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### The Birth of Nuclear Eternity

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Futures

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### Abstract and Keywords

This chapter reconnects modes of futures-making with the requirements of democracy by focusing on the naturalization of nuclear weapons and their removal from the realm of democratic choice at a particular point in time. The chapter revolves around the concept of ‘nuclear eternity’ as a means of reducing public choices about the use of nuclear weapons. It critiques the idea that nuclear weapons have always been perceived as ‘here to stay’ and reassesses the dominant narrative about the 1960s as an emancipatory decade by arguing that the decade actually witnessed a significant shrinking of future political possibilities. Finally, the chapter identifies three shapes of the future which produce ‘nuclear eternity’—an *absent post-nuclear future*, an *inconsistent post-nuclear future*, and a *disconnected post-nuclear future*—and illustrates them with historical examples

Keywords: nuclear weapons, future, arms control, democracy, futures-making

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We lack the metric with which to measure the proximity of our programs to our circumstances. We must walk, in relative darkness, the narrow path between wishful thinking and the denial of the pragmatic, prophetic residue in our understanding of transformative possibility. We lack the metric, and always will.<sup>1</sup>

### Nuclear Future Perfect

How did most policymakers, experts, and citizens of the world come to believe that nuclear weapons were part of eternal future horizons?<sup>2</sup> How did it become possible to think that their invention had added a layer of irreversibility in human history? The literature in social sciences has traced the genealogy of the belief in neoliberalism as the only possible form of economic organization of societies back to the end of the 1970s. Did a similar attempt at closing the future happen with nuclear weapons a decade earlier?<sup>3</sup> These questions have not been addressed in a satisfactory (p. 485) fashion by the literature in inter-

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## The Birth of Nuclear Eternity

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national nuclear history and political theory. For instance, in his classic book *A Perpetual Menace*, William Walker acknowledges the importance of ‘discourses about *future* time—the manner in which expectations, visions, commitments, imaginaries, fantasies or what you will [say] about the future affect debates about order and the decisions relating to them’. And, one page before the end of the book, he articulates what I am trying to turn into a question: ‘states and people cannot be resigned to the permanent, active presence in the world of nuclear weapons and weapon programmes’.<sup>4</sup> The literature on nuclear normalization, which offers fruitful insights on such a process, is mostly psychological or linguistic but is not focused on historicizing the phenomena it identifies, let alone investigating the production of a particular image of the future.<sup>5</sup> The literature on nuclear futures and nuclear apocalypse does not engage with the making of nuclear weapons as a permanent feature of any possible future. For instance, in his insightful study of the US nuclear imaginary, Joseph Masco called for ‘figuring a post-nuclear post-terror security studies’ but he does not investigate how nuclear eternity came into being.<sup>6</sup>

By nuclear eternity, I do not mean an endless time in which nuclear weapons and the possibility of a nuclear explosion will remain, but rather the idea that no future without them is conceivable. This is a good reminder that nuclear eternity might not be very long at all, since escalation to global nuclear war may end human life on the planet: it only names the time mankind has left, while acknowledging that the men and women I will be referring to considered a large scale nuclear war as a possibility. Nuclear eternity should also be acknowledged as a metaphor: Martin Amis’s essay on the thinkability of a nuclear future, for example, reminds us that if we assume that mankind is an earthbound species, then nuclear eternity is limited by ‘the death of the sun’ which, for sure, will end life on Earth but may not be the end of time.<sup>7</sup> Imaginaries of nuclear eternity perfectly coexist with schemes that attempt to manage or miniaturize the macro imaginary of eternity through calls to restraint, rollback, or reversal.

This essay focuses on nuclear weapons and does not engage with nuclear energy, while fully recognizing that the distinction between the two cannot be grounded in (p. 486) physics.<sup>8</sup> The radioactive effects of fissile materials alone project us into a future of tens of thousands of years which, by human standards, is tantamount to eternity. In that respect, with or without nuclear weapons, the issue of nuclear eternity would be at stake by the mere existence of radioactive material in the world.<sup>9</sup> It is quite telling that a Finnish documentary about the long-term repository of radioactive waste at the Onkalo site is entitled *Into Eternity* (directed by Michael Madsen, 2010). Let us consider the representations and metaphors that bring about an imagined future in which nuclear explosions are a continued possibility.

I would like to divide the original puzzle into three. First, the practice of nuclear deterrence was originally conceived as a temporary solution to the strategic and policy problems of the day.<sup>10</sup> However, the caveat about its temporary nature has been progressively removed. How did that become possible? This is all the more puzzling as most policies

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## The Birth of Nuclear Eternity

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that are being perpetuated remain labelled as temporary, which is not the case for nuclear deterrence.

Second, a mainstream grand narrative of the nuclear age claims that the early attempts at finding a supranational solution to the nuclear weapons problem were doomed to fail and that Atoms for Peace and the Non-Proliferation Treaty illustrate a return to intergovernmental reason.<sup>11</sup> This narrative of inevitability misses a crucial question. Whether or not one calls it a return to reason, when does this sense that the nuclear weapons problem can only be solved by classic Westphalian international politics emerge and how? In other words, as I will show in the first section of this essay, this narrative overlooks the fact that other forms of transformative engagement with the problem have been tried for at least fifteen years before being abandoned.<sup>12</sup> The most interesting and largely unaddressed question is why did such efforts not stop sooner or later than they did?

Third, how did nuclear weapons become acceptable in a democratic context in spite of their anti-democratic nature?<sup>13</sup> To articulate this puzzle, I rely on Daniel Deudney and Robert Dahl. Deudney writes: 'Nuclear explosives are intrinsically (p. 487) despotic for three related reasons: the *speed* of nuclear use decisions, the *concentration* of the nuclear use decision in the hands of one individual, and the *lack of accountability* stemming from the inability of affected groups to have their interests represented at the moment of nuclear use.'<sup>14</sup> Interestingly, in 1985, Dahl had already noted: 'The democratic process has clearly failed to function in controlling what may well be the most important decisions that will ever be made on this earth.'<sup>15</sup>

In this chapter, which attempts to address this puzzle before I do so in the form of a full-length monograph, I would like to make three arguments. First, I will identify three figures of the future which lead us to imagine nuclear eternity as the only conceivable shape of it, and I will illustrate them with historical examples. Second, I will argue that the belief in nuclear eternity as the only possible shape of the future is not co-terminus with the invention of nuclear weapons. Third, and consequently, I will argue that the 1960s—often conceived of as the decade of the opening of political futures, material and ideational changes through decolonization, and civil rights movements alongside other emancipatory practices—also contributed significantly to the entrenchment of nuclear eternity in nuclear weapons states to such an extent that it would not be challenged until the 1980s.

## Three Modes of Perpetualization

Nuclear eternity derives from at least three representations of a post-nuclear future. These are a *disconnected post-nuclear future* in which nuclear weapons no longer are, but which is depicted without any effort to connect it to present conditions, or (p. 488) which posits that the connection can only be made through unprecedented and massive change; an *absent post-nuclear future* in a managerialist form of presentism that literally does not engage with it and, in doing so, slowly but surely entrenches nuclear weapons in the world; and an *inconsistent post-nuclear future* which is claimed to be the outcome of a se-

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## The Birth of Nuclear Eternity

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ries of steps that are advocated to reach it, but can demonstrably be shown not to be the actual outcome of the planned steps.

First, the *disconnected post-nuclear future* is the most common shape of the future in the speeches of US Presidents and leaders of nuclear-armed states.<sup>16</sup> Here, I will only give two examples and two exceptions, from four different constituencies and eras: Barack Obama's 2009 Prague Speech, Winston Churchill's last speech before the House of Commons in 1955, Rajiv Gandhi's 1988 address before the United Nations General Assembly, and the movement to eliminate nuclear weapons via a process of banning them and raising awareness of the humanitarian consequences of their use in the 2010s.

Barack Obama's Prague Speech of 5 April 2009 explicitly displays the disconnect between the hoped-for post-nuclear future and the present. In it, he stated that the goal of a world free of nuclear weapons 'will not be reached quickly—perhaps not in my lifetime'.<sup>17</sup> Several public declarations of Obama administration officials focus on this idea of a very long-term goal. Robert Gates had done so after his reappointment as Secretary of Defense in 2008. The most telling statement may be the July 2010 thank you speech of Secretary of State Hillary Clinton addressed to the staff involved in the negotiation of the New START treaty: 'I am personally very grateful for everything you have done to move us toward our goal of a world some day, *in some century*, free of nuclear weapons.'<sup>18</sup> One can find such hopeful pronouncements with no concern for their plausible implementation as early and eloquently as in Churchill's famous speech to the House of Commons on 1 March 1955. It ends with these words, which not only disconnect the post-nuclear future from the present but also suggest that it requires no less than a change in human nature as we know it:

To conclude: mercifully, there is time and hope if we combine patience and courage. All deterrents will improve and gain authority during the next ten years. By that time, the deterrent may well reach its acme and reap its final reward. The day may dawn when fair play, love for one's fellow-men, respect for justice and freedom, will enable (p. 489) tormented generations to march forth serene and triumphant from the hideous epoch in which we have to dwell. Meanwhile, never flinch, never weary, never despair.<sup>19</sup>

Implicitly in the speeches from the Obama era and explicitly in Churchill's, a post-nuclear nuclear future requires a world different from the one we live in so that the policy prescription is to create such a world, which would carry a set of preconditions enabling a post-nuclear future.

In contrast, the speech by Indian Prime Minister Gandhi before the General Assembly of the United Nations on 9 June 1988, and the process of eliminating nuclear weapons starting with a treaty prohibiting them, avoid this disconnect because the post-nuclear future they are calling for is not a future world different from ours; it is our present world without nuclear weapons, i.e. a post-nuclear present. Gandhi's speech breaks out of the nuclear eternity frame: it states the goal of elimination of nuclear weapons and connects it to time-bound steps that could possibly lead to it, and are described in an action plan

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## The Birth of Nuclear Eternity

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which is immediately implementable and expected to reach its final goal within twenty-two years.<sup>20</sup> Similarly, key proponents of the humanitarian initiative calling for nuclear disarmament regard the 2017 treaty on the prohibition of nuclear weapons as a milestone in a contingent and contested process of invention of nuclear disarmament in our world, which does not depend on a radically different future.<sup>21</sup> However, such remarkable calls come from India, a country which had not weaponized its nuclear programme in spite of the 1974 test and from a coalition of 122 non-nuclear weapons states who voted in favour of adopting a Treaty on the Prohibition of Nuclear Weapons in the UN General Assembly in 2017, which suggests how widespread the representation of a *disconnected* post-nuclear future is in the discourse of the policymaking elites of nuclear weapons states.

Second, the *absent* post-nuclear future is widespread in nuclear weapons scholarship, in the policy world in nuclear weapons states, and in science fiction. Nuclear eternity follows: a post-nuclear future is either painted as undesirable or as impossible to achieve or both. However, this mode of nuclear eternity is quite diverse and compatible with the physical presence or absence of nuclear weapons, regardless of whether they explode. In either of those worlds, though, nuclear weapons do not disappear before mankind does.

I have shown elsewhere that most nuclear analyses operate under this frame, which does not make space for a post-nuclear future.<sup>22</sup> This does not mean that (p. 490) analysts actively believe in a nuclear eternity. They act and write as though they believe in it and, if they do not, they produce it by reproducing the nuclear present. In expert as well as policy circles, no one actually speaks about 'nuclear eternity' and many would probably reject the notion but its unspeakability may well be a condition of its continued reproduction. For policymaking elites, as well as mainstream analysts in nuclear weapons states, future horizons do not extend that far; they are limited to the current term in office or the current generation (see Obama's Prague Speech above). Their strategy therefore consists in postponing the moment of nuclear detonation or radical nuclear change beyond such a horizon, which is enough to reproduce nuclear eternity whether or not one acknowledges it. Persistent calls for 'strategic stability' as the best possible goal illustrate that situation.

One way of projecting such an *absent post-nuclear future* comes from the invocation of expected veto positions in discourses about nuclear policy, whatever nuclear or non-nuclear future the speaker would sincerely wish for. This invocation assumes that one actor or group who believes in the nuclear orthodoxy has to be taken into account because this actor will veto the proposed transformation. As a consequence, convincing people of the fallacies of part of the nuclear conversation might not be enough to change their practices. As long as they anticipate that powerful others believe in the orthodoxy and act upon this anticipation, their sincere belief does not actually affect what they do.<sup>23</sup> For example, between 1961 and 1964 there was a constant disconnect between what Secretary of Defense Robert McNamara claimed to be the nuclear force requirements for the national security of the United States and the actual weapons that he requested, which can be explained by what he regarded as the expected veto player. As early as February 1961, he claimed that the missile gap was 'an illusion' and, three years later, in spite of a significant increase in Soviet nuclear weapons capabilities, he argued in a memo for President

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## The Birth of Nuclear Eternity

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Johnson that four hundred 1 mt weapons would be enough to achieve 'assured destruction'.<sup>24</sup> However, he asked Congress for many more weapons than that. On 28 March 1961, he announced the construction of six hundred ground-to-ground Minuteman missiles and twenty-four submarines carrying Polaris missiles. On 10 October of that year, Deputy Secretary of Defense Roswell Gilpatric stated publicly that the supposed missile gap which was driving the shape and size of US nuclear forces did not exist and that the US were ahead in terms of nuclear weapons capabilities.<sup>25</sup> (p. 491) In December 1961, McNamara argued before Congress in favour of even more weapons than he had before: one thousand Minuteman missiles and forty-one submarines. Later on, he would explain that he thought he would not be credible in front of Congress had he asked for fewer.<sup>26</sup> In this case, the constituency producing his expected loss of credibility was the expected veto player. One has to note, here, that in the early 1960s, where there was disagreement between McNamara's suggestions backed by systems analysis and procurement options proposed by the military, the US Congress often found McNamara's perspective more convincing. The questioning of systems analysis by Congress did not start before the mid-1960s.<sup>27</sup> Nuclear history offers many other examples of the use of expected veto players but the interesting result is that they allow for a form of discourse in which no future is properly discussed, and certainly not a post-nuclear one.<sup>28</sup>

One needs to observe, though, that the representation of an *absent post-nuclear future* does not necessarily coincide with a stance opposing the physical elimination of nuclear weapons. In his bestselling book *The Abolition*, Jonathan Schell crafted the notion of 'weaponless deterrence' in which it is the possibility of rebuilding nuclear weapons that makes a world without their physical presence achievable and desirable. In other words, the author calls for a world without nuclear weapons while making the case that the idea of such weapons can never be forgotten so that the world will remain nuclear in the mind in perpetuity.<sup>29</sup> In such a world, the author hopes, the weapons may not be detonated.

Science fiction as a genre offers other modalities of the *absent post-nuclear future*. This includes the continued physical presence of nuclear weapons as well as their detonation. On the one hand, post-World War Two apocalyptic science fiction depicts the end of the species in a nuclear war. The endings of Stanley Kramer's 1959 *On the Beach* and Stanley Kubrick's 1963 *Dr Strangelove* are probably the most famous instances. On the other hand, a few other science fiction stories depict a society from a very distant future in which almost every aspect of technology and social life has changed, except for the presence of nuclear weapons in the arsenals of the political entities that exist. In both cases, nuclear weapons are the least changeable feature of our world, therefore leaning towards nuclear eternity. The multi-award-winning (p. 492) TV show *Battlestar Galactica* (2004–9) can serve as an eloquent example of the latter. Even though the characters are looking for an illusory planet Earth and not living on it, they are still 'humans'.<sup>30</sup> So, if one accepts them as such, it is striking that cyborgs that can look and feel like humans have been invented but nuclear weapons are still playing the role of the most destructive weapons system available. This is all the more striking as, in the show, they have repeatedly been used to produce holocausts. Even that was not enough to undo nuclear eternity as the only conceivable horizon. The cyclical temporality that is one of the signature fea-

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## The Birth of Nuclear Eternity

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tures of the show is only another mode of nuclear eternity: humans are destined to repeat the destruction of their planet by nuclear weapons. As a few survivors escape into space, they take nuclear weapons on board their ships.<sup>31</sup>

Third, the four horsemen initiative, of George Shultz, William Perry, Henry Kissinger, and Sam Nunn, from 2007 to 2013, which claimed to seek a world free of nuclear weapons, is a good example of an *inconsistent post-nuclear future*. Their image of a world free of nuclear weapons is a mountain top that cannot be seen yet.<sup>32</sup> The merit of the initiative had to do with their attempt at connecting the steps with the goal and presenting both. Their post-nuclear future is neither absent nor disconnected but it does require the creation of a different world more amenable to nuclear disarmament. They write:

Reassertion of the vision of a world free of nuclear weapons and practical measures toward achieving that goal would be, and would be perceived as, a bold initiative...Without the bold vision, the actions will not be perceived as fair or urgent. Without the actions, the vision will not be perceived as realistic or possible.<sup>33</sup>

However, in spite of the title of their first editorial, 'A World Free of Nuclear Weapons', it quickly became clear that this initiative was essentially an incrementalist effort. It embraced proliferation as the macro-dynamic of world history, extended it to the problem of nuclear terrorism, and could not produce disarmament.<sup>34</sup> (p. 493) They argued that interstate nuclear deterrence was decreasingly relevant and increasingly dangerous but did so within a framework in which those weapons remained security providers for the US. It could therefore be read as an attempt to re-establish the credibility of the United States' incredible pledge to disarm, according to the requirements of Article VI of the Non-Proliferation Treaty. It ultimately produced the nuclear security summit process (2010-16) that led to more control over nuclear materials but nothing more transformative.

## The 1960s as a Decade of Entrenchment of Nuclear Eternity

The triumph of nuclear eternity does not coincide with the invention of the weapons. In the first twenty years of the nuclear age, radical alternatives existed and were seriously considered, beyond the global anti-nuclear movement, whose efforts have been well documented.<sup>35</sup> This is not incompatible with the well-established findings that there was bad faith in the early years of US-Soviet nuclear disarmament diplomacy and that the argument of technological irreversibility was applied to nuclear weapons early among US defence intellectuals.<sup>36</sup> As Daniel Ellsberg, a war planner at RAND in the 1950s, recollected in his memoirs: "you can't uninvent nuclear weapons". That has been a widespread and effective argument against a total unilateral abolition over the past seventy years.<sup>37</sup> This was confirmed by Freeman Dyson, a physicist from the Manhattan Project, speaking about the Federation of American Scientists: it only suggests that policy officials and defence intellectuals from the US and the Soviet Union spoke as though they accepted nuclear eternity early on. However, the thermonuclear revolution triggered an interesting

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## The Birth of Nuclear Eternity

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and rare level of agreement among prominent intellectuals of multiple traditions about its fundamental implications. Even the US strategic community originated alternative ideas about possible futures. Dyson underlined that some proponents of the Orion (p. 494) Project were hoping to use and do away with the stockpile of US nuclear weapons to build a spaceship to go to Mars.<sup>38</sup>

Even if the belief in nuclear eternity had already started spreading in the 1950s, the core narrative of the 1960s as a decade of emancipation and protest against nuclear weapons can be challenged.<sup>39</sup> It is claimed that in the 1960s humanity tamed the nuclear dragon practically and legally: the peak of the US nuclear arsenal is said to have been reached in 1966-7, and testing, horizontal proliferation, and the arms race between the US and the Soviet Union are said to have been contained. The following treaties are often considered instrumental in the legal restriction and containment of nuclear weapons in the 1960s: the 1963 Partial Test Ban Treaty; the Outer Space Treaty; the 1967 Treaty of Tlatelolco (the first treaty instituting a nuclear weapons-free zone in a densely populated area, i.e. Latin America and the Caribbean); the 1968 Non-Proliferation Treaty; and the beginning of the Strategic Arms Limitation Talks process in 1969, which would lead to the SALT and ABM treaties in 1972.<sup>40</sup>

It is true that 1966 is the year when the size of the US nuclear arsenal reaches its peak *if one counts the number of warheads deployed*. But even if one counts US weapons only and not the world's stockpile, a focus on the lethality of the US arsenal shows that it does not peak until decades later.<sup>41</sup> This is because the technology of MIRVing, developed in the 1970s, allowed multiple warheads which could be targeted independently to be placed on a single missile; it is also explained by the shift from a quantitative to a qualitative arms race after 1966. If one focuses on the total number of warheads in the world, the peak is in 1986, i.e. long after the end of the 1960s.<sup>42</sup> The task of measuring the aggregated lethality of the world's nuclear arsenals remains to be done. Even though one has to recognize the crucial role of non-material factors in this dynamic, in 1969 there were almost three times as many nuclear warheads in the world as a decade earlier. This is a total of more than (p. 495) 38,000 nuclear warheads in the world, or 25,000 built in a decade.<sup>43</sup> It was also in the early years of the 1960s that intercontinental ballistic missiles, coupled with thermonuclear warheads, entered service in silos and on submarines. Their destructive capability is in the order of magnitude of a thousand times more than the first generation of atomic bombs. Subsequent technological innovations do not fundamentally modify this. In addition, the most recent scholarship has convincingly challenged the conventional wisdom about parity and arms control as the overarching features of the late 1960s and 1970s, up to the Reagan administration. Instead, it is now established that as early as 1969 US policymakers sought to transcend parity rather than only manage it.<sup>44</sup>

Moreover, in the 1960s nuclear weapons started to spread beyond the original participants of the Manhattan Project and the Soviet Union. In only a decade three additional nuclear-armed states appear on the map, a larger number than in any other decade of the nuclear age: France (the first A-bomb test in 1960 and the first H-bomb test in 1968), Chi-

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## The Birth of Nuclear Eternity

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na (1964), and Israel (1967). Of course, one does not want to fall for a teleological narrative; it is important to observe, for instance, that the 1960s witnesses the reversal of Swedish plans to build nuclear weapons.<sup>45</sup> At the same time, there were signs of attempts to acquire a latent/hedging nuclear weapons capability in Italy and Australia. The German case is still debated. This is where the materiality of those weapons matters.<sup>46</sup> The endless reproduction of a nuclear(ized) present will be enough to enact a nuclear eternity because a substantive effort to dismantle them would be required. They will not just rot away.<sup>47</sup> For instance, the US disarmament movement lost its ability to put pressure on governments when the Partial Test Ban Treaty, which entered into force in 1963, led many activists to decrease their involvement, at the same time as the Vietnam War was becoming a priority for them.<sup>48</sup> The absence of a post-nuclear future also has a social grounding: when a powerful coalition is lobbying for nuclear weapons acquisition or for the projection of the existing nuclear infrastructure into a distant future, not putting pressure on the government is de facto entrenching nuclear eternity or, more precisely, making its undoing more difficult.

(p. 496) The signing of the Treaty on the Non-Proliferation of Nuclear Weapons in 1968 manifests the entrenchment of nuclear eternity earlier if one focuses on the negotiation strategies that led to it. It is true that the parties gesture towards an intention to disarm in the preamble and Article VI of the Treaty.<sup>49</sup> However, Swedish diplomat and disarmament negotiator Alva Myrdal wrote, early on, that the Treaty was intended to stabilize the US-Soviet hegemony over world politics. As suggested above, both countries were then engaged in a nuclear arms race and were definitely living the nuclear eternity. Interestingly, the US delegation made sure that Articles I and II of the Treaty would not interfere with the previous arrangements to share US nuclear weapons with NATO allies. Washington and London also made sure that the restrictions in nuclear weapons trade would not affect their cooperation in nuclear warhead design. Those gestures are additional signs that in the 1960s, from the perspective of the two leading supporters of the Treaty, the US and the Soviet Union, its purpose was to stabilize their hegemony over a perpetual nuclear future rather than change it.<sup>50</sup> When the Non-Proliferation Treaty entered into force in 1970, its Article III.1 assigned the Atomic Energy Agency with the mission of concluding safeguard agreements with state parties and verifying the adequate implementation of such agreements. Technical practices of safeguard agreements and verification by the associated International Atomic Energy Agency have naturalized the eternal nuclear present and contributed to the entrenchment of nuclear eternity.<sup>51</sup>

Finally, after the surprise Chinese nuclear test in 1964, suspicion of nuclear proliferation in US intelligence circles expanded beyond industrially developed countries.<sup>52</sup> This obviously does not change the fact that most countries have not explored nuclear weapons options and that the imaginary of many policy elites in non-nuclear weapons states has remained non-nuclear. It only expands the scope of US suspicion.

Beyond those material, strategic, and legal forms of entrenchment of nuclear eternity, a series of intellectual shifts that took place in the 1960s made it possible for the presence of nuclear weapons in the world to be thought of as an irreversible (p. 497) and defining

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## The Birth of Nuclear Eternity

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feature of world politics.<sup>53</sup> In his February 1960 article in the *Bulletin of the Atomic Scientists* entitled 'How to Live with the Bomb and Survive', Leo Szilard embodies the rise of what I call a *disconnected post-nuclear future* among nuclear scientists: no explicit statement of the impossibility of a different future but a decrease of the sense of urgency for nuclear disarmament and an acceptance of postponing action towards it and transferring the associated responsibility to those who will come after. He wrote: 'I believe the time has come to face up to this situation and to ask in all seriousness whether the world could learn to live for a while with the bomb.'<sup>54</sup> More specifically, significant intellectual shifts producing nuclear eternity include the rise of 'arms control' and its triumph over 'disarmament' as a framing category of the nuclear weapons problem, and the widespread adoption of the metaphor of 'proliferation' as a descriptor of the direction of global nuclear history. The latter also led to a widening of the suspicion of proliferation within US intelligence circles after the Chinese nuclear test of 1964, as suggested above.<sup>55</sup> The shift from the language of 'non-dissemination' used by the Irish in their 1958 resolution, which evokes a prohibitive injunction, to that of 'non-proliferation', which includes a metaphorical reference to self-begetting contagion, also illustrates the entrenchment of nuclear eternity.<sup>56</sup>

The point of this essay is not to naturalize nuclear eternity as irreversible once it has been entrenched. Of course I recognize that movements *proposing* the abolition of nuclear weapons did exist after the 1960s and that some policymakers have proclaimed support for that goal in the five decades that followed. In fact, every American President since Harry Truman, with the exception of Richard Nixon, has proclaimed at least once that the long-term goal of abolishing nuclear weapons should be taken seriously.<sup>57</sup> Similarly, the 1980s witnessed a new wave of anti-nuclear (p. 498) activism and anti-nuclear movements which have remained active and gained recognition in 1985, 1995, and 2017 with the International Physicians for the Prevention of Nuclear War (IPPNW), the Pugwash Conferences on Science and World Affairs, and the International Campaign to Abolish Nuclear Weapons (ICAN) being awarded the Nobel Peace Prize.<sup>58</sup> The issue to be investigated further is whether the efforts to create alternative imaginaries of the future after the 1960s came from different communities than the ones I am focusing on and whether and how they managed to set themselves free from the macro-frame of nuclear eternity.

In other words, the global history of the 1960s needs to be revisited beyond the production of emancipatory futures of all kinds: the triumph of civil rights, decolonization and independence, and a consolidated civil rights movement.

## Conclusion

This chapter is the beginning of an effort to reconnect modes of futures-making with the requirements of democracy by focusing on the naturalization of nuclear weapons and their removal from the realm of democratic choice. In particular, it has focused on one

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## The Birth of Nuclear Eternity

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way of shrinking the realm of choice about nuclear weapons by creating a sense that they will be with us forever.

It has made three interventions in existing debates. First, it has denaturalized the idea that nuclear weapons have always been perceived as 'here to stay' from the moment of their invention. This insight is present within the literature but its significance has been underplayed so far. Second, it is an invitation to rethink the 1960s as a decade of significant shrinking of future political possibilities as opposed to the dominant narrative of it as the emancipatory decade. Third, it has identified three shapes of the future that produce nuclear eternity: a *disconnected post-nuclear future* in which nuclear weapons no longer exist, but which is depicted without any effort to connect it to present conditions, or which posits that the connection can only be made through unprecedented massive change; an *absent post-nuclear future* which appears in the speeches of heads of nuclear weapons states, in scholarship about nuclear weapons, and even in science fiction; and an *inconsistent post-nuclear future* which cannot be reached by the steps that are advocated as steps towards it.

This is only a beginning and an invitation. Ideas and modes of futurity are treated here as though they were causal forces in their own right and this needs to be modified in at least two ways. First, the self-contradictory nature of nuclear discourse has long been recognized, so the account of the rhetorical power of nuclear ideas (p. 499) should treat the force of contradiction as a tool towards unfalsifiability as opposed to the current assumption that logical consistency always works as an asset. Second, assessing the entrenchment of nuclear eternity requires us to think about the embeddedness of those ideas in broader epistemic, affective, and institutional structures of nuclear authority.<sup>59</sup> Those structures of authority can be the unanimously adopted governance model of nuclear technocracy or 'guardianship' itself, the institutions mandated to produce official nuclear truths, which have been insufficiently studied, or the transnational mechanisms of professional recognition for the different professions that grant an authority to speak on nuclear matters.

At the empirical level, this chapter calls for additional questions. First, if the 1960s is such a decade of entrenchment of nuclear eternity, how does this modify the status and role of subsequent nuclear weapons politics? For instance, in regimes aspiring to be democratic, are the justifications of nuclear guardianship as the best possible governance structure for nuclear weapons validated by the attitudes and preferences of the citizens of today? Or do they manifest the ability of a generation of elites to institutionalize its preferences?<sup>60</sup> Second, how does time affect the entrenchment of nuclear eternity? Is it a generational effect and, if so, what are its manifestations? Third, how can we account for the processes through which this entrenchment is reversed?

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### Further Reading

Bess, Michael. *Realism, Utopia, and the Mushroom Cloud: Four Activist Intellectuals and Their Strategies for Peace, 1945–1989: Louise Weiss (France), Leo Szilard (USA), E. P. Thompson (England) and Danilo Dolci (Italy)* (University of Chicago Press, 1993).

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De Groot, Gerard. *The 60s Unplugged: A Kaleidoscopic History of a Disorderly Decade* (Cambridge, MA: Harvard University Press, 2010).

Hecht, Gabrielle. *Being Nuclear* (Boston: MIT Press, 2012).

Lebovic, James H. *Flawed Logics: Strategic Nuclear Arms Control from Truman to Obama* (Baltimore: Johns Hopkins University Press, 2013).

Masco, Joseph P. *Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton University Press, 2006).

Pelopidas, Benoît. 'Power, Luck, and Scholarly Responsibility at the End of the World(s)', *International Theory*, Doi=10.1017/S1752971920000299.

Ritchie, Nick. 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons', *Contemporary Security Policy*, Doi=10.1080/13523260.2019.1571852.

**(p. 500)** Sylvest, Casper and Rens van Munster. *Nuclear Realism: Global Political Thought during the Thermonuclear Revolution* (London: Routledge, 2016).

Walker, William. *A Perpetual Menace: Nuclear Weapons and International Order* (London: Routledge, 2011).

Wittner, Lawrence. *The Struggle against the Bomb*, 3 vols. (Stanford University Press, 1993, 1997, and 2003).

### Notes:

<sup>(1)</sup> Roberto Unger, *Democracy Realised: The Progressive Alternative* (London: Verso, 1998), 237.

<sup>(2)</sup> I am grateful to S. M. Amadae, Grey Anderson, Jenny Andersson, Alex Bollfrass, James Cameron, Debak Das, Kjølvs Egeland, Thomas Fraise, Martin Hellman, David Holloway, Leopoldo Nuti, Nick Ritchie, Jan Ruzicka, Sanne Verschuren, William Walker, Anna Weichselbraun, and Alex Wellerstein for in-depth engagement with this essay. This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement no. 759707).

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## The Birth of Nuclear Eternity

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(<sup>3</sup>) I refer to the Thatcher/Reagan/Deng Xiaoping/Mitterrand turn to neoliberalism and Thatcher's famous claim that 'there is no alternative' to neoliberalism. See Philip Mirowski and Dieter Plehwe (eds.), *The Road from Mont Pèlerin* (Cambridge, MA: Harvard University Press, 2009); David Harvey, *A Brief History of Neoliberalism* (Oxford University Press, 2005), chapter 2, 39-63; Mathias Bernard, *Les Années Mitterrand: Du changement socialiste au tournant liberal* (Paris: Belin, 2015), chapters 3 and 4, 71-127; Ludivine Bantigny, *La France à l'heure du monde* (Paris: Seuil, 2013), 31.

(<sup>4</sup>) William Walker, *A Perpetual Menace: Nuclear Weapons and International Order* (London: Routledge, 2011), 12, 193.

(<sup>5</sup>) The most famous piece about nuclear normalization by the techno-strategic discourse remains Carol Cohn, 'Sex, Death and the Rational World of Defense Intellectuals', *Signs* 12, no. 4 (1987), 687-718. On the psychological sources of normalization, via numbing, dissociation, and other mechanisms, see Robert J. Lifton and Eric Markusen, *The Genocidal Mentality: Nazi Holocaust and Nuclear Threat* (London: Macmillan, 1990).

(<sup>6</sup>) Joseph P. Masco, 'Nuclear Pasts, Nuclear Futures: Or Disarming through Rebuilding', *Critical Studies on Security* 3, no. 3 (2015), 308-12, 312. Communication studies sees 'the future of nuclear weapons as a rhetorical genre' but take for granted the permanence of the weapons, even within the genre they study (Bryan C. Taylor, 'A Hedge against the Future: The Post-Cold War Rhetoric of Nuclear Weapons Modernization', *Quarterly Journal of Speech* 96, no. 1 (2010), 1-24, 2).

(<sup>7</sup>) Martin Amis, 'Thinkability', in *Einstein's Monsters* (New York: Harmony Books, 1987), 7-28, 14.

(<sup>8</sup>) Gabrielle Hecht, *Being Nuclear* (Boston: MIT Press, 2012), 13-16.

(<sup>9</sup>) For the problems of adjudicating deep time, see Vincent Ialenti, 'Adjudicating Deep Time: Revisiting the United States: High Level Nuclear Waste Repository Project at Yucca Mountain', *Science and Technology Studies* 2 (2014), 27-48. See also Anthony Burke, 'Nuclear Time: Temporal Metaphors of the Nuclear Present', *Critical Studies on Security* 4, no. 1 (2016), 73-90.

(<sup>10</sup>) This point is best established and summarized in Daniel Deudney, *Bounding Power: Republican Security Theory from the Polis to the Global Village* (Princeton University Press, 2007), 247. See also Jonathan Schell, 'Nuclear Weapons and the Real Twentieth Century', in *The Fate of the Earth and The Abolition* (Stanford University Press, 2000), v-xl, xxxii.

(<sup>11</sup>) Walker, *A Perpetual Menace*, chapter 3, 53-85.

(<sup>12</sup>) Deudney, *Bounding Power*, chapter 9, 244-64.

(<sup>13</sup>) Here I do not want to accept a teleological version of political history and I am fully aware of the precarious conditions of the possibility of democratic rule. For a sobering ac-

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## The Birth of Nuclear Eternity

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count, see Timothy Mitchell, *Carbon Democracy* (London: Verso, 2011). However, democracies in the second half of the twentieth century did not seem to picture their own end as a possible future, so I am asking the question from their own perspective.

(<sup>14</sup>) Deudney, *Bounding Power*, 255–6.

(<sup>15</sup>) Robert Dahl, *Controlling Nuclear Weapons: Democracy vs Guardianship* (New York: Syracuse University Press, 1985), 16. Beyond Deudney's point about the absence of accountability at the moment of nuclear use, there is an absence of accountability during the creation of these weapons and an expansion of the realm of secrecy; this will be investigated further in a paper with Fabricio Fialho, 'Probing the Priesthood', currently under review, and in Thomas Fraise's PhD dissertation. Avner Cohen summarizes the problem very well when he writes: 'In regard to procedure, nuclear weapons necessitate a level of secrecy never known before to liberal democracies. Such secrecy obviates fundamental democratic values like transparency, oversight, public deliberations and the public's right to know' (*The Worst-Kept Secret: Israel's Bargain with the Bomb* [New York: Columbia University Press, 2010, 147]). Studies of the US case reach similar conclusions. For instance, Joseph Masco's studies of US nuclear history also suggest that nuclear weapons make possible an anti-democratic mode of governance by a secretive national security state: Joseph P. Masco, *Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton University Press, 2006) and 'Terror as Normality', *Bulletin of the Atomic Scientists* 69, no. 6 (November–December 2013), 26–32. See also Daniel Deudney, 'Political Fission: State Structure, Civil Society and Nuclear Security Politics in the United States', in Ronnie Lipschutz (ed.), *On Security* (New York: Columbia University Press, 1995), chapter 4, 87–123. Switzerland stands out as one of the few cases in which the population was consulted about the appropriateness of building a nuclear weapon (in April 1962 and May 1963). On the Swiss case, see Ursula Jasper, *A Pragmatist Framework of Analysis* (London: Routledge, 2013), chapter 4, 55–115.

(<sup>16</sup>) Even Donald Trump claims that this is a goal of his: press briefing, 18 April 2018, <http://www.whitehouse.gov/briefings-statements/remarks-president-trump-prime-minister-abe-japan-joint-press-conference>.

(<sup>17</sup>) <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-barack-Obama-prague-delivered>.

(<sup>18</sup>) Hillary Clinton, Remarks to Members of the US Delegation to the New START Negotiations and Nuclear Posture Review Department Staff, 13 July 2010, <https://2009-2017.state.gov/secretary/20092013clinton/rm/2010/07/144577.htm> (emphasis added).

(<sup>19</sup>) Winston Churchill, 'Never Despair!', speech before the House of Commons on 1 March 1955, reproduced in Winston S. Churchill (ed.), *Never Give In! Winston Churchill's Speeches* (New York: Bloomsbury, 2013), 410–16, 416.

(<sup>20</sup>) The statement can be read here: <http://fissilematerials.org/library/gan98.pdf>.

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## The Birth of Nuclear Eternity

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(<sup>21</sup>) See Nick Ritchie, 'Inventing Nuclear Disarmament', *Critical Studies on Security* 7, no. 1 (2019), 73–7.

(<sup>22</sup>) Benoît Pelopidas, 'Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies', *Journal of Global Security Studies* 1, no. 4 (November 2016), 326–36.

(<sup>23</sup>) Slavoj Žižek, *The Sublime Object of Ideology* (London: Verso, 1989), 186.

(<sup>24</sup>) Desmond Ball, *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration* (Berkeley: University of California Press, 1980), 93; Robert McNamara, 'Draft Presidential Memorandum to President Johnson, 3 December 1964', p. 11, <http://nsarchive.gwu.edu/nukevault/ebb275/20.pdf>; Natural Resources Defence Council, 2002, Archive of Nuclear Data, <http://www.nrdc.org/nuclear/nudb/datab10.asp>.

(<sup>25</sup>) Roswell L. Gilpatric, 'Address before the Business Council, Hot Springs, Virginia, 10 October 1961', reprinted in *Documents on Disarmament 1961* (Washington, DC: US Arms Control and Disarmament Agency, 1962), 542–50.

(<sup>26</sup>) Georges Le Guelte, *Armes nucléaires: Mythes et réalités* (Arles: Actes Sud, 2009), 104–5; Stephen Schwartz (ed.), *Atomic Audit* (Washington, DC: Brookings Institution Press, 1998), 186, 189–90 n. 203.

(<sup>27</sup>) See S. M. Amadae, *Rationalizing Capitalist Democracy: The Cold War Origins of Rational Choice Liberalism* (University of Chicago Press, 2003), 10, 11, 64.

(<sup>28</sup>) I offer two others in 'A Bet Portrayed as a Certainty: Reassessing the Added Deterrent Value of Nuclear Weapons', in George P. Shultz and James E. Goodby (eds.), *The War That Must Never Be Fought: Dilemmas of Nuclear Deterrence* (Stanford: Hoover Institution Press, 2015), 53–5.

(<sup>29</sup>) Jonathan Schell, *The Abolition* (New York: Alfred A. Knopf, 1984), 118–20; and Schell, 'Part I: The Bomb in the Mind', in *The Seventh Decade: The New Shape of Nuclear Danger* (New York: Metropolitan Books, 2007), 3–84. See also Sidney D. Drell and Raymond Jeanloz, 'Nuclear Deterrence in a World without Nuclear Weapons', in Sidney D. Drell, James E. Goodby, and George P. Shultz (eds.), *Deterrence: Its Past, Its Future* (Stanford: Hoover Institution Press, 2011), 99–130.

(<sup>30</sup>) This is clear from the opening caption of the mini-series through to the end of the show via the title sequence of every season, and from frequent reference to the need to be able to discriminate between humans and cylons. Even the cylons talk about themselves as 'humanity's children'.

(<sup>31</sup>) Marco Fey, Annika Poppe, and Carsten Rauch, 'The Nuclear Taboo, *Battlestar Galactica* and the Real World: Illustrations from a Science Fiction Universe', *Security Dialogue* 47, no. 4 (2016), 348–65.

(<sup>32</sup>) Sam Nunn, speech delivered at the Council on Foreign Relations, 14 June 2007, <http://www.nti.org/analysis/speeches/nunn-mountaintop-free-weapons>.

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## The Birth of Nuclear Eternity

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<sup>(33)</sup> George Shultz, William J. Perry, Henry Kissinger, and Sam Nunn, 'A World Free of Nuclear Weapons', *Wall Street Journal*, 4 January 2007, <http://www.wsj.com/articles/SB116787515251566636>.

<sup>(34)</sup> Anne Harrington de Santana, 'The Strategy of Non-Proliferation: Maintaining the Credibility of an Incredible Pledge to Disarm', *Millennium* 40, no. 1 (2011), 3-19; David Mutimer, 'From Arms Control to Denuclearization: Governmentality and the Abolitionist Desire', *Contemporary Security Policy* 32, no. 1 (2011), 57-75; Walker, *A Perpetual Menace*, 161; Hugh Gusterson, 'The New Abolitionists', *Bulletin of the Atomic Scientists* (2012), <https://thebulletin.org/2012/03/the-new-abolitionists>; Susan Watkins, 'The Nuclear Non-Protestation Treaty', *New Left Review* 54 (November-December 2008), 5-26, 25 n. 24; Martin Senn and Christoph Erhardt, 'Bourdieu and the Bomb: Power, Language and the Doxic Battle over the Value of Nuclear Weapons', *European Journal of International Relations* 20, no. 2 (2014), 316-40.

<sup>(35)</sup> Casper Sylvest and Rens van Munster, *Nuclear Realism: Global Political Thought during the Thermonuclear Revolution* (London: Routledge, 2016); Lawrence Wittner, *The Struggle against the Bomb* (Stanford University Press, 1993), vol. 1; Fritz Bartel, 'Surviving the Years of Grace: The Atomic Bomb and the Specter of World Government', *Diplomatic History* 39, no. 2 (2015), 275-302.

<sup>(36)</sup> David Tal, *The US Nuclear Disarmament Dilemma 1945-1963* (New York: University of Syracuse Press, 2008).

<sup>(37)</sup> Daniel Ellsberg, *The Doomsday Machine: Confessions of a Nuclear War Planner* (New York: Bloomsbury, 2017), 340. See also the sentence of Richard Dean Burns and Joseph Siracusa about those who attended the first nuclear test in the conclusion of their two-volume study of the nuclear arms race: 'Most of them realized...they had let the nuclear genie out of the bottle with little likelihood of putting it back' (Richard Dean Burns and Joseph Siracusa, *A Global History of the Nuclear Arms Race: Weapons, Strategy and Politics* (Santa Barbara: Praeger, 2013), vol. 2, 581).

<sup>(38)</sup> Unpublished interview with Freeman Dyson, Princeton, Institute for Advanced Studies, 11 November 2015.

<sup>(39)</sup> This follows in the steps of Sezin Topçu, Christophe Bonneuil, and Céline Pessis (eds.), *Une Autre Histoire des Trente Glorieuses* (Paris: La Découverte, 2013).

<sup>(40)</sup> Robert S. Norris and Hans Kristensen have 1967 as the year with the most weapons on the US side ('Global Nuclear Weapons Inventories 1945-2013', *Bulletin of the Atomic Scientists* 69, no. 5 (2013), 75-81, 78); Richard Rhodes mentions 1966 as the peak with 32,200 weapons in *Arsenals of Folly: The Making of the Nuclear Arms Race* (New York: Knopf, 2007), 95. The same year appears in David Koplow, *The US Military's Quest for Usable Weapons* (Cambridge University Press, 2010), 108; Rhodes, *Arsenals of Folly*, 73-4.

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## The Birth of Nuclear Eternity

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(<sup>41</sup>) In her published chapter, Lynn Eden shows the lethality of the US nuclear arsenal peaking in 2002 ('The US Nuclear Arsenal and Zero: Sizing and Planning for Use—Past, Present and Future', in Judith Reppy and Catherine Kelleher (eds.), *Getting to Zero: The Path to Nuclear Disarmament* (Stanford University Press, 2011), 69 and fig. 4.2, p. 72). Ryan Snyder and I found that it did peak at the end of the 1980s.

(<sup>42</sup>) Norris and Kristensen, 'Global Nuclear Weapons Inventories 1945–2013', 78.

(<sup>43</sup>) Norris and Kristensen, 'Global Nuclear Weapons Inventories 1945–2013', 78. In 1969, the total number of warheads is 38,621, against 13,424 in 1959 and an all-time maximum of 64,449 in 1986.

(<sup>44</sup>) Nicollo Petrelli and Giordana Pulcini, 'Nuclear Superiority in the Age of Parity: US Planning, Intelligence Analysis, Weapons Innovation and the Search for a Qualitative Edge 1969–1976', *International History Review* 40, no. 5 (2018), 1191–209.

(<sup>45</sup>) Thomas Jonter, *The Key to Nuclear Restraint* (London: Palgrave, 2016), 195–254.

(<sup>46</sup>) Vincent Pouliot, 'The Materials of Practice: Nuclear Warheads, Rhetorical Commonplaces and Committee Meetings in Russian–Atlantic Relations', *Cooperation and Conflict* 45, no. 3 (2010), 294–311.

(<sup>47</sup>) One would need to elaborate on this, as it is true that the perpetual physical presence of the weapons requires constant curation and reinvention. See Mike Bourne, 'Invention and Uninvention in Nuclear Weapons Politics', *Critical Studies on Security* 4, no. 1 (2016), 6–23.

(<sup>48</sup>) Lawrence Wittner, *The Struggle against the Bomb*, vol. 2 (Stanford University Press, 1997), 442–62.

(<sup>49</sup>) See the text of the Treaty on the Non-Proliferation of Nuclear Weapons, <https://www.un.org/disarmament/wmd/nuclear/npt/text>.

(<sup>50</sup>) Jan Ruzicka, 'Behind the Veil of Good Intentions: Power Analysis of the Nonproliferation Regime', *International Politics* 55 (2018), 371–4; Daniel Khalessi, 'Strategic Ambiguity: Nuclear Sharing and the Secret Strategy for Drafting Articles I and II of the Nonproliferation Treaty', *Nonproliferation Review* 22, nos. 3–4 (2015), 421–39; Walker, *A Perpetual Menace*, 77–8; Kjølsv Egeland, 'The Road to Prohibition: Nuclear Hierarchy and Disarmament, 1968–2017', PhD thesis, Oxford University, 2018, 52–6.

(<sup>51</sup>) Anna Weichselbraun, 'Constituting the International Nuclear Order: Bureaucratic Objectivity at the IAEA', PhD thesis, University of Chicago, 2016.

(<sup>52</sup>) Moeed Yusuf, *Predicting Proliferation: A History of the Future of Nuclear Weapons* (Washington, DC: Brookings Institution, 2009) and Jeffrey Richelson, *Spying on the Bomb: American Nuclear Intelligence from Nazi Germany to Iran and North Korea* (New York; London: W. W. Norton, 2007), 137–94.

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## The Birth of Nuclear Eternity

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<sup>(53)</sup> This is a fundamentally different claim from the existential one that Gunther Anders made in the 1950s. He suggested that the invention of nuclear weapons has opened and defines a new era in human history which is distinct from any previous one because it will be the last one (Anders, 'Theses for the Atomic Age', *The Massachusetts Review* 3, no. 3 (1962), 493-505). Anders's claim is that citizens do not realize it and not that they are told it is irreversible.

<sup>(54)</sup> Leo Szilard, 'How to Live with the Bomb and Survive', *Bulletin of the Atomic Scientists* 16, no. 2 (February 1960), 58-73, 59.

<sup>(55)</sup> Jennifer Sims, *Icarus Restrained: An Intellectual History of Nuclear Arms Control 1945-1960* (Boulder: Westview Press, 1990); Neil Cooper, 'Putting Disarmament back in the Frame', *Review of International Studies* 32, no. 2 (2006), 353-76; Benoît Pelopidas, 'The Oracles of Proliferation: How Experts Maintain a Biased Historical Reading That Limits Policy Innovation', *Nonproliferation Review* 18, no. 1 (2011), 297-314, and 'Renunciation: Restraint and Rollback', in Joseph Pilat and Nathan E. Busch (eds.), *Routledge Handbook of Nuclear Proliferation and Policy* (London: Routledge, 2015), 337-48; and David Mutimer, *The Weapon State* (Boulder: Lynne Rienner, 2000).

<sup>(56)</sup> United Nations General Assembly, 13th Session Official Records, 19 September 1958 (A/PV.751), 8-10.

<sup>(57)</sup> Jonathan Pearl, 'Forecasting Zero: US Nuclear History and the Low Probability of Disarmament' (US Army War College, Strategic Studies Institute, 2011), 1-23. Recent literature on Reagan portrays him as a genuine abolitionist: Paul Lettow, *Ronald Reagan and His Quest to Abolish Nuclear Weapons* (New York: Random House, 2005); Martin and Annelise Anderson, *Reagan's Secret Wars: The Untold Story of his Fight to Save the World from Nuclear Disaster* (New York: Three Rivers Press, 2010). See also n. 16 above.

<sup>(58)</sup> See the authoritative study by Lawrence Wittner, *The Struggle against the Bomb*, 3 vols. (Stanford University Press, 1993, 1997, and 2003).

<sup>(59)</sup> Joseph Masco's work on the 'national security affect' is of primary importance in this respect.

<sup>(60)</sup> See Benoît Pelopidas and Fabricio Fialho, 'Democracy and Nuclear Weapons: Re-assessing the Case for Guardianship and Popular Attitudes towards Nuclear Weapons at a time of Modernization', under review.

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## **The Birth of Nuclear Eternity**

weapons enterprise or from anti-nuclear activists in order to problematize conflicts of interest and their effect on knowledge production.

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