WORKING PAPER

International Control of Powerful Technology: Lessons from the Baruch Plan for Nuclear Weapons

Waqar Zaidi and Allan Dafoe[1]
Centre for the Governance of AI
Future of Humanity Institute, University of Oxford
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Abstract

The invention of atomic energy posed a novel global challenge: could the technology be controlled to avoid destructive uses and an existentially dangerous arms race while permitting the broad sharing of its benefits? From 1944 onwards, scientists, policymakers, and other technical specialists began to confront this challenge and explored policy options for dealing with the impact of nuclear technology. We focus on the years 1944 to 1951 and review this period for lessons for the governance of powerful technologies, and find the following: Radical schemes for international control can get broad support when confronted by existentially dangerous technologies, but this support can be tenuous and cynical. Secrecy is likely to play an important, and perhaps harmful, role. The public sphere may be an important source of influence, both in general and in particular in favor of cooperation, but also one that is manipulable and poorly informed. Technical experts may play a critical role, but need to be politically savvy. Overall, policymaking may look more like "muddling through" than clear-eyed grand strategy. Cooperation may be risky, and there may be many obstacles to success.

[1] For helpful input on this work, we thank Nick Bostrom, Diane Cooke, Alex Debs, Jeff Ding, Jade Leung, Sören Mindermann, and especially Markus Anderljung and Carl Shulman. We want to also thank those who have worked in this space with us: Carrick Flynn championed this topic early on; Toby Ord has expertly examined the earlier period of the development of nuclear weapons for similar lessons; and Jason Matheny, Luke Muehlhauser, and Michael Page, who share our fascination with this period and the lessons that it offers, and with whom we have had stimulating conversations.

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1. Introduction

Humanity is likely to confront novel powerful technologies and weapons in the coming decades, including those which could emerge from developments in artificial intelligence. Developing and deploying these in a way that is good for humanity (the governance problem) may be hard, owing to structural features of the risks and decision-making context.[2]

On the other hand, radical levels of cooperation become more feasible in light of truly existentially dangerous technology: in which the gains from coordination are tremendous, the losses from failed coordination terrible,[3] and where most actors' long-term interests are aligned. We might hope that powerful individuals would set aside their narrow self-interest and perspectives, and work together to secure for humanity a flourishing future. They might do this because deep down they believe this is what most matters; because of status motivations to leave a legacy of securing this historical achievement; because of social pressure from their peers, family, or the public; or for other motivations. We hope that individuals—when confronted with a decision that could take humanity towards flourishing and away from existential harm—would make the right decision. But would they?

This paper looks to the development and attempted governance of nuclear technology for lessons on this question. It focuses on the uncertain early years of this technology, especially 1943 to 1951. Policymakers, statesmen, scientific and technical specialists, and other intellectuals attempted to understand the nature and impact of nuclear technology and devise governance for the dangers that many saw. They saw nuclear technology, just as we see some technologies today, as bringing great promise, but also great threats. This dual-use nature led them to conclude that simply banning nuclear technology was not an option, as then its potential benefits would be lost. Instead, proponents argued, the world needed to devise international governance mechanisms which would both reduce the risks but also allow the beneficial outcomes to emerge.[4]

This document is organized by lessons and recommendations. These distil and generalize the lessons that may be applicable to future efforts to control those technologies that pose significant risks of misuse and accident, but that also come with substantial military and economic advantage.[5] We believe these lessons will help those participating in conversations on the governance of such technologies by highlighting historical parallels and expanding the space of conceivable, and considered, political dynamics and opportunities.

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[2] On the structural causes of AI risk, see Remco Zwetsloot and Allan Dafoe, "Thinking About Risks from AI: Accidents, Misuse and Structure", *Lawfare* (11 February 2019). Available at: https://www.lawfareblog.com/thinking-about-risks-ai-accidents-misuse-and-structure, accessed 27 May 2019.

[3] Nick Bostrom, "The Vulnerable World Hypothesis", *Global Policy* (2019), doi: 10.1111/1758-5899.12718; Nick Bostrom, Allan Dafoe, and Carrick Flynn, "Policy Desiderata for Superintelligent AI: A Vector Field Approach" (2018). Available at: https://www.nickbostrom.com/papers/aipolicy.pdf, accessed 28 April 2020.

[4] Many proposals for international control began by stating that nuclear energy has a dual nature. See, for example, the beginning of the Baruch Plan: *United States Atomic Energy Proposals* (Washington, D.C: U.S. Department of State, 1946), p. 1. This interest in the international governance of nuclear weapons remains today: the International Campaign to Abolish Nuclear Weapons won the Nobel Peace Prize in 2017.

[5] On global catastrophic risk see: Nick Bostrom and Milan M. Cirkovic (eds.), *Global Catastrophic Risks* (Oxford: Oxford University Press, 2008), pp. 3-5. This volume highlights four such technologies: nuclear weapons, A.I., biotechnology, and nanotechnology,

Through which processes might governance be discussed and set up? What problems might policymakers and other interested parties need to anticipate when thinking about governance? Who might support proposals for governance, and how and why? How sincere or cynical will participants be? How likely is it that key actors will misunderstand the problem or miscommunicate their preferences?

This report begins with a historical overview of proposals for the "international control of atomic energy" (that is, international regulation of atomic weapons and underlying technologies, sciences, and materials) between 1944 and 1946, followed by key dates and short summaries of the key proposals. In summary, we find that radical schemes for international governance can get widespread support, even from skeptics, but that the support can be tenuous and fleeting. Technical experts can bolster support, but muddled policymaking, secrecy, and concerns over security can undermine it. We highlight the following lessons for those thinking about technological governance today:

1. Radical proposals which would normally appear naive or extreme may, in the right circumstances, gain traction and be seriously proposed, discussed, and even adopted as official policy.
2. Groups or coalitions supporting (or opposing) international control will contain individuals who have different reasons and rationale for their support (or opposition).
3. The support of realists is possible and possibly even crucial for international control to become policy.[6]
4. Secrecy and security will play a central role in discussions on the governance of powerful technologies.
5. The public sphere will likely have a powerful impact on debates regarding international control.
6. Technical experts and specialists (scientists, engineers, technicians, academics) have significant power to shape proposals and policy, though their opponents may criticize them for political naivety.
7. Policymaking involves significant muddling through, rather than grand strategy. It is also deeply affected by domestic politics and often develops on the basis of short-term objectives, poorly thought-out criteria, and poor quality information. Policymaking may develop in unexpected directions or for the expected reasons.
8. Achieving agreement on a workable scheme for international control is difficult.
9. Attempts at cooperation come with risks of strategic, diplomatic, political, and technological losses.

The lessons have been organized so that readers may skip the historical case expositions if they wish. The cases do, however, flesh out the bare bones lessons, and unpack and explore the various aspects of the lesson in more detail.

For those wanting more detail, we have included a list of key events and short biographies of central figures in the appendices. For further reading, we would also point readers to the rich historical literature on the politics of atomic energy in its early years, much of which is cited in the footnotes and listed in the References section. We have relied on a variety of secondary (and some primary) sources but have found Gregg Herken's *The Winning*

[6] By "realists" we mean those who understand international relations in terms of power and national interest, and prefer policies which preserve and strengthen their state in relation to others. Jack Donnelly, *Realism and International Relations* (Cambridge: Cambridge University Press, 2004), pp. 7-8.

Weapon to be the single most detailed and reliable source.[7] We would recommend this as the first port of call for any reader interested in further exploring the history of the international control of nuclear weapons.

Nuclear Technology as an Analogy

History can provide a rich source for insight about novel policy challenges. To understand the challenges of governing today's emerging powerful technologies, one can examine attempts at the governance of earlier powerful technologies when they first emerged. Of the various technologies for which international governance regimes were created or contemplated in the twentieth century (including, for example, aviation, chemical and biological weapons, telecommunications, and the internet), nuclear technology stands out as a particularly promising candidate for study of the pressing, but thorny, problem of international control.[8] In particular, we would highlight the following properties which make this case relevant to understanding efforts to control a future powerful technology (such as AI):

(a) Nuclear technology was marked out as a powerful technology when it was first revealed, and policymaking was made within a context that took its potential impact seriously.
(b) Because of the sudden way the atomic bomb was revealed, and its seemingly esoteric nature, there was significant uncertainty about its impact. Consequently, there was a rich public and policymaking debate about the nature of this technology and its impact. As well as strategic and political dimensions, this debate included an ethical dimension.
(c) Many people, including many elites,[9] perceived nuclear technology as an existential risk and so engendered a rich policymaking debate on international governance, known then as "international control."
(d) Elements of national competition and negotiation, and of a technological arms race, were present during the early history of nuclear weapons.
(e) Nuclear technology rested on complex, rapidly developing science.

Nevertheless, readers should be aware that there are a number of ways in which this historical moment and nuclear technology are a poor analogy for the future governance of powerful technologies. Consider the following disanalogies to AI:

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[7] Gregg Herken, *The Winning Weapon: The Atomic Bomb in the Cold War 1945-1950* 2nd edition (Princeton, NJ: Princeton University Press, 1988). Henceforth referred to as Herken in the footnotes.
[8] There is some discussion of similarities and dissimilarities between AI and nuclear technology in Kenneth Payne, "Artificial Intelligence: A Revolution in Strategic Affairs?", *Survival: Global Politics and Strategy* 60,5 (2018), pp. 7-32; Matthijs M. Maas, "How Viable is International Arms Control for Military Artificial Intelligence? Three Lessons from Nuclear Weapons", *Contemporary Security Policy* 40,3 (2019), pp. 285-311. Other types of historical cases and comparisons may be fruitful too, see for example: Peter Cihon, Matthijs M. Maas, and Luke Kemp, "Should Artificial Intelligence Governance be Centralised? Design Lessons from History", *Proceedings of the 2020 AAAI/ACM Conference on AI, Ethics, and Society (AIES '20), February 7–8, 2020, New York, NY, USA* (2020). https://doi.org/10.1145/3375627.3375857.
[9] By "elites" we mean those individuals or groups who can have a policymaking impact through direct intervention (as opposed to, say, though voting or mass protest). Elites generally include policymakers within the state (including politicians, bureaucrats, diplomats, senior defense officials, and advisors) and those outside, such as prominent nuclear scientists or industrialists.

- **Private Sector Involvement**: AI is primarily being developed and deployed by the private sector, and the private sector is likely to continue to push forward the science of AI irrespective of what governments do. Nuclear technology in its earliest decades was controlled and funded by states.
- **Secrecy**: While nuclear technologies were heavily guarded secrets (though the basic science was broadly known), artificial intelligence technology is more international, broadly held, and public.
- **Impact and Proliferation**: AI is already a major economic technology and deployed around the world, whereas the economic value of nuclear technology was unclear and it was deployed in only a few locations in the period 1943–1951. AI is deployed and innovated in a greater number of fields as compared to nuclear technology, and offers greater future economic potential. The barriers to entry for the development and deployment of AI are also lower than in the case of nuclear technology.
- **Discernibility of Risks**: It may be easier to understand how nuclear weapons could be dangerous, whereas the accident risks from AI are more subtle, theory dependent, or fantastic seeming.
- **Safety Difficulty**: The accident risks from nuclear weapons are likely easier to manage than from AI, because nuclear bombs or power plants are not complex adaptive (intelligent) systems.
- **Verification**: It is easier to unilaterally verify nuclear developments (nuclear tests, ICBM deployments), and it appears easier to control the nuclear supply chain with relatively low disruption of industry.
- **Strategic Value**: The strategic value of nuclear weapons plateaus once one has secure second-strike capability, whereas from the present vantage point, there is no obvious plateau in AI's strategic value.

Further, the historical context for the early development of nuclear technology differs in important ways from the current and future moments in which attempts to govern other powerful technologies may be made:

- **Postwar Context**: Atomic development occurred at the end of a war widely seen as catastrophic. This led to a very different social and political context within which nuclear weapons were introduced.
- **Visceral Example of Danger**: The world witnessed the use of nuclear weapons to destroy cities and some of the horrors this entailed. Future technology risks may not produce visceral harms in advance of attempts to govern them.
- **Superpower Relationships**: Nuclear control negotiations took place between powers who were allies and had just suffered through this war. These powers also had incompatible political-economic models and so found themselves in much more zero-sum relations than the great powers of today.
- **Information**: The great powers had less cultural and ideological commonality, and less information about each other, than do the great powers, and their publics, of today.

Readers should be aware of two further methodological caveats:

- **n=1**. To some extent, this historical period represents a single observation (n=1) in that a single large shock to decision processes could have led to different outcomes. The implication of this is that we should not primarily use the outcome as our evidence, but should instead inspect all the informative historical moments throughout the episode for insight into historical dynamics and mechanisms. For example, we can learn from the rich ways in which decision makers responded to information, formed beliefs, and devised strategy.
- **Sources**. Our analysis of Soviet proposals and responses is restricted by the relative paucity of historical work on the Soviet Union. Consequently, we focus largely on the United States (on which there is a

richer historical literature), but here too we are restricted by what historians have chosen to explore and elucidate.[10]

These caveats having been stated, this case study represents a rare historical moment when great powers seriously discussed strategies for avoiding an arms race in a new technology,[11] and where influential people within the state with the technological monopoly seriously considered giving up their monopoly. Furthermore, this historical episode took place between relatively modern great powers and at a time when U.S. elite and public culture was not entirely dissimilar to today's; for example, the media was important in informing the public and shaping its opinion on major events, politicians took public opinion into account when making policy decisions, interservice rivalry played a role in some policy decisions, and policymaking was done through a mix of committees, experts, career statesmen, and trusted advisors.

[10] There is new material appearing into the public domain at regular intervals, see for example David Holloway, "The Soviet Union and the Baruch Plan". https://www.wilsoncenter.org/blog-post/soviet-union-and-baruch-plan, accessed 13 June 2020. We use what we consider to be the latest and best historical work.

[11] The next best analogy may be efforts towards the international control of aviation. See Waqar Zaidi, "'Aviation Will Either Destroy or Save Our Civilization': Proposals for the International Control of Aviation, 1920-1945", *Journal of Contemporary History* 46,1 (2011), pp. 150-78.

2. Historical Overview

Summary

By the start of World War II, scientists around the world were aware that the construction of a bomb based on the release of atomic energy was theoretically possible. Britain was the first to start a concerted bomb program, joined soon after by the United States, Germany, Japan, and the Soviet Union. The German and Japanese programs did not progress far. Britain, faced with more pressing resource requirements, eventually paused its program and transferred its expertise into the Manhattan Project, joining the U.S. program as a junior partner. The Manhattan Project, begun in October 1941, led to a working bomb that was tested in July 1945. Atomic bombs were dropped on the Japanese cities of Hiroshima on August 6 and Nagasaki on August 9. Japan announced its surrender on August 15, and the signing of the formal surrender treaty on September 2 brought the Second World War officially to a close. The use of the atomic bomb led to an acceleration of the Soviet bomb project and a restart of the British project.

Even before the bomb was used, scientists expressed concern about its destructiveness and a possible arms race after the war. Senior Danish physicist Niels Bohr brought these concerns to the attention of British Prime Minister Winston Churchill in May 1944 and U.S. President Franklin D. Roosevelt in August 1944. By mid 1945, scientists working on the Manhattan Project also became concerned about the impact of atomic weapons and issued a series of warnings to the government. Many of the suggestions for dealing with the bomb called for the "international control of atomic energy" (that is, effective international regulation of atomic weapons and the underlying science and technology through multilateral agreements or an international organization). Various proposals for international control were made from late 1944 onwards. These became widespread after the atomic bomb was made public in August 1945, and by the end of the year, scientists had organized themselves into various groups calling for international control. State officials also, at times, considered adopting international control as policy, and there was discussion on atomic matters with the Soviet Union. In late December 1945, Stalin agreed to the formation of a United Nations Atomic Energy Commission to study the "control of atomic energy," and the United Nations General Assembly authorized its formation in January 1946.

In January 1946, Secretary of State James F. Byrnes authorized the formation of a committee (chaired by Under Secretary of State Dean Acheson and ex-Chairman of the Tennessee Valley Authority David Lilienthal) to study the international control of atomic energy. This committee in turn asked a group of consultants (led by prominent physicist J. Robert Oppenheimer) to prepare a policy proposal for international control for government consideration. The committee completed its detailed plan for international control, dubbed the Acheson-Lilienthal Report, in March 1946. The report was adopted, with important modifications, by the first U.S. representative to the newly formed United Nations Atomic Energy Commission (UNAEC), Bernard Baruch, who presented his so-called Baruch Plan at the UNAEC in June 1946. The Soviet Union, implicitly rejecting this plan, responded with its own proposal a few days later (the Gromyko Plan).

Subsequent negotiations with the Soviet Union were carried out amidst deteriorating relations between the superpowers and failed by the end of the year. In our assessment of this case, failure was overdetermined (see Section *Could International Control Have Succeeded*). There was a great divergence in U.S.-Soviet expectations and conflicting interests around the world. Mistrust had also been growing since early 1945. By mid 1946, the U.S. administration had given up whatever hope it had in international control and only carried out negotiations for propaganda purposes. The Soviet Union similarly was interested in the propaganda value of negotiations. It hoped to generate negative publicity for the U.S. and extract as much information as possible on the U.S. program. The final vote in the Security Council in December 1946 had 10 UNAEC votes in favor, and two abstentions (the Soviet Union and Poland); these abstentions were understood as an effective veto.

Both the U.S.'s and the Soviet Union's atomic programs continued unhindered whilst the negotiations were carried out. U.S. atomic bombs became more advanced and increased in size and number in the late forties. The Soviet Union eventually carried out its first atomic bomb test in August 1949, catching most U.S. intelligence and military planners by surprise. Stimulated by this, the United States developed the much more powerful hydrogen bomb, testing it in November 1952; the Soviet Union followed soon thereafter, in November 1955. Through these years, the quantity of atomic bombs, and then hydrogen bombs, increased exponentially, from less than 20 in 1947 to more than 100 in 1949 and to more than 10,000 by 1959 (see Figure 1).[12]

Alongside the development of nuclear arsenals came proliferation: Britain tested its first device in October 1952, France in February 1960, and China in October 1964. The nuclear arms race continued not just in quantity and geographical spread, but also through the invention of qualitatively new systems, like submarine launched missiles, MIRVs (multiple independently targetable reentry vehicles), battlefield nuclear weapons, and missile defense systems (anti-ballistic missiles and "Star Wars").

[12] Max Roser and Mohamed Nagdy, "Nuclear Weapons", *OurWorldInData.org* (2013). Retrieved from: https://ourworldindata.org/nuclear-weapons. Accessed 26 August 2020.

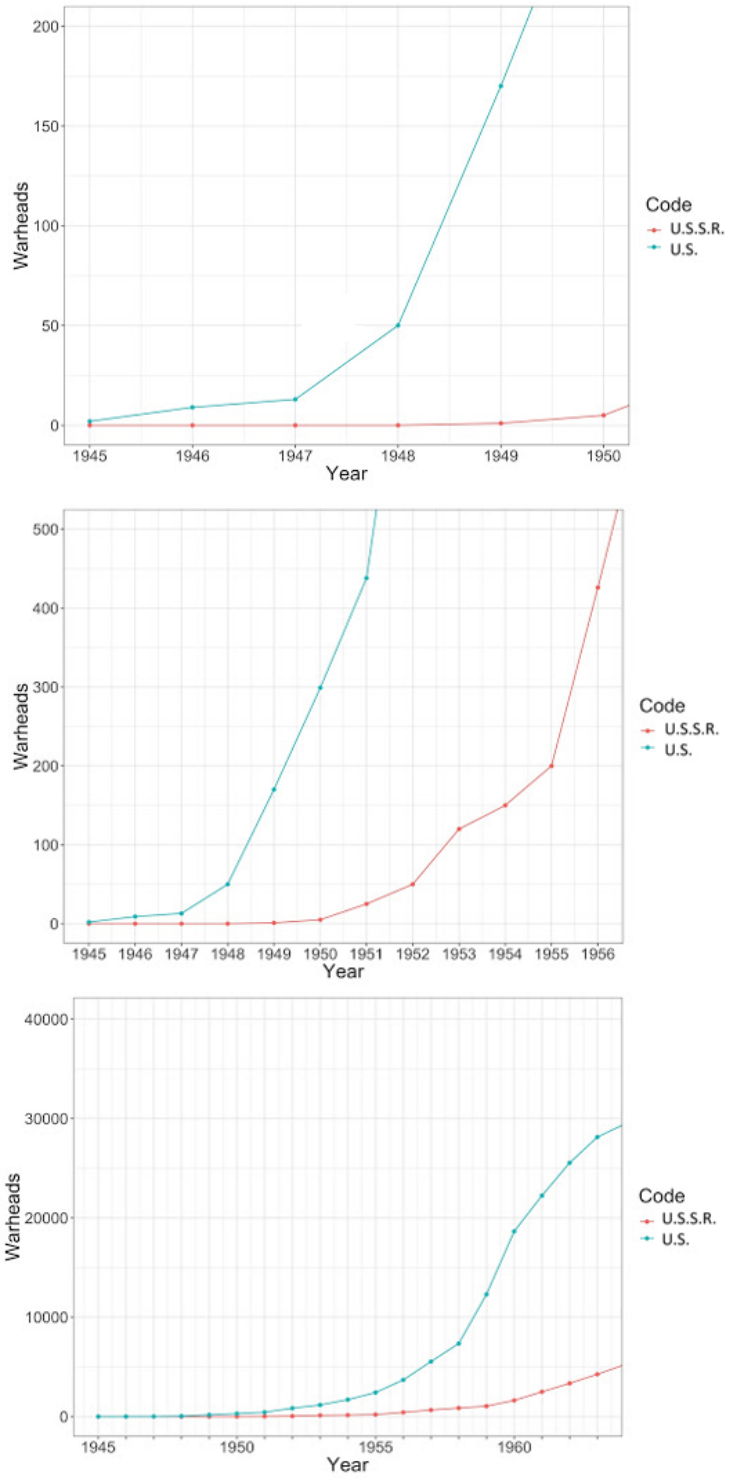

Figure 1. Nuclear warheads in the U.S. and U.S.S.R., at three temporal zoom levels spanning 1945–1963. Note that the y-axis scale increases by orders of magnitude between the figures. From: Max Roser and Mohamed Nagdy, "Nuclear Weapons", *OurWorldInData.org* (2013). Available at: https://ourworldindata.org/nuclear-weapons. Accessed 26 August 2020.

Key Dates

Dec 1941	President Franklin D. Roosevelt authorizes Manhattan Engineering District
Feb 1945	Yalta Conference
April 1945	Franklin D. Roosevelt dies
May 1945	Germany surrenders
June 1945	United Nations Charter signed in San Francisco
July 1945	Trinity Test; Potsdam Conference
August 1945	Hiroshima and Nagasaki bombed; Japan surrenders
October 1945	Military-backed May-Johnson Bill for the domestic regulation of atomic energy introduced in Congress
Dec 1945	Conference of Foreign Ministers in Moscow; The McMahon Bill for the domestic regulation of atomic energy introduced in Congress
Jan 1946	First session of the U.N. General Assembly
Feb-March 1946	Soviet spy ring; Long Telegram; U.S.S.R. missed deadline on Iran; Churchill's "Iron Curtain" speech
March 1946	Acheson-Lilienthal Report completed, and leaked
June 1946	Baruch Plan presented to the UNAEC
Dec 1946	Baruch Plan vote, 10 in favor and 2 abstentions (U.S.S.R., Poland)

For a detailed chronology, see Appendix A. For a brief biography of some of the key historical figures, see Appendix B.

3. Proposals for International Control: A Brief Summary

There were many proposals in the U.S. for international control between mid 1945 and mid 1946, articulated in varying degrees of detail. The most influential are noted below:

Niels Bohr's Proposals, July 1944

Senior Danish physicist Niels Bohr met British Prime Minister Winston Churchill in May 1944 and U.S. President Franklin D. Roosevelt in August 1944, suggesting to both that the U.S. inform the Soviet Union of its bomb project and begin negotiations on the international control of atomic energy. He laid out his ideas in the most detail in a memorandum prepared for Roosevelt, dated July 1944. It warned of a future arms race and suggested that international control was the only solution. Bohr emphasized the need for complete exchange of information, some "guarantee of common security," and international cooperation amongst scientists. He did not give any specifics as to how international control would operate, e.g., on stages, verification, disposal of current facilities and weapons, and raw materials.[13]

The Bush-Conant Memo, September 1944

Senior science policymakers Vannevar Bush (head of the U.S. Office of Scientific Research and Development) and James B. Conant prepared a policy suggestion on atomic energy for Secretary Henry L. Stimson in September 1944. They advised that other countries could catch up with the U.S. within four years. They suggested sharing scientific information with all countries; only manufacturing and military details were to remain secret. Excessive secrecy could lead to an arms race with the Soviet Union. It was not possible for the U.S. to monopolize raw materials going forward. Their only concrete suggestion for international control was free flow of scientific information and international inspections through an international organization.[14]

The Bush Plan, November 1945

Vannevar Bush presented his proposal for international control in a memorandum to Secretary of State Byrnes in November 1945. The proposal was significantly more detailed than earlier ones and emphasized, for the first time, a staged process, at the end of which the U.S. would give up atomic weapons. The stages were, first, the formation of a U.N. agency for the dissemination of scientific information, including free access for scientists to

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[13] Niels Bohr, *Niels Bohr's Memorandum to President Roosevelt* (July 1944). Available at: http://www.atomicarchive.com/Docs/ManhattanProject/Bohrmemo.shtml. Accessed 22 September 2018. On Bohr's activism, see Martin J. Sherwin, "Niels Bohr and the First Principles of Arms Control", in Herman Feshbach, Tetsuo Matsui, and Alexandra Oleson (eds.), *Niels Bohr: Physics and the World* (Abingdon: Routledge, 1998), pp. 319-30; Finn Aaserud, "The Scientist and the Statesmen: Niels Bohr's Political Crusade during World War II", *Historical Studies in the Physical and Biological Sciences* 30,1 (1999), pp. 1-47.

[14] Vannevar Bush and James B. Conant, "Memorandum" (30 September 1944). Available at: https://nsarchive2.gwu.edu//NSAEBB/NSAEBB162/1.pdf. Accessed 22 September 2018. Also: G. Pascal Zachary, *Endless Frontier: Vannevar Bush, Engineer of the American Century* (New York: Simon and Schuster, 2018), p. 243; James Hershberg, James B. Conant: *Harvard to Hiroshima and the Making of the Nuclear Age* (New York: Alfred A. Knopf, 1993), pp. 204-5.

basic research. Second came the establishment of a U.N. inspection system, with a gradual exchange of information on raw materials and facilities. This was to culminate with the sharing of the most practical and most secret atomic know-how. Nations were to agree to use such information for commercial purposes only. Finally, the U.S. was to convert its bombs to peaceful uses.[15] This plan was adopted by Byrnes (in a somewhat modified form) in December. Byrnes had formerly taken a more hawkish position on the bomb and the Soviet Union but accepted this cooperative approach after he realized that the U.S.'s atomic bomb was not helping in geopolitical negotiations with the Soviets.[16]

The Cohen-Pasvolsky Plan, December 1945

This was the official State Department plan, drawn up by a committee headed by State Department officials Benjamin Cohen and Leo Pasvolsky. The plan was accepted by Byrnes and presented to the Soviets in the December 1945 Moscow conference. The Cohen-Pasvolsky Plan was based on the November 1945 Bush Plan, but included one crucial change; although it emphasized stages, it added that the international control process could move onto the next stage without having completed the previous stage. The stages thus did not have to progress in a strict sequence.[17]

The Acheson-Lilienthal Plan, March 1946

The Acheson-Lilienthal Report set out a plan produced by a group of expert consultants (including the leading Manhattan Project physicist J. Robert Oppenheimer) for the State Department in March 1946. This was the single most detailed proposal for international control produced in the U.S. and was the basis (with crucial changes) for the official U.S. proposal—the so-called Baruch Plan—at the United Nations Atomic Energy Commission (UNAEC) a few months later.[18]

The Acheson-Lilienthal Plan was premised on the assumption that inspections were insufficient for international control. Instead, the U.N., through an Atomic Development Authority (ADA), was to control all fissionable raw materials and have a monopoly on all "dangerous" activities (i.e., those with military applications). States would shut down all dangerous activities, and all atomic material would be transferred to U.N. ownership. Peaceful development (R&D, power plants), however, could continue in states. The United States would begin a phased transition of its bombs, material, and facilities to the ADA, once set up. The U.S.

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[15] The Bush memo can be found at: United States Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945. General: Political and Economic Matters* Volume II (Washington, D.C., 1946), pp. 69-73. Available at: http://digicoll.library.wisc.edu/cgi-bin/FRUS/FRUS-idx?type=article&did=FRUS.FRUS1945v02.i0005&id=FRUS.FRUS1945v02&isize=M. Accessed 24 April 2019. For context, see Barton J. Bernstein, "The Quest for Security: American Foreign Policy and International Control of Atomic Energy, 1942-1946", *The Journal of American History* 60,4 (March 1974), pp. 1003-1044; Zachary, *Endless Frontier*, pp. 309-310.

[16] Herken, pp. 61, 71, 72.

[17] Herken, pp. 71-2. Memorandum, "Draft Proposals on Atomic Energy for Submission to Soviet Government" (10 December 1945), in United States Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945. General : Political and Economic Matters* Volume II (Washington, DC, 1946). Available at: https://history.state.gov/historicaldocuments/frus1945v02/d38. Accessed 22 April 2019.

[18] Chester I. Barnard, J. R. Oppenheimer, Charles A. Thomas et al., *A Report on the International Control of Atomic Energy* (Washington, D.C.: The State Department, 1946).

would *not* cease atomic operations prior to the setting up of the ADA. The plan placed significant emphasis on the cooperation of internationalist scientists working at the ADA.[19]

The ADA was the centerpiece of the Acheson-Lilienthal Plan. It was to set up large R&D centers and conduct research on peaceful and warlike uses of atomic energy. It would also have its own operational reactors. These reactors and other atomic facilities were to be spread across a number of (unspecified) countries in a "strategic balance among nations" so that in the event of a breakdown of the ADA (or the U.N. itself) there would be a "balance of facilities" across states. This, it was hoped, would reduce the fears of any one state that joining would undermine its security in the event of a diplomatic breakdown. The ADA would own and operate all mining, refining, and production of fissionable raw materials. Existing mines, plants, and factories (e.g., at Hanford and Oak Ridge) were to be transferred to the control of the ADA. It would dispense "denatured"[20] fissionable raw materials to individual nations for their nuclear power plants and license and inspect their (civilian) nuclear facilities.[21]

The Baruch Plan, June 1946

The Baruch Plan was developed by Bernard Baruch—a businessman and financier who was the U.S. representative on the UNAEC—between March and June 1946. The plan was adopted as official U.S. policy and presented at the UNAEC in June 1946.[22] It was based on the Acheson-Lilienthal Report but included some crucial changes that made the plan more hawkish and pro-business. There were likely several reasons for these changes. One might have been to help Baruch appear as the author of the proposal, rather than just a "messenger boy" for the Acheson-Lilienthal Report.[23] Another might have been to reduce the risk to the U.S. if the plan failed or the Soviet Union reneged. A third may have been to retain private sector autonomy in the nuclear industry.[24]

The central elements of the Baruch Plan were that it abolished the veto power of the Security Council in relation to atomic matters. It emphasized "immediate, swift, and sure punishment," including the possibility of atomic attack, on violators of the plan. The plan insisted on a survey of Soviet resources as a first step. This would have put the Soviets at a great disadvantage, as they would reveal secret information without the U.S. reciprocating at that point. This can be thought of as a "hidden U.S. veto" built into this international control process, because the U.S. would give up little in the initial stages and so could abort the process part way through with minimal downside. The plan de-emphasized the role of the Atomic Development Authority

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[19] Ibid., pp. 41-53.
[20] By "denatured" the plan meant fissionable raw materials which could not be used for "dangerous" purposes. In reality, this is not technically possible, but it was believed to be at the time.
[21] Ibid., pp. 41-53.
[22] "The American Proposal for International Control Presented by Bernard Baruch", *Bulletin of the Atomic Scientists* 1&2 (1 July 1946), pp. 3-5, 10. Also at: http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml. Accessed 22 April 2019.
[23] Herken, p. 160; Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War,* pp. 122-23.
[24] On Baruch's motivations, see Herken, pp. 163-164. On the hawkish nature of the plan, see Herken, pp. 169, 171. One alternative view is that Baruch explicitly designed his plan to be an "obvious propaganda ploy," see Shane J. Maddock, *Nuclear Apartheid: The Quest for American Atomic Supremacy from World War II to the Present* (Chapel Hill, NC: the University of North Carolina Press, 2010), p. 57.

(ADA) and instead shifted responsibility for mining and refining of fissionable materials to private industry. In the Acheson-Lilienthal Plan, all mining and refining was to be carried out by the ADA. In Baruch's plan, the ADA would only own/manage "activities potentially dangerous to world security"; the rest would only be inspected or licensed by the ADA.[25]

The Gromyko Plan, June 1946

This was the official Soviet counterproposal to the U.S. Baruch Plan. It was announced at the UNAEC by Soviet delegate Andrei Gromyko on 19 June 1946 as an implicit rejection of the Baruch Plan.[26] The plan focused on disarmament rather than controlling the raw materials or the scientific R&D behind atomic weapons. It called for a complete ban on atomic weapons, which were to be destroyed within three months of the treaty coming into force, and contracting parties were to agree not to make or use atomic weapons. Violations would be regarded as a "crime against humanity," and *penalties would be determined by domestic legislation*. The plan insisted that the Security Council veto apply to international control and all atomic matters (contra the Baruch Plan). It suggested the formation of two United Nations committees overseen by the Security Council: the first was to organize the exchange of atomic information and the second to ensure that the international agreement is followed. The requirement of early U.S. disarmament made this proposal completely unacceptable to the United States. However, it was the veto that was a focus of Baruch's opposition, even though it was probably strategically worthless since—in the event of breakdown—the only real sanction would be a threat of war.[27] Historians believe that Soviet Union itself did not expect this proposal to be accepted and only put it forward for propaganda reasons, and perhaps also to learn more about the U.S. atomic weapons program.[28]

[25] "The American Proposal for International Control Presented by Bernard Baruch", *Bulletin of the Atomic Scientists* 1&2 (1 July 1946) pp. 3-5, 10. Also at: http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml. Accessed 25 April 2019.
[26] "The Russian Proposal for International Control", *Bulletin of the Atomic Scientists* 2, no.1,2 (1 July 1946), pp. 8-10. Also available at: U.S. Department of State, *Documents on Disarmament* volume 1 1945-1956 (Washington, DC: Department of State, 1960), pp. 17-24.
[27] Herken, pp. 174-75.
[28] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War,* pp. 135-140.

4. Lessons

This section outlines some of the lessons we believe can be gleaned from the history of early attempts at international control of nuclear weapons. These lessons stress the complexity and messiness which has long been recognized as an inherent part of policymaking; nevertheless, we feel that pinpointing these lessons specifically in relation to powerful technologies makes them more salient for those thinking about such technologies today. The lessons begin with some aspects of the proposals before moving to consider some of the constituencies and processes that generated them. We then consider their likelihood of success and end with some consideration of cooperation and unilateral action. These lessons do not constitute a comprehensive or holistic overview of these proposals: for that we would point readers to the various historical studies on this topic (see References for a list and Introduction for a guide to the literature).

4.1 Serious Radical Proposals

Lessons

Radical proposals which would normally appear naive or extreme may, in the right circumstances, be seriously proposed, discussed, and even adopted as official policy. Two conditions are conducive to this. First, if the emergent technology is spectacularly disruptive, it can expand the realm of politically feasible policies. Second, a sense of rupture or crisis in international political affairs can make otherwise unrealistic proposals more acceptable and possible.

Historical Case

Proposals for international control of atomic energy were radical for their time. They proposed that states be bound by powerful and wide-ranging multilateral agreements and that powerful international organizations be created with the power to police such agreements. In both these senses, these proposals were much more radical than other serious (that is, taken up at the diplomatic level) discussions on international governance at the time. The United Nations charter, for example, did not create obligations on states as binding, or intrusive on national soil, as some envisaged in the Acheson-Lilienthal Report.[29] Similarly, no other armaments were subject to such proposals in the 1940s.[30]

The Acheson-Lilienthal Plan, for example, proposed that a powerful new U.N. Atomic Development Authority (ADA) would set up large R&D centers and conduct research on peaceful and warlike uses of atomic energy. It would own and operate all mining, refining, and production of fissionable raw materials—including having its own operational reactors—and dispense fissionable raw materials to nations for their nuclear power plants. It would also license and inspect operating civilian nuclear facilities in nation states.[31]

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[29] On international governance in the 30s and 40s (including the U.N. charter), see Mark Mazower, *Governing the World: The History of an Idea* (Penguin: New York, 2012), chapters 5 and 7.

[30] On the uniqueness of international control, see Patrick M. Morgan, "Elements of a General Theory of Arms Control", Robert E. Williams and Paul R. Viotti (eds.), *Arms Control: History, Theory, and Policy* (Santa Barbara, CA: Praeger, 2012), pp. 15-40.

[31] Chester I. Barnard, J. R. Oppenheimer, Charles A. Thomas et al., *A Report on the International Control of Atomic Energy* (Washington, DC: The State Department, 1946).

These proposals were taken seriously by many of their proponents and much of the public. There is every indication, for example, that the framers of the Acheson-Lilienthal Plan genuinely believed that their plan could work and that it was the most effective and realistic way of dealing with the problems of atomic energy.[32]

There are several conditions that allowed the Acheson-Lilienthal Report to gain traction. (1) The report was accepted because of a growing public and elite perception of the threat that atomic weapons posed. It was widely believed in late 1945 and 1946 that atomic weapons would be used in any future major war, wiping out cities and killing millions. T*he Bulletin of the Atomic Scientists*, for example, was set up to warn of the destructive effects of atomic weapons. At the same time, many believed that atomic energy offered cheap electricity and new types of medicines and agricultural products.[33] Publics and elites were amazed that an atomic bomb had been developed so fast and often assumed that this rapid pace would continue into the near future. Novels and futuristic magazine and newspaper articles contributed to these beliefs.[34] (2) The recent experience with an awful war increased public and elite receptiveness to radical political proposals. There was a sense that regular politics had failed, and more radical measures were required. (3) The need for postwar reconstruction and the growth of U.S. influence globally made possible new initiatives in international relations which were not possible before. The formation of the United Nations and other international organizations (e.g., the Bretton Woods system to manage the global economy) were widely welcomed.[35] (4) Scientists who worked on atomic matters generally threw their weight behind the Acheson-Lilienthal Report and formed powerful organizations that advocated for international control. Their status and newfound prominence gave their message traction in the media and in government.[36]

[32] Bernstein, "The Quest for Security"; Herken, pp. 155-58.
[33] On early fears and hopes about atomic energy in the U.S., see Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (New York: Pantheon Books, 1985), Parts 4 and 5; Paul Boyer, "A Historical View of Scare Tactics", *Bulletin of the Atomic Scientists* 42,1 (January 1986), pp. 17-19.
[34] Boyer, *By the Bomb's Early Light*, Parts 4 and 5.
[35] On U.S. internationalism during 1939-1945, see Robert A. Divine, *Second Chance: The Triumph of Internationalism in America During World War II* (New York: Atheneum, 1971).
[36] On their activism, see Alice Kimball-Smith, *A Peril and a Hope: The Scientists' Movement in America: 1945-47* (Chicago: The University of Chicago Press, 1965), chapters 5 to 12. See also later lessons in this report.

4.2 Differences and Changes in Views

Lessons

Groups or coalitions supporting (or opposing) international control will contain individuals who have different reasons and rationale for their support (or opposition). Their motivations will be on a spectrum from the cynical to the idealistic. Their views and strength of opposition (or support) may vary significantly over time. Individuals may take positions for short-term gain. Those thinking about governance of powerful technologies need to be aware that support and opposition may shift and be prepared for it. They need to build coalitions that encompass a broad range of agendas and approaches, and would benefit from a "political entrepreneur" to hold divergent views together, build consensus, and forge a way forward.[37]

Historical Case

Individuals Had Different Understandings about the Impact of the Atomic Bomb

On the one hand, some thought that the atomic bomb was a useful weapon of war. The U.S. army thought that nuclear weapons could play a significant, but not transformative, tactical role in slowing Soviet armies. The navy thought that the atomic bomb would be central to stopping a Soviet attack, and the air force eventually came to see it as a strategic weapon that could land a knockout blow (the "air-atomic strategy").[38] Ex-Prime Minister Winston Churchill thought that the atomic bomb could be used to keep the Soviet Union in check and assure U.S. and British domination of world affairs into the near future.[39] Yet others thought that it had transformed international relations and warfare in a negative way. These people believed it made wars more destructive and suicidal, and increased the likelihood that smaller aggressive nations (now armed with atomic weapons) would launch wars.[40]

Views Changed over Time

Key policymakers' opinions on international control shifted over time. In some ways, these shifts reflected broader shifts in opinion about the Soviet Union or the destructiveness of atomic bombs. Opinion was particularly fluid during the war. Secretary of War Henry L. Stimson, for example, advised President Roosevelt in December 1944 not to give atomic information to the Soviet Union without a "real quid pro quo," such as liberalization of domestic Soviet rule. In June 1945, he added that the quid pro quo could include international control, or a negotiated settlement over the fate of Eastern Europe. By the time of the first atomic bomb test in July 1945, Stimson had abandoned hope of simple cooperation with the Soviet Union and instead argued that the U.S. should force Soviet liberalization as a precondition for cooperation on the atomic bomb. By

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[37] For a review of the literature on political entrepreneurs, see J. Hogan and S. Feeney, *The Role of the Political Entrepreneur in the Context of Policy Change and Crisis,* Midwest Political Science Association Annual Conference, Chicago, April 14th 2013. Available at https://arrow.dit.ie/cgi/viewcontent.cgi?article=1015&context=buschgracon. Accessed 22 April 2019.
[38] Herken, pp. 202-04, 212. George W. Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford: Stanford University Press, 1996), pp. 287-88; Edward Kaplan, *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction* (Ithaca, NY: Cornell University Press, 2015), pp. 22-28.
[39] Barton J. Bernstein, "The Uneasy Alliance: Roosevelt, Churchill, and the Atomic Bomb, 1940-1945", *The Western Political Quarterly* 29,2 (June 1976), pp. 202-30; Graham Farmelo, *Churchill's Bomb: How the United States Overtook Britain in the First Nuclear Arms Race* (New York: Basic Books, 2013), p. 331.
[40] See, for example, Atomic Scientists of Chicago, *The Atomic Bomb: Facts and Implications* (Chicago: The Atomic Scientists of Chicago, 1946).

September, he had given up on a quid pro quo, recognizing how unlikely the Soviet Union was to make those concessions and having greater concern about the dangers of the atomic bomb. He reemphasized the imperative of international control and a proposed U.S.-U.K.-Soviet "covenant": that the Soviets refrain from atomic development, and in return, the West would share the peaceful applications of atomic energy and agree not to employ the atomic bomb. One of the reasons for Stimson's conversion to international control may have been his impending retirement; he presented his influential memorandum calling for international control at a Cabinet meeting in September 1945 just prior to his retirement. Stimson may have seen it as an ideal policy to pursue, potentially creating a legacy but with little personal risk to himself.[41] Other policymakers may have pushed for international control for similar reasons. Secretary of State Byrnes was demoted in December 1945, and that may have been a factor in him setting up a State Department Committee to look into international control as one of his final acts.[42] This suggests a potential lesson: look for officials near retirement or leaving office as candidates for enacting more idealistic policies, with path-dependent impacts.

Perceptions of Soviet threat continued to have a large impact on individuals' opinions into 1946. As the Soviet Union appeared to grow economically in the first half of 1946 and become more assertive in international affairs (especially in relation to Turkey), U.S. policymakers (including Byrnes and Truman) came to increasingly see cooperation as impossible.[43] The famous "Long Telegram," sent to the State Department in February 1946 by George F. Kennan, the chargé d'affaires at the United States Embassy in Moscow, typified this repositioning.[44] This shift reduced willingness to negotiate on international control and led senior policymakers to increasingly see international control negotiations as only useful for propaganda purposes. Policymakers also responded to growing public concerns over Soviet spying. Truman, for example, refused to support civilian control of atomic energy following a spy scandal in February/March 1946. He instead bent to public opinion, which increasingly preferred a strong military role in controlling atomic energy domestically.[45] By the middle of 1947, even previously strong supporters of international control gave up on it, having decided that the Soviet Union could not be trusted or negotiated with. Oppenheimer, for example, met Baruch's replacement as the U.S. delegate on the UNAEC, Frederick Osborn, specifically to request that the U.S. withdraw from atomic control negotiations.[46]

Building a Coalition of Support from Differing Constituencies was Important

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[41] Herken, pp. 14, 16, 19, 24-7, 29-31. Sean L. Malloy, *Atomic Tragedy: Henry L. Stimson and the Decision to Use the Bomb Against Japan* (Ithaca, NY: Cornell University Press, 2008), pp. 110-12, 145-53.
[42] Herken, pp. 92, 97, 98; Lieberman, *The Scorpion and the Tarantula,* pp. 234-5.
[43] Herken, pp. 139-40; John Lewis Gaddis, *The Cold War*, pp. 28-9; Fernande Scheid Raine, "The Iranian Crisis of 1946 and the Origins of the Cold War" in Melvyn P. Leffler and David S. Painter (eds.), *Origins of the Cold War: An International History* 2nd ed. (New York: Routledge, 2005), pp. 93-111; and Eduard Mark, "The Turkish War Scare of 1946," in ibid., pp. 112-33.
[44] John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy during the Cold War* 2nd edition (New York: Oxford University Press, 2005), pp. 53-4. The "Long Telegram" was an influential note written by Kennan arguing that Soviet policy was inherently expansionist and based on a neurotic view of world affairs. He argued against cooperation with the Soviet Union.
[45] Herken, pp. 135-36.
[46] Joseph I. Lieberman, *The Scorpion and the Tarantula: The Struggle to Control Atomic Weapons 1945-1949* (Boston: Houghton Mifflin Company, 1970), pp. 390-91.

Individuals and initiatives that built support from a range of constituencies and viewpoints were more likely to succeed. The Acheson-Lilienthal Report gained traction not only because it was sponsored by the State Department, but because it had the power and prestige of its committee members behind it, who represented a range of different interests. These included the liberal New Dealer David Lilienthal (former head of the TVATennessee Valley Authority), Under Secretary of State Dean Acheson (who had the support of much of the State Department), and J. Robert Oppenheimer, who carried with him the support of the Atomic Scientists' Movement. Early attempts at international control by Secretary of State Byrnes (in late 1945), on the other hand, had failed because he had excluded certain powerful, but skeptical, congressmen. They felt slighted that he had not shared policymaking with them, and so undermined his policy initiatives.[47]

[47] Lieberman, *The Scorpion and the Tarantula*, pp. 270-72; Kimball-Smith, *A Peril and a Hope*, pp. 461-62; Herken, pp.74-87.

4.3 Cautious or Cynical Cooperators

Lessons

Schemes for international governance can garner support from "realists," understood here as policymakers who believe in the primacy and inevitability of power politics and who focus first and foremost on national interest.[48] Their support, though often cautious or cynical, can be crucial, but it can also be fickle.

Historical Case

Although realists were disturbed by the implications of atomic weapons, they did not see them as fundamentally changing the world or international relations. Realists tended to believe that cooperating on the control of nuclear weapons was futile and, in any case, best done from a position of strength. They tended to not perceive a nuclear arms race as particularly dangerous, especially compared to the dangers from making oneself vulnerable through steps towards international control. Such steps could be dangerous for the U.S. because they could lead to the diffusion of capabilities and could undermine the country's resolve to resist Communism. They thus concluded that the U.S. should continue with atomic weapons development.[49] In a (realist) analysis of atomic weapons presented to Congress in January 1946, the former head of the Manhattan Project Leslie Groves presented only two alternatives for the U.S.: "Either we must have a hard-boiled, realistic enforceable world agreement ensuring the outlawing of atomic weapons or we and our dependable allies must have an exclusive supremacy in the field." It was clear to him that if "there are to be atomic weapons in the world, we must have the best, the biggest and the most."[50]

The realist commitment to the U.S. atomic arsenal was bolstered by their belief that the Soviet Union would not be able to build an atomic bomb for many years. Groves, for example, gave various estimates but, from November 1945 onwards, usually said twenty years.[51] The high financial costs of the Manhattan Project and the scientific, technological, industrial, and organizational hurdles the United States had to overcome in order to build the bomb led many to believe that, even in the best of circumstances, it would take the Soviet Union much longer to achieve this feat.[52] Even if the Soviet Union managed to develop atomic bombs, many believed that the U.S. could remain ahead in atomic weapons R&D, production, deployment, and delivery over the coming decades. Moreover, the Soviet economy appeared to be in no shape to take the burden of an expensive atomic program. It was suffering from wartime devastation, overburdened with the costs of the occupation of Eastern Europe, and had an economy still tuned to the production of (conventional) military forces.[53] In addition, Groves believed that the U.S. and its allies could monopolize nuclear fuel, thus delaying or stopping the Soviet atomic program altogether, and he worked hard to achieve this. This belief appeared to be important for his confident assertions that the Soviets would not soon get atomic weapons, but he did not share it because he regarded the U.S.'s monopolization efforts as a state secret.[54]

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[48] For definitions of realism and realist dispositions, see Donnelly, *Realism and International Relations*, pp. 6-13.
[49] Zachary S. Davis, "The Realist Nuclear Regime", *Security Studies* 2,3-4 (1993), pp. 79-99.
[50] Herken, p. 112.
[51] Gordin, *Red Cloud at Dawn*, p. 70.
[52] Herken, p. 231; Gordin, *Red Cloud at Dawn*, pp. 70-1.
[53] Herken, p.138.
[54] In a September 1944 report, for example, Groves predicted that the U.S., through the Combined Development Trust, could control 90% of the world's high-grade uranium ore by the war's end. Herken, pp. 101-02. In December 1945, Groves claimed that the Trust controlled 97% of the world's uranium output and 65% of the world's supply of thorium, see Holloway, *Stalin and the Bomb*, p. 174. Also: Charles A. Ziegler, "Intelligence Assessments of Soviet Atomic Capability,

Lastly, the Soviet Union economy appeared to U.S. policymakers to be in no shape to pose a challenge to U.S. interests. The country, they reasoned, was suffering from wartime devastation, overburdened with the costs of the occupation of Eastern Europe, focused on postwar reconstruction, and still tuned to the production of (conventional) military forces.[55]

While realists represented only a minority of the elites in favor of international control, their support was disproportionately important, as they were often powerful individuals, embedded high in the state, with strong influence on policy. However, while they supported international control, they were not *strongly* committed to it. They had, at best, a weak preference for it and quickly abandoned it as circumstances changed. Examples include Bernard Baruch and perhaps even President Truman himself. Baruch was picked by Truman to shape the U.S. proposal on international control and present it at the United Nations Atomic Energy Commission (UNAEC). Baruch quickly abandoned hope for international control once negotiations stalled. Historians now believe that he was only weakly committed to it, if at all.[56] The extent of Truman's commitment to international control in early 1946 is unclear, but he was certainly attracted to the idea and interested enough to allow for a U.S. proposal to be formulated and placed before the UNAEC. What is clear, however, is that he quickly lost interest by mid 1946 once he became convinced that aggressive Soviet foreign policy could not be met with concessions.[57]

There were a number of reasons for why realists thought that international control would support their objective to maximize U.S. power in international affairs:

(1) By supporting a policy that was popular amongst the public, they hoped to boost their own popularity. They wanted to be seen addressing public concerns about atomic weapons. Carrying out negotiations, they calculated, would be enough to meet this concern. If negotiations failed, they hoped to place the blame on the Soviet Union, thus highlighting the Soviet Union as, at best, an unreliable partner in international affairs, and at worst, a threat to U.S. security.[58]

(2) Some supported international control for administrative political reasons. One of the reasons why Secretary of State Byrnes formed a committee of consultants to look into international control in

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1945-1949: Myths, Monopolies and Maskirovka", *Intelligence and National Security* 12,4 (1997), pp. 1-24; Gordin, *Red Cloud at Dawn*, pp. 72-74; Jonathan E. Helmreich, *Gathering Rare Ores: The Diplomacy of Uranium Acquisition, 1943-1954* (Princeton, NJ: Princeton University Press, 1986), pp. 248-9.

[55] Herken, p.138. Carl Shulman has pointed out that this conclusion is in some ways surprising given that the GDP of the Soviet Union at that time was roughly 14 times the cost of the Manhattan Project. This is calculated by taking the estimated GDP of the Soviet Union in 1946 (this is a rough estimate, and no reliable figure for 1945 is available) as USD 664.646 billion (in 2011 USD from the Maddison Project Database 2018 at https://www.rug.nl/ggdc/historicaldevelopment/maddison/, accessed 28 May 2020) and the cost of the Manhattan Project as USD 1.889 billion (in 1942–1945 dollars, from Stephen I. Schwartz, *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, DC: Brookings Institution Press, 1998), p. 60). Converting the latter figure to 2011 dollars using https://www.measuringworth.com/calculators/uscompare/ gives a Manhattan Project cost figure (using a production worker compensation inflator) as USD 48.4 billion.

[56] Maddock, *Nuclear Apartheid*, chapter 3.

[57] Herken, pp. 139-40, 175. S. David Broscious, "Longing for International Control, Banking on American Superiority: Harry S Truman's Approach to Nuclear Weapons", in John Lewis Gaddis et al (eds.), *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945* (Oxford: Oxford University Press, 1999), pp. 15-38. On Truman's growing confrontational stance towards the Soviet Union, see Gaddis, *The Cold War*, pp. 28-9; Raine, "The Iranian Crisis of 1946 and the Origins of the Cold War"; Mark, "The Turkish War Scare of 1946".

[58] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, p. 130. See also: Public Sphere lesson.

January 1946 was that he wanted to retain atomic foreign policymaking and expertise within the State Department, rather than to lose it to Congress or some other state entity.[59]

(3) Some may have believed that the official U.S. proposal, the Baruch Plan, was designed to safeguard U.S. national security interests in that it included the maximum possible concessions that the U.S. could make without jeopardizing its security. They consequently supported it because it was not only the best possible international control plan but also because it mitigated enough risk for the U.S. to be acceptable. Bernard Baruch and his negotiators, historians largely conclude, did not try harder to reach an agreement with the Soviets for this very reason. Baruch and his associates believed that the plan was the best that the U.S. could offer, and preferred a no-deal scenario that would still leave the U.S. in a dominant position in atomic weapons for decades to come.[60]

[59] Herken, p. 97; Lieberman, *The Scorpion and the Tarantula,* pp. 234-5.
[60] Maddock, *Nuclear Apartheid*, chapter 3.

4.4 Secrecy and Security

Lessons

Secrecy and security will play a central role in any discussion on the governance of powerful technologies. They can have a significant effect on the possibility of international cooperation as well as on intrastate power struggles. They can give tremendous power to individuals and state institutions (such as the military) which control the flow of information and, in particular, can be used to undermine opponents. Secrecy can be terrible for epistemics, undermining competent organizational deliberation. Secrecy is often antithetical to cooperation and trust, in part because the public and actors who are outside secret access are often more in favor of cooperation and trust.[61] Secrecy can be used to empower narratives of fear and belligerence.

Policymakers need to carefully weigh decisions to expand secret domains. They need to make sure such decisions are counterbalanced within institutions and that a wide range of perspectives are used to inform policymaking. This will reduce the risks of corruption and abuse as well as decision-making from an overly narrow perspective. Policymakers also need to be wary of arguments that warn of imminent security threats. Such narratives can easily lead to increased secrecy. Policymakers should obtain a wide range of views so as to get better quality information and make informed decisions. They should also ensure that technical experts are involved in key strategic decisions.

Historical Case

Appeals to the security of the United States and warnings of imminent security threats were an intrinsic part of debates over international control of atomic energy. These were not constant but waxed and waned in intensity and influence. One major drop in public and elite support for international control (and civilian control of domestic atomic energy) occurred due to the sensational revelation of Soviet "atomic spies" in February 1946. The Soviet Union increasingly did not appear to be reliable allies and, instead, were seen as having malign intent and a growing atomic bomb program.[62]

More specifically, secrecy gave tremendous power to those who controlled the flow of information, notably Leslie R. Groves (the head of the Manhattan Project).[63] Groves accrued power and responsibility for himself by taking advantage of his privileged access to information and his ability to demarcate the boundaries and hierarchies of secrecy. He began with responsibility for building the plants and factories to make atomic fuel. This evolved into responsibility for scientific research, weapon design, and atomic security, intelligence, and counterintelligence. He was also eventually involved in high-level policymaking on both domestic and

[61] Note that, in some cases, secrecy can permit cooperative gestures that a hawkish/nationalistic public would punish (especially if unsuccessful) and can allow for collusion to prevent escalation. Counterexamples include outreach in the style of Nixon to China, the Oslo Accords, and preventing escalation from Soviet-US conflict in Korea. A. Carson "Facing Off and Saving Face: Covert Intervention and Escalation Management in the Korean War", *International Organization* 70,1 (2016), pp. 103-31. Also: Allison Carnegie and Austin Carson, "The Disclosure Dilemma: Nuclear Intelligence and International Organizations", *The American Journal of Political Science* 63,2 (2019), pp. 269-285.

[62] Herken, pp. 127, 132, 136; Gregg Herken, "'A Most Deadly Illusion': The Atomic Secret and American Nuclear Weapons Policy, 1945-1950", *Pacific Historical Review* 49,1 (February 1980), pp. 51-76; Kimball-Smith, *A Peril and a Hope*, pp. 373-5, 387-8; Hogan, *A Cross of Iron*, p. 238.

[63] On Groves' "compartmentalization' strategy see: Sherwin, *A World Destroyed*, pp. 58-62.

international issues, and in the planning and execution of the atomic bombing missions.[64] Using his privileged access to secret information, Groves was able to win arguments with adversaries by pointing to their ignorance, e.g., about the duration of the U.S. monopoly.[65] He was able to avoid his policies being questioned, e.g., by Congress. Even his collaborators found themselves pulled along by Groves' faits accomplis.[66] He discredited others as being uncareful with secret information or even being treasonous. He did this with Niels Bohr, J. Robert Oppenheimer, Leo Szilard, and David Lilienthal.[67] Groves used his access to secret information to shape policymaking by recommending his "technical advisors" for key decisions. For example, he almost scuttled Lilienthal's consultant group on international control by recommending his technical advisors instead.[68] Groves also used his privileged access to directly influence key policymakers such as Truman. Truman's belief in early 1946 that the U.S. would have a long-lived atomic monopoly was due directly to Groves' arguments and influence.[69] Groves was also able to shape public opinion and whip up public and policymaker concern over security and spying.[70]

Secrecy led to poor information flow and so to bad decision-making. Two examples of this are especially prominent. First, Groves imposed his view of the duration of the U.S. atomic monopoly on the U.S. government by preventing reasoned debate. In late 1944 and early 1945, Vannevar Bush, James B. Conant, and Leo Szilard—who disagreed with Groves and believed that the Soviet Union could access high-grade uranium ore and so build an atomic bomb relatively quickly—were stifled through secrecy regulations (specifically the silo information structure within the Manhattan Project).[71] Groves's views also carried significant weight with the public. One historian has noted that "Groves's predictions carried more weight with the public than anyone else's, precisely because he was the individual expected to have the largest amount of secret information upon which to base an estimate. Few challenged him directly...."[72]. Second, information on atomic bomb production and stockpiles was such a closely guarded secret within the military that parts of the military concerned with atomic weapon use were denied crucial information. War plans were created in 1945, 1946, and 1947, for example, with little understanding of the size of the U.S. atomic arsenal and its deliverability, or based on inaccurate estimates of its size. Staff officers drawing up plans did not even know for certain how they were allowed to use atomic weapons. One January 1946 plan from the Joint War Plans Committee designated 17 Soviet cities as targets for which it assumed the Air Corps would require 98 atomic bombs plus 98 in reserve,

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[64] According to Groves' biographer, security through compartmentalization was the "secret of Groves's power." Robert S. Norris, *Racing for the Bomb: The True Story of General Leslie R. Groves, the Man behind the Birth of the Atomic Age* (Hanover, NH.: Steerforth Press, 2002), pp. xiii, 11, 185. Also Herken, pp. 110-11.
[65] Herken, pp. 109-10; Michael Gordin, *Red Cloud at Dawn: Truman, Stalin, and the End of the Atomic Monopoly* (New York: Farrar, Straus and Giroux, 2009), pp. 73-5; Charles A. Ziegler and David Jacobson, *Spying Without Spies: Origins of America's Secret Nuclear Surveillance System* (Westport, CT: Praeger, 1995), pp. 24-5.
[66] Norris, *Racing for the Bomb*, p.14.
[67] Herken, p. 242; William Lanouette and Bela Silard, *Genius in the Shadows: A Biography of Leo Szilard, the Man Behind the Bomb* (New York: C. Scribner's Sons, 1992), p. 310; Michael J. Hogan, *A Cross of Iron: Harry S. Truman and the Origins of the National Security State* (Cambridge: Cambridge University Press, 2000), p. 244, 258.
[68] Herken, p. 154.
[69] Herken, p. 99; Ziegler, "Intelligence Assessments of Soviet Atomic Capability, 1945-1949"; Ziegler and Jacobson, *Spying Without Spies*, pp. 24-5.
[70] Herken, p. 273. Particularly during the Soviet spy scare of February 1946; see Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp. 121-22; Reginald Whitaker, *Cold War Canada: The Making of a National Insecurity State, 1945-1957* (Toronto: University of Toronto Press, 1994), p. 93; Hogan, *A Cross of Iron*, p. 258.
[71] Herken, p. 110-11; Gordin, *Red Cloud at Dawn,* pp. 75-8.
[72] Gordin, *Red Cloud at Dawn*, p. 75.

giving a total of requirement of 196. At the end of 1946, the actual number of bombs in U.S. possession was around 7! Moreover, none of the bases from which the atomic strikes were to be launched were equipped with atomic weapons loading pits or atomic storage facilities. The Joint Chiefs of Staff even officially complained that they were denied access to intelligence collected and held by Groves. This led to significant disagreement and inconsistency between various military plans on the use of atomic weapons.[73]

Secrecy led to a poor public understanding of damage to civilian populations from atomic warfare. In one fall 1945 public hearing, Groves' casual comment that an atomic war would "only" lead to 40 million U.S. casualties shocked the audience.[74] Some policymakers saw benefit in hiding the destructiveness of the atomic bomb from the public. One later Joint Chiefs report noted that "A situation dangerous to our security could result from impressing on our own democratic peoples the horrors of future wars of mass destruction while the populations of the 'police' states remain unaware of the terrible implications."[75]

Concerns over the possible loss of the "atomic secret," driven by reports of Soviet spies in February 1946, empowered narratives of fear and hawkishness. Without fuller information, it was easier for the public to panic about security risks. In such an atmosphere, those possessing top secret clearance (especially Groves) were empowered. In an atmosphere of increased security consciousness, it was easier for the military and its supporters to gain backing for their views on atomic technology.[76] It also reduced support for international cooperation on the atomic bomb amongst the public, and even scientists reduced their support for international control as rumors circulated that the House Un-American Activities Committee was to investigate Oak Ridge scientists for security threats.[77] Secrecy may have contributed to the lack of trust between the U.S. and the Soviet Union, and possibly also between the U.S. and Britain. It also led to tensions between Groves and the civilians and scientists working on atomic policy, who resented his control over atomic information and his use of secrecy to win arguments.[78]

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[73] Herken, pp. 199-200, 219-20, 229; Steven T. Ross, *American War Plans 1945-1950* (New York: Routledge, 2013), pp. 12-17; Ziegler, "Intelligence Assessments of Soviet Atomic Capability". The January 1946 plan is noted in Ross, *American War Plans*, pp. 16-17. On the number of atomic bombs, see John M. Curatola, *Bigger Bombs for a Brighter Tomorrow: Strategic Air Command and American War Plans at the Dawn of the Atomic Age, 1945-1950* (Jefferson, NC: MacFarland, 2016), pp. 53.

[74] Herken, p. 222.

[75] Herken, p.221.

[76] Herken, pp. 127, 132, 136; Gregg Herken, "'A Most Deadly Illusion': The Atomic Secret and American Nuclear Weapons Policy, 1945-1950", *Pacific Historical Review* 49,1 (February 1980), pp. 51-76; Hogan, *A Cross of Iron*, p. 238. There are echoes of this in current day concerns over Chinese cyberespionage in the U.S. See, for example, Samm Sacks, "The Ripple Effects of the China Chip Hacking Story", *War on the Rocks* (17 October 2018). At: https://warontherocks.com/2018/10/the-ripple-effects-of-the-china-chip-hacking-story. Accessed 24 April 2019.

[77] Kimball-Smith, *A Peril and a Hope*, pp. 373-5, 387-8.

[78] On the relationship with Britain see Herken, pp. 36, 58, 61-3, 103-05, 146-47. On scientists' concerns with the military's secrecy on atomic matters, see Kimball-Smith, *A Peril and a Hope*, pp. 242-361.

4.5 Public Sphere

Lessons

The public sphere will have a powerful impact on debates on international control. Political and policymaking elites will be sensitive to large shifts in public opinion, which will (for example) influence their political prospects. They will seek to mobilize public opinion in support of their preferred policies. Public opinion on this issue is malleable and can be shaped in support of or against particular policies, people, institutions, or countries.

Although elite opinion remains paramount, participants in debates on international control benefit from harnessing the power of the public sphere and shaping public opinion. They should run publicity campaigns, make arguments that would appeal to the public, and garner support from individuals and groups with high public profiles.

Historical Case

In relation to the international control of atomic energy, although elite opinion was paramount, policymakers nevertheless were influenced by and reacted to public opinion.[79] Domestic pressures, for example, forced Truman to commit the U.S. to the principle of international control before Secretary of State Byrnes had even attempted to extract a quid pro quo from Moscow in late 1945.[80] Public concerns over the safety of the "atomic secret" and Soviet spies led Truman to maintain higher secrecy around atomic operations than might otherwise have been ideal.[81] Alternatives to international control, such as the concept of an "atomic league," were not fully explored as they emphasized preventive war, which was out of favor with the public.[82] Baruch became obsessed with even the smallest shift in public support for his proposals during UNAEC negotiations in September 1946.[83] Policies were sometimes vaguely stated in order to satisfy the public: NSC-30, the "Policy on Atomic Warfare" released at the end of 1948, for example, avoided the issue of first use of atomic weapons in order to not upset public opinion.[84] Baruch and his advisory team, when they heard of Soviet delegate Andrei Gromyko's rejection of the Baruch Plan in June 1946, did not want to openly reject the Soviet counterproposal (the so-called "Gromyko Plan") so early in the negotiations but nevertheless wanted to signal their rejection. They thus leaked a series of stories to the press from "anonymous but reliable sources" that the U.S. delegation could not accept the Gromyko Plan.[85]

Elites shaped public opinion in their favor, using press releases, briefings, and publications. Groves, for example, may have been the confidential source cited by news reports that broke sensationalist news of Soviet spies

[79] Another example of the influence of public opinion on nuclear arms control policymaking is James Cameron, *The Double Game The Demise of America's First Missile Defense System and the Rise of Strategic Arms Limitation* (New York: Oxford University Press, 2017).
[80] Herken, p. 52.
[81] Herken, p. 136; Hogan, *A Cross of Iron*, p. 238.
[82] Herken, p. 265.
[83] Herken, p. 179-80.
[84] Herken, p. 268; Steven Miller, *Strategy and Nuclear Deterrence: An International Security Reader* (Princeton, NJ: Princeton University Press, 1984), p. 123.
[85] Lieberman, *The Scorpion and the Tarantula*, p. 311.

operating in Canada and the United States in February 1946. These news stories increased support for the May-Johnson Bill, which advocated military control of atomic energy policy.[86]

Public opinion was not uniform or entirely coherent. It sometimes contained views that were in tension with one another. For example, surveys in September 1945 revealed that ~70% of citizens did not want to share the secret of the atomic bomb with other countries. At the same time, however, 90% thought that the U.S. would not be able to keep the secret for long anyway and other countries would soon build the bomb.[87] Polls in October 1945 showed 17% support for international control through the U.N. Security Council, but 67% support for "England, Russia, France, [the] United States, China, and other countries" to "get together to agree that atomic bombs should never be used as a war weapon."[88] A 1947 poll showed that a majority believed that atomic bombs made war less likely but were also willing to initiate an atomic war.[89] The public had erroneous technical beliefs, such as that, by October 1947, ~60% of the public surveyed "thought that Russia was manufacturing atomic bombs in quantity"; ironically, while the public was very mistaken here, they were comparably mistaken but in the opposite direction as the most informed expert, General Groves.[90]

[86] Groves would himself later discount the effectiveness and importance of this spying. Herken, p. 130-33. There is a possibility that the source was in the FBI (perhaps the Director himself, J. Edgar Hoover) or from within the Justice Department; see: Ellen Schrecker, *Many Are the Crimes: McCarthyism in America* (Princeton, NJ: Princeton University Press, 1999), p. 170; Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp. 121-22.
[87] Herken, p. 32.
[88] Hadley Cantril, *Public Opinion 1935-1946* (Princeton, NJ: Princeton University Press, 1951), p. 22.
[89] Herken, p. 311.
[90] Herken, p. 232.

4.6 Technical Experts

Lessons

Technical experts and specialists (scientists, engineers, technicians, academics) have significant power to shape proposals and policy to be more effective and more cooperative, though their influence depends on their political sophistication.

Technical experts should be given a central role in drafting proposals, policymaking, and public engagement. Experts should invest time in understanding the political landscape and identifying political allies; their most important contribution to the problems of powerful technologies may be from their shaping of political discussions, rather than marginally more scientific or academic work.

Historical Case

From 1944 to 1946, atomic scientists played a central role in proposals for international control. They were leading advocates, passionate and committed. They were some of the first to warn of the dangers of atomic energy, they formed advocacy groups and raised funds for their activism, and they carried out public engagement to explain atomic energy and warn of its dangers. They played an important role in providing information and advice to elites and to the public, with whom they garnered enormous respect, authority, and credibility.[91] Foremost amongst them was J. Robert Oppenheimer (head of the Los Alamos laboratory during the war), who was considered a national hero, the "father of the atomic bomb," and made the cover of *Time* magazine in November 1948.[92] Scientists were also central in shaping proposals. The Acheson-Lilienthal Report was drafted largely by Oppenheimer, who brought into it many of the ideas of the Atomic Scientists' Movement.[93]

Scientists also provided technical and strategic insights for elites. Leo Szilard, for example, lobbied hard to convince the U.S. government that they needed to start an atomic bomb program in 1939.[94] James B. Conant, Oppenheimer, and Vannevar Bush had significant input on atomic policymaking during the war. The wartime "Scientific Advisory Panel" (staffed by scientists Oppenheimer, Ernest Lawrence, Enrico Fermi, and Arthur H. Compton) was instrumental in determining how the atomic bomb would be used.[95] In 1944 and 1945, other scientists informed policymakers of the strategic implications of atomic weapons in reports and memos. Many

[91] On their activism, see Kimball-Smith, *A Peril and a Hope*, chapters 5 to 12. Historian Jessica Wang has summarized their impact thus: "Despite their individual anonymity, the atomic scientists soon established a powerful presence in American political life. They appealed directly to the public through a long series of media interviews, articles, radio addresses, and public speaking engagements in which they discussed both the specific legislation at hand and the general political and social implications of atomic energy...Between October and December 1945, some thirty-odd scientists went to Washington, where, in a whirlwind of social and political activity, they built influence in excess of their numbers." Jessica Wang, *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (Chapel Hill, NC: University of North Carolina Press, 1999), p.16.

[92] Kai Bird and Martin J. Sherwin, *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer* (New York: Vintage Books, 2006), xi.

[93] Herken, pp. 155-58.

[94] Barton J. Bernstein, "Scientists and Nuclear Weapons in World War II", in Thomas W. Zeiler and Daniel M. DuBois (eds.), *A Companion to World War II* volume 1 (Oxford: Wiley-Blackwell, 2013), pp. 516-48.

[95] Ibid.

of these warned that there could be an arms race, that there was no such thing as an "atomic secret" that could be kept, and that the Soviets would acquire the atomic bomb within a few years. These warnings turned out to be more accurate than Groves' predictions on when the Soviet Union would get the atomic bomb.[96] Scientists also played a key role in the development of monitoring technologies and strategies in the late 40s.[97]

The most detailed proposal for international control, the Acheson-Lilienthal Plan, could not have been drawn up without the participation of a scientist. Others working on the plan knew very little, if anything at all, about the workings of atomic energy or the atomic bomb. Because of his technical expertise, Oppenheimer took the lead in educating other committee members about atomic energy and then in drafting the plan.[98] He was uniquely able to suggest potential technical developments (such as separability and denaturing) to ease the problems inherent to international control.[99]

On the other hand, scientists were sometimes perceived as naive, especially by politicians and diplomats. Scientists (especially those in the Atomic Scientists' Movement or supporters of world government) were often derided for their idealistic views and lack of understanding of the politically possible. Prominent State Department official George Kennan, for example, reported back to the State Department in August 1946, following meetings with members of the Atomic Scientists' Movement, that "[p]olitically, these people are as innocent as six-year-old maidens. In trying to explain things to them I felt like one who shatters the pure ideals of tender youth."[100] Einstein's calls for world government in 1947/48 (which included international control of nuclear weapons) were similarly derided by the State Department as "naive… The man who popularized the concept of the fourth dimension could think in only two of them in consideration of World Government."[101] After a meeting in October 1945, Oppenheimer was described by Truman as a "cry-baby scientist" who had come to his office and "spent most of his time wringing his hands and telling me they had blood on them because of his discovery of atomic energy."[102]

Scientists were also vulnerable to the criticism that they were a security threat. This was due largely to their openness, their international connections and communications (for example with Eastern bloc scientists), and their (generally) progressive politics. One of the earliest calls for international control, by Danish physicist Niels Bohr to Winston Churchill and Franklin D. Roosevelt in 1944, was met with the response from Churchill that

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[96] For example, through the June 1945 Franck Report and the November 1944 Jeffries Report: Kimball Smith, *A Peril and a Hope,* pp. 19-24, 41-8.
[97] Gordin, *Red Cloud at Dawn,* pp. 189-213.
[98] Bird and Sherwin, *American Prometheus,* p. 341.
[99] Oppenheimer suggested that a new technique called isotopic denaturing could be used to prevent misuse of uranium reactor fuel for nuclear weapons. Isotopic denaturing meant the addition of a different isotope of nuclear fuel which would render the fuel useless as an explosive. The fuel, however, could still be used for power reactors. Such an isotope, it was thought, could not be chemically separated. This was the foundation for his idea that military uses of atomic energy could be practically separated from civilian uses. The military uses could then be tightly controlled by an international authority. Civilian uses could be safely left to sovereign states. See: Barnard et al, *A Report on the International Control of Atomic Energy*, pp. 26-7; and Herken, pp. 155-59. The reliance on denaturing turned out to be misguided; see later sections.
[100] Lawrence S. Wittner, *The Struggle Against the Bomb* volume 1: One World or None: A History of the World Nuclear Disarmament Movement Through 1953 (Stanford: Stanford University Press, 1993), p. 264.
[101] Herken, p. 264.
[102] Ray Monk, *Robert Oppenheimer: A Life Inside the Center* (New York: Doubleday, 2012), p. 494.

"[Bohr] is very near the edge of mortal crimes" for discussing atomic matters with Soviet citizens.[103] There were a few public denouncements of scientists in the forties; one of the most serious was in March 1948 when the House Un-American Activities Committee denounced theoretical physicist Edward Condon, then director of the National Bureau of Standards, as ''one of the weakest links in our atomic security."[104] Privately, the security establishment was intensely suspicious of many internationalist scientists. In early 1948, the Justice Department considered prosecuting nuclear physicist Leo Szilard under the Logan Act (which criminalizes negotiation by unauthorized persons with foreign governments having a dispute with the United States) following the publication of his "Letter to Stalin" in the *Bulletin of the Atomic Scientists*. In this open letter (which was not actually separately delivered to the Soviet Union), Szilard called for international control through the United Nations and for Stalin to speak directly to the U.S. people in this regard. In 1950, the FBI even launched an investigation into Albert Einstein, eventually accumulating over 1,500 pages of evidence on him.[105]

Scientists were often reactive rather than proactive and sometimes were overtaken by events or failed to respond effectively to them. Other elites (such as Groves, for example, or Truman) often drove policymaking or nudged public opinion in various directions, and scientists could only react, often not effectively. Two prominent examples of this are the spy revelations (and subsequent controversy) in February/March 1946 and the appointment of Bernard Baruch as the U.S. representative of the UNAEC with authority to shape international control proposals to his own liking. In both cases, scientists were unhappy with the turn of events, were caught unprepared, and were unable to develop effective responses.[106] Scientists' inability to react effectively was due to their distance from the powers of decision-making. In both cases, Truman and those directly around him determined policy; scientists were not part of the inner circle.

[103] Aaserud, "The Scientist and the Statesmen".
[104] David Kaiser, "The Atomic Secret in Red Hands? American Suspicions of Theoretical Physicists During the Early Cold War", *Representations* 90,1 (Spring 2005), pp 28-60.
[105] Wittner, *The Struggle Against the Bomb* volume 1, pp. 267-8; Helen S. Hawkins et al (eds.), *Toward a Livable World: Leo Szilard and the Crusade for Nuclear Arms Control* (Cambridge, MA: The MIT Press, 1987), p. Xl; Leo Szilard, "Calling for a Crusade", *Bulletin of the Atomic Scientists* (May 1947), pp. 102-6, 125. Einstein was particularly forward in writing to Soviet scientists on arms control, see Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp. 147-8.
[106] Herken, pp. 129-36, 159-63. Kimball-Smith, *A Peril and a Hope,* pp. 386-8, 464.

4.7 Muddled Policymaking

Lessons

Policymaking involves significant muddling through rather than grand strategy.[107] It is also deeply affected by domestic politics and public opinion, and often developed on the basis of short-term objectives and poor quality information. Proposals are sometimes slow to be developed, poorly thought-out or expressed, gambled on technical solutions, and lacking crucial details. There can be a lack of clarity on responsibility for policymaking, which is often dependent on personalities.

Historical Case

In relation to the international control of atomic energy, debates were often unclear about what was being discussed and proposed and what was at stake. Debates were hugely shaped by domestic politics, lack of information, vague understandings, retirements, private initiatives, committee room dealings, egos, and organizational interests. Debates about international control were also sometimes intertwined with debates over domestic policy.

Secrecy and Lack of Information

As noted in lesson 4.4, secrecy, lack of information, and misconceptions about the development of atomic weapons shaped policy and negotiations. No one in government, not even Truman, had a clear idea of the number of atomic bombs in U.S. possession in 1946 (Truman would be visibly shocked when Lilienthal revealed in a 1947 inventory exercise how few the U.S. possessed).[108] Even the U.S. military made war plans without understanding the number and deliverability of U.S. atomic weapons.[109] Curtis LeMay (then deputy chief of Air Staff for Research & Development, and the future commander of the Air Force's Strategic Air Command) complained in 1946 that the Air Force struggled to plan for atomic bomb delivery because of secrecy surrounding the number and nature of the U.S. bomb stock.[110] Indeed, one January 1946 plan by the Joint War Plans Committee worked off the assumption that the Air Corps had access to 196 bombs, while the actual number for the U.S. as a whole was around 7.[111] International control policy and negotiations were largely developed under the general impression that the Soviets were many years away from completing their first atomic bomb.[112] An important wartime agreement between Roosevelt and Churchill to cooperate on

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[107] Charles E. Lindblom, "The Science of 'Muddling Through'", *Public Administration Review* 19,2 (Spring, 1959), pp. 79-88.

[108] Curatola, *Bigger Bombs for a Brighter Tomorrow*, pp. 52-3; David Alan Rosenberg, "U.S. Nuclear Stockpile, 1945 to 1950", *Bulletin of the Atomic Scientists* 38,5 (May 1982), pp. 25-30; David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960", *International Security* 7,4 (Spring 1983), pp. 3-71; Herken, p. 197.

[109] Herken, pp. 219-20, 229; Rosenberg, "The Origins of Overkill"; Ross, *American War Plans 1945-1950*, pp. 12-17.

[110] Herken, p. 198.

[111] Herken, pp. 199-200, 219-20, 229; Ross, *American War Plans 1945-1950*, pp. 12-17; Ziegler, "Intelligence Assessments of Soviet Atomic Capability". The January 1946 plan is in Ross, American War Plans, pp. 16-17. On the number of atomic bombs see John M. Curatola, *Bigger Bombs for a Brighter Tomorrow: Strategic Air Command and American War Plans at the Dawn of the Atomic Age, 1945-1950* (Jefferson, NC: MacFarland, 2016), pp. 53.

[112] Herken, pp. 113; Gordin, *Red Cloud at Dawn,* pp. 75-8. On the CIA's mistaken assessments see Donald P. Steury, "How the CIA Missed Stalin's Bomb: Dissecting Soviet Analysis, 1946-50". Available at: https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol49no1/html_files/stalins_bomb_3.html, accessed 1 June 2019.

atomic development was kept secret from most policymakers, including Truman, who later ignored it when he found out.[113]

Proposals were Slow to be Developed, Poorly Thought-out or Expressed, Gambled on Technical Solutions, and Lacked Crucial Details

Serious thinking about proposals for international control were not formulated until relatively late. This is due in large part to the existence of nuclear weapons being a closely held secret until the detonation of the first atomic bomb at Hiroshima in August 1945. Efforts to make sense of nuclear weapons only dramatically accelerated after the bomb's existence was made public.[114]

Secretary of War Henry L. Stimson crisply stated the high-level problem of postwar governance of nuclear weapons in April 1945, but little serious thought about international control took place after then.[115] This neglect can be in part understood, because policymakers were swamped with massive geopolitical problems: ending the war with Japan, negotiating a postwar order with Russia, setting up the United Nations, and rebuilding Europe.

Secretary of War Stimson's ideas in late 1944 and early 1945 on international control and possible quid pro quos were cursory. Most proposals for international control lacked detail and failed to think through the Soviet response. This is particularly true of the earliest thinking in 1944 and 1945. Stimson thought that international control could be achieved through "freedom both of science and access" to atomic information. By this he meant some form of sharing of atomic scientific information, but he did not go into further detail. Stimson also thought that the U.S. could demand liberalization of internal rule in the Soviet Union in return for information on the atomic bomb, which reflected a complete misunderstanding of Soviet preferences. Similarly his later idea of a simple "covenant" between the great powers to not use atomic energy for military purposes, without any thought of safeguards or punishments, was ill thought-out.[116] Stimson's memorandum on international control, presented at a crucial September 1945 meeting on atomic energy, generated significant confusion over what he was proposing. Some participants thought he wanted to give the atomic bomb to the Soviets. This was due to an unfamiliarity on their part with the development of the bomb and its international politics, as well as a lack of clarity on Stimson's part.[117]

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[113] Barton J. Bernstein, "Roosevelt, Truman, and the Atomic Bomb, 1941-1945: A Reinterpretation", *Political Science Quarterly* 90,1 (Spring 1975), pp. 23-69; Herken, p. 62.
[114] As, for example, is illustrated by Bernard Brodie recounting the moment when his career pivoted to the study of nuclear weapons. Fred Kaplan, *The Wizards of Armageddon* 2nd edition (Stanford: Stanford University Press, 1991), p. 10.
[115] Henry Stimson, *Memorandum Discussed with the President* (25 April 1945). Available at: http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-04-25.htm, accessed 15 October 2019. This memorandum was discussed in the May 31 meeting of the Interim Committee, see *Notes of the Interim Committee Meeting, Thursday 31 May 1945* (31 May 1945). Available at: http://www.nuclearfiles.org/menu/key-issues/nuclear-weapons/history/pre-cold-war/interim-committee/interim-committee-informal-notes_1945-05-31.htm, accessed 15 October 2019.
h/t Luke Muehlhauser, who reflects on this: https://twitter.com/lukeprog/status/1181774870096400384
[116] Herken, pp. 14, 25; Malloy, *Atomic Tragedy*, pp. 173-4.
[117] Henry Stimson, *Memorandum on the Effects of the Atomic Bomb* (11 September 1945). Available at: http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-09-11.htm, accessed 16 October 2019. Herken, p. 30; Lieberman, *The Scorpion and the Tarantula*, pp. 145-6.

The international control of technology is made easier when the dangerous uses and productive uses can each be cleanly, verifiably, and robustly separated from each other. In this case, there was one technical possibility that the most thought-through proposal, the Acheson-Lilienthal Plan, invested a lot of hope in, but which in retrospect was misguided. (This was plausibly foreseeable at the time). The planners allowed themselves to depend on a speculative technical fix, called isotopic denaturing. It was hoped this could be used to prevent (the easy) misuse of uranium or plutonium reactor fuel for nuclear weapons. Effective denaturing was, however, a highly speculative concept, and history has not borne it out.[118] The report was criticized by other scientists (and by Leslie Groves) for relying on such an impractical idea soon after the plan was made public.[119]

The plan also did not explain what was to be done with the existing atomic bombs once international control was instituted: were they to be destroyed, or passed onto the U.N.? In this case, the vagueness was probably deliberate and reflected the political ramifications of choosing between these options: there were many calling for the complete destruction of atomic bombs and yet others for them to be kept and used by the U.N. for collective security or policing purposes.[120]

Lack of Clarity on Responsibility for Policymaking

Responsibility for policymaking on atomic matters was not clearly demarcated, especially in late 1945 (it would improve later on with the Acheson-Lilienthal committee, though the committee itself was a gambit for State Department influence). Congressional committees, congressmen, State Department officials, military men, scientific advisors, external consultants, and other advisors all had influence at one point or another. Scientific administrator Vannevar Bush would write to Stimson in November 1945 expressing frustration at the lack of

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[118] Below is a selection from the Acheson-Lilienthal Report, emphasis ours. Note that the actual text admits that this technique is not foolproof.
"U 235 and plutonium can be denatured; such denatured materials do not ***readily*** lend themselves to the making of atomic explosives, but they can still be used with no essential loss of effectiveness for the peaceful applications of atomic energy. ... It is important to understand the sense in which denaturing renders material safer. In the first place, it will make the material unuseable by any methods ***we now know*** for effective atomic explosives ***unless steps are taken to remove the denaturants.*** In the second place, the development of more ingenious methods in the field of atomic explosives which might make this material effectively useable is not only dubious, but is certainly not possible without a very major scientific and technical effort.

It is possible, both for U 235 and for plutonium, to remove the denaturant, but doing so calls for rather complex installations which, though not of the scale of those at Oak Ridge or Hanford, nevertheless will require a large effort and, above all, scientific and engineering skill of an appreciable order for their development. It is not without importance to bear in mind that, although as the art now stands denatured materials are unsuitable for bomb manufacture, developments which do not appear to be in principle impossible might alter the situation. This is a good example of the need for constant reconsideration of the dividing line between what is safe and what is dangerous." Barnard et al, *A Report on the International Control of Atomic Energy*.

[119] Isotopic denaturing meant the addition of a different isotope of nuclear fuel which would render the fuel useless as an explosive. The fuel however could still be used for power reactors. Such an isotope, it was thought, could not be chemically separated. Barnard et al, *A Report on the International Control of Atomic Energy*, pp. 26-7. Anthony Leviero, "Denaturing Guard on Atom Not Sure", *New York Times* (10 April 1946), p. 16. Kimball-Smith, *A Peril and a Hope*, pp. 462-3. For more recent thinking on denaturing see: A. DeVolpi, "Denaturing Fissile Materials", *Progress in Nuclear Energy* 10,2 (1982), pp. 161-220. C.E. Till, "Denatured Fuel Cycles", in Joseph L. Fowler, Cleland H. Johnson, Charles D. Bowman (eds.), *Nuclear Cross Sections for Technology: Proceedings of the International Conference* vol 13 (Oak Ridge, TN: Oak Ridge National Laboratory, 1980), p.115-18.

[120] Barnard et al, *A Report on the International Control of Atomic Energy*.

clearly demarcated responsibilities for atomic policymaking and advice: "I have never participated in anything that was so completely unorganized or so irregular…It is somewhat appalling…to think of this country handling many matters in such an atmosphere."[121] Many, such as Groves in late 1945, became powerful, but still unofficial, advisors.[122]

Because of this lack of clarity, individuals often competed against each other to influence policymaking. Vannevar Bush, for example, suggested a new committee, including the State Department, scientists, and representatives of Congress, to make atomic policy in November 1945 but was rebuffed.[123] Secretary of State Byrnes fought with Senator Arthur H. Vandenberg and others to retain sole control over atomic diplomacy in late 1945.[124] One of the reasons Byrnes set up a committee to make a proposal for international control in December 1945/January 1946 was to keep atomic diplomacy within the State Department, instead of losing it to Congressional committees.[125] The Acheson-Lilienthal Report was produced largely by its technical board of consultants. Leslie Groves had opposed the appointment of this board, and had attempted to get a board to his liking appointed instead. Similarly, the State Department later opposed Bernard Baruch's board of consultants (which eventually helped formulate the Baruch Plan) and also attempted to get its own board appointed.[126]

Interservice rivalry had a large impact on debates and policies. Each military service attempted to increase its influence on atomic weapons and atomic policy, and decrease that of the other services.[127] Perhaps the most notorious episode in this regard was the infamous "Admirals' Revolt" of 1949, in which the navy attempted to divert funding away from the air force and towards the navy. In a series of hearings before the House Armed Services Committee, senior naval officers argued that the air force's strategy of "atomic blitz" could not win a war against the Soviet Union and was anyhow immoral. The navy instead suggested (ultimately unsuccessfully) that aircraft carrier-based bombers launch tactical atomic strikes against the invading Soviet armies.[128]

Public Opinion and the Atomic Secret

Public opinion on atomic matters and international control (which had significant influence on policymaking, see earlier section) was based on one crucial misconception: that there existed an "atomic secret" which was the key to the production of the bomb. It was widely believed that if the Soviets discovered this secret, they could build the atomic bomb. There was significant debate and confusion in public discourse over what this secret was and how it could be protected or shared.[129] Scientists spent a significant amount of effort debunking the idea that such an atomic secret existed. They pointed out that the basic science was already in the public

[121] Zachary, *Endless Frontier*, p. 313.
[122] Herken, pp. 37-8.
[123] Zachary, *Endless Frontier*, p. 310.
[124] Herken, pp. 74-7, 82, 85-6, 93. Lieberman, *The Scorpion and the Tarantula*, pp. 218-22.
[125] Herken, p. 97; Lieberman, *The Scorpion and the Tarantula*, p. 236.
[126] Herken, pp. 154, 169.
[127] Herken, p. 198-9, 252-3. One manifestation of this was the 1946 atomic bomb tests; see: Lloyd J. Graybar, "The 1946 Atomic Bomb Tests: Atomic Diplomacy or Bureaucratic Infighting", *The Journal of American History* 72,4 (March 1986), pp. 888-907.
[128] Phillip S. Meilinger, "The Admirals' Revolt of 1949: Lessons for Today", *Parameters* 19,3 (September 1989), pp. 81-96; Herken, pp. 308-9.
[129] David Kaiser, "The Atomic Secret in Red Hands? American Suspicions of Theoretical Physicists During the Early Cold War", *Representations* 90,1 (Spring 2005), pp 28-60; Herken, "'A Most Deadly Illusion'".

domain, and stressed the importance of scientific and industrial expertise and resources, as well as financial resources. Their statements had limited impact: the idea of an atomic secret was deeply embedded and was moreover used and repeated in public rhetoric by opponents of international control such as Groves.[130]

Personality

High-level policymaking was highly dependent on personality. The wartime president, Franklin D. Roosevelt, had a reputation for not disagreeing with individuals in face-to-face meetings. He preferred to raise objections later with confidants.[131] His successor Truman only digested short briefings.[132] Truman had opportunities to make a greater impact on atomic policy and diplomacy but did not, for no clear reason. At Potsdam, for example, he dodged the issue of informing the Soviet Union clearly about the U.S. atomic program (the next opportunity would arise after the war).[133] Roosevelt, if he had lived, would probably have conducted policy differently than Truman and reacted differently to political developments.[134]

Groves, Baruch, and Secretary of State Byrnes (amongst others) also put their personal stamp on diplomacy and policymaking. Ego and personal career motivations shaped their approaches. Crucially, one reason for Baruch formulating his own distinct proposal for international control—rather than following the earlier Acheson-Lilienthal Plan—was ego. He refused, he said, to be a mere "messenger boy" for the Acheson-Lilienthal Plan.[135] Truman himself would later recall that Baruch was driven by the need for "public recognition."[136] One of the reasons why Oppenheimer's role in policymaking in 1946 was limited to his participation in the drafting of the Acheson-Lilienthal Report was because he made a poor personal impression on Truman during their first private meeting.[137] On the Soviet side, atomic diplomacy appears to have been largely personally determined by Stalin, with diplomats having little autonomy.[138]

Mixed Signals

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[130] Herken, "'A Most Deadly Illusion'".
[131] Aaserud, "The Scientist and the Statesmen".
[132] Herken, p. 15.
[133] Wilson D. Miscamble, *The Most Controversial Decision: Truman, the Atomic bombs, and the Defeat of Japan* (Cambridge: Cambridge University Press, 2011), p. 70.
[134] Campbell Craig and Sergey Radchenko, for example, believe that "Truman at the outset of his presidency was more disposed toward cooperation with the Soviet Union than Roosevelt had been at the end of his." Roosevelt was also, they suggest, strongly influenced by Churchill in his atomic diplomacy. Craig and Radchenko, pp. 29, 65. There is also some speculation of this in Bernstein, "Roosevelt, Truman, and the Atomic Bomb".
[135] Herken, p. 160. For a list of the key differences between the Baruch Plan and the earlier Acheson-Lilienthal Report, see the summary of the Baruch Plan in the earlier section which reviews proposals for international control.
[136] Harry S. Truman, *Memoirs* Volume II Years of Trial and Hope (New York: Doubleday and Company, 1956), p.10; James Grant, *Bernard M. Baruch: The Adventures of a Wall Street Legend* (New York: John Wiley & Sons, 1997), p. 292.
[137] Truman would later call Oppenheimer a "cry-baby scientist" who had come to his office and "spent most of his time wringing his hands and telling me they had blood on them because of his discovery of atomic energy." He kept Oppenheimer away from policymaking from that point on. Ray Monk, *Robert Oppenheimer: A Life Inside the Center* (New York: Doubleday, 2012), p. 494; Bird and Sherwin, *American Prometheus*, pp. 331-3, 350.
[138] For example: Herken, p. 20; Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp. 97-8, 102, 105, 109; Holloway, *Stalin and the Bomb*, chapter 8.

Actors attempted to understand each others' intentions, but often sent out mixed signals and misunderstood each others' positions.[139] When Soviet Foreign Minister Vyacheslav Molotov arrived in New York in October 1946, his early conciliatory statements led U.S. policymakers to believe that he would take, at most, a soft stance against the Baruch Plan during his U.N. General Assembly speech. Instead he stunned both U.S. policymakers and the U.N. by aggressively attacking the plan and even Baruch himself ("conceited" and "short-witted"). Policymakers scrambled to figure out a response.[140] Mixed signals were also present at domestic meetings. Bohr, for example, met Roosevelt in 1944 to call for international control and left the meeting thinking that he had made an impact. In fact, Bohr had little impact on Roosevelt other than to suggest to him that the Danish physicist may be a security risk.[141]

Diplomatic Missteps

Actors also made missteps when carrying out atomic diplomacy. Secretary of State Byrnes' exclusion of the French from the December 1945 Moscow conference, for example, "needlessly offended that ally" and allowed Stalin to magnanimously invite the French to future conferences.[142] Similarly, not including general disarmament into the Baruch Plan, as Baruch wanted, gave the Soviets the opportunity to announce it as part of their rival proposal later on.[143] Byrnes omitted key passages on stages in the U.S. proposal presented at Moscow in December 1945. This upset Truman, and Byrnes was forced to include them later on. This misstep further damaged his relationship with Truman.[144] Byrnes also could have worked harder to build support in Congress before embarking on his atomic diplomacy in late 1945.[145]

Misunderstandings of the Significance of Issues

Negotiators and policymakers misunderstood the significance of various aspects of international control. In early U.S.-Soviet discussions at the UNAEC during June to September 1945, Baruch and his delegation focused on the veto. This fixation missed the fact that the veto was strategically irrelevant. As critics of Baruch's insistence on removing the veto (such as Under Secretary of State Dean Acheson and political commentator Walter Lippmann) pointed out: if the international control regime broke down, it would lead to a breakdown in cooperation in the United Nations and a veto would have little impact.[146] In a widely publicized September 1946 attack on the veto aspect of the Baruch Plan, Secretary of Commerce Henry Wallace pointed out that "the proposal to abolish the veto...has no meaning with respect to a treaty on atomic energy...Once the treaty is ratified...the question of veto becomes meaningless. If any nation violates the treaty provision...the remaining signatory nations are free to take what action they feel is necessary including the ultimate step of declaring war."

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[139] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, p. x.
[140] Lieberman, *The Scorpion and the Tarantula*, pp. 365-6.
[141] Aaserud, "The Scientist and the Statesmen".
[142] Herken, p. 74. British diplomats were also upset at Byrnes' dismissal of diplomatic protocol. James L. Gormly, "The Washington Declaration and the 'Poor Relation': Anglo-American Atomic Diplomacy, 1945-46", *Diplomatic History* 8,2 (April 1984), pp. 125-143.
[143] Herken, p. 186; Lieberman, *The Scorpion and the Tarantula*, p. 290.
[144] Herken, p. 82.
[145] Herken, pp. 91-2; Arnold A. Offner, *Another Such Victory: President Truman and the Cold War, 1945-1953* (Stanford: Stanford University Press, 2002), pp. 116-8.
[146] Herken, p. 164. Walter Lippmann, "Mr. Baruch and the Veto", *Washington Post* (20 June 1946).

[147] Baruch may also have become trapped by his own rhetoric: by overselling the importance of the veto to the U.S. public and political elites, he left himself little room to compromise on it.[148]

Incongruous Stances

Even on issues such as secrecy (where one might imagine clear battle lines between advocates for and opponents of increased secrecy), there were seemingly incongruous stances. The Smyth Report, released on the 12th of August 1945, soon after the atomic bombings, is a case in point. This official published primer on the atomic bomb and the Manhattan Project, written by physicist Henry DeWolf Smyth, provided a "semi-technical" (Smyth's words) explanation of how the atomic bomb worked and how it was developed. It proved to be especially helpful for the Soviet project: the NKVD (the Soviet secret police) had it translated and published with a print run of 30,000 copies. Given the secrecy around the project, how did it come to be published? As it happens, Groves supported its publication—he wanted to justify the large expenditure on the Manhattan Project and create a "security fence" highlighting what could be released to the public on atomic energy. Groves also mistakenly believed that it would be of little use to the Soviets—an astonishing oversight for an individual so focused on secrecy and the Soviet threat. On the other hand, many opponents of secrecy, such as Leo Szilard, David Lilienthal, and Secretary of Commerce Henry Wallace, argued that the report gave away important information to the Soviets. They did this in order to discredit the military's management of atomic energy and to push for civilian control.[149] Moreover, there were mishaps too with the management of information revealed in the Smyth Report. The first edition included a reference to the unforeseen poisoning of the Hanford reactors, which Groves had excised from the second (and more widely circulated) edition when he became aware of it. The revelation was picked up by the Soviet government when they compared the first and second editions and may have been useful for the Soviet program.[150]

Domestic Politics Shaped Debates on International Control

Domestic partisan politics shaped support for international control and related policy. There are two key examples of this. First, debates over international control became intertwined with debates over legislation on domestic governance of national atomic facilities and policies. The political battle to set up a domestic organizational and legislative framework to govern atomic energy began at the end of the war, and ended with the signing of the Atomic Energy Act and the creation of the Atomic Energy Commission in August 1946. The political fights over this legislation polarized into those wanting more military oversight and those arguing for less. Support for both domestic and international control was divided along political lines: on domestic issues, liberal and progressive elites generally supported civilian oversight on domestic atomic policy, whereas Republicans and conservatives preferred military oversight. Similarly, Democrats were more supportive of

[147] Lieberman, *The Scorpion and the Tarantula,* p. 348.
[148] Herken, pp. 174-77.
[149] Gordin, *Red Cloud at Dawn*, pp. 91-104. The Smyth Report has been republished as: Henry DeWolf Smyth, *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb Under the Auspices of the United States Government, 1940-1945* (Stanford: Stanford University Press, 1989). According to Gordin, the Smyth Report "revealed the scale of the effort and the sheer quantity of resources, and also hinted at some of the paths that might work and, by omission, some that probably would not." From Gordin, *Red Cloud at Dawn*, p. 103.
[150] Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon and Schuster, 1995), pp. 215-7.

international control than Republicans. The military opposed international control and opposed civilian control of domestic atomic energy.[151]

A second example is Truman's appointment of Bernard Baruch as U.S. representative on the UNAEC in March 1946. Baruch was appointed with the power to make policy. With this powerful appointment, Truman undercut both his existing atomic experts and the State Department. He did this largely because of Baruch's acceptability to Congress and broader conservative opinion. Baruch, in turn, appointed friends and associates with little knowledge of atomic matters as his advisors. Truman soon regretted his decision.[152]

The intertwining of domestic politics with international control had, on the whole, a negative impact on international control. The effects were that, first, it probably made international control more polarized. Republicans and conservative support for the military on domestic legislation led them also to ally themselves to the military on international control. These divisions may not have been so stark if the policymaking processes had not run concurrently or if the debate on domestic control had taken place after the debate on international control.[153] Second, scientists, who were a key lobby group for international control, were forced to spend time and energy lobbying on domestic legislation, leaving them less time and energy to think about international control.[154] The debate on domestic atomic legislation also exacerbated divides amongst scientists. This may have lessened their ability to work together on international control.[155] Third, policy decisions on international control were made with domestic results in mind. These decisions may not have led to the best outcomes for international control itself. One prominent example of this was the appointment of Bernard Baruch as chief policymaker on international control. The appointment of someone with better knowledge of and interest in international control may have been a better choice.[156]

[151] On the legislative history of the Atomic Energy Act, see Richard G. Hewlett and Oscar E. Anderson, Jr., *A History of the United States Atomic Energy Commission* volume 1 The New World 1939/1946 (University Park, PA: The University of Pennsylvania Press, 1962), pp. 428 - 455, 482-530. Also, on political divisions, see Herken, p. 263.
[152] Herken, pp. 158-60; Bernstein, "The Quest for Security"; Grant, *Bernard M. Baruch*, p. 292.
[153] Hogan, *A Cross of Iron,* pp. 235-252.
[154] According to historian Barton Bernstein "American scientists devoted far more energy and thought in 1946 to gaining civilian (rather than military) control of atomic energy than they did to analyzing American plans for international control." This dampened their critical engagement with the Acheson-Lilienthal Plan. Bernstein, "The Quest for Security".
[155] Senior scientists Bush, Conant, and Oppenheimer supported the May-Johnson Bill, whereas most rank and file atomic scientists opposed it. Wang, *American Scientists in an Age of Anxiety*, pp.14-15.
[156] Herken, pp. 158-60.

4.8 Viability of International Control

Lessons

Achieving agreement on a workable scheme for international control is difficult, even if the political atmosphere is conducive or negotiators are more willing to compromise. There may be fundamental structural strategic obstacles, such as an insurmountable transparency-security trade-off.[157] Thus, while there may be interventions to improve the chances of successful international control, such as making policymaking more informed, it may not be enough to achieve successful international control. It may be that radically different political or social circumstances would be required for its success.

Historical Case

Improving processes, with clearer, more transparent, and more informed policymaking would not likely have led to successful international control in 1945/46. This is only likely to have been achieved under radically different historical circumstances. This is because of important underlying factors working against international control. We have grouped these factors below into fundamental structural strategic obstacles, a wider lack of support in the U.S. and the Soviet Union, and confusion in policymaking. These factors were interrelated: the fundamental structural obstacles tended to lead to confusion in policymaking and a lack of support for international control in the U.S. and the Soviet Union.

Fundamental Structural Strategic Obstacles

There are fundamental strategic obstacles to arms control. For example, international control required some staged process. But different stages bestow advantages and disadvantages to different sides. Thus it can be fundamentally challenging to develop a policy that balances these advantages and disadvantages, and more so if the two sides disagree about their power as well as the size of the advantages and disadvantages bestowed by the stages. So, for example, the Baruch Plan suggested a survey of Soviet resources as a first step, without the U.S. reciprocating at that point. This gave the U.S. the option to abort international control at that stage, having gained sensitive information about the Soviet atomic program without equivalent reciprocation.[158]

A second obstacle is that any monitoring (or control) scheme which would be transparent enough to assure the other party they will not be caught off guard by a secret armaments program will be too invasive for the

[157]This obstacle to arms control is well developed in: Andrew J. Coe and Jane Vaynman, "Why Arms Control Is So Rare", *American Political Science Review* 114,2 (2020), pp. 342–55.

[158] "The American Proposal for International Control Presented by Bernard Baruch", *Bulletin of the Atomic Scientists* 1&2 (1 July 1946) pp. 3-5, 10. Also at: http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml. Accessed 25 April 2019. Secretary of Commerce Henry Wallace made this very observation and criticism of the Baruch Plan, noting that the Soviet Union had only "two cards which she can use in negotiating with us: (l) our lack of information on the state of her scientific and technical progress on atomic energy and (2) our ignorance of her uranium and thorium resources. These cards are nothing like as powerful as our cards---a stockpile of bombs, manufacturing plants in actual production, B-29s and B-36s, and our bases covering half the globe. Yet we are in effect asking her to reveal her only two cards immediately-telling her that after we have seen her cards we will decide whether we want to continue to play the game." Herken, pp. 181-82.

monitored party, exposing them to security risks.[159] In this case, this trade-off bit hard. The U.S. military sought information on Soviet capabilities, and was in fact caught off guard by their development of the atomic bomb. In turn, the Soviet Union perceived it to be a fundamental risk to allow foreign actors to have extensive access to the Soviet Union.[160] It's hard to imagine any monitoring scheme which would have permitted the United States to have sufficient information, which wouldn't have been perceived as an existential threat to the Soviet Union.

Lack of Support in the U.S.

Many U.S. policymaking elites were weak supporters or even opponents of international control. This was because, first, they believed that so long as the risk of war existed with the Soviets, the atomic bomb was needed for U.S. deterrence and defense. With smaller postwar military forces unable to defend Europe against a Soviet invasion, atomic bombs were seen as an important element of the country's military arsenal. Opponents of international control such as Groves held that the atomic bomb could only be relinquished once war itself was enforceably outlawed, which they largely did not believe possible.[161] Second, policymakers believed that a monopoly on atomic weapons (no matter how short lived), gave the United States coercive diplomatic power. Thus, the atomic bomb was described by some as "the winning weapon."[162]

Third, policymakers were also insufficiently worried about a possible arms race. Most were not looking more than a decade or so ahead. In that time frame, many were certain they could keep ahead in any arms race and anyway believed that they would have a monopoly on atomic weapons for many years.[163] This thinking was built on the assumption that Soviet industrial, scientific, and economic resources were significantly poorer than those of the U.S. and certainly not enough for the U.S.S.R. to catch up with the U.S. in terms of atomic research and development. For example, early analyses of the Soviet bomb program assumed that the Soviet Union had a limited ability to work in parallel on the various elements needed to make a bomb.[164] Similarly, the U.S. Air

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[159] See for example: Coe and Vaynman, "Why Arms Control Is So Rare".

[160] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp.136, 139. Herken, p. 177.

[161] On military opposition, see Lieberman, *The Scorpion and the Tarantula*, pp. 286-9. For Grove's arguments: Norris, *Racing for the Bomb*, pp. 471-2.

[162] Herken, pp. 4-8.

[163] Herken, p.7. Also see previous lesson on Secrecy and Security.

[164] Ziegler, "Intelligence Assessments of Soviet Atomic Capability, 1945-1949"; Gordin, *Red Cloud at Dawn*, pp. 72-4. In the *Saturday Evening Post* in 1948, Groves wrote that the Soviet Union "simply does not have enough precision industry, technical skill or scientific numerical strength to come even close to duplicating the magnificent achievement of the American industrialists, skilled labor, engineers and scientists who made the Manhattan Project a success. Industrially, Russia is, primarily, a heavy-industry nation; she uses axle grease where we use fine lubricating oils. It is an oxcart-versus-automobile situation." From Rhodes, *Dark Sun*, p. 211. David Lilienthal would later note that Groves went too far in thinking of the Soviet Union as an "ignorant, clumsy, backward country". See Ziegler, "Intelligence Assessments of Soviet Atomic Capability, 1945-1949". This characterization was not limited to Groves, but widely held in government circles. Richard Rhodes notes one popular joke in Washington, D.C., during the war: "The Russians couldn't deliver an atomic bomb in a suitcase, the joke went, because they didn't know how to make a suitcase." Rhodes, *Dark Sun*, p. 211. The Soviet atomic program was nevertheless a massive and difficult undertaking for the Soviet Union. One historian estimates that the program cost more in absolute terms than the U.S. atomic program: Vladislav M. Zubok, "Stalin and the Nuclear Age", in John Lewis Gaddis et al (eds.), *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945* (Oxford: Oxford University Press, 1999), pp. 39-61.

Force believed in 1946 that it would be many years before the Soviet Union built a fleet of heavy bombers capable of carrying atomic bombs.[165]

The belief that the Soviet Union would not be able to develop an atomic bomb in the forties was also founded on the conclusion that the U.S.S.R. did not have access to sufficient high-grade uranium. The rapid exploitation of the Soviet Union's (supposed) low-grade uranium would require, thought Groves, a "revolution in extraction techniques" that was beyond the Soviet Union's current technical capabilities.[166] Some (such as the diplomat and analyst George Kennan) also thought that international diplomacy, conflict, or perhaps even a Soviet collapse could work to slow or halt the Soviet atomic development.[167] This confidence was boosted by the assumption that the U.S. could keep ahead by accelerating research and development in atomic weapons.[168] Nor were these developments necessarily incremental: some physicists (in particular Edward Teller) believed that it was possible for the United States to develop the far more powerful thermonuclear "superbomb."[169]

Much of the support for international control was transient. For example, cynical realists such as Baruch and his team were only committed to an international control deal in which the U.S. would not need to make any substantial compromises. Once their preferred deals were rejected, they rejected international control altogether.[170] Others, such as senior Republican Senator Arthur Vandenberg, only switched to support the United Nations when it was politically expedient (and possibly electorally popular).[171] Support from key policymakers (e.g., the wartime Secretary of War Henry L. Stimson and Secretary of State James F. Byrnes) also waxed and waned depending on their assessment of Soviet flexibility and U.S. progress in atomic weapons.[172] The public was itself easily alarmed by security and secrecy concerns (see previous lesson Secrecy and Security).

Lack of Support in the Soviet Union

Soviet atomic policy was determined by Stalin, and historians believe that he was unlikely to agree to any form of international control. After August 1945, he was fully committed to the development of the Soviet atomic bomb.[173] Stalin did not appear to fear the destructive effects of the atomic bomb or a subsequent arms race, and thought that he could catch up with the U.S. atomic program or compensate through other means (e.g., larger

[165] The air force even dismissed reports in the Berlin press in November 1946 that the Soviet Union had begun work on an indigenous copy of the B-29 Superfortress. Concern over Soviet delivery capability was only raised following the unveiling of three Tu-4 heavy bombers at the 1947 Tushino display. Steve Zaloga, *Target America: the Soviet Union and the Strategic Arms Race, 1945-1964* (Novato, CA: Presido, 1993), p. 73.
[166] Ziegler, "Intelligence Assessments of Soviet Atomic Capability, 1945-1949"; Gordin, *Red Cloud at Dawn*, pp. 72-4.
[167] Herken, pp. 187, 212, 216, 235-36; David Mayers, *George Kennan and the Dilemmas of US Foreign Policy* (Oxford: Oxford University Press, 1988), pp. 120, 303-5, 307.
[168] Zachary, *Endless Frontier*, pp. 250-51.
[169] Rhodes, *Dark Sun*, pp. 206-7.
[170] For example, Baruch. Herken, p. 170.
[171] Herken, p. 75.
[172] On Stimson: Herken, p.19; Ronald E. Powaski, *March to Armageddon: The United States and the Nuclear Arms Race, 1939 to the Present* (Oxford: Oxford University Press, 1987), pp. 29-30. On Byrnes: Herken, pp. 61, 71, 72.
[173] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp. 99-101, 105-06, 109-110; Holloway, *Stalin and the Bomb*, p. 162; Vladislav Zubok and Constantine Pleshakov, *Inside the Kremlin's Cold War: From Stalin to Khrushchev* (Cambridge, MA: Harvard University Press, 1996), pp. 40-46; Zubok, "Stalin and the Nuclear Age".

conventional forces).[174] He had a cynical attitude to cooperation; "scientific exchange," for example, meant extracting scientific and other insights from the U.S.[175] Stalin was also set against foreign missions in the Soviet Union, for example, for inspections or monitoring.[176] Soviet delegate to the UNAEC Andrei Gromyko would reflect forty years later that "I am certain that Stalin would not have given up the creation of his own atomic bomb. He well understood that Truman would not give up atomic weapons."[177]

Tensions between the U.S. and the Soviet Union

Growing tensions between the U.S. and the Soviet Union undermined confidence in each other, increased the allure of atomic weapons, and no doubt made agreement harder to reach. It led to, in Gaddis' words, a "growing sense of insecurity" in 1945 and 1946.[178] We know most about U.S. attitudes, where historians have noted that disagreements over postwar Europe, for example over issues in Poland, Romania, and Germany, and later over Iran, decreased U.S. trust in the Soviet Union from 1945 onwards. The discovery of Soviet atomic espionage from 1943 detracted from confidence building, though historians are divided on how much of an impact it may have had on U.S. policy towards the Soviet Union.[179] On the Soviet side, there is some indication that certain U.S. policies, such as Truman's cancellation of lend-lease to the Soviet Union, may have hardened Soviet attitudes towards the U.S., leading in this case to an increase in "unilateralist" tendencies.[180]

Process

There was significant confusion and muddling through in policymaking (see the lesson Muddled Policymaking). Given that one side had atomic weapons and the other did not, it was difficult to create a transitional process which would provide security to both sides and not leave them vulnerable. This was especially problematic given the increasing trust deficit between the two countries in late 1945 and 1946.[181] Even if an international control agreement had been achieved, it may have quickly broken down as all types of monitoring, in practice, were difficult[182] and changing international relations, domestic politics, or public opinion may have led one country or the other to abandon the agreement.[183]

Distant Counterfactuals

Improving processes, with clearer, more transparent, and more informed policymaking would probably not have led to successful international control. Only very radically different historical circumstances, which would

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[174] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, p. 109-10.
[175] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, pp.136, 139.
[176] Herken, p. 177.
[177] Cited in: Holloway, "The Soviet Union and the Baruch Plan".
[178] John Lewis Gaddis, *The Cold War* (London: Allen Lane, 2005), 27.
[179] Lynn Etheridge Davis, The Cold War Begins: Soviet-American Conflict Over Eastern Europe (Princeton, NJ: Princeton University Press, 1974), chapters 7,8, and 9. Raine, "The Iranian Crisis of 1946 and the Origins of the Cold War". For the argument that it undermined trust, see: Katherine A.S. Sibley, *Red Spies in America: Stolen Secrets and the Dawn of the Cold War* (Lawrence, KS: University of Kansas Press, 2004). p. 174-180. For the opposite point of view see: Herken, pp. 135-36.
[180] Vladislav M. Zubok, *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachev* (Chapel Hill, NC: University of North Carolina Press, 2007), p.15.
[181] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, p. 138.
[182] To appreciate the difficulties in monitoring, see Gordin, *Red Cloud at Dawn*, chapter 5.
[183] For a sense of the rapidly changing international politics of the late forties, see Gaddis, *The Cold War* , chapter 1.

have changed the underlying political and social dynamics, may have led to international control. These most distant counterfactuals could be:

- If the Soviet Union was willing to settle for a junior status internationally vis-a-vis the United States. This might have come about in a variety of ways, including, one historian has speculated, through Stalin's death in the fall of 1945, in which his successors "might have chosen a more accommodating course toward the United States"[184].
- If there had been less conflict of interest between the Soviet Union and the U.S. in Europe and Asia. For example, if the Soviets were less expansionist and/or the U.S. more accepting of Soviet expansionism.
- If there had been both conventional and nuclear power parity between the two superpowers, making it easier for them to identify a symmetric arms control bargain.
- If policymakers were radically more long-termist, with more foresight and perception of the dangers of a nuclear arms race, or otherwise radically more concerned about the nuclear arms race.
- If the U.S. carried out a successful preventive strike on the Soviet Union, thus stalling the Soviet atomic program, or otherwise was able to coercively stop the Soviet program.

[184] Zubok, *A Failed Empire*, p.51.

4.9 Risky Cooperation

Lessons

While, in the abstract, international cooperation is desirable, in practice, steps for cooperation can incur substantial strategic, diplomatic, political, and technological losses. Elites may also personally lose support or political capital by supporting international control. Advocates of cooperation would do well to fully understand the potential risks from cooperation so as to mitigate them. Risks are often not explicitly stated by the concerned parties, and some risks are deeply embedded in the circumstances, institutions, or world view.[185]

Historical Case

Risks for the United States

Entering into or even discussing international control with the Soviet Union carried substantial strategic and diplomatic risks for the United States and political risks for the incumbent administration.

Simply discussing international control with the Soviet Union would lessen the diplomatic leverage that atomic bombs might bring whilst the discussions were ongoing.[186] Discussions may also have risked revealing information about key aspects of the U.S. atomic program, such as the highly secret effort to monopolize global high-grade uranium deposits.[187] Negotiations consequently carried the risk of slowing down the U.S. atomic program and possibly even allowing the Soviets to catch up.[188]

International control could also lead to the sharing of technical or strategic information (e.g., how few bombs the U.S. had) that would allow an acceleration of the Soviet bomb program or other strategic advantage over the United States. Stalin had decided that the Soviet Union should attempt to copy the U.S. bomb-making process, so any technical information gleaned may have been useful. Moreover, in 1946, the U.S.S.R. was struggling with the construction of its first experimental reactor and the large-scale separation of uranium, and even the Russian translation of the Smyth Report helped with the Soviet program in early 1946.[189]

There were also risks associated with public reaction. First, starting negotiations on international control raised public expectations that a favorable agreement may eventually be reached. Yet such expectations may not be met, which would reflect unfavorably on the administration. That was one of the reasons why it was important for Baruch and other U.S. policymakers to ensure that the Soviet Union would be blamed if/once international

[185] For example, a reduction in the perceived usefulness of the atomic bomb for the Soviet Union may have reduced the riskiness of the country entering into international control. See the Historical Case discussion. For a theoretical discussion on risk perception, see Hye-Jin Paek and Thomas Hove, "Risk Perceptions and Risk Characteristics", *Oxford Research Encyclopedias: Communication*. Available at: https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-283 , accessed 1 June 2019.
[186] Herken, pp. 4-8; Bernstein, "The Quest for Security".
[187] Herken, p. 188.
[188] This concern was encapsulated in the debate over stages, see Herken, pp. 157.
[189] Gordin, *Red Cloud at Dawn,* p. 152. Holloway, *Stalin and the Bomb*, pp. 178-9.

control negotiations failed.[190] Second, international control discussions risked further sensitizing the U.S. public to the destructiveness of the atomic bomb, making it harder to mobilize the public for military action.[191]

There were also risks associated with cooperating with allies. Doing so risked increased leaks to the Soviet Union, and indeed, British scientists such as Klaus Fuchs did pass on information from the Manhattan Project to the Soviet Union.[192] The U.S. also risked offending allies by direct bargaining with Soviet Union. For example, the British wished to be included in any negotiations on international control. When Secretary of State Byrnes did directly bargain with the Soviet Union in late 1945, Britain and especially France were offended, and it harmed the alliance.[193]

Risks for the Soviet Union

Negotiating or starting the process of international control also carried significant risks for the Soviet Union. International inspections could reveal raw materials and facilities, and facilitate a preventive attack on the Soviet program.[194] Inspections and openness could undermine regime stability. U.S. proposals advocated a gradual staged process for the institution of international control. From the Soviet point of view, this gave the U.S. an advantage in the earlier stages of international control. The Bush Plan, for example, suggested three stages: (1) basic information sharing, (2) inspections (at which point each country would reveal its atomic facilities and resources), and (3) transfer of resources and material.[195] The Acheson-Lilienthal Plan was more nuanced. But that too stipulated that the U.S. and the Soviet Union would give up information on their atomic facilities in gradual stages. Similarly, the formal handover of atomic facilities to the U.N. would occur in stages. Crucially, the handover of atomic bombs themselves would only occur at the end. The plan did not stipulate when the U.S. would stop manufacturing bombs.[196] The first detailed denunciation of the Baruch Plan in the Soviet press focused on the issue of stages. Why, asked *Pravda*, did the plan allow the U.S. to continue making atomic bombs throughout most of the international control institution process?[197]

The U.N. and particularly the Security Council was dominated by the U.S. and its allies, and so were also suspect to the Soviets. Any controlling international organization, noted the Soviet physicist (and advisor to the Soviet delegation at the UNAEC) D.V. Skobel'tsyn in 1946, would be "in reality, probably... American."[198]

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[190] Craig and Radchenko, *The Atomic Bomb and the Origins of the Cold War*, p. 130.
[191] The public was already war weary and somewhat fearful of atomic war. Herken, pp. 214-16. Boyer, *By the Bomb's Early Light,* pp. 13-15.
[192] Herken, p. 265. Robert Chadwell Williams, *Klaus Fuchs: Atom Spy* (Cambridge, MA: Harvard University Press, 1987).
[193] Susanna Schrafstetter, "'Loquacious...and pointless as ever'? Britain, the United States and the United Nations Negotiations on International Control of Nuclear Energy, 1945-48", *Contemporary British History* 16,4 (Winter 2002), 87-108.
[194] On Soviet concerns, see David Holloway, "The Soviet Union and the creation of the International Atomic Energy Agency", *Cold War History* 16,2 (2016), pp. 177-93. This concern was also voiced by Secretary of Commerce Henry Wallace to Truman in July 1946, see Herken, p. 181.
[195] United States Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945. General: Political and Economic Matters* Volume II (Washington, DC: Government Printing Office, 1946), pp. 69-73. Available at: http://digicoll.library.wisc.edu/cgi-bin/FRUS/FRUS-idx?type=article&did=FRUS.FRUS1945v02.i0005&id=FRUS.FRUS1945v02&isize=M. Accessed 25 April 2019.
[196] That, for example, was Wallace's criticism of the Baruch Plan: Herken, p. 181.
[197] Lieberman, *The Scorpion and the Tarantula*, p. 312.
[198] Holloway, *Stalin and the Bomb*, p. 164.

Such an organization, and so international control itself, could be used against the Soviet Union. This concern can be seen in the Soviet insistence that (1) the UNAEC report to the U.N. Security Council and not the General Assembly (which was perceived to be even more biased towards the U.S.) and (2) that the veto apply to the deliberations of the UNAEC and to international control.[199]

Lastly, both the U.S. and Soviet Union could lose bargaining leverage by offering cooperation first. According to historian John Lewis Gaddis, for example, Truman lost bargaining advantage by unilaterally committing the U.S. to international control in late 1945.[200]

[199] Herken, pp. 84, 174.
[200] John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy during the Cold War* 2nd ed. (Oxford: Oxford University Press, 2005), p.17.

4.10 Preventive Strike

Lesson

Even the most violent of solutions, such as a preventive war or a preventive strike, may gain traction.

Historical Case

During the years of the U.S. atomic monopoly, 1945–1949, many in the U.S. and Britain favored resorting to force to prevent the Soviet Union from obtaining atomic weapons. Generals such as Henry H. "Hap" Arnold, Carl Spaatz, and Curtis LeMay argued this, as did internationalists such as Ely Culbertson.[201] Hawkish intellectuals published books suggesting preventive war. In *If Russia Strikes* (1949), George Eliot, a leading military analyst, called for the U.S. to present an ultimatum to Moscow: accept the Baruch Plan or the U.S. would use atomic bombs against Soviet atomic facilities. Political scientist James Burnham, in his 1947 *Struggle for the World*, called for political subversion to destroy the Communist state, or if that failed, then air strikes on Soviet military targets. *New York Herald Tribune* journalists Joseph and Stewart Alsop called for preventive war in their columns.[202] Even pacifist and socialist-friendly Bertrand Russell called for the U.S. to threaten war as "part of a plan he had developed to promote global peace."[203] As recounted by a member of the audience, in one speech Russell argued that:

> The Soviet Union did not yet possess a nuclear capability but that it would very soon do so, after which all history made it clear that sooner or later there would be a war between the two superpowers that would be infinitely more devastating than either of the two world wars through which he had lived. The only way of preventing this Armageddon, he concluded with remorseless if unpalatable logic, was for America to launch a nuclear attack on the Soviet Union before it acquired the bomb: after that it would be too late.[204]

The following are, in our estimation, the reasons why a preemptive strike or a preventive war was not launched by the U.S. in the late 40s.

Intent and Appetite

There was no public appetite for another major war due to significant war weariness. The public wanted wide-scale demobilization and expressed concern at continued overseas deployments. Truman and other

[201] Russell D. Buhite and WM. Christopher Hamel, "War for Peace: The Question of an American Preventive War against the Soviet Union, 1945–1955", *Diplomatic History* 14,3 (1990), pp. 367–84. Melvyn P. Leffler, "Strategy, Diplomacy, and the Cold War: The United States, Turkey, and NATO, 1945-1952", *The Journal of American History* 71,4 (March 1985), pp. 807-25. Secretary of Defense James Forrestal would write in 1947 that "The years before any possible power can achieve the capability effectively to attack us with weapons of mass destruction are our years of opportunity." Quoted in John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982), p. 62. See also George H. Quester, *Nuclear Monopoly* (New Brunswick: Transaction Publishers, 2000), chapter 4.

[202] Buhite and Hamel, "War for Peace".

[203] David Blitz, "Did Russell Advocate Preventive Atomic War Against the USSR?", *The Journal of Bertrand Russell Studies* 22 (summer 2002), pp. 5-45.

[204] Quoted in Blitz, "Did Russell Advocate Preventive Atomic War Against the USSR?".

politicians responded to this public pressure.[205] An overt act of aggression would not have played well with public opinion and would have been disagreeable to some policymakers who saw it as being against American principles.[206] It was only after 1950 that support for a preventive war against the Soviet Union began to grow appreciably amongst the U.S. public. This, in turn, spurred talk of preventive war amongst policymakers. "For the first time," noted *Newsweek* in February 1950, "some members of Congress were beginning to speculate on what had formerly been an almost forbidden subject - preventive war."[207]

Although many potential supporters of a preventive strike were hawks, there were also policymakers who were instinctively much less hostile to the Soviet Union. In 1950 and 1951, for example, when a preventive war was more openly discussed in policymaking circles, key policymakers such as Secretary of State Dean Acheson expressed significant concern.[208] Hawkish attitudes may have been dampened by the fact that the U.S. military and many in government were overconfident about their atomic lead over the Soviet Union and had underestimated the progress being made by the Soviet program, particularly the Soviet Union's ability to acquire high-grade uranium.[209] Many policymakers were so confident of the U.S. lead that they even opposed the development of a program for detecting Soviet nuclear tests.[210] The U.S. government, in fact, had little information about the Soviet bomb program. If it had had credible information about the progress of the program, this could have acted as a focusing event for a war.[211]

Hawkish attitudes may also have been dampened by the belief, held by many in the U.S. administration, that Soviet expansionism (more a concern than the Soviet atomic program in the 40s) could be contained through diplomacy, alliance building, and initiatives such as the Marshall Plan. There was a general consensus in the U.S. military establishment in the late 40s that the Soviet Union wished to avoid military engagements.[212]

Targeted strikes may have been unpalatable because they would probably have led to general war, which would be very costly: Europe and parts of Asia would likely have been invaded and occupied by the Soviet Union for at

[205] Herken, pp. 214-16; Lieberman, *The Scorpion and the Tarantula*, pp. 227-30; Harry S. Truman, *The Memoirs of Harry S. Truman* volume 1 (New York: Garden City, 1955), pp. 443, 453.
[206] Buhite and Hamel, "War for Peace"; Herken, p. 223. On war weariness and public pressure, see R. Alton Lee, "The Army 'Mutiny' of 1946", *The American Journal of American History* 53,3 (December 1966), pp. 555-71.
[207] Steven Casey, "Selling NSC-68: The Truman Administration, Public Opinion, and the Politics of Mobilization, 1950–51", *Diplomatic History* 29,4 (September 2005), pp. 655-90. Also: "Significance of the H-Bomb, and America's Dilemma", *Newsweek* (12 February 1950), p. 20, cited in Casey, "Selling NSC-68".
[208] Timothy J. Botti, *Ace in the Hole: Why the United States Did Not Use Nuclear Weapons in the Cold War, 1945 to 1965* (Westport, CT: Greenwood Press, 1996), pp. 28-9. On preventive war discussions more broadly, see Marc Trachtenberg, *History and Strategy* (Princeton, NJ: Princeton University Press, 1991), pp. 103-7.
[209] The Pincher war plan, for example, assumed that the U.S. would most probably retain an atomic monopoly until 1956: Herken, p.229. Also: Lawrence Freedman, *The Evolution of Nuclear Strategy* 3rd ed. (London: Palgrave Macmillan, 2003), p. 26.
[210] Herken, p. 300.
[211] In 1953 for example, Truman briefly considered a preventive strike after hearing of the first Soviet hydrogen bomb test. Buhite and Hamel, "War for Peace".
[212] Buhite and Hamel, "War for Peace". Melvyn P. Leffler, "The American Conception of National Security and the Beginnings of the Cold War, 1945-48", *The American Historical Review* 89,2 (April 1984), pp. 346-81.

least a year, and it would have led to millions of Soviet deaths, hundreds of thousands if not millions of U.S. allied deaths, and tens of thousands of U.S. combat deaths.[213]

Military Capabilities

Following demobilization, U.S. armed forces were inadequate for a military defeat of the Soviet Union, and the U.S. was well aware of this. Soviet air forces, radar, and anti-aircraft guns continued to improve through to the fifties.[214] It is also unclear whether the U.S. had the capabilities to carry out a sufficiently effective preventive strike. Soviet atomic facilities were widespread and not easily attacked by the United States. Lack of intelligence meant that U.S. military planners had immense difficulty selecting targets for aerial attack (conventional or atomic) in the late 40s.[215] The U.S. had a poor level of nuclear readiness. They had very few atomic bombs: by the end of 1947, the U.S. only had 13, and by 1948, only 50. There were also issues with bomb assembly and delivery capabilities.[216]

Could There Have Been a Preventive Strike?

Counterfactually, then, a preventive strike would have become a realistic option if a certain number of factors had been present: amongst policymakers, a more alarmist assessment of the Soviet Union's atomic program and its progress, and better intelligence about Soviet atomic facilities. For example, more serious crises in Turkey and the Middle East, then of significant concern for the U.S., may also have helped make a stronger case for a strike against Soviet atomic facilities.[217] In 1953, following the Soviet detonation of an H-bomb, Truman briefly thought about a preventive strike. With the appropriate intelligence, and if the circumstances had been favorable, he may have considered a strike earlier, prior to the Soviet atomic bomb test in 1949.[218] Factors such

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[213]On the *Pincher* plans for a general war in Europe and these crude fatality estimates, see Ross, *American War Plans*, pp. 25-52. Unfortunately, we do not have a clear reference for the estimated fatalities from different war plans.

[214] Although the Soviet Union had demobilized as well, it still had sufficient ground forces to defend itself from a U.S. attack. The United States was aware of this: a Joint Intelligence Committee of the Joint Chiefs of Staff noted in November 1945 that in a war in Europe or mainland Asia, "the Soviets would enjoy a great preponderance in numbers of men against the United States or even against the United States, Great Britain and France." Quoted in: Holloway, *Stalin and the Bomb*, p.231. NSC100, issued in January 1951, estimated that U.S. military strength was 10% of that of the Soviet Union at that time, though could be increased to 20% in the near future. NSC 100, "Recommended Policies and Actions in Light of the Grave World Situation", 11 January 1951, available at: https://www.mtholyoke.edu/acad/intrel/korea/nsc100.htm. Accessed 20 April 2019. The Red Army's 500 divisions at the end of the war were reduced to 175 through demobilization, but these remaining divisions were strengthened with greater firepower and mobility: Holloway, *Stalin and the Bomb*, p.231. More details on Soviet postwar army strength are in Matthew A. Evangelista, "Stalin's Postwar Army Reappraised", *International Security* 7,3 (Winter 1982-1983), pp. 110-38. The West, by contrast, had 375,000 occupying soldiers in Germany and Austria, and another 400,000 in Western Europe (excluding Britain). See Holloway, *Stalin and the Bomb*, p.232. There were also rapid improvements in early warning radar, anti-aircraft guns, jet fighters, and strategic bombers (including the Tu-4) in the late forties. Holloway, *Stalin and the Bomb*, pp.235-6, 243; Buhite and Hamel, "War for Peace".

[215] Ken Young, "US 'Atomic Capability' and the British Forward Bases in the Early Cold War", *Journal of Contemporary History* 42,1 (January 2007), pp. 117-36.

[216] Robert S. Norris and Hans M. Kristensen, "Global Nuclear Weapons Inventories, 1945–2010", *Bulletin of the Atomic Scientists* 66,4 (2010), pp. 77-83. David Alan Rosenberg, "American Atomic Strategy and the Hydrogen Bomb Decision", *The Journal of American History* 66,1 (June 1979), pp. 62-87.

[217] On U.S. concerns over Soviet expansionism in Asia, see Melvyn P. Leffler, "Strategy, Diplomacy, and the Cold War: The United States, Turkey, and NATO, 1945-1952", *The Journal of American History* 71, 4 (March 1985), pp. 807-25.

[218] Buhite and Hamel, "War for Peace".

as less demobilization of military forces and less war weariness amongst the public may also have increased the chances of a preventive strike as a realistic option.

5. Conclusion and Extensions

Our study of attempts at the international control of atomic energy in 1945–46 suggests that radical schemes for international governance can get widespread support, even from skeptics, but that the support can be tenuous and fleeting. Technical experts can bolster support, but muddled policymaking, secrecy, and concerns over security can undermine it. Our lessons point to the difficulties inherent in attempting to achieve international control and to the deep intertwining of technical and political issues. It is, in fact, amazing that debates on international control got as far as they did in 1946 (that is, in fact, our first lesson). There are, however, opportunities for those pushing towards international governance: even cynics can support proposals, and public opinion and technical expertise can be powerful sources of support.

The history of atomic international control is too rich and broad to be fully captured in this report, and can provide many other lessons for future powerful technologies. Questions and topics worthy of further inquiry include:

- The role of activists and activism. How did activists form and maintain their organizations? How were they funded, and did that matter? What tactics and organizations were especially successful?
- How are the politics of international control impacted by traditionally important features of the political landscape, such as partisan divides, the judiciary, strong executives, lame-duck presidents, strong or weak incumbents, upcoming elections, etc.?
- Can we say more about the role and dynamics of the public sphere? What ideas or framings were most likely to resonate? What communications were most impactful (e.g., lectures, radio talks, interviews, presidential speeches)?
- The military responded in complex and varied ways to atomic weapons. More work should be done to understand the extent to which these responses were shaped by organizational interest, ideas, personal idiosyncrasies, and other factors.

Other moments in the global politics of nuclear weapons and of other powerful technologies also warrant study. These include:

- Earlier negotiations revolving around the abolition of large classes of technologies, especially the naval arms treaties of the 1920s, the 1925 Geneva Protocol on the prohibition of the use of chemical weapons, and the discussions at the 1932 Geneva disarmament conference (e.g., aviation) may give useful insights into possible directions for modern transformative technologies.
- Negotiations over the Strategic Arms Limitation Talks agreement (signed 1972), the Anti-Ballistic Missile Treaty (1972), the Biological Weapons Convention (1972), the Strategic Arms Limitation Talks II agreement (1979), the Strategic Arms Reduction Treaty (1991), and the Chemical Weapons Convention (1993) may also be relevant.[219]

[219] There is a very large literature on these agreements and efforts. For an overview of these, see Robert E. Williams, Jr., and Paul R. Viotti, *Arms Control: History, Theory, and Policy* volume 1: Foundations of Arms Control (Santa Barbara, CA: ABC-CLIO, 2012), chapters 14,15,16,17,18.

Finally, it is worth a reminder that all of these historical episodes provide only circumscribed lessons for future powerful technologies, such as AI. None of them offer a clean analogy. Rather, they are sources of inspiration, insight into mechanisms and dynamics, and examples of how politics can play out.

6. References

United States Official Documents

Bush, Vannevar, and James B. Conant, "Memorandum", 30 September 1944. Available at: https://nsarchive2.gwu.edu//NSAEBB/NSAEBB162/1.pdf. Accessed 22 September 2018.

Barnard, Chester I., J. R. Oppenheimer, Charles A. Thomas et al., *A Report on the International Control of Atomic Energy* (Washington, DC: The State Department, 1946).

"Memorandum by the Director of the Office of Scientific Research and Development (Bush) to the Secretary of State", 5 November 1945, in U.S. Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945*. General: Political and Economic Matters Volume II (Washington, DC: Government Printing Office, 1946), pp. 69-73. Available at: http://digicoll.library.wisc.edu/cgi-bin/FRUS/FRUS-idx?type=article&did=FRUS.FRUS1945v02.i0005&id=FRUS.FRUS1945v02&isize=M. Accessed 24 April 2019.

Memorandum, "Draft Proposals on Atomic Energy for Submission to Soviet Government", 10 December 1945, in U.S. Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945*. General: Political and Economic Matters Volume II (Washington, DC: Government Printing Office, 1946). Available at: https://history.state.gov/historicaldocuments/frus1945v02/d38. Accessed 22 April 2019.

"Memorandum by the Commanding General, Manhattan Engineer District (Groves)", 2 January 1946, in U.S. Department of State, *Foreign Relations of the United States, 1946*. General; The United Nations, Volume I (Washington, DC: Government Printing Office, 1947), document 600. Available at: https://history.state.gov/historicaldocuments/frus1946v01/d600. Accessed 24 April 2019.

Notes of the Interim Committee Meeting, Thursday 31 May 1945 (31 May 1945). Available at: http://www.nuclearfiles.org/menu/key-issues/nuclear-weapons/history/pre-cold-war/interim-committee/interim-committee-informal-notes_1945-05-31.htm, accessed 15 October 2019.

NSC 100, "Recommended Policies and Actions in Light of the Grave World Situation", 11 January 1951, available at: https://www.mtholyoke.edu/acad/intrel/korea/nsc100.htm. Accessed 20 April 2019.

Stimson, Henry, *Memorandum Discussed with the President* (25 April 1945). Available at: http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-04-25.htm, accessed 15 October 2019.

Henry Stimson, *Memorandum on the Effects of the Atomic Bomb* (11 September 1945). Available at: http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-09-11.htm, accessed 16 October 2019.

U.S. Department of State, *Documents on Disarmament* volume 1 1945-1956 (Washington, DC: Department of State, 1960), pp. 17-24.

U.S. Department of State, *United States Atomic Energy Proposals* (Washington, DC: U.S. Department of State, 1946).

Other Primary Sources

"Report of the Meeting of the Ministers of Foreign Affairs of the Union of Soviet Socialist Republics, the United States of America, the United Kingdom", 27 December 1945. At http://avalon.law.yale.edu/20th_century/decade19.asp. Accessed 24 April 2019.

"Significance of the H-Bomb, and America's Dilemma", *Newsweek* (12 February 1950).

"The Carnegie Draft Convention", *Bulletin of the Atomic Scientists* 1&2,2 (1 July 1946), pp. 15-19.

"The American Proposal for International Control Presented by Bernard Baruch", *Bulletin of the Atomic Scientists* 1&2 (1 July 1946) pp. 3-5, 10. Also at: http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml. Accessed 25 April 2019.

"The Russian Proposal for International Control", *Bulletin of the Atomic Scientists* 1&2, 2 (1 July 1946), pp. 8-10.

"United Nations and Atomic Energy....", *Bulletin of the Atomic Scientists* 3,2 (1947), pp. 55-6.

Atomic Scientists of Chicago, *The Atomic Bomb: Facts and Implications* (Chicago: The Atomic Scientists of Chicago, 1946).

Bohr, Niels, "Niels Bohr's Memorandum to President Roosevelt", July 1944. Available at: http://www.atomicarchive.com/Docs/ManhattanProject/Bohrmemo.shtml. Accessed 22 September 2018.

Cantril, Hadley, *Public Opinion 1935-1946* (Princeton, NJ: Princeton University Press, 1951).

Leviero, Anthony, "Denaturing Guard on Atom Not Sure", *New York Times* (10 April 1946), p. 16.

Lippmann, Walter, "Mr. Baruch and the Veto", *Washington Post* (20 June 1946).

Oppenheimer, J.R., "The Atom Bomb as a Great Force for Peace", *The New York Times* (9 June 1946).

Smyth, Henry DeWolf, *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb Under the Auspices of the United States Government, 1940-1945* (Stanford: Stanford University Press, 1989).

Szilard, Leo, "Calling for a Crusade", *Bulletin of the Atomic Scientists* 3,4-5 (May 1947), pp. 102-6, 125.

Truman, Harry S., *The Memoirs of Harry S. Truman* volume 1 (New York: Garden City, 1955).

Truman, Harry S., *Memoirs* Volume II Years of Trial and Hope (New York: Doubleday and Company, 1956).

Wright, Quincy, "Draft for a Convention on Atomic Energy", *Bulletin of the Atomic Scientists* 1 (1 April 1946), pp. 11-13.

Secondary Sources

Aaserud, Finn, "The Scientist and the Statesmen: Niels Bohr's Political Crusade during World War II", *Historical Studies in the Physical and Biological Sciences* 30,1 (1999), pp. 1-47.

Baer, George W., *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford: Stanford University Press, 1996).

Beisner, Robert L., *Dean Acheson: A Life in the Cold War* (Oxford: Oxford University Press, 2006).

Bernstein, Barton J., "The Quest for Security: American Foreign Policy and International Control of Atomic Energy, 1942-1946", *The Journal of American History* 60,4 (March 1974), 1003-1044.

Bernstein, Barton J., "Roosevelt, Truman, and the Atomic Bomb, 1941-1945: A Reinterpretation", *Political Science Quarterly* 90,1 (Spring 1975), pp. 23-69.

Bernstein, Barton J., "The Uneasy Alliance: Roosevelt, Churchill, and the Atomic Bomb, 1940-1945", *The Western Political Quarterly* 29,2 (June 1976), pp. 202-30.

Bernstein, Barton J., "Scientists and Nuclear Weapons in World War II", in Thomas W. Zeiler and Daniel M. DuBois (eds.), *A Companion to World War II* volume 1 (Oxford: Wiley-Blackwell, 2013), pp. 516-48.

Bird, Kai, and Martin J. Sherwin, *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer* (New York: Vintage Books, 2006).

Blitz, David, "Did Russell Advocate Preventive Atomic War Against the USSR?", *The Journal of Bertrand Russell Studies* 22 (summer 2002), pp. 5-45.

Nick Bostrom, Allan Dafoe, and Carrick Flynn, "Policy Desiderata for Superintelligent AI: A Vector Field Approach" (2018). Available at: https://www.nickbostrom.com/papers/aipolicy.pdf, accessed 28 April 2020.

Bostrom, Nick, "The Vulnerable World Hypothesis", *Global Policy* (2019), doi: 10.1111/1758-5899.12718.

Botti, Timothy J., *Ace in the Hole: Why the United States Did Not Use Nuclear Weapons in the Cold War, 1945 to 1965* (Westport, CT: Greenwood Press, 1996).

Boyer, Paul, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (New York: Pantheon Books, 1985).

Broscious, David, "Longing for International Control, Banking on American Superiority: Harry S Truman's Approach to Nuclear Weapons", in John Lewis Gaddis et al (eds.), *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945* (Oxford: Oxford University Press, 1999), pp. 15-38.

Buhite, Russell D., and WM. Christopher Hamel, "War for Peace: The Question of an American Preventive War against the Soviet Union, 1945–1955", *Diplomatic History* 14,3 (1990), pp. 367–84.

Cameron, James, *The Double Game The Demise of America's First Missile Defense System and the Rise of Strategic Arms Limitation* (New York: Oxford University Press, 2017).

Carnegie, Allison, and Austin Carson, "The Disclosure Dilemma: Nuclear Intelligence and International Organizations", *The American Journal of Political Science* 63,2 (2019), pp. 269-285.

Carson, A., "Facing Off and Saving Face: Covert Intervention and Escalation Management in the Korean War", I*nternational Organization* 70,1 (2016), pp. 103-31.

Casey, Steven, "Selling NSC-68: The Truman Administration, Public Opinion, and the Politics of Mobilization, 1950–51", *Diplomatic History* 29,4 (September 2005), pp. 655-90.

Cihon, Peter, Matthijs M. Maas, and Luke Kemp, "Should Artificial Intelligence Governance be Centralised? Design Lessons from History", *Proceedings of the 2020 AAAI/ACM Conference on AI, Ethics, and Society (AIES '20), February 7–8, 2020, New York, NY, USA* (2020). https://doi.org/10.1145/3375627.3375857.

Coe, Andrew J., and Jane Vaynman. "Why Arms Control Is So Rare", *American Political Science Review* 114,2 (2020), pp. 342–55.

Curatola, John M., *Bigger Bombs for a Brighter Tomorrow: Strategic Air Command and American War Plans at the Dawn of the Atomic Age, 1945-1950* (Jefferson, NC: MacFarland, 2016).

Dafoe, Allan, A*I Governance: A Research Agenda* (Oxford: Future of Humanity Institute, 2018). Available at: https://www.fhi.ox.ac.uk/wp-content/uploads/GovAIAgenda.pdf, accessed 27 May 2019.

Davis, Lynn Etheridge, *The Cold War Begins: Soviet-American Conflict Over Eastern Europe* (Princeton, NJ: Princeton University Press, 1974), chapters 7, 8, and 9.

Davis, Zachary S., "The Realist Nuclear Regime", *Security Studies* 2,3-4 (1993), pp. 79-99.

DeVolpi, A., "Denaturing Fissile Materials", *Progress in Nuclear Energy* 10,2 (1982), pp. 161-220.

Divine, Robert A., *Second Chance: The Triumph of Internationalism in America During World War II* (New York: Atheneum, 1971).

Donnelly, Jack, *Realism and International Relations* (Cambridge: Cambridge University Press, 2004).

Donovan, Robert J., *Conflict and Crisis: The Presidency of Harry S. Truman, 1945-1948* (Columbia, MO: University of Missouri Press, 1996).

Evangelista, Matthew A., "Stalin's Postwar Army Reappraised", *International Security* 7,3 (Winter, 1982-1983), pp. 110-38.

Farmelo, Graham, *Churchill's Bomb: How the United States Overtook Britain in the First Nuclear Arms Race* (New York: Basic Books, 2013).

Freedman, Lawrence, *The Evolution of Nuclear Strategy* 3rd ed. (London: Palgrave Macmillan, 2003).

Gaddis, John Lewis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982).

Gaddis, John Lewis, *The Cold War* (London: Allen Lane, 2005).

Gaddis, John Lewis, *Strategies of Containment: A Critical Appraisal of American National Security Policy during the Cold War* 2nd ed. (Oxford: Oxford University Press, 2005).

Gordin, Michael, *Red Cloud at Dawn: Truman, Stalin, and the End of the Atomic Monopoly* (New York: Farrar, Straus and Giroux, 2009).

Gormly, James L., "The Washington Declaration and the 'Poor Relation': Anglo-American Atomic Diplomacy, 1945-46", *Diplomatic History* 8,2 (April 1984), pp. 125-143.

Grant, James, *Bernard M. Baruch: The Adventures of a Wall Street Legend* (New York: John Wiley & Sons, 1997).

Graybar, Lloyd J., "The 1946 Atomic Bomb Tests: Atomic Diplomacy or Bureaucratic Infighting", *The Journal of American History* 72,4 (March 1986), pp. 888-907.

Hawkins, Helen S. et al (eds.), *Toward a Livable World: Leo Szilard and the Crusade for Nuclear Arms Control* (Cambridge, MA: The MIT Press, 1987).

Helmreich, Jonathan E., *Gathering Rare Ores: The Diplomacy of Uranium Acquisition, 1943-1954* (Princeton, NJ: Princeton University Press, 1986).

Herken, Gregg, *The Winning Weapon: The Atomic Bomb in the Cold War 1945-1950* 2nd edition (Princeton, NJ: Princeton University Press, 1988).

Herken, Gregg, "'A Most Deadly Illusion': The Atomic Secret and American Nuclear Weapons Policy, 1945-1950", *Pacific Historical Review* 49,1 (February 1980), pp. 51-76.

Hershberg, James, *James B. Conant: Harvard to Hiroshima and the Making of the Nuclear Age* (New York: Alfred A. Knopf, 1993).

Hewlett, Richard G., and Oscar E. Anderson, Jr., *A History of the United States Atomic Energy Commission* volume 1 The New World 1939/1946 (University Park, PA: The University of Pennsylvania Press, 1962).

Hogan, Michael J., *A Cross of Iron: Harry S. Truman and the Origins of the National Security State* (Cambridge: Cambridge University Press, 2000).

Hogan, J., and S. Feeney, "The Role of the Political Entrepreneur in the Context of Policy Change and Crisis", Midwest Political Science Association Annual Conference, Chicago, April 14th 2013. Available at https://arrow.dit.ie/cgi/viewcontent.cgi?article=1015&context=buschgracon. Accessed 22 April 2019.

Holloway, David, "The Soviet Union and the creation of the International Atomic Energy Agency", *Cold War History* 16,2 (2016), pp. 177-93.

David Holloway, "The Soviet Union and the Baruch Plan". Https://www.wilsoncenter.org/blog-post/soviet-union-and-baruch-plan, accessed 13 June 2020.

Kaiser, David, "The Atomic Secret in Red Hands? American Suspicions of Theoretical Physicists During the Early Cold War", *Representations* 90,1 (Spring 2005), pp 28-60.

Kaplan, Edward, *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction* (Ithaca, NY: Cornell University Press, 2015).

Kaplan, Fred, *The Wizards of Armageddon* 2nd edition (Stanford: Stanford University Press, 1991),

Kimball-Smith, Alice, *A Peril and a Hope: The Scientists' Movement in America: 1945-47* (Chicago: The University of Chicago Press, 1965).

Lanouette, William, and Bela Silard, *Genius in the Shadows: A Biography of Leo Szilard, the Man Behind the Bomb* (New York: C. Scribner's Sons, 1992).

Lee, R. Alton, "The Army 'Mutiny' of 1946", *The American Journal of American History* 53,3 (December 1966), pp. 555-71.

Leffler, Melvyn P., "Strategy, Diplomacy, and the Cold War: The United States, Turkey, and NATO, 1945-1952", *The Journal of American History* 71,4 (March 1985), pp. 807-25.

Leffler, Melvyn P., "The American Conception of National Security and the Beginnings of the Cold War, 1945-48", *The American Historical Review* 89,2 (April 1984), pp. 346-81.

Lieberman, Joseph I., *The Scorpion and the Tarantula: The Struggle to Control Atomic Weapons 1945-1949* (Boston: Houghton Mifflin Company, 1970).

Lindblom, Charles E., "The Science of 'Muddling Through'", *Public Administration Review* 19,2 (Spring 1959), pp. 79-88.

Lipsey, Richard G., Kenneth I. Carlaw, and Clifford T. Bekar, *Economic Transformations: General Purpose Technologies and Long-Term Economic Growth* (Oxford: Oxford University Press, 2005).

Maas, Matthijs M., "How Viable is International Arms Control for Military Artificial Intelligence? Three Lessons from Nuclear Weapons", *Contemporary Security Policy* 40,3 (2019), pp. 285-311.

Maddock, Shane J., *Nuclear Apartheid: The Quest for American Atomic Supremacy from World War II to the Present* (Chapel Hill, NC: The University of North Carolina Press, 2010).

Malloy, Sean L., *Atomic Tragedy: Henry L. Stimson and the Decision to Use the Bomb Against Japan* (Ithaca, NY: Cornell University Press, 2008).

Mark, Eduard, "The Turkish War Scare of 1946," in Melvyn P. Leffler and David S. Painter (eds.), *Origins of the Cold War: An International History* 2nd ed. (New York: Routledge, 2005), pp. 112-33.

Mayers, David, *George Kennan and the Dilemmas of US Foreign Policy* (Oxford: Oxford University Press, 1988).

Mazower, Mark, *Governing the World: The History of an Idea* (New York: Penguin, 2012).

Meilinger, Phillip S., "The Admirals' Revolt of 1949: Lessons for Today", *Parameters* 19,3 (September 1989), pp. 81-96.

Miller, Steven, *Strategy and Nuclear Deterrence: An International Security Reader* (Princeton, NJ: Princeton University Press, 1984).

Miscamble, Wilson D., *The Most Controversial Decision: Truman, the Atomic bombs, and the Defeat of Japan* (Cambridge: Cambridge University Press, 2011).

Monk, Ray, *Robert Oppenheimer: A Life Inside the Center* (New York: Doubleday, 2012).

Morgan, Patrick M., "Elements of a General Theory of Arms Control", Robert E. Williams and Paul R. Viotti (eds.), *Arms Control: History, Theory, and Policy* (Santa Barbara, CA: Praeger, 2012), pp. 15 - 40.

Norris, Robert S., *Racing for the Bomb: The True Story of General Leslie R. Groves, the Man behind the Birth of the Atomic Age* (Hanover, NH: Steerforth Press, 2002).

Norris, Robert S., and Hans M. Kristensen, "Global Nuclear Weapons Inventories, 1945–2010", *Bulletin of the Atomic Scientists* 66,4 (2010), pp. 77-83.

Offner, Arnold A., *Another Such Victory: President Truman and the Cold War, 1945-1953* (Stanford: Stanford University Press, 2002).

Paek, Hye-Jin, and Thomas Hove, "Risk Perceptions and Risk Characteristics", *Oxford Research Encyclopedias: Communication*. Available at: https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-283, accessed 1 June 2019.

Payne, Kenneth, "Artificial Intelligence: A Revolution in Strategic Affairs?", *Survival: Global Politics and Strategy* 60,5 (2018), pp. 7-32.

Raine, Fernande Scheid, "The Iranian Crisis of 1946 and the Origins of the Cold War" in Melvyn P. Leffler and David S. Painter (eds.), *Origins of the Cold War: An International History* 2nd ed. (New York: Routledge, 2005), pp. 93-111.

Plokhy, S. M., *Yalta: The Price of Peace* (New York: Penguin, 2011).

Roser, Max, and Mohamed Nagdy, "Nuclear Weapons", *OurWorldInData.org* (2013). Retrieved from: https://ourworldindata.org/nuclear-weapons. Accessed 26 August 2020.

Powaski, Ronald E., *March to Armageddon: The United States and the Nuclear Arms Race, 1939 to the Present* (Oxford: Oxford University Press, 1987).

Quester, George H., *Nuclear Monopoly* (New Brunswick: Transaction Publishers, 2000).

Rhodes, Richard, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon and Schuster, 1995).

Rosenberg, David Alan, "American Atomic Strategy and the Hydrogen Bomb Decision", *The Journal of American History* 66,1 (June 1979), pp. 62-87.

Rosenberg, David Alan, "U.S. Nuclear Stockpile, 1945 to 1950", *Bulletin of the Atomic Scientists* 38,5 (May 1982), pp. 25-30.

Rosenberg, David Alan, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960", *International Security* 7,4 (Spring 1983), pp. 3-71.

Roser, Max, and Mohamed Nagdy, "Nuclear Weapons", *OurWorldInData.org* (2013).

Ross, Steven T., *American War Plans 1945-1950* (New York: Routledge, 2013).

Sacks, Samm, "The Ripple Effects of the China Chip Hacking Story", *War on the Rocks* (17 October 2018). https://warontherocks.com/2018/10/the-ripple-effects-of-the-china-chip-hacking-story. Accessed 24 April 2019.

Schrafstetter, Susanna, "'Loquacious...and pointless as ever'? Britain, the United States and the United Nations Negotiations on International Control of Nuclear Energy, 1945-48", *Contemporary British History* 16,4 (Winter 2002), 87-108.

Schrecker, Ellen, *Many Are the Crimes: McCarthyism in America* (Princeton, NJ: Princeton University Press, 1999).

Schwartz, Stephen I., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, DC: Brookings Institution Press, 1998).

Schweber, Silvan S., *Einstein & Oppenheimer: The Meaning of Genius* (Cambridge, MA: Harvard University Press, 2008).

Sherwin, Martin J., "Niels Bohr and the First Principles of Arms Control", in Herman Feshbach, Tetsuo Matsui, and Alexandra Oleson (eds.), *Niels Bohr: Physics and the World* (Abingdon: Routledge, 1998), pp. 319-30.

Sherwin, Martin J., *A World Destroyed: Hiroshima and Its Legacies* 3rd edition (Stanford: Stanford University Press, 2003).

Sibley, Katherine A.S., *Red Spies in America: Stolen Secrets and the Dawn of the Cold War* (Lawrence, KS: University of Kansas Press, 2004).

Steury, Donald P., "How the CIA Missed Stalin's Bomb: Dissecting Soviet Analysis, 1946-50". Available at: https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol49no1/html_files/stalins_bomb_3.html, accessed 1 June 2019.

Till, C.E., "Denatured Fuel Cycles", in Joseph L. Fowler, Cleland H. Johnson, Charles D. Bowman (eds.), *Nuclear Cross Sections for Technology: Proceedings of the International Conference* vol 13 (Oak Ridge, TN: Oak Ridge National Laboratory, 1980), pp. 115-18.

Trachtenberg, Marc, *History and Strategy* (Princeton, NJ: Princeton University Press, 1991).

Wang, Jessica, *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (Chapel Hill, NC: University of North Carolina Press, 1999).

Whitaker, Reginald, *Cold War Canada: The Making of a National Insecurity State, 1945-1957* (Toronto: University of Toronto Press, 1994).

Williams, Robert Chadwell, *Klaus Fuchs: Atom Spy* (Cambridge, MA: Harvard University Press, 1987).

Williams, Jr., Robert E., and Paul R. Viotti, *Arms Control: History, Theory, and Policy* volume 1: Foundations of Arms Control (Santa Barbara, CA: ABC-CLIO, 2012).

Wittner, Lawrence S., *The Struggle Against the Bomb* volume 1: One World or None: A History of the World Nuclear Disarmament Movement Through 1953 (Stanford: Stanford University Press, 1993).

Young, Ken, "US 'Atomic Capability' and the British Forward Bases in the Early Cold War", *Journal of Contemporary History* 42,1 (January 2007), pp. 117-36.

Zachary, G. Pascal, *Endless Frontier: Vannevar Bush, Engineer of the American Century* (New York: Simon and Schuster, 2018).

Zaidi, Waqar, "'Aviation Will Either Destroy or Save Our Civilization': Proposals for the International Control of Aviation, 1920-1945", *Journal of Contemporary History* 46,1 (2011), pp. 150-78.

Zaloga, Steve, *Target America: the Soviet Union and the Strategic Arms Race, 1945-1964* (Novato, CA: Presido, 1993).

Ziegler, Charles A., and David Jacobson, *Spying Without Spies: Origins of America's Secret Nuclear Surveillance System* (Westport, CT: Praeger, 1995).

Ziegler, Charles A., "Intelligence Assessments of Soviet Atomic Capability, 1945-1949: Myths, Monopolies and Maskirovka", *Intelligence and National Security* 12,4 (1997), pp. 1-24.

Zubok, Vladislav, and Constantine Pleshakov, *Inside the Kremlin's Cold War: From Stalin to Khrushchev* (Cambridge, MA: Harvard University Press, 1996).

Zubok, Vladislav M., "Stalin and the Nuclear Age", in John Lewis Gaddis et al (eds.), *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945* (Oxford: Oxford University Press, 1999), pp. 39-61.

Zubok, Vladislav M., *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachev* (Chapel Hill, NC: University of North Carolina Press, 2007),

Zwetsloot, Remco, and Allan Dafoe, "Thinking About Risks from AI: Accidents, Misuse and Structure", Lawfare (11 February 2019). Available at: https://www.lawfareblog.com/thinking-about-risks-ai-accidents-misuse-and-structure, accessed 27 May 2019.

Appendix A: Timeline

1941	
Oct 9	President F.D. Roosevelt gives go ahead for the development of the atomic bomb.
Dec 6	Roosevelt authorizes the Manhattan Engineering District for the creation of the atomic bomb.
1942	
Sept 23	Colonel Leslie Groves placed in charge of the Manhattan Project. Physicist J. Robert Oppenheimer appointed Scientific Director.
1944	
May 16	Eminent Danish physicist Niels Bohr meets British Prime Minister Winston Churchill in London in an effort to convince him of the dangers of atomic warfare and an atomic arms race and to suggest international control of atomic energy. The meeting fails.
Aug 26	Niels Bohr meets Roosevelt in Washington, D.C., in an effort to convince him of the dangers of atomic warfare and an atomic arms race and to suggest international control of atomic energy. Roosevelt appears receptive to Bohr's arguments.
1945	
Feb 4-11	Yalta Conference. A high point of Soviet-West relations.
March	Rapid deterioration in U.S.-Soviet relations. "Relations sank to their lowest point since 1941" because the Soviets wouldn't let U.S planes or officers into Poland to rescue American POWs who were not doing well; Stalin feared attempts to infiltrate and surveil.[220] Other crises developed on Soviet conduct in Romania and Poland; the Bern crisis emerged when Stalin feared the West would make a separate peace. On March 24, Roosevelt "banged his fists on the arms of his wheelchair and said: 'Averell is right; we can't do business with Stalin. He has broken every one of his promises he made at Yalta.'"[221]
April 12	Roosevelt dies. Harry Truman is named the 33rd President of the United States.
May 14, 31 and June 1	Interim Committee deliberations. May 14: Scientific advisors Vannevar Bush and James B. Conant share memo warning of atomic arms race.[222]
June 26	The United Nations charter is signed by delegates of fifty nations at San Francisco.

[220] S. M. Plokhy, *Yalta: The Price of Peace* (New York: Penguin, 2011), p. 341.
[221] Robert J. Donovan, *Conflict and Crisis: The Presidency of Harry S. Truman, 1945-1948* (Columbia, MO: University of Missouri Press, 1996), p. 11.
[222] Zachary, *Endless Frontier*, p. 243.

July 16	Trinity Test of the first atomic bomb at Alamogordo, New Mexico.
July 17 - Aug 2	Potsdam Conference.
Aug 6	U.S. drops atomic bomb on Hiroshima.
Aug 9	U.S. drops atomic bomb on Nagasaki.
Sept 11 - Oct 2	First meeting of Council on Foreign Ministers. Held in London. Secretary of State James F. Byrnes represents the U.S. and attempts to carry out negotiations without involving other policymaking elites in the U.S., including others in the State Department. Byrnes hoped that the atomic bomb would help in negotiations with Soviet counterpart Molotov, but it did not. [223]
Sept 21	Secretary of War Henry L. Stimson presents his proposal for international control to the Cabinet.[224]
Oct	Representative Andrew May (chairman of the House Military Affairs Committee) and Senator Edwin C. Johnson (chairman of the Senate Military Affairs Committee) introduce the May-Johnson Bill in Congress on the proposed domestic atomic energy agency. The bill got stuck over the coming weeks and was eventually supplanted by the McMahon Bill.
Nov c. 1-15	Vannevar Bush presents his plan for international control to the State Department, the so-called Bush Plan. This plan formed the basis for State Department thinking on atomic cooperation with the Soviet Union in December 1945.[225]
Nov 15	Britain, Canada, and the U.S. agree on the Three Nation Declaration on atomic energy.
Dec 10	The State Department's Cohen-Pasvolsky Committee completes a plan for the international control of atomic energy. This plan would inform Secretary of State Byrnes' negotiations with the Soviets in Moscow in December 1945.
Dec 20	Senator Brien McMahon introduces into the Senate legislation for an alternative civilian-oriented atomic energy bill (known as the McMahon Bill).

[223] "Since the start of the council, therefore, it had become increasingly apparent to Byrnes that the bomb was a bust as a hoped-for master card in diplomacy. As the conference continued, moreover, it began to dawn on him that America's atomic monopoly, far from being an asset at London, might be instead a diplomatic liability there." Herken, p.49.
[224] Powaski, *March to Armageddon,* pp.30-1.
[225] The Bush memo can be found at United States Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945. General: Political and Economic Matters* Volume II (Washington, DC: Government Printing Office, 1946), pp. 69-73. Available at: http://digicoll.library.wisc.edu/cgi-bin/FRUS/FRUS-idx?type=article&did=FRUS.FRUS1945v02.i0005&id=FRUS.FRUS1945v02&isize=M. Accessed 24 April 2019. For context see: Bernstein, "The Quest for Security; Zachary, *Endless Frontier*, pp. 309-10.

Dec 16 - 26	The second Conference of Foreign Ministers held at Moscow. Attended by the United States (Secretary of State James F. Byrnes), the United Kingdom (Ernest Bevin), and the Soviet Union (Vyacheslav Molotov). Byrnes attends with the aim of negotiating a pathway to cooperative control of the atomic bomb with the Soviet Union, based on the Cohen-Pasvolsky plan. The conference is partially successful, leading to several agreed points between the Soviet Union and the United States (see below).[226]
Dec 27	Communique issued after the Moscow Conference. Includes an agreement on the establishment of a United Nations commission for the control of atomic energy.[227]
1946	
Jan 2	General Groves releases his memorandum on atomic weapons to Congress: *Our Army of the Future—As Influenced by Atomic Weapons*.[228]
Jan 24	U.N. General Assembly passes a resolution creating the U.N. Atomic Energy Commission.
Feb 3	Columnist Drew Pearson publishes a report revealing that a Soviet spy ring, led by British physicist Alan Nunn May, had been discovered in Canada.
Feb 22	George Kennan, U.S. chargé d'affaires in Moscow, sends his "Long Telegram" on the Soviet Union.
March 5	Former British Prime Minister Winston Churchill delivers his "Iron Curtain" speech at Fulton, Missouri.
March 18	Financier Bernard Baruch appointed as U.S. delegate to the U.N. Atomic Energy Commission.
April 1	Political scientist Quincy Wright releases his proposal for international control, the "Draft for a Convention on Atomic Energy".[229]
June	The Carnegie Endowment for International Peace releases its proposal for international control, titled "Draft Convention of the Carnegie Endowment Committee on Atomic Energy".[230]
June 9	J. Robert Oppenheimer publishes an article in the *New York Times* explaining his position on international control. The article is a defense of the Acheson-Lilienthal Report and, thus, implicitly a criticism of the Baruch Plan.[231]

[226] Herken, pp. 69-85.
[227] "Report of the Meeting of the Ministers of Foreign Affairs of the Union of Soviet Socialist Republics, the United States of America, the United Kingdom", 27 December 1945. At: http://avalon.law.yale.edu/20th_century/decade19.asp. Accessed 24 April 2019. Herken, pp. 87-8.
[228] "Memorandum by the Commanding General, Manhattan Engineer District (Groves)", 2 January 1946, in U.S. Department of State, *Foreign Relations of the United States,1946*. General; The United Nations, Volume I (Washington, DC: Government Printing Office, 1947), document 600. Available at: https://history.state.gov/historicaldocuments/frus1946v01/d600. Accessed 24 April 2019
[229] Quincy Wright, "Draft for a Convention on Atomic Energy", *Bulletin of the Atomic Scientists* 1 (1 April 1946), pp. 11-3.
[230] "The Carnegie Draft Convention", *Bulletin of the Atomic Scientists* 1-2,2 (1 July 1946), pp. 15-19.
[231] J.R. Oppenheimer, "The Atom Bomb as a Great Force for Peace", *The New York Times* (9 June 1946).

June 14	Baruch presents the Baruch Plan for international control at the U.N. Atomic Energy Commission.
June 19	Andrei Gromyko presents the Gromyko Plan at the U.N. Atomic Energy Commission and states that the Soviet Union would not accept any revision of the veto for atomic issues.
July 1	U.S. conducts its first postwar atomic bomb test ("Shot Able") at Bikini Atoll in the Marshall Islands.
July 25	U.S. conducts its second postwar atomic bomb test ("Shot Baker") at Bikini Atoll in the Marshall Islands.
Aug 1	President Truman signs the Atomic Energy Act. This establishes the Atomic Energy Commission (AEC) which assumes responsibility for all Manhattan Engineering District (MED) properties.
Sept 12	Secretary of Commerce Henry Wallace gives a prominent speech in New York criticizing U.S. policy towards the Soviet Union, including the Baruch Plan.
Sept 18	A July 23 letter from Wallace to Truman is leaked to the press. The letter attacks the Baruch Plan.
Sept 20	Truman asks for Wallace's resignation as Secretary of Commerce, and receives it.
Nov 13	The UNAEC approves, by a ten-to-two vote, the U.S. proposal to issue a report to the U.N. Security Council by the end of the year.
Dec 26	The Soviet atomic program achieves its first chain reaction in an experimental nuclear reactor.
1947	
Jan 1	The U.S. Atomic Energy Commission takes over the Manhattan Project's research and production facilities from the Manhattan Engineer District.
Jan 4	Bernard Baruch's wish to resign as U.S. representative on the UNAEC is accepted by Truman.
Jan 5	Bernard Baruch and his group of advisors resign from the UNAEC. Baruch is replaced by former Senator Warren R. Austin as the U.S. representative to the UNAEC.[232]
1949	
Aug 29	The Soviet Union explodes its first atomic bomb, near Semipalatinsk.

[232] "United Nations and Atomic Energy....", *Bulletin of the Atomic Scientists* 3,2 (1947), pp. 55-56.

Appendix B: Key Historical Figures

Scientists

Bohr, Niels (1885–1962) - Senior and highly respected Danish theoretical physicist who served as an advisor to the British government in 1944–45 and visited the U.S. at that time, working briefly on the Manhattan Project. Concerned with the development of the atomic bomb, he met Churchill and then Roosevelt in the spring and summer of 1944, urging them to begin discussions with the Soviets for international control of atomic energy. Roosevelt and Churchill did not follow Bohr's suggestions and instead, in a later meeting, expressed concern that Bohr may leak atomic secrets to the Soviet Union.[233]

Bush, Vannevar (1890–1974) - Head of the U.S. Office of Scientific Research and Development during World War Two and one of the three senior scientific administrators involved in atomic policy during the war. In mid 1945, Bush was a proponent of atomic disarmament and, by November 1945, had finalized the so-called "Bush Plan" for atomic disarmament.[234] The Bush Plan incorporated a step-by-step process for international control and ultimately disarmament. Bush remained a strong proponent of a "staged" process of international control through to the end of 1945 and 1946. He called for Secretary of State Byrnes to adopt a staged approach in late 1945 and, in early 1946, argued, as part of the Acheson committee, that the State Department report on international control (the so-called Acheson-Lilienthal Report) adopt a staged approach because it would help "open up" the Soviet Union. Bush was disappointed with the appointment of Baruch as the U.S. representative at the UNAEC.[235]

Conant, James Bryant (1893–1978) - Chemist, President of Harvard University (1933–1953), and Chair of the National Defense Research Committee during the war. He was one of the three senior scientific administrators involved in atomic policy during the war. Conant was a member of the State Department's Acheson Committee charged in early 1946 with producing a proposal on international control. During his time on the committee, he joined Bush and Groves in pressuring the consultants, led by Lilienthal, to produce a staged international control scheme.[236]

Einstein, Albert (1879–1955) - Senior theoretical physicist based at the Princeton Institute of Advanced Study (1933–1955). Lent his name and celebrity to calls for international control (he founded the Emergency Committee of Atomic Scientists with Leo Szilard in 1946, which publicized international control) and world

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[233] The most detailed accounts of Bohr's activities are Martin J. Sherwin, "Niels Bohr and the First Principles of Arms Control", in Herman Feshbach, Tetsuo Matsui, Alexandra Oleson (ed.), *Niels Bohr: Physics and the World* (Abingdon: Routledge, 1998), pp. 319-30; Aaserud, "The Scientist and the Statesmen".

[234] The Bush memo can be found at "Memorandum by the Director of the Office of Scientific Research and Development (Bush) to the Secretary of State", 5 November 1945, in U.S. Department of State, *Foreign Relations of the United States: Diplomatic Papers, 1945. General : Political and Economic Matters* Volume II (Washington, DC: Government Printing Office, 1946), pp. 69-73. Available at: http://digicoll.library.wisc.edu/cgi-bin/FRUS/FRUS-idx?type=article&did=FRUS.FRUS1945v02.i0005&id=FRUS.FRUS1945v02&isize=M. Accessed 24 April 2019. For context, see Bernstein, "The Quest for Security"; Zachary, *Endless Frontier*, pp. 309-310.

[235] Herken, pp. 157, 161.

[236] Vannevar Bush and James B. Conant, "Memorandum" (30 September 1944). Available at: https://nsarchive2.gwu.edu//NSAEBB/NSAEBB162/1.pdf. Accessed 22 September 2018. Also: Zachary, *Endless Frontier,* p. 243; James Hershberg, James B. Conant: *Harvard to Hiroshima and the Making of the Nuclear Age* (New York: Alfred A. Knopf, 1993), pp. 204-5.

government (by supporting internationalists such as Raymond Gram Swing and Emery Reves) in the late 1940s, though was himself not particularly active.[237]

Oppenheimer, J. Robert (1904–1967) - Senior theoretical physicist and one of a handful of scientists involved in U.S. atomic policy at the highest levels in the 1940s. Head of the Los Alamos Laboratory during the Manhattan Project. Member of the board of consultants that drafted the Acheson-Lilienthal Report for the State Department in early 1946. The report was largely based on his work and in particular on an earlier draft for international control that he prepared (the so-called "Oppenheimer Plan").[238] In 1947, he was appointed as the first Chairman of the General Advisory Committee to the newly formed Atomic Energy Commission.

Rabinowitch, Eugene (1901–1973) - Russian-born American biophysicist who worked at the Met-Lab as part of the Manhattan Project. A leading (and early) proponent of international control in the forties and founding member of the Atomic Scientists' Movement. Founded and then edited the *Bulletin of the Atomic Scientists* in 1945 until his death. Rabinowitch (and his *Bulletin*) supported the Acheson-Lilienthal Plan, but he also helped fellow Chicago academic Quincy Wright produce his own (lesser known) plan for international control.[239]

Szilard, Leo (1898–1964) - Hungarian-German-American physicist who worked at the Illinois-based Metallurgical Laboratory ("Met-Lab") during the Manhattan Project. A vocal advocate for international control from 1944 onwards. Whilst working on the Manhattan Project, Szilard circulated a petition amongst scientists calling for Japan to be given a public chance to surrender prior to the use of the atomic bomb.[240] Co-founded the Emergency Committee of Atomic Scientists with Albert Einstein in 1946.

<u>Military</u>

Forrestal, James Vincent (1892–1949) - U.S. Secretary of the Navy (May 1944 to September 1947) and Secretary of Defense (September 1947 to March 1949). Deeply distrustful of the Soviet Union, Forrestal pushed Truman to take a hard line against the Soviets after the war. He effectively opposed international control and Byrnes' diplomacy (calling it "appeasement") in late 1945.[241]

Groves, Leslie R. (1896–1970) - Senior United States Army Corps of Engineers officer (eventually Lieutenant General) who was Director of the Manhattan project from 1942 to 1947, and the single most influential person in the U.S. atomic program at that time. He was briefly head of the Armed Forces Special Weapons Project (1947–48) until his retirement in 1948. Early on in the Manhattan Project, Groves came to see the Soviet Union as the U.S.'s main postwar enemy, later noting that "There was never, from about two weeks from the time I took charge of this Project any illusion on my part but that Russia was our enemy."[242] He was distrustful of the Soviet Union and a strong supporter of a large U.S. bomb program: if "there are to be atomic weapons in the world we must have the best, the biggest and the most" he told Congress in January 1946. He believed the U.S. could acquire a global monopoly on high-grade uranium and thorium and began an effort to do so in fall 1942. This belief was crucial for his belief and claim that Russia would not get the bomb for a long time (20 years he

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[237] Silvan S. Schweber, *Einstein & Oppenheimer: The Meaning of Genius* (Cambridge, MA: Harvard University Press, 2008), pp. 74-81.
[238] Herken, pp. 155-61.
[239] Kimball-Smith, *A Peril and a Hope,* pp. 452-3.
[240] Kimball-Smith, *A Peril and a Hope,* pp. 55-57.
[241] Herken, p. 74; Bernstein, "The Quest for Security"..
[242] Herken, p. 106; Martin J. Sherwin, *A World Destroyed: Hiroshima and Its Legacies* (Stanford: Stanford University Press, 2003), p. 62.

claimed in May 1945).[243] Groves was crucial for persuading Truman and others that Russia would not get the bomb for many years.[244]

Politicians and Others

Acheson, Dean (1893–1971) - Statesman and lawyer. Undersecretary of the U.S. Department of State from August 1945 to June 1947; Secretary of State 1949–1953. A leading supporter of international control within the State Department in the first half of 1946. Chair of the Special State Department Committee tasked with the preparation of a plan for international control in December 1945. Acheson was keen[245] that the Committee succeed in its task not only because he wanted international control and atomic cooperation with the Soviet Union, but also because he wanted the Committee to inform politicians and diplomats on atomic matters, and because he, like Byrnes, wanted to retain as much policymaking/expertise within the State Department as possible (and not lose it to Groves or some military committee).[246] Once Baruch was appointed as the U.S. representative to the UNAEC and began to formulate his own policy on international control, Acheson emerged as one of the most prominent opponents of Baruch's policymaking (and thus supporter of the original Acheson-Lilienthal Report).[247]

Barnard, Chester (1886–1961) - Head of New Jersey Bell Telephone (1927–1948) and member of the board of consultants charged with preparing a report on international control in January 1946.

Baruch, Bernard (1870–1965) - Senior financier, administrator, and political consultant. Appointed (in March 1946) by President Truman as the United States representative to the United Nations Atomic Energy Commission (UNAEC) 1946–1947. Drafted the U.S.'s official proposal for international control, known as the Baruch Plan, and presented it to the UNAEC in June 1946.

Byrnes, James F. (1882–1972) - Senior government official involved in atomic policymaking 1943–1946. Director of the Office of War Mobilization (1943–1945) and Secretary of State (July 1945 to January 1947).

Gromyko, Andrei (1909–1988) - Soviet diplomat and politician. Soviet permanent representative to the United Nations and to the U.N. Atomic Energy Commission in 1946.

Johnson, Edwin C. (1884–1970) - Democratic Senator for Colorado and Chairman of the Senate Military Affairs Committee in 1945. Introduced the May-Johnson Bill in Congress in October 1945 alongside Andrew J. May. The bill proposed the creation of a domestic atomic energy agency.[248]

Lilienthal, David E. (1899–1981) - Senior technocrat and public administrator (he had been Chairman of the Tennessee Valley Authority 1941–1946). Chair of the five-member board of consultants charged with preparing a report on international control for the State Department Special Committee on atomic energy in January 1946 (the so-called Acheson-Lilienthal Report was released in March 1946). A strong proponent of international control of atomic energy in 1946. The first chair of the Atomic Energy Commission, October 1946 to February 1950.

May, Andrew J. (1875–1959) - A House Representative from Kentucky and chairman of the House Military Affairs Committee. In October 194,5 he introduced the May-Johnson Bill in Congress on the proposed

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[243] Herken, pp. 101-06, 112. Gordin, *Red Cloud at Dawn,* pp. 73-5.
[244] Herken, pp. 110-11; Ziegler, "Intelligence Assessments of Soviet Atomic Capability, 1945-1949"; Ziegler and Jacobson, *Spying Without Spies*, pp. 24-5.
[245] Waqar Zaidi, *Did Dean Acheson Want International Control of Atomic Energy?* (2018).
[246] Herken, p. 153; On Acheson being less hawkish than many around in 1945 and early 1946, see Robert L. Beisner, *Dean Acheson: A Life in the Cold War* (Oxford: Oxford University Press, 2006), pp. 28-30.
[247] Maddock, *Nuclear Apartheid,* p.57.
[248] Hewlett and Anderson, Jr., *A History of the United States Atomic Energy Commission* vol. 1, p. 428.

domestic atomic energy agency. The May-Johnson Bill was drafted largely by the War Department and placed domestic control of atomic energy under the control of the military. It also restricted the President's power on atomic matters, required strict security and secrecy regulations, and mandated heavy penalties for any security violations. The bill was supported by the three prominent scientist administrators (Vannevar Bush, James B. Conant, and Robert J. Oppenheimer) but opposed by most scientists working on atomic matters.[249]

McMahon, Brien (1903–1952) - Senator and key ally of the Atomic Scientists' Movement in the Senate. Author of the McMahon Act introduced into Congress in December 1945. Chair of the Senate Atomic Energy Committee (October 1945 to August 1946) and subsequently Chair of the Joint Atomic Energy Committee (August 1946 to January 1947, January 1949 to July 1952). The McMahon Act was drafted with the assistance of prominent scientists and the Atomic Scientists' Movement as an alternative to the military's May-Johnson Bill. The bill placed atomic energy under the control of a civilian Atomic Energy Commission, and emphasized the peaceful uses of atomic energy. It also emphasized the need for free exchange of scientific information to the fullest extent possible. The bill was passed into law as the Atomic Energy Act on August 1, 1946, but only after significant amendments which watered down its civilian focus and increased penalties.[250]

Pasvolsky, Leo (1893–1953) - Internationalist State Department official who played a leading role in postwar planning (including for the United Nations Organization). A strong supporter of the United Nations and international control and co-drafted an early proposal for international control in November/December 1945 (the so-called Cohen-Pasvolsky Plan).[251]

Searls, Jr., Fred (1888–1968) - Mining engineer and consultant to Secretary of State Byrnes in 1945/46. Appointed by Baruch as advisor on atomic energy and as Alternate Delegate to the UNAEC. Had some input into the production of the Baruch Plan and advocated for the creation of an Atomic League.[252]

Stimson, Henry L. (1867–1950) - U.S. Secretary of State, July 1940 to September 1945. Retired in September 1945. According to Herken, during the war he had hoped that international control might be possible, but the 1945 Potsdam Conference led him to believe that the Soviets would not accept it.[253] In September 1945, prior to leaving office, he once again became an advocate of international control.[254]

Thomas, Charles (1900–1982) - Chemist and Vice-President of Monsanto Chemical Company. From 1943 to 1945, he coordinated Manhattan Project work on plutonium purification and production, and later became Director of the Clinton Laboratories at Oak Ridge, Tennessee (1945–1948). Member of the board of consultants to the State Department charged with preparing a report on international control in January 1946.

Vandenberg, Arthur (1884–1951) - Republican Senator from Michigan, Chairman of the Senate Committee on Foreign Relations. An avowed internationalist, he nevertheless pushed for a strong stance towards the Soviet Union in late 1945 and 1946. He opposed Byrnes' atomic diplomacy in late 1945, seeing it as offering "compromise" to the Soviet Union and "sheer appeasement."[255]

Wallace, Henry (1888–1965) - Vice-President under FD Roosevelt (1941–1945), and subsequently Secretary of Commerce (1945–1946). Emerged as a prominent and public critic of U.S. policy towards the Soviet Union

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[249] Hewlett and Anderson, Jr., *A History of the United States Atomic Energy Commission* vol. 1, pp. 411-18, 431-39. Wang, *American Science in an Age of Anxiety*, pp. 13-15.
[250] Wang, *American Science in an Age of Anxiety*, pp. 18-24.
[251] On the Cohen-Pasvolsky Plan, see Powaski, *March to Armageddon*, p. 35.
[252] On his input, see Lieberman, *The Scorpion and the Tarantula*, pp. 276-77.
[253] Herken, p.19.
[254] Powaski, *March to Armageddon*, pp. 29-30.
[255] Herken, pp.75-6. Lieberman, *The Scorpion and the Tarantula*, pp. 218-22.

in late 1946. This included strong public criticism of the Baruch Plan—certainly the strongest public criticism from within the government. For this criticism he was forced to resign in September 1946.[256]

Winne, Harry A.(1888–1968) - Vice-President in charge of engineering at General Electric and member of the board of consultants charged with preparing a report on international control in January 1946.

[256] Hewlett and Anderson, Jr., *A History of the United States Atomic Energy Commission* vol. 1, pp. 597-606.