SIPRI could calculate the nuclear weapon equivalents for the mortality in developing countries due to poverty, something that sociologists had labeled “structural violence.” The SIPRI director and board chair declined the suggestion. Early in 1979, a Cornell graduate student, Charles Zimmerman, asked to carry out a project, and Leitenberg suggested Camara’s request. The number of deaths caused by lack of development in any country can be compared to the number of deaths caused by the explosion of a single small nuclear weapon. The two highest outcomes were 99 nuclear weapon equivalents per year for India and 77 for all of Africa combined.

Chapter 16 (1980): “World-Wide Military Coups Since 1945: A Short Note on a Data Collection.” Successful military coups are essentially civil wars that end quickly and with little or no loss of life in comparison with civil wars. They undermine democracy, impede civil governance, and destabilize states. Successful coups breed additional military coups. They are therefore important in the political history of any nation and particularly those that experience multiple coups. Even before his Cornell Peace Studies monograph *Deaths in Wars and Conflicts in the 20th Century* (2006), Leitenberg had begun to pay attention to military coups during his research dating back to the mid-1970s. Also, during Leitenberg’s research on the role of military governments and the impact of military expenditure on development in developing countries (Chap. 8 in this volume), it became important to understand the frequency with which military coups were taking place and their regional distribution. Leitenberg further became interested in military coups through work for the Swedish government on military governments, which later provided information for Nicole Ball’s book *Security and Economy in the Third World*.¹⁶ Reading made it quickly apparent that there were no satisfactory aggregates of military coups, and so this publication set out to aggregate existing datasets of military coups. Leitenberg’s research found that coups were almost always seriously undercounted and that some military coups had far more serious consequences than simply one general replacing another. For example, the military coups in Brazil in 1964, in Peru in 1968, in Chile in 1973, and in Uganda in 1971, as well as others in Egypt, Syria, Iraq, and elsewhere, led to significant consequences in terms of social and political developments within the country, subsequent regional arms races, international political alignments, regional wars, and the political role of the military.

Chapter 17 (1980): “NATO and WTO Long Range Theatre Nuclear Forces.” The SALT negotiations between the United States and the Soviet Union dealt with land-based and submarine-launched intercontinental ballistic missiles, as well as long range bombers capable of reaching each side’s homeland. However, shorter range ballistic missiles also existed on the European continent: Soviet missiles that were capable of targeting all of Western Europe, and US missiles based in NATO member states that could target all Warsaw Pact states and could also reach into a limited portion of Soviet territory (e.g., the Pershing II missile). These were called long range theater nuclear forces (LRTNF) or intermediate range nuclear forces (INF). Millions of people took to the streets in Europe to oppose the NATO deployment of the US Pershing missile. The paper opens with a detailed examination of how the counts of LRTNF/INF weapons were manipulated in public statements by Soviet officials, as well as by pro-NATO sources. The paper then provides several tables presenting the most accurate data that were available, including from Soviet published sources, that showed that all the Soviet numbers of NATO INF weapons were inflated. This paper was one of two papers that led the Soviet Union to declare Leitenberg “an enemy of the Soviet Union.” (The other is Chap. 21 in this volume.) The paper provides a detailed review of the discussions among NATO nations and between the United States and the USSR over the period 1979–1983. This paper has relevance for today:

¹⁶ Nicole Ball, *Security and Economy in the Third World* (Princeton University Press, 1988)

as early as 2008, under Vladimir Putin, Russia began testing a new intermediate range cruise missile, and, in 2013, testing and deploying two new INF-range road-mobile ballistic missiles. After four years of private complaints to Russia during the Obama administration, both countries suspended the INF treaty within two days of one another in February 2019, and the United States withdrew from the treaty in August 2019. Russia withdrew more recently and has continued to deploy its new generation of INF missiles. To date, the United States and NATO have not responded.

Chapter 18 (1981): “Efforts at Reducing Defense Expenditure in the United States, 1960–1978.” The reduction of military expenditure is often suggested as a possible means of arms control. This paper demonstrates that it has proved to be as unproductive, in the post-World War II period, as have negotiations on specific weapon types. Leitenberg describes the outcome of two episodes. The first was the 1963–1965 US-USSR “mutual example” military expenditure reduction exercise. The military expenditure reduction exercise is an extremely interesting episode, one of very few US-USSR informal arms control agreements. But its constraints were decisive: it had to involve very small reductions; it had to be kept secret and isolated from potential domestic political opposition in the US Congress and from the NATO allies of the United States; and it was of short duration. The exercise did not last long, was never implemented, and had little to no effect. However, the fact that the two strategic weapon antagonists agreed to a mutual cut of 5% or 10% in military expenditure was a significant outcome despite the fact that it was never implemented. The second example was a unilateral one carried out by the United States, prompted by a series of events that followed a year or two later. The US administration anticipated reductions in its own defense budget. It nevertheless rejected governmental planning for defense industry conversion and all congressional legislation designed to institute such procedures.

Chapter 19 (1981): “Presidential Directive (P.D.) 59: United States Nuclear Weapon Targeting Policy.” This paper provides official information regarding US nuclear weapon targeting. It was written to educate the segment of the research community most interested in arms control and peace research about the actual state of planning regarding the potential use of nuclear weapons and how this differed from public accounts. It demonstrates that, at least since 1960, US nuclear weapon targeting had always been primarily countermilitary—“counterforce”—and not directed in the first instance against the cities of the USSR. These military targets have always and primarily been the Soviet nuclear weapon systems, including hardened missile silos as these were developed by the USSR. The United States possessed four policies relevant to nuclear weapons: (1) employment policy; (2) acquisition policy; (3) declaratory policy; and (4) deployment policy. The most important of these was the employment policy, the Single Integrated Operations Plan (SIOP), which describes the targets and how the United States plans to use the nuclear weapons which it possesses. The chapter provides additional information about the SIOP.

Chapter 20 (1982): “The Case of the Stranded Sub.” This paper discusses the 1981 incident of “Whisky on the Rocks,” when an old Soviet diesel-powered Whisky class submarine ran aground outside of Karlskrona in southern Sweden, within one of the two most important Swedish naval base areas. Between 1975 and 1980 the

penetration into Swedish territorial waters by unidentified submarines had averaged about 10 “certain” and “possible” events in total per year. The grounding of the Soviet Whisky class sub was likely to have simply been an accident during one of these penetrations. During the days following the stranding, Swedish defense agencies were able to ascertain that the submarine was equipped with one or more nuclear torpedoes. This had much wider implications, as it impinged on long-standing Soviet and Warsaw Pact proposals for a Nordic nuclear-free zone. The paper illustrates that the Soviet Union was aggressive enough to move a submarine with a nuclear torpedo five miles off the coast of a supposedly neutral country—although Sweden had, during this time, made top secret arrangements with the United States and NATO to come to Sweden’s defense if the country were attacked by the USSR (as Leitenberg wrote later in his book *Soviet Submarine Operations in Swedish Waters, 1980–1986*¹⁷). Although not publicly known, even to the Swedish international relations community, and certainly not to the general public, this arrangement altered the notion of Swedish “neutrality.” Although there was extensive Swedish press reporting about this incident, much less was reported in the English-language press. Leitenberg believed it was important that the international arms control community should know about the incident. This paper briefly summarizes the interactions between Sweden and the USSR following the submarine stranding, as well as the different proposals for a Nordic nuclear-free zone.

Chapter 21 (1983): “Problems of the Reliability of Armament and Security Information.” This paper was commissioned by UNESCO officials as a background paper to be presented to United Nations (UN) member states at a conference titled “The Media and Disarmament,” to be held in Nairobi, Kenya, in April 1983. The paper has five sections: an introduction; “Nine Problems”; “Sources”; “Governments”; and “Reliability.” The nine problems are: (1) motivation of the journalist in delving into details of weapons systems; (2) the “numbers game,” the manipulation of raw statistics without examination of what they contain or omit; (3) priorities, which subjects the media choose to examine and report; (4) carelessness, essentially meaning incompetent and poor reporting; (5) the emphasis on “news,” the disappearance of important issues for long periods when they are not momentarily “newsworthy”; (6) lack of understanding, when an event has implications that the media does not realize, or when an issue requires some understanding and repeating of antecedent events (possibly decades earlier) in order to be reported properly; (7) false issues, when much is made of a recent event precisely because reporters are ignorant of its antecedents; (8) war, grossly unreliable information is distributed by governments or contending parties during wartime; and (9) carelessness #2, that is particularly an extension of the first “carelessness,” in that reporters frequently garble information they are provided with despite great care by the informant. The section on governments provides details on the very poor responses that the Office of the UN Secretary-General receives when it asks member states for information for major UN reports. The section includes separate discussions of information provided to the

¹⁷ Milton Leitenberg, *Soviet Submarine Operations in Swedish Waters, 1980–1986* (Praeger, for Center for Strategic and International Studies, September 1987).

public (both domestic and international) by the United States, the USSR, China, and West Germany regarding their own weapons, arms transfers, military expenditure, military assistance, overseas military engagements, and so on. The section on “Reliability” discusses the problem of reliability of information from the Soviet Union in particular, illustrated with several examples—showing that the Soviets lied publicly to the UN. The USSR essentially supplied no public information or false information. The conference papers for the Nairobi meeting were distributed to UN member states in advance of the meeting. All UN activities take place under consensus rules, and when the Soviet foreign ministry officials read Leitenberg’s conference paper they refused to allow the conference to be convened if the paper were a “background paper.” This led to two days of diplomatic negotiations between the chair of the conference and the Soviets. As a compromise, Leitenberg’s paper was no longer a “background paper” for the meeting but merely a paper available at the meeting.

Chapter 22 (1984): “The Wars in Vietnam, Cambodia and Laos. A Bibliographic Guide” (with Richard Dean Burns). This chapter is a short summary of the history of the wars in Vietnam, Cambodia, and Laos. Hanoi’s military triumph in 1975 concluded three decades of war in Indochina that had begun with the end of Japanese occupation in 1945 and the subsequent French attempt to reestablish their colonial possession. During the First Indochina War (1946–1954) the Vietnamese struggled to eject the French. This conflict—which many Vietnamese feel began in the 1880s—ended with the signing of the Geneva Accords in 1954 and the temporary separation of Vietnam into northern and southern halves. The Second Indochina War (1961–1975)—by far the most violent—was a civil war between the two separated halves of Vietnam, complicated by American, Soviet, and Chinese intervention. Under Presidents Kennedy and Johnson, American combat forces slowly increased in numbers and gradually undertook expanded military operations. The early US decision to employ its technological advantage, rather than large armies, led to such destruction of the countryside that critics labeled these operations “ecocide.” Under increasing public and congressional pressure to end American involvement, President Nixon reduced US ground operations in Vietnam and relied on airpower and bombing to end the war. The 1973 armistice saw the accelerated withdrawal of US ground forces, an end to all US military operations, and restrictions on US military aid to South Vietnam. US-Vietnamese negotiations were close to completion when they were abruptly interrupted by renewed fighting in Indochina. Hanoi’s victory in 1975 led most observers to assume that the long skein of war in Indochina was at an end. They believed that, after 30 years of conflict, the Vietnamese would relish their independence, rejoice at the unification of their country, and turn their energies to repairing the ravages of war. But, after a brief respite, war broke out again in 1977 when the Vietnamese invaded Cambodia, and China responded by attacking Vietnam. Indochina thus began its third cycle of war since the end of World War II.¹⁸

¹⁸ We were not able to obtain all the necessary permissions to republish the 1972 paper: Milton Leitenberg, “America in Vietnam: Statistics of a War,” *Survival* 14, no. 6 (1972): 268–274. That paper described the incredibly destructive military policies carried out by the United States in the Indochina wars, which resulted in the deaths of approximately 3.5 million people. However, anyone

This chapter is composed of introductory sections to a bibliography of over 6200 non-press sources selected from among nearly 8000 that Leitenberg had accumulated.

Chapter 23 (1984): “Studies of Military R&D and Weapons Development.”

When a UN member state suggests a special session of the UN General Assembly or a UN secretary-general’s special study, that state is responsible for supplying background supporting information. In 1978 the Swedish government suggested the UN Special Session on Disarmament (UNSSOD), and in 1984 it suggested that the secretary-general produce a special study on military research and development (R&D). In 1978 and 1979 Leitenberg and Nicole Ball prepared the background information for the Swedish Ministry for Foreign Affairs to support their proposal for UNSSOD. The material in this chapter was commissioned by the ministry to serve as part of the background information for the R&D study. This study, a 515-page, book-length manuscript, was never published, and the Soviet Union in the end refused to agree to the public release of the UN secretary-general’s completed study. The purpose of Leitenberg’s study was to explain in very great detail how military R&D is undertaken, and it included four illustrative case studies (anti satellite weapons systems; weather modification technologies; multiple independent reentry vehicles for land- and sea-based ballistic missiles; and biological weapons).

Chapter 24 (1985): “The Impact of the Worldwide Confrontation of the Great Powers: Aspects of Military Intervention and the Projection of Military Power.”

This chapter was originally drafted as a monograph. It provides the reader with a thorough understanding of the various forms of foreign military intervention, which extend well beyond outright invasion and war, and the many national actors that engaged in foreign military intervention in the post-World War II years. The study is divided into five parts: The introduction discusses relevant aspects of international law, provides a provisional classification of foreign military intervention, and includes a section that provides a brief overview of wars and conflicts from 1945 to 1982. Part II surveys the foreign military interventions of the United States, the USSR, United Kingdom, and France. Part III examines three particularly important military-political activities: threats of the use of nuclear weapons, acquisition and use of overseas military bases, and arms transfers. Part IV surveys the sometimes very extensive foreign military interventions by a group of smaller countries: Libya, Cuba, South Africa, Israel, East Germany, Vietnam, and Pakistan. Part V, titled “Other Important Considerations,” examines surrogate war, the question of humanitarian intervention and internationally sanctioned intervention. This was the first paper to discuss, in aggregate, how all of these were examples of military capability in the central US-Soviet contention. This paper was written to educate the arms control and peace community about different facets of military intervention, beyond the deployment of military troops.

Chapter 25 (1987): “Summary of “United States–Soviet Strategic Arms Control: The Decade of Detente 1970–1980, and a Look Ahead.” When several of the early SIPRI Yearbook chapters in this book were first published, in 1969 and

1970, information about Soviet nuclear weapon programs and deployments, comparable to that available for the United States, simply did not exist. The US government published information about US strategic weapons constantly. The Soviet government published absolutely nothing about its own strategic nuclear weapons. Even the names of Soviet land-based and sea-based ballistic missiles were considered secret in the USSR. By the time this study was written, in 1984, additional information was available about Soviet strategic weapons. This was not because the USSR had changed its public information policies, but because the US government released the information. It became clear that developments in Soviet strategic weapons and their missile delivery systems had been enormous since the late 1960s. The study set out to describe that record and made extensive use of tables and charts which made the developments easy to understand. It covers US and Soviet strategic weapon developments and deployments from the mid- to late 1960s up to 1984, a period twice as long as the title phrase, “Decade of Détente, 1970–1980,” suggests. The paper is important because it provided a comparison between the US and Soviet intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and other weapon developments. The paper was initially commissioned as a monograph by the Hessische Stiftung Friedens- und Konfliktforschung (HSFK), the main German peace research institute (now known as the Peace Research Institute Frankfurt). Nevertheless, the institute decided not to publish it because two HSFK staff members thought the paper was too “anti-Soviet,” although it did no more than provide the exact same information for Soviet nuclear weapon delivery systems as had always been available for US nuclear delivery systems. The study was a successor to the 1974 *Bulletin of the Atomic Scientists* publication (Chap. 10 in this volume). The study was also intended to be a “look ahead” to what one could expect the arms race to look like for the next 15 years, but that was all changed by Mikhail Gorbachev.

Chapter 26 (1988): “The Soviet Union and the Lessons of World War II.” Each year in May the USSR celebrated the anniversary of the end of World War II. Soviet military spokespeople routinely used the occasion to make pronouncements on “the lessons of the great patriotic war,” stressing the Soviet Union’s need of a powerful defense to repel invaders and justifying the claims such a defense made on the material resources of the nation. In the summer of 1985, on the occasion of the 40th anniversary of the end of World War II, the USSR published a substantial number of historical reviews of “the lessons of World War II” which stressed this theme. The most important political message in the postwar years was the direct linkage of those alleged lessons and the terrible losses in human life and resources suffered by the USSR in the war to the continuing need for Soviet military preparedness and rearmament after World War II, and even to the military occupation of Eastern Europe after 1945. In the summer of 1985 Mikhail Gorbachev had only been in office for four months. There was as yet no perestroika and no “new thinking,” most certainly not in the Soviet Ministry of Defense. The nature of all the military publications in 1985 on the “lessons” was therefore the same as they had been in all the decades since the end of World War II. There were, however, three simple reasons for the Soviet military debacle in the first six months after Germany invaded the USSR in June 1941, and none of them was ever mentioned in the “lessons” presented by

the Soviet military authors: (1) the Stalin purges of the USSR senior officer corps; (2) the quick loss of Soviet armies and military equipment because Stalin refused to accept numerous strategic warnings of impending German invasion—from his own intelligence services, from the governments later to be his wartime allies, and from neutral nations; (3) the 1939 Nazi-Soviet Pact. So great was Stalin's overriding interest to regain former tsarist-era Russian territories that had been lost after the end of World War I that he was even willing to assist the military buildup in Nazi Germany in 1939 in exchange for regaining those territories. The paper points out what the real lessons were that should have been learned by Soviet policymakers and citizens, not the ones that Russian generals kept repeating.

Chapter 27 (1992): “Anthrax in Sverdlovsk: New Pieces to the Puzzle.” On April 4, 1979, people arrived at hospitals in the Soviet city of Sverdlovsk, in the Urals, with an illness which appeared to be acute pneumonia. However, most people died very quickly, often within 24 hours. Soviet KGB officers confiscated medical records from hospitals, families, and factories. The area in the city from which a substantial number of victims came was directly adjacent to one of the four major Ministry of Defense facilities involved with biological weapons, “Military Compound Number 19,” one of the institutes in the Scientific Research Institute of Microbiology of the USSR Ministry of Defense. US satellite photoreconnaissance showed that after the disease outbreak very extensive urban decontamination measures were undertaken, including removal of topsoil and spraying houses, rooftops, and even machinery in a factory in which a large number of the victims had worked, located adjacent to Compound 19. US intelligence agencies rather quickly concluded that the Sverdlovsk deaths were due to the victims having inhaled aerosolized anthrax particles. Soviet officials launched extensive disinformation campaigns, claiming that the victims had died of intestinal anthrax caused by having eaten infected meat. Soviet scientists published several professional papers explaining various ways in which anthrax-contaminated meat allegedly spread in city markets. Later in the Gorbachev years, between March 1990 and the middle of 1991, with freedom of the press expanding rapidly, a half dozen dedicated and intrepid Russian journalists demolished the Soviet explanation for the Sverdlovsk anthrax outbreak bit by bit, using classical investigative reporting. They interviewed hospital surgeons, former military and KGB generals, and investigated the slaughterhouses through which the Soviet scientists had claimed anthrax-infested bonemeal infected additional cattle. All the official Soviet government explanations of 1980 to 1990 proved false. The journalists were also able for the first time to provide information about the nature of the work being carried out inside Compound 19: it produced dried anthrax. They even picked up information about the nature of the accident which had vented the anthrax into the adjacent district of the city. In January 1992 Russia's President Yeltsin stated—with extreme euphemism—that there had been “a lag in implementing” the Biological Weapons Convention in the USSR, and that the Soviet Union's leaders “deceived the Americans, particularly on the issue of chemical and bacteriological weapons.” This paper summarizes the relevant events between April 1979 and January 1992, pulling together the material published in Russia during the late Gorbachev years

under conditions of freedom of the press. It exposes the Soviet Union's lies and demonstrates that there really was an anthrax production facility in Compound 19.

Chapter 28 (1992): "Soviet Resources in the Defense Sector and Their Availability for Economic Recovery." This paper discusses Soviet defense conversion. There were several short periods during the Cold War during which the subject of defense industry conversion was of political interest. Soviet authors had always written that it would be no problem for the Soviet economy to convert from defense industrial production to producing items for civilian consumer use. Since the Soviet economy was a state-controlled, command economy, the government had only to decide and production lines would be converted. The Soviet economy had been stagnant or in actual decline since the late 1970s. There had never been any defense industry conversion during that time, and Soviet military expenditure constantly increased up to 1988. Since the end of World War II, Soviet military expenditure had amounted to approximately 25% or more of its national product, possibly as much as 30%. Soviet military expenditures reported by the Soviet government had always been a fiction. In 1990 and 1991, statements by Soviet government officials doubled the reported number, then increased it fourfold. In December 1988, in an address to the United Nations, Mikhail Gorbachev announced that the Soviet Union would develop a plan for defense industry conversion, some of the broad outlines and quantitative goals of which were publicly disclosed. Little was achieved. By 1990 the Soviet civilian economy was in acute crisis, with store shelves empty of food products even in Moscow. This paper was part of a larger body of work on defense industry conversion by Leitenberg and Nicole Ball.

Chapter 29 (1998): "New Russian Evidence on the Korean War Biological Warfare Allegations: Background and Analysis." The major allegation of the use of biological weapons during the Cold War was made during the Korean War, against the United States. In 1951 and again in 1952, China, North Korea, and the Soviet Union charged that the United States had used a wide range of biological warfare (BW) agents, bacterial and viral pathogens and insect vectors of disease against China and North Korea. They alleged the use of BW agents against humans, plants, and animals. The charges were organized into a worldwide media campaign and also brought before the United Nations. US government officials denied the charges, but it had never before been possible to establish definitively whether the charges were true or false. In January 1998, 12 documents from former Soviet Central Committee archives became available which provided explicit and detailed evidence that the charges were contrived and fraudulent. While the 12 documents are far from a complete history of the events, they nevertheless describe, at least in part, how the allegations were contrived by Chinese officials and Soviet advisors and identify several of the individuals involved in the process. One document, addressed to Mao Zedong, reads: "The Soviet Government and the Central Committee of the CPSU [Communist Party of the Soviet Union] were misled. The spread in the press of information about the use by the Americans of bacteriological weapons in Korea was based on false information. The accusations against the Americans were fictitious." This paper provides a brief history of the allegations and a summary of the documents' major disclosures, as well as the results of additional research on the

subject. This work is important because this was an allegation of significant biological weapon use by one of the two superpowers that was ultimately shown to be a massive disinformation campaign.

Chapter 30 (1975–2006): “Studies on War, Conflict, Genocide and Humanitarian Intervention.” This chapter is a compendium of 12 separate studies and 4 shorter items relating to wars, conflicts, and humanitarian intervention. The items include the following: “A Bibliography on Counterinsurgency, with Coverage of Sources from 1900 to Mid-1973” (1975); “A Survey of Studies of Post-World War II Wars, Conflicts and Military Coups” (1977, at Cornell University, with the assistance of Robert Kalish and Dolores Lombardi; 1991–1993, at the University of Maryland, with the assistance of Todd Perry); “Research on War and Conflicts: Methodological Considerations” (1983); “The Impact of the Worldwide Confrontation of the Great Powers: Aspects of Military Intervention and the Projection of Military Power” (1985); “The Media, Genocide, Early Warning, and Political Will” (1998); “Humanitarian Intervention and Other International Initiatives to Enforce Peace” (1993, funded by the MacArthur Foundation); “The Case of Rwanda: US and UN Actions Result in Escalation of Genocide and Higher Costs” (1996); “Rwanda and Burundi Genocide: A Case Study of Neglect and Indifference” (1996); “Epilogue to ‘Rwanda and Burundi Genocide: A Case Study of Neglect and Indifference’” (1996); “Deaths in Wars and Conflicts in the 20th Century” (2006, occasional paper, Cornell University Peace Studies Program); “Beyond the ‘Never Again,’” (2006, epilogue to Cornell monograph); “Genocide in Darfur: 2003 to 2006” (2006); “US Foreign Assistance Priorities—and Israel” (1989); “Anatomy of a Massacre” (1994); “The War, Denials, and the Future” (1997, on Japanese atrocities during World War II); “Memorandum for the Conflict Prevention Project, the Woodrow Wilson International Center for Scholars” (n.d., ca. 2001–2002)]. Links to 15 of the 16 items in this compendium can be found at <https://man.fas.org/eprint/leitenberg/war-conflict/index.html>. The remaining study, “Deaths in Wars and Conflicts in the 20th Century,” can be accessed at <https://ecommons.cornell.edu/bitstream/handle/1813/69395/29-Leitenberg-Deaths-in-Wars-3ed.pdf>.

Chapter 31 (1997): “Rwanda and Burundi Genocide: A Case Study of Neglect and Indifference.” Between April 6 and mid-July 1994, a period of some 13 weeks, roughly 750,000 people were murdered in a spasm of civil war and genocide in Rwanda. They were mostly members of one group, Tutsi, killed by members of a second, Hutu. Those killed amounted to roughly 10% of the nation’s population. Over 2 million people fled or were forcibly displaced into neighboring countries, and another million or more were displaced within Rwanda. The events had been foreseen and forewarned. In the words of a (German) diplomat: “There are no ‘unknown Rwandas.’ We all know about the Rwandas. What we don’t know is how the international community should respond.” Urgent warnings also came in the first days of the genocide from Canadian general Romeo Dallaire, who commanded a United Nations peacekeeping mission deployed in Rwanda—with, however, very inadequate forces and without Chapter VII authority to use force. His request to UN headquarters for such authority was peremptorily denied. The events which preceded the outbreak of the killing were known, and what took place during and after the killing was

known, yet it all continued. Nations, diplomats, civil servants—European, American, African—the UN and the Organization of African Unity—all stood by and watched and did nothing. The genocide could have been prevented or stopped if governments had wanted to intervene. Leitenberg wrote the first op-ed about the Rwanda genocide in the *New York Times* in June 1994. He became interested in the topic of genocide from studying the Holocaust and the Korean and Vietnam Wars. He disputed how political scientists were using criteria for counting deaths in war as 1,000 *battlefield* deaths—which would mean the Rwandan genocide would not count. Leitenberg's work on genocides emphasized the problem with using those criteria. The work was originally a response to his participation in a small group of colleagues, all European peace researchers, who wanted to write a book about weapons, wars, and conflicts. The work on genocide resulted from that experience, which led to an independent effort to create a better dataset on deaths in wars and conflicts.

Chapter 32 (2006): “A Current Assessment of Biological Weapons.” This chapter, originally a PowerPoint presented during a Harvard Sussex Day at the University of Sussex, UK, in June 2006, is a detailed examination of the concerns about bioterrorism threats. Biological weapons in the hands of nonstate actors and terrorist groups became the subject of major international attention in the mid-1990s. Since biological weapons, as they had been prepared by the United States and the Soviet Union, were capable of mass lethality, very great dangers were projected if terrorist groups could develop similar capabilities. Scenarios were produced for US government agencies predicting mass deaths in cities across the United States caused by aerial dispersal of the most lethal biological agents. These fears were prompted by the efforts of three nonstate actors/events: (1) the Japanese group Aum Shinrikyo; (2) the al-Qaeda group in Afghanistan; (3) the US Amerithrax attacks. Leitenberg discusses each of these concerns and debunks the popular rhetoric of bioterrorism threats at the time. At Leitenberg's Harvard Sussex Day presentation, several prominent members of the UK security establishment who were in attendance privately supported Leitenberg's assertions about the exaggeration of the bioterrorism threat. The PowerPoint was based on a small book that Leitenberg wrote, *Assessing the Biological and Bioterrorism Threat*, published by the US Army War College in December 2005. This publication provides a detailed overview of the subject. This work carefully explains why terrorist groups did not have the technical capability in the years 1995 to 2005 to produce biological weapons, even the most elementary ones, a situation that continued at least through the end of June 2025.

Chapter 33 (2010): “Assessing the Threat of Bioterrorism.” This chapter appeared in a book published by the Cato Institute in 2010 and updates the reader on the bioterrorism threat from Chap. 32. Bioterrorism killed no US citizens in the 20th century and has killed five to date in the 21st century. These statistics are presented as an introduction to assessments regarding the risk of bioterrorism. Between the October–November 2001 Amerithrax attacks—in which 22 people were sickened, of whom 5 died—and 2009, the US government appropriated \$64 billion for biological weapons prevention and defense. The rate of appropriation for this purpose was \$7 billion per year, which continues to the present time, reaching approximately \$133

billion as of fiscal year 2023. Placing the sentences above alongside one another presents the crux of the issues examined in this chapter: Is it possible to present a reasonable estimate of the threat of bioterrorism to the United States? How has the subject been treated in the political world? What are the consequences of some of the US government's responses to the problem since 2001? The chapter examines five policy questions. The first is the assessment of the bioterrorist threat to the United States. The second is how the US government's response since 2001 has increased the proliferation potential of biological weapons and damaged national security. The third is the diversion of resources within the US public health sector due to funding for bioterrorism preparedness and response efforts. The fourth is the misdirection of public health efforts in developing nations for bioterrorism preparedness and response efforts. The final policy issue examined is that of oversight and regulation of the burgeoning US biodefense program. Leitenberg continued to write on bioterrorism issues to counter the exaggerated portrayals of the "threat." Readers interested in more detailed examination of the same issues can see his monograph *Assessing the Biological Weapons and Bioterrorism Threat*.¹⁹

Chapter 34 (2013): "The Soviet Biological Weapons Program. A History."

This chapter was originally a PowerPoint presentation and serves as an introduction to the history of the Soviet/Russian bioweapons program. The Soviet Union had the largest offensive biological weapons program in history. And after 1972, when the Biological Weapons Convention (BWC) was signed, and 1975, when the BWC was ratified and entered into force, the entire Soviet program was in violation of the treaty and international law. The chapter provides a very detailed summary of all the major aspects of the Soviet biological weapons program covered in the book *The Soviet Biological Weapons Program: A History*.²⁰

Chapter 35 (2014): "The Biological Weapons Program of the Soviet Union."

This chapter provides continued information on the biological weapons (BW) program of the Soviet Union. It was originally Leitenberg's 2014 testimony to a US congressional committee that held a hearing to examine what happened to the infrastructure and programs left behind by the Soviet offensive BW program and its continuation in post-1992 Russia. All the BW facilities belonging to the Soviet Ministry of Defense remained; none of them has ever allowed international visitors, including from any UN agency or the World Health Organization. There is no way of knowing whether any of these institutes ever ceased its offensive BW work. In 1994 Russian officials participating in the trilateral negotiations with the United States and the United Kingdom retracted the September 1992 admission by the Russian government that it had maintained an offensive BW program. One year later Russia's President Yeltsin informed President Clinton that he no longer wanted to be bothered with US questions about the subject. The most recent event of significance took place

¹⁹ Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat* (US Army War College Press, 2005), https://drum.lib.umd.edu/bitstream/handle/1903/7879/assessing_bw_threat.pdf.

²⁰ Milton Leitenberg and Raymond Zilinskas, *The Soviet Biological Weapons Program: A History* (Harvard University Press, 2012).

in 2012, when Russian president Vladimir Putin publicly decreed that the Russian Ministry of Defence should develop new “genetic” weapons, a clear violation of the Biological Weapons Convention. Russia’s defense minister Anatoly Serdyukov, speaking on television, promised that the tasks would be completed quickly.

Chapter 36 (2016): “China’s False Allegations of the Use of Biological Weapons by the United States During the Korean War.” In the early morning of June 25, 1950, North Korean military units, using Soviet-supplied tanks and heavy artillery, invaded South Korea all along the 38th parallel. After June 25, the United States and UN forces entered the Korean War on behalf of South Korea; Chinese armies and the Soviet air force fought on behalf of the North. The war lasted until July 1953, and ended only with an armistice, not a peace treaty. A little-remembered aspect of the Korean War is an issue of great importance to those concerned with arms control and allegations of the use of weapons of mass destruction, namely nuclear, biological, and chemical weapons. During and after the war, North Korea, China, and the Soviet Union alleged that the United States used biological weapons (BW) on an enormous scale in areas of both China and North Korea. Despite the public disclosure of Soviet Central Committee documents in 1998, as described in Chap. 28 of this volume, which revealed that the allegations were fraudulent, China and—much more noisily—North Korea still maintain the charges. The purpose of this working paper was to describe recent publications in Chinese journals of an unprecedented nature on the subject, which demonstrated the allegations to be false. In addition to discussing these new Chinese publications about the BW allegations, the working paper reproduced a number of newly declassified Russian documents which demonstrate the extent of communications between Mao, Stalin, and Zhou Enlai on the subject, two of which authenticate the 1998 Soviet documents that disproved the allegations. Based on what is known about the status of the US BW program in 1952, as well as the proof contained in the Soviet Central Committee documents obtained in 1998, the working paper concludes that the Korean War BW allegations against the United States made by China and the USSR—an accusation of the use of a weapon of mass destruction—were fraudulent, a grand piece of political theater.

Chapter 37 (2016): “The Soviet Biological Warfare Program.” This chapter further discusses the Soviet biological weapons (BW) program. It draws heavily from the book *The Soviet Biological Weapons Program: A History*.²¹ Despite all the efforts to understand the Soviet BW program, large parts of it remain shrouded in secrecy, due in part to current Russian laws prohibiting any former participant from revealing its details. What is known about the program is therefore largely owed to information from defectors or former participants in the Soviet program who could legally leave the USSR or its successor countries, as well as information pieced together from extensive literature searches and interviews. This chapter describes that program. One interesting and very important aspect of the Soviet BW history is that Mikhail Gorbachev, despite all his other superlative achievements in arms control involving strategic nuclear, conventional, and chemical weapons, was unable to get the Soviet Ministry of Defense to end the Soviet BW program. It is not known

²¹ Leitenberg and Zilinskas.

exactly when all offensive BW activities in Russia may have been terminated, if they were, and it appears that they were again renewed by a decision of Russia's President Putin in 2012. In reviewing the book by Leitenberg and Zilinskas, Raymond L. Garthoff, former U.S. ambassador to Bulgaria, wrote, "This is the most authoritative and comprehensive account of an important if arcane subject, requiring prodigious research, and care in evaluating and verifying official and unofficial reported information."

Chapter 38 (2018): "The Hazards of Operations Involving Nuclear Weapons During the Cold War." Short of a Russian invasion of Western Europe, under what conditions between 1945 and 2018 was there the greatest risk of the use of nuclear weapons among the nations possessing them? This study was begun in the mid-1980s for two Swedish government ministries, focusing particularly on interactions between the United States and the Soviet Union. Everyone knows about the great dangers that were involved during the October 1962 Cuban missile crisis, and perhaps one or two other of the most fraught moments of the Cold War. However, there were a great many activities and interactions of Soviet and US weapon platforms carrying nuclear weapons during both crisis and noncrisis situations over the course of roughly 70 years. These ranged from nuclear weapon accidents (see Chap. 12 in this volume); nuclear alert failures; false warning of land- or submarine-based intercontinental ballistic missile launches; deep penetrations of the opposing side's air space, made for reconnaissance purposes; and several more types of interactions. Many of these events occurred as a result of deliberate policies and practices established by the governments of the United States and the USSR. At the time, questions were raised about the possibility of accidental nuclear war. The paper reviews all of the categories of events in detail, establishes a hierarchy of greater or lesser risk of escalation among the categories, and estimates their frequency. The paper argues that the greater the degree of deliberateness and the less that true accident is involved, the greater is the risk of escalation. It is very skeptical, if not dismissive, of the concept of "accidental" nuclear war. Leitenberg's main argument is that, if things go wrong, it will not be the result of an accident but because of deliberate policy decisions made by the United States and the USSR that lead to a nuclear interaction.

Chapter 39 (2018): "The Hazards of Operations Involving Nuclear Weapons During the Cold War—Soviet and Russian Alerts." This chapter is the last portion of the original manuscript that was published as "The Hazards of Operations Involving Nuclear Weapons during the Cold War" in the *Journal of Cold War Studies* in 2018 (Chap. 38 in this volume). Because of length restrictions, the journal was unable to publish the last portion of the paper. This portion of the paper consists of major events that took place involving the USSR or Russia—or, as in the first three cases, Soviet nuclear weapons that were on foreign soil or on Soviet submarines. These were: the Cuban missile crisis, October 1962; the Soviet invasion of Czechoslovakia, June 1968; the Arab-Israeli War, October 1973; the "seven hours nuclear war," June 1982; false Soviet satellite warning, September 1983; Russia's Project RYaN and the Able Archer exercise, November 1983. The chapter reviews these six events in great detail.

Chapter 40 (2018): “A Review of the Question of Weapons of Mass Destruction Terrorism.” Earlier chapters in this volume (Chaps. 32 and 33) concerned the possibility that terrorist organizations might obtain and use biological weapons. This chapter, originally a PowerPoint presentation prepared in 2018, reviews the success or failure of terrorist organizations, as of 2018, to obtain any of the weapons of mass destruction (WMD)—chemical (C), biological (B), radiologic (R), or nuclear (N)—and their likelihood to do so in the near future. After reviewing the known information for each of the categories of WMD, the presentation surveys several questions: Why did the Japanese Aum Shinrikyo group fail to obtain biological agents? What are the implications of that failure in relation to the likelihood of biological weapons terrorism overall? Which terrorist groups might be cause for concern that they might seek any C, B, R, or N capability? Which C, B, R, or N capabilities should cause the most concern? What is the most concerning threat if not C, B, R, or N terrorism? This presentation summarizes why terrorist groups did not have the technical capability in the years 1995 to 2018 to actually produce biological weapons, even the most elementary ones. Very fortunately, that assessment remains valid as of the time of preparing this volume as of January 2025: no terrorist group has to date demonstrated such abilities.

Chapter 41 (2020): “Did the SARS-CoV-2 Virus Arise from a Bat Coronavirus Research Program in a Chinese Laboratory? Very Possibly.” Cases of pneumonia began to appear in the large industrial city of Wuhan—a major Chinese national and international travel hub, as well as a major center of Chinese scientific research institutes—probably sometime during September 2019. By the end of December 2019, medical staff in Wuhan hospitals realized that the pneumonia was being caused by an unknown virus. In the last days of 2019, several doctors in Wuhan also realized that the new pneumonia was aerosol transmissible by infected people breathing. It was also aerosol transmissible by people who were infected but who showed no symptoms. Several days later the genome of the virus causing the disease was identified as a bat coronavirus and was designated as SARS-CoV-2. China penalized the doctors who reported aerosol transmission, suppressed the information, and informed the World Health Organization (WHO) that the virus was not aerosol transmissible. It also delayed informing the WHO of the genome of the virus, and not until January 20, 2020 did it inform the WHO that the virus was aerosol transmissible. China violated the WHO’s International Health Regulations on both counts. Chinese government authorities also permitted national and international travel from Wuhan until January 22, 2020. It quickly became known that the Wuhan Institute of Virology (WIV) had been carrying out research on bat coronaviruses for a half dozen years. A debate ensued in the international scientific community as to whether the 2020 SARS-CoV-2 pandemic had occurred by natural transmission from an animal host to humans, or whether it may have occurred by escape from the WIV—or one of the several other research institutes in Wuhan also researching bat coronaviruses—due to the infection of an institute scientist. The debate was, however, marked by very strong attempts by important virologists and by the major international scientific journals to suppress the suggestion that a laboratory infection may have been responsible. The paper discusses the evidence available and concludes that the most

likely origin was the WIV. This work is related to some of Leitenberg's earlier arms control scholarship on the question of whether a disease outbreak is deliberate or natural.

Chapter 42 (2021): "China Versus SARS." A first global pandemic caused by a bat coronavirus originated in China between November 2002 and 2004. A novel pneumonia had emerged on the eastern coast of China in November 2001 which ultimately infected over 8,000 people in more than 30 countries, killing 774—a mortality rate of approximately 10%. It was not however aerosol transmissible, allowing it to be contained and eradicated using strict quarantine and isolation methods. It was labeled severe acute respiratory syndrome (SARS) and was eradicated by 2004. It was a natural animal-to-human transmission, as are most viral pandemics such as the recurring influenzas, most of which originate in China. What is of enormous significance for international public health was the pattern of lying and cover-up by Chinese government officials and agencies. The behavior was almost exactly the same as that subsequently exhibited by the Chinese government in 2020. In both cases China (1) delayed reporting to the WHO; (2) provided false information to international agencies and the international community; (3) initially restricted information even to Chinese officials outside the province where the disease began; (4) dismissed the problem as a minor one, accused other nations of being the source of the outbreak, and claimed that the outbreak was either under control or had been eliminated, when that was far from true. This paper illustrates the pattern of evasion, lying, and deception by the Chinese government to the Chinese people and to international authorities concerning disease outbreaks.

Chapter 43 (2019): "Russian Disinformation Campaigns re Biological Weapons in the Putin Era." This PowerPoint presentation preceded the very long study published in December 2020 by *The Nonproliferation Review*, "False Allegations of Biological Weapons Use from Putin's Russia." We were unable to obtain all the necessary permissions from Taylor & Francis, the journal publisher, to enable the paper to be reprinted in this volume. The chapter provides an outline on the basis of which the much longer publication was written. It summarizes key aspects of Soviet and Russian disinformation campaigns involving biological weapons use. Between 1949 and 1988 the Soviet Union carried out an unprecedented campaign of false allegations of biological weapon use against the United States. The two most famous of these allegations were made, first, between 1951 and 1953, alleging that the United States had used biological weapons during the Korean War against China and North Korea; and, second, between 1985 and 1988, alleging that the United States had manufactured the AIDS virus and had released it in Africa in order to kill black Africans. In May 2007, Nikolai Patrushev, then head of the Russian Federal Security Service (FSB) and subsequently the head of Putin's national Security Council, initiated the new era of Russian biological weapons disinformation that has continued to this day.²² The history of Russian post-2007 false biological weapon allegations made by its most senior officials and its whole-of-government approach is not simply stupid and routine disinformation and propaganda. It is of great importance because it

²² At the time of finalizing this volume in August 2025.

actively, deliberately, and persistently undermines the Biological Weapons Convention, the international legal regime in force since 1975 for the purpose of outlawing biological weapons, one of the three weapons of mass destruction.

Chapter 44 (2022): “Russian Nuclear and Biological Disinformation Undermines Treaties on Weapons of Mass Destruction.” This chapter continues from Chap. 43 to discuss how the Russian government, through an unprecedented and extraordinary biological weapons disinformation campaign aimed primarily at the United States and the governments of Georgia and Ukraine, displayed an open disdain and disregard for the Biological Weapons Convention (BWC). The Russian government’s lies regarding biological laboratories in Ukraine are deliberate and knowing. The Russian government knows with absolute certainty that none of the charges leveled at any of the facilities in Ukraine, or at the United States, are true. Similarly, the Russian government has shown its equal disdain and disregard for the Chemical Weapons Convention (CWC). The Russian government did this through its years of support for the government of Syria, its denial of the Syrian government’s use of the chemical nerve agent sarin against its own citizens, and its attempts to undermine the efforts of the Organization for the Prohibition of Chemical Weapons to carry out investigations of the Syrian government’s use of chemical munitions. President Putin created a deliberate state policy of widespread and repeated disinformation. Subsequently, the same lies concerning biological weapons and the United States became a staple of statements by the spokesperson of the Ministry of Foreign Affairs of China. False allegations of possession and use of biological weapons undermine the authority and legitimacy of international treaties such as the BWC and CWC, whose purpose is to prevent the proliferation of weapons of mass destruction—in this case, biological weapons.

Kathleen M. Vogel

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