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Life in the nuclear age: Classical realism, critical theory and the technopolitics of the nuclear condition

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Abstract

Classical realist thought provides a diagnosis of the significance nuclear weapons that calls into question the very possibility of politics in the nuclear age. While sharing similarities with this outlook, critical theoretic reflections suggest a more expansive consideration of the nuclear condition as underpinned by combinations of dystopian fears of nuclear destruction and utopian visions of nuclear futures. Most prominently Herbert Marcuse's critical theory intimates an understanding of the nuclear condition as one that is rendered tolerable so long as nuclear technologies are associated with and related to innovation, progress and modernity. The study of the technopolitics of the nuclear condition might thus look not only to classical realists' concern with 'Death in the Nuclear Age' but also incorporate corresponding critical awareness of claims to the life-sustaining applications of nuclear technologies in areas such as energy production, industry and medicine. Applying an 'aporetic' form of immanent critique, and to exemplify how the international politics of the nuclear age has often been predicated on efforts to distinguish and relate different kinds of nuclear technologies, the paper revisits the US-led post-war vision of 'Atoms for Peace' and compares it to the International Atomic Energy Agency's contemporary 'How the Atom Benefits Life' campaign.

Keywords

Nuclear power, classical realism, critical theory, immanent critique, technopolitics

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Introduction

In February 2012 the CBS-affiliated channel KMOV, based in St. Louis, Missouri, broadcast a short news feature entitled 'Life Down Under: Survival Condos Promise to Protect Against a Nuclear Attack' (KMOV 2012) as part of its 'News 4 St. Louis'. The feature detailed a visit to a former US Air Force Atlas F missile silo 'somewhere in Kansas' (the exact location kept secret) to report on the development of a 'Luxury Survival Condo' complex under the supervision of the project developer, Larry Hall. In response to questions from a seemingly incredulous reporter, Hall confirmed that residents of St. Louis were among those that had expressed an interest in the underground complex (one of a projected three in development), where condos retail at a reported $1.5m for a half floor, $3m for a full floor (Dowling 2014; see also Luxury Survival Condo, 2016). Built in 1960, the silo was 'hardened' to protect the nuclear-armed missile it housed. No longer in use for its original purpose, Hall's project has worked to build a technological support system for comfort living into the 175ft deep reinforced concrete structure, designed to allow residents to survive with a in-built supply of food, water, clean air and electricity to last up to five years in the event of a nuclear attack (or, indeed, according to Hall, in the event of any other kind of global catastrophe). As well as residences the condo would host a grocery store, medical, rooms, dental office, shooting range, indoor dog park, movie theatre and indoor pool and water slide amongst its other facilities (see Logic Integration 2013).

The 'functionality' of the complex as a whole would be based around integrated computer systems that as well as monitoring and sustaining physical living conditions such as air filtration and water sensors, would also ensure the provision of state of the art audio visual facilities, lighting control and entertainment systems for residents. The intention, according to system designer Bill Craig, is that in the event of catastrophe residents could 'live here and enjoy the facility, not just survive' (in Logic Integration 2013: 1:38). Ultimately the challenge

and the reward of the project from a design perspective was that it *'...took a facility intended to destroy and turned it into a facility intended to preserve*' (in Logic Integration 2013: 3:45, emphasis added).

Marketing the dream of luxury survival living to the 1% of Americans that would be able to afford it (Foster 2016: 295), the Luxury Survival Condos might be regarded as simply the latest manifestation of what Joseph Masco (2009) has termed the 'bunker society'. During the Cold War, as Masco forensically details and illustrates, the construction of purpose-built underground nuclear shelters constituted a key element of federal civil defense efforts from the mid-1950s onwards. As an attempted means of state management of collective nuclear fear, Masco argues, during the Cold War these '…built spaces stocked with state-of-the-art technologies and commodities presented a utopian vision of an invulnerable America closed off from the outside world but still functioning perfectly' (2009, 13).

Yet while clearly continuous with that lineage the Luxury Survival Condos are distinctive in that as opposed to being purpose-built, they are instead re-purposed: the disused nuclear missile silo has been transformed into a living space. In the design and marketing of the condos the survivability of the structure and its status as a former nuclear weapon facility as selling points are blended together with the everyday comforts provided by its hotel-like furnishings and features. The condos are also precisely for that reason an interesting kind of 'nuclear thing', to use the terminology employed by Gabrielle Hecht (2012), where Hecht argues that we can identify different manifestations of 'nuclearity' as 'a *technopolitical* phenomenon that emerges from political and cultural configurations of technical and scientific things, from the social relations where knowledge is produced' (2012: 15, emphasis in original). Hecht's understanding of nuclearity points to an approach that seeks to analyse not just how 'nuclear things' are distinguished as being uniquely different from 'non-nuclear things', but also how nuclear things are distinguished from – and related to – each other in

contextually specific ways (see also the editors' Introduction and Sonja D. Schmid's contribution to this special issue). The Luxury Survival Condos serve as an exemplar in this respect, taking as they do an artefact of the nuclear age once used to house nuclear weapons but now marketed in large part on the assumed virtues of the facility for sustaining human lives in the event of a nuclear catastrophe.

This theme of configurations of life-destroying and life-sustaining nuclear things as a technopolitical phenomenon is pursued in more detail in this paper, and is explored in relation to the points of overlap and distinction between classical realist and critical theoretic reflections on the 'nuclear condition' in respect of this theme. Classical realist thought provides a diagnosis of the nuclear weapons condition that, at times, seems to call into question the very possibility of politics in the nuclear age. Critical theoretic reflections suggest a more expansive understanding of the nuclear condition and its underpinning combinations of dystopian fears of nuclear destruction and utopian visions of nuclear-powered futures. Elements of each, the paper suggests, can be brought together to inform an immanent critique of the nuclear condition as not just a prevailing situation of global vulnerability and human endangerment, but also as a situation *conditional upon* a series of assumed distinctions about the nature and applications of nuclear technologies. In particular the paper argues that while classical realists such as Hans J. Morgenthau and John H. Herz focused extensively on the condition of 'Death in the Nuclear Age', the work of critical theorists such as Herbert Marcuse points to a wider concern with the ways in which the prospect of nuclear death exists alongside and is often bound up with claims to the life-sustaining properties and applications of 'the atom'. The latter orients us towards understanding the contemporary nuclear condition as being predicated upon a more complex political and cultural configuration of nuclear things. By way of illustration, the paper details how the post-war 'Atoms for Peace' initiative in particular exemplified a vision of nuclear

power that split the 'peaceful atom' from the 'military atom' in a manner that still remains at the core of efforts to regulate the contemporary nuclear condition at an international level. To evaluate the continuing significance of such understandings the paper then turns to a discussion of the International Atomic Energy Agency's campaign to demonstrate 'How the Atom Benefits Life'.

Classical realism and the nuclear weapons condition

> My own view is that the development of these weapons can make, if wisely handled, the problem of preventing war, not more hopeless, but more hopeful, than it would otherwise have been, and that this is so not merely because it intensifies the urgency of our hopes, but because it provides new and healthy avenues of approach. In developing these avenues the fact that there is so far-reaching a technical inseparability of the constructive uses of atomic energy from the destructive ones – a fact that at first sight might appear to render the problem only more difficult – this fact is precisely the central vital element that can make effective action possible. If we are clear on this, we shall have some guide for the future (Oppenheimer 1955 [1946]: 16-17).

Coming in the aftermath of the use of nuclear weapons in the bombing of Hiroshima and Nagasaki, J. Robert Oppenheimer's reflections on atomic energy indicated a hope not only that the manifest destructiveness of nuclear weapons would lead the world towards avoidance of their use, but also that the 'technical inseparability of the constructive uses of atomic energy from the destructive' provided a residual but crucial prospect for international cooperation on the uses of nuclear power. By contrast to 'Oppenheimer's hope' (Peoples 2016: 229), the writings of Hans J. Morgenthau and John H. Herz in the late 1950s and early 1960s suggested a profound shift to a new existential global condition with the advent of the 'nuclear age' and a much more pessimistic outlook. Indeed their work during that period –

written in the wake of the development of thermonuclear weapons and the corresponding increase in the destructive potential of nuclear weapons – is marked by an overriding focus on and concern with the global existential threat created by the 'nuclear revolution' as a key facet of their wider considerations of post-war political modernity (see Craig 2003; van Munster and Sylvest 2014; 2016).

Morgenthau's (1961) reflections in 'Death in the Nuclear Age' stand out as the most prominent variation on this theme, declaring that it was the very 'possibility of nuclear death' had become the defining feature of the nuclear condition:

> The significance of the possibility of nuclear death is that it radically affects the meaning of death, of immortality, of life itself. It affects that meaning by destroying most of it. Nuclear destruction is mass destruction, both of persons and of things. It signifies the simultaneous destruction of tens of millions of people, of whole families, generations, and societies, of all the things that they have inherited and created. It signifies the total destruction of whole societies by killing their members, destroying their visible achievements, and therefore reducing the survivors to barbarism. Thus nuclear destruction destroys the meaning of death by depriving it of its individuality. It destroys the meaning of immortality by making both society and history impossible. It destroys the meaning of life by throwing life back upon itself. (1961: 2).

For Morgenthau, it was not simply that the advent of a particular type of technology marked the distinction between the nuclear and pre-nuclear age. The constant and realisable possibility of nuclear death constituted a 'qualitative transformation of the meaning of our existence' (Morgenthau 1961: 4), but one which policy makers had generally failed to recognise. In terms that arguably parallel his critique of the 'rationalistic' approach of 'scientific man' (Morgenthau 1946; see Russell 1991: 119), Morgenthau would later go on to lament the fact that 'while our conditions of life have drastically changed under the impact of the nuclear age, we still live in our thoughts and act through our institutions in an age that has passed' (1964: 23), and the fact that at a political level the recognition was lacking

developments in the destructive capacity of nuclear armaments had 'radically altered the relations that have existed since the beginning of history between the ends of foreign policy and violence as a means to these ends' (1962: 11).

The writings of John H. Herz from the late 1950s onwards exhibited a number of broadly comparable concerns. In his *International Politics in the Atomic Age,* originally published in 1959, Herz too made the case that the advent of nuclear weapons required both scholars and practitioners of international relations to radically rethink the ways in which states in the international system interacted with one another. There he characterised the 'nuclear situation' as the

> …unprecedented condition that has befallen mankind. And the first thing to realize is that the situation confronts for the first time the whole human race as one group, negatively, it is true, for it is the menace rather than the promise, the destructive rather than the constructive and creative potentiality of atomic energy that concerns the group as such by placing its very continuance in doubt (1962 [1959]: 304).

In the wake of the H-bomb's exponential increase in destructive capacity as well as the quantitative increase in the number of nuclear weapons and innovations in their means of delivery, contra Oppenheimer's 'hope' Herz made explicit the view that appeals to the 'constructive' applications of atomic energy were a distraction from, or at the very least secondary to, its destructive potentiality. Instead of an expectation that international cooperation could be anchored in the collaborative development of nuclear power for energy production, he argued that the destructive potential of nuclear weapons reinvigorated the idea of world government. Indeed it necessitated its development precisely because 'the chief external function of the modern state […] seems to have vanished' (1962 [1959]: 22) in an era where global nuclear destruction had become possible. On this basis Herz identified 'The Atomic Bomb as Attitude Maker': a weapon so destructive in scale that it also had the potential to create global self-conception of 'what Reinhold Niebuhr has recently called "the

minimal community of the fate of the common threat of nuclear annihilation," because it creates what a German author has referred to as "the interdependence of doom"' (Herz 1962 [1959]: 303-304). The only true hope for human survival in the nuclear age, Herz contended, was that out of the fear of global nuclear annihilation '[A]n attitude of "universalist concern"' may yet 'save us' (Herz 1962 [1959]: 302).

Critical theory: Aporetic immanent critique of nuclear modernity

In short, Morgenthau and Herz identified the nuclear condition as a nuclear *weapons* condition. Yet while emphasising the exceptional characteristics of nuclear weapons and their corresponding conditioning effects on modern international politics, both at times argued that this nuclear weapons condition should be regarded as an outgrowth of broader developments in technology and accompanying modes of thought. Thus Morgenthau critiqued what he saw as a misguided attempt to create 'political science' in the 20th century when 'what is required for its [i.e. politics'] mastery is not the rationality of the engineer but the wisdom and moral strength of the statesman' (1946: 10-11), with the assumption that 'engineering rationality' could be employed to manage the nuclear condition being the ultimate such fallacy. Herz identified the technological dimensions of the 'change which the advent of the "atomic" or "nuclear age" has wrought' as:

> …the accumulated and accumulating impact of a process which can be termed truly revolutionary: the process of scientific invention and technological discovery which not only has "perfected" the fission and fusion weapons themselves, but in its wake so far has brought jet aircraft with intercontinental range and super-sonic speed, missiles with nuclear warheads, and the prospect of nuclear-powered planes and submarines with unlimited range, and rockets with equally unlimited range and with guidance to specific targets anywhere in the world (Herz 1962 [1959]: 12).

Morgenthau and Herz thus articulated broadly comparable views that nuclear weapons should be treated as continuous with wider processes of scientific rationalisation and technological development. Morgenthau later developed this theme in his (1972) *Science: Servant or Master?*, as did Herz's (1976) *The Nation-State and the Crisis of World Politics*. Both works not only suggested that 'the spectre of nuclear death raised far-reaching questions about technology' (Scheuerman 2009: 571), but also raised fundamental concerns that the nature and speed of modern technological development risked replacing politics and statecraft with a technocratic form of governance. As William Scheuerman puts it, their '…growing anxieties about the horrific possibility of nuclear war ultimately encouraged both thinkers [Morgenthau and Herz] to develop a critical account of modern technology' amounting, Scheuerman makes the case, to '…a distinctively *Realist* critique of technology' (2009: 564, emphasis in original).

If the classical realist critique of technology is distinctive from recent (neo)realist scholarship – Scheuerman (2009: 563) contrasts it with the work of Kenneth Waltz and John Mearsheimer in particular – it nonetheless exhibits homologies with roughly contemporaneous critical reflections on the 'technological condition' and a wider strand of what has elsewhere been termed as 'nuclear realism' (van Munster and Sylvest 2016). Most notably Herz (1976) acknowledged resonances of his arguments with Herbert Marcuse's (1964) *One-Dimensional Man*. Scheuerman caveats this with the caution that 'it would be a mistake to claim that Herz borrowed extensively from the Frankfurt School', but goes on to note '…there is undoubtedly some thematic overlap and some common preoccupations' (Scheuerman 2009: 573). Allowing for such common preoccupations, a crucial distinction is that whereas Morgenthau and Herz follow a direction of travel that takes them from a concern with the nuclear weapons condition to more a more expansive critique of technology, the critical thinking of the Frankfurt School might be said to take a similar route in the

opposite direction: nuclear technologies are regarded as the apotheosis of the modern technological condition, an outgrowth of processes of rationalisation and instrumentalisation that precede (see for example Marcuse (1941)) the advent of the nuclear age.

In part this is evident from how and where nuclear technologies feature in the work of thinkers associated with the Frankfurt School, where they often serve as illustrative examples of the wider tendencies of 'industrial society'. Thus, for example, does Theodor Adorno's oft-cited proclamation that 'there is no universal history leading from savagery to humanitarianism, but there is one leading from the slingshot to the megaton bomb' (Adorno 1972: 343) invoke nuclear weapons as an exemplar in his *Negative Dialectics*. But it is precisely as an exemplar of wider tendencies, in passing, that Adorno makes the citation. 'The profit interest and thus the class relationship make up the objective motor of the production process which the life of all men hangs by', Adorno continues, 'and the primacy of which has its vanishing point in the death of all. This also implies the reconciling side of the irreconcilable; since nothing else permits men to live, not even a changed life would be possible without it'. Similarly, Marcuse's references to nuclear technologies, most notably in his (1964) *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* only briefly book-end his broader critique of 'technological society'. But the manner in which Marcuse discusses nuclear technologies is notable precisely for the way he treats the subject. The introduction to the first edition of *One-Dimensional Man* opens with the passage:

> Does not the threat of an atomic catastrophe which could wipe out the human race also serve to protect the very forces which perpetuate this danger? The efforts to prevent such a catastrophe overshadow the search for its potential causes in contemporary industrial society […] We submit to the peaceful production of the means of destruction, to the perfection of waste, to being educated for a defense which deforms the defenders and that which they defend (Marcuse 1964: xli).

In this sense Marcuse uses the spectre of 'atomic catastrophe' to exemplify the 'one-dimensional' nature of industrial society, with nuclear technologies cited as emblematic of a 'vast, repressive technological civilization that was bringing every aspect of humanity under its control' (Winner 1986: 66). As *One-Dimensional Man* moves towards it close, Marcuse argues that people can tolerate the prospect of an 'unbearable nightmare' and can '…support the continuous creation of nuclear weapons, radioactive fallout…', but 'cannot tolerate being deprived of the entertainment and education which make them capable of reproducing the arrangements for their defense and/or destruction' (1964: 246). His conclusion consequently declares that:

> Auschwitz continues to haunt not the memory but the accomplishments of man – the space flights; the rockets and the missiles […] This is the setting in which the great human achievements of science, medicine, technology take place: *the efforts to save and ameliorate life are the sole promise in the disaster* […] Beauty reveals its terror as highly classified nuclear plants and laboratories become "Industrial Parks" in pleasing surroundings; Civil Defense Headquarters display a "deluxe fallout-shelter" with wall-to-wall carpeting ("soft"), lounge chairs, television , and Scrabble, "designed as a combination family room during peacetime (sic!) and family fallout shelter should war break out" (Marcuse 1964: 248, emphasis added).[1]

The quotations cited by Marcuse in this passage – from an article in *The New York Times* dated November 11, 1960 and displayed at the New York City Civil Defense Headquarters (Marcuse 1964: 248, fn1) – serve a clear purpose as a closing illustration to his broader thesis on the 'one-dimensional' quality of life in industrial society. In ways that call to mind again the promises of Larry Hall's Luxury Survival Condos as well as Masco's (2009) discussion of Cold War America's 'bunker society', the prospect of nuclear catastrophe is, Marcuse suggests, assuaged by the association of nuclear war with bucolic imagery, family life and home comforts (cf. Cohn 1987), while nuclear technology more generally is placed among the pantheon of 'human achievements' in 'science, medicine, technology'.

Whilst overlapping to some degree with the classical realist preoccupation with the nuclear weapons condition, then, a Marcusian approach points towards analysis of the ways in which efforts to manage the 'perils' of nuclear weapons have, historically, been bound up with the 'promises' of nuclear power as a key aspect of efforts to manage and regulate the nuclear condition.[2] As I have suggested elsewhere (Peoples 2016: 216) this can be categorised as 'nutopianism': a mode of understanding nuclear power and technology that is 'imbued with a spirit of technological optimism in relation to "peaceful" nuclear power, but simultaneously qualified by an awareness of the destructive uses and catastrophic potentialities of nuclear weapons' .

Consideration of this theme – of the promise of material abundance and comforts provided by modern technology off-setting the technological capacities for human destruction – might provide the grounds for a sustained immanent critique of the contemporary nuclear condition. It is, though, arguably an 'aporetic' (Benhabib 1986: 163) mode of immanent critique, particularly as manifested in, for example, Marcuse's *One Dimensional Man*. In the 1930s the critical theorists associated with the Frankfurt School practiced immanent critique as a means of comparing society to its own norms, and identifying the contradiction between the two within an historical context. In totalitarian states in particular, Enlightenment ideals could be used as 'norms of social critique' (Kellner 1993: 48) in identifying the remaining emancipatory potentialities within contemporary administered societies. Although different in substance, this mode of Critical Theory was consistent with Marx's historical materialist critique of the 'estrangement' created by an 'economically mediated process of social domination' (Antonio 1981: 333).

As Seyla Benhabib (1986: 149) argues, though, with the transition to 'the critique of instrumental reason', influenced by Max Weber's account of rationalization and disenchantment and exemplified in different ways in Adorno and Horkheimer's (1972

[1944]) *Dialectic of Enlightenment* and Marcuse's *One Dimensional Man*, the mode of immanent critique that remains is 'aporetic' in nature. Although a concern with identifying emancipatory potentialities persisted to some degree, that concern became largely secondary to (and arguably at times is even precluded by) the identification of persistent and apparently insoluble contradictions within modern societies. Adorno's (1972) theorisation of 'negative dialectics' constitutes perhaps the ultimate form of aporetic immanent critique, insofar as it '…denies that there is an immanent logic to the actual that is emancipatory' (Benhabib, 1986: 173). In short, 'Adorno rejects the *logic* of immanence, while preserving immanent critique' (Benhabib, 1986: 173, emphasis in original).

For some, most prominently for Jürgen Habermas, the latter move effectively constituted, if not an abandonment of immanent critique, then a blind alley, necessitating a revitalisation of normative critique on different terms (see Vaki 2005). But it is in this sense of an aporetic mode of immanent critique that we can understand Adorno's identification of the 'reconciling side of the irreconcilable' and Marcuse's diagnosis of submission to 'the peaceful production of the means of destruction'. Marcuse's own sense of incredulity at the 'willful play with fantastic possibilities' (1964: 247) in itself constituted a refusal to accept the association of nuclear catastrophe with such imagery of scientific endeavour and human achievement. For both the nuclear age is replete with instances of such contradictions that fail to reduce to a straightforward resolution, but are instead perpetuated by a seemingly productive tensions and sustained by utopian visions of how nuclear technologies might be incorporated into and reconciled with industrial civilization. Their reflections on the advent of the nuclear age are aporetic in the sense that they are pervaded by a sense of perplexity at reconciling of life-destroying and life-sustaining tendencies. Here it is precisely the 'promise' of nuclear technologies to sustain and preserve life rather than their potential to destroy it comes to play an important part. The 'willful play with fantastic possibilities', Marcuse

suggests, soften and offset awareness of the capacity for global annihilation in the nuclear age. As the proceeding sections seek to illustrate, such a mode of analysis constitutes a particularly powerful way of understanding efforts to reconcile the ostensibly divergent applications of nuclear technologies.

Atoms for peace

While the classical realist diagnosis of the nuclear condition as articulated by Morgenthau and Herz arguably assumes nuclear weapons to be the defining technology of the modern era, efforts to differentiate and distinguish between nuclear things have been a persistent and continuing feature of the nuclear age right from its 'beginning'. The idea that 'the close technical parallelism and interrelation of the peaceful and the military applications of atomic energy ceases to be a difficulty, and becomes a help' (Oppenheimer 1955 [1946]: 9) is, arguably, an understanding that has consistently remained at the core of post-World War II efforts to build and regulate an international nuclear order. Variations of it are to be found in the US Acheson-Lilienthal Report and the Baruch Plan of 1946, the Soviet Gromyko plan of the same year, President Eisenhower's 'Atoms for Peace' proposal as articulated in 1953, and the 1957 statute of the International Atomic Energy Agency (IAEA).

Sceptics, of course, doubt whether such initiatives were ever truly intended to curtail the development of and eliminate possession of nuclear weapons, and suggest that they were instead intended to obscure their continued development and possession. Thus for example, Craig and Radchenko argue that the Truman administration intentionally put forward the Baruch Plan in the knowledge that it would fail (2008: 125); Medhurst (1997) that Eisenhower's 'Atoms for Peace' was intended to 'distract' the world audience away from the nuclearization of NATO. But even allowing for the above and questions of sincerity

notwithstanding, variations 'Oppenheimer's hope' came to be central to post-War efforts to regulate the international nuclear order, with lasting practical implications. With the Atoms for Peace initiative in particular, Mara Drogan makes the case, a 'nuclear imperative' came to be a 'pervasive mindset' in the 1950s, in which 'the expansion and use of nuclear technology for military and civilian purposes was both inevitable and necessary, and [it was assumed] that the United States must maintain its lead in the nuclear field, regardless of economic costs, technological complications, or questions of health, safety, and security' (Drogan 2016: 948; cf. Winkler 1993: 144-147). Eisenhower, in the address to the UN on 8 December 1953 that launched the initiative, famously declared that:

> The United States would seek more than the mere reduction or elimination of atomic materials for military purposes […] The United States knows that if the fearful trend of atomic military build-up can be reversed, this greatest of destructive forces can be developed into a great boon, for the benefit of all mankind […] Who can doubt that, if the entire body of the world's scientists and engineers had adequate amounts of fissionable material with which to test and develop their ideas, this capability would rapidly be transformed into universal, efficient and economic usage? (Eisenhower 1953: np).

Even if the subsequent implementation of the proposal fell short of a rapid, US-led global transformation of that destructive capacity into 'universal, efficient and economic usage' it nonetheless set in policy a progressive vision of nuclear power. Most importantly, and institutionalised in 1957 with the formation of the International Atomic Energy Agency (IAEA), the Atoms for Peace proposal established a continuum of 'destructive' and 'constructive' applications of nuclear power, with efforts to constrain the former seen to be innately related to efforts to enable the latter. Thus Eisenhower proposed that the role of an international atomic energy agency should not only be to uphold a 'system of world-wide inspection and control' as regards military applications and to impound and store fissionable

material, but should also be put to work to '…devise methods whereby this fissionable material would be allocated to serve the peaceful pursuits of mankind. Experts will be mobilized to apply atomic energy to the needs of agriculture, medicine and other peaceful activities. A special purpose would be to provide abundant electrical energy in the power-starved areas of the world' (Eisenhower 1953: np).

Atoms for Peace thus established and institutionalised a particular kind of chain of association between different kinds of nuclear things, envisaging a specific international technopolitical configuration: 'Atoms for peace remade US foreign and nuclear policy in the years to follow, [and] would reshape the political and technological map through the export of knowledge, fissionable material and equipment' (Drogan 2016: 974). The application of atomic energy to agriculture, as advocated in Eisenhower's speech, came to be a key part of wider efforts to 'modernise' agricultural production in developing countries in 1960s (see Hamblin 2009). The establishment of the International Atomic Energy Agency (IAEA) in 1957 established within the United Nations 'America's drive to export the peaceful atom', while the United Nations Educational, Scientific, and Cultural Organization (UNESCO) evaluation of Atoms for Peace in the 1950s 'drew upon a host of existing notions about the relationship between social and technological progress' (Hamblin 2006: 737).

The nutopian political and scientific vision set out by Atoms for Peace was of course rearticulated in popular cultural manifestations too (for an extended discussion, see Winkler 1993: 136-164). A classic example is *Our Friend the Atom* (1957), The Disney-fied version of the Atoms for Peace ideal that employed a retelling of the fable of the genie and the fisherman as a 'motif for the atomic age' (Winkler 1993: 140) and a jumping off point for introducing viewers to the basics of nuclear physics and a vision of atomic energy as the power source of the near future. Introduced by 'Uncle Walt' himself, the feature presented viewers with the fabled genie as a vehicle for understanding atomic power: dangerous upon

its initial release, but then tricked and contained again in the lamp, and eventually pressed into the service of the fisherman who pulled it out of the sea (Disney 1957: 0mins-7:41).

At the heart of such characterisations '…was the bipolarity of weapons versus peaceful uses, the atomic genie who could be either menace or servant' (Weart 1988: 88; 2012: 170). In this configuration, applications of nuclear technologies in war, health, agriculture and energy were treated as distinct but crucially interrelated at one and the same time. Even the US development of the hydrogen bomb could not, it seemed, entirely displace the nutopian promise of the use of nuclear energy for the unlimited production of electricity as a particularly prominent application of Atoms for Peace. John von Neumann for example, one of the key architects of the H-bomb, would in 1955 reiterate the promise of nuclear (fusion) power amidst his more pessimistic prognosis of whether humanity could 'survive' technology (von Neumann 2013 [1955]). As Oppenheimer had sought to emphasise the 'constructive' applications of atomic power in the years immediately after Hiroshima and Nagasaki, fission, von Neumann argued, '…is not nature's normal way of releasing nuclear energy. In the long run, systematic industrial exploitation of nuclear energy may shift reliance onto other and still more abundant modes'. In a variation of the 'electricity too cheap to meter' prediction[3], von Neumann hypothesised that (on the proviso of 'a decade of really large-scale industrial effort' and a shift away from the focus on plutonium production as an objective) 'It is likely that we shall gradually develop procedures more naturally and effectively adjusted to the new source of energy, abandoning the conventional kinks and detours inherited from chemical-fuel processes. Consequently, a few decades hence energy may be free – just like the unmetered air – with coal and oil used mainly as raw materials for organic chemical synthesis, to which, as experience has shown, their properties are best suited' (von Neumann 2013 [1955]: np).

Elsewhere Edward Teller would in the late 1950s and into the 1960s advocate the envisioned use of nuclear explosives as 'excavation technologies' as a means to '…change the earth's surface to suit us' (cited in Kirsch 2005: 3). Although projected plans to carve out a Central American canal using atomic devices never came to pass (see Kirsch 2005; Kaufman 2012; Masco 2016: 58-60) the US Atomic Energy Commission's 'Project Plowshare' foresaw and planned for the widespread 'geographical engineering of continental river systems, dams, quarries, vast road cuts, and "nuclear blasted" instant harbors' (Kirsch 2005: 3). In perhaps the most obvious attempt to re-purpose nuclear weapons to 'constructive' ends within the wider context of Atoms for Peace (see Kaufman 2012: 2-3), Plowshare 'involved turning the planet into an imaginative space for nuclear engineering, as proponents sought a project big enough to sell to the mass public as well as to industry and government the idea of converting the bomb from weapon of mass destruction to engineering tool' (Masco 2016: 58).

How the atom benefits life

Of course in the contemporary era 'It is impossible to discuss "nuclear modernity" without also recording social challenges to such a vision' (Irwin 2000: 84), and the early nutopianism of the Atoms for Peace era never went entirely uncontested (see Hamblin 2006: 734-735). Project Plowshare's 'dream' (Kirsch 2005) of nuclear earthmoving as a shortcut to geoengineering was beset from the outset and ultimately curtailed by the protests of those that pointed out the radioactive and environmental hazards that would be created as a result. The promised 'boon to all mankind' central to the 1950s vision of the 'peaceful atom' still persists, not least for those that now argue that a 'nuclear imperative' exists in the need to replace consumption of fossil fuels (see, e.g., Cravens 2008; Eerkens 2006; various

contributors to Stone 2013; cf. Van Munster and Sylvest 2015). But such advocacy contends with the continuing public memory of events such as Three Mile Island, Chernobyl and Fukushima, ongoing controversies over the disposal and storage of radioactive waste, and a record of the financial costs of developing nuclear power facilities that leaves little store in predictions of electricity too cheap to meter (Peoples 2016: 219; Hamblin 2006: 734-736).

As 'tarnished' (see Lifton 2001: 27) by events of the intervening decades the nuclear utopianism of the 1950s may be, the centrality, recurrence and longevity of nutopianism as a feature of proposals for regulation of the nuclear condition remains of interest precisely for that reason (see also Peoples 2016: 228-230). Indeed in some contexts, reiteration of the life-sustaining potentialities of 'the peaceful atom' persist virtually to the point of banality. Thus for example this rendering remains a commonplace of debates on international nuclear governance and security (cf. Sonja D. Schmid's discussion of 'nuclear normalcy' in this special issue). As well as often being articulated via extensive degrees of technical detail in, for example, discussion of nuclear 'safeguards' and 'nuclear security', it is commonly represented via a series of by now familiar tropes and metaphors as shorthand (see, especially, Kinsella 2005) that do the discursive 'boundary work' of designating legitimate and illegitimate applications of nuclear power. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is fundamentally premised (as is outlined in its preamble) on the 'need to make every effort to avert the danger of [nuclear] war' going hand-in-hand with a commitment that '…the benefits of peaceful applications […] should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States' (UNODA 1968). The International Atomic Energy Agency (IAEA) likewise also continues to frame its animating purpose in relation to Atoms for Peace in the terms set out in its statute '[to] seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world' and, concurrently, '[to] ensure, as far as it

is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose' (IAEA 1956: np).

The 'Peaceful Uses Initiative' of the IAEA represents the most obvious manifestation of this continuing promise to 'save and ameliorate life', in Marcuse's terms, as a concomitant facet of the agency's mission to prevent nuclear disaster. In particular a recent IAEA campaign (IAEA 2015) sets out to make the case that rather than being inherently dangerous or even exceptional, nuclear technologies can and are also being '…used world-wide to meet some of the fundamental needs of modern life' (IAEA 2015: 1). Combining introductory animation with video footage, 'How the Atom Benefits Life' details how water, food, energy and health, as 'the corner-stones of modern daily life', can be 'protected, provided and preserved through the use of nuclear technologies'. The campaign suggests that 'Using nuclear science, countries can manage their scarce water resources better', and notes that 'The IAEA operates projects that use nuclear techniques to improve crop varieties and soil quality' as well as promoting the 'use of a technique to control pests that can destroy fruit and kill livestock'. In a global context of increasing energy demand, the IAEA 'offers services for the safe and sustainable operation of reactors and helps countries to develop safe and secure control systems for radioactive sources'. With respect to health, 'Nuclear techniques are used to support national nutritional programmes', 'Irradiation can make food safer by killing contaminants that can cause food poisoning', and 'Radiology is used to diagnose and manage disease, and radiotherapy to treat and cure it' (IAEA 2015: 1-2).

The campaign's simple message is reiterated in closing: 'Water – Food – Energy – Health: We need them now. In the future we'll need them even more. Nuclear technologies help to ensure these fundamental needs are met for an ever-growing and developing population through the support of the IAEA' (IAEA 2015: 2). While the 'How the Atoms Benefits Life' video, running at just under 6 minutes, provides little detail, elsewhere the

IAEA website sets out a series of accompanying '(IAEA) Impact Stories' (IAEA 2016), among them: 'Sri Lanka Proves Radioactivity Is Not an Issue in Its Coastal Waters'; 'Plant Mutation Breeding Helps Bangladesh to Feed Its Growing Population'; 'South Africa improves exclusive breastfeeding monitoring using nuclear techniques'; 'Increasing Safety in Radioactive Waste Management'; 'Making the World Safer, One Research Reactor at a Time'; 'Water Protection Measures and Community Involvement Increase Sustainability of Uranium Mining in Tanzania' (IAEA 2016: 1).

The 'How the Atom Benefits Life' campaign thus functions as a continuation of the nutopian vision of Atoms for Peace, combining as it does more grandiose projections of the significance of nuclear technologies to the future health and prosperity of the human population with more everyday illustrations of the applications of such technologies. To return to Hecht's definition of nuclearity the campaign should be understood within the context of the IAEA's wider effort to manage a specific (international) political, cultural and institutional configuration of nuclear things. While actively working to contain the prospect 'death in the nuclear age' in its activities to constrain nuclear proliferation and to promote the safety if nuclear facilities, the agency simultaneously continues to promote and exemplify the contributions of the 'peaceful atom' to human life and health.

With regards to the latter it can of course reasonably be pointed out that radiation *is* part of human life. 'Living things have evolved in an environment which has significant levels of ionising radiation', the World Nuclear Association points out; 'Furthermore, many of us owe our lives and health to such radiation produced artificially. Medical and dental X-rays discern hidden problems, and some people are treated with radiation to cure disease. We all benefit from a multitude of products and services made possible by careful use of such radiation' (World Nuclear Association, 2012: np). Yet here we could mind Hecht's differentiation of between radiation and nuclearity where '*Radiation* is a physical

phenomenon that exists independently of how it is detected or politicized' but 'nuclearity' is a '…technopolitical phenomenon that emerges from political and cultural configurations of technical and scientific things' (Hecht 2012: 15, emphasis in original; see also Schmid in this special issue). As Jacob Darwin Hamblin notes, when a 2011 IAEA factsheet on 'Radiation and Everyday Life' lists the multiple applications of radiation and nuclear techniques, it contextualizes these within an evaluation that 'No human activity is devoid of associated risks. Radiation should be viewed from the perspective that the benefit from it to mankind is less harmful than from many other agents' (cited in Hamblin 2012: 288). For Hamblin that way of conceiving of radiation 'downplays' the 'significance of damage and thus abrogates responsibility for harm'. Rather than being a straightforward statement of fact, then, Hamblin's argument suggests that such an evaluation is deeply politicised, part of an ingrained IAEA 'outlook' wherein 'the future is nuclear, and we should set aside our objections' (2012: 292).

Conclusion

Reflecting on Disney's *Our Friend the Atom* and its allegory of the destructive genie freed and then tamed, the physicist and historian Spencer R. Weart argued the film's central motif to be representative of a 'history of images' in which hopes and fears about the potential of nuclear power is all too commonly rendered and imagined via 'archaic themes' and 'primal associations' (1988: 73; 298). Weart's work is regularly perforated by his 'wish' that '…we could have a moratorium on the archaic images that incite such emotions' (Weart 1988: 430-431; 2012: 304)[4] and his sense that even otherwise coolheaded nuclear physicists too often indulged in the temptation to characterise nuclear power in either utopian or apocalyptic terms when they came to propose arrangements to control and manage the spread of nuclear technologies in the post-war decades. Instead of 'grand schemes' to govern the international nuclear order, Weart suggests that 'solutions' to the problem of nuclear energy should be

'…more complex and modest' (1988: 429; cf. Weart 2012: 301) and that these kinds of bipolar characterisations of the 'bad atom' and the 'good atom' were and are thus particularly unhelpful.

Yet Weart's wide-ranging catalogue of the 'imagery' of the nuclear age perhaps in the process underestimates the significant and continuing role of a particular kind of nuclear narrative that maintains and institutionalises distinctions between 'good' and 'bad' atom in ways and in configurations that are often complex. The Atoms for Peace initiative and the How the Atom Benefits Life campaign can be considered as historical counterparts and comparisons in this respect. While both share the lasting diptych of 'atoms for peace' and 'atoms for war', the How the Atom Benefits Life campaign is separated out from discussion of the IAEA's activities in relation to nuclear weapons, and while the campaign references the potential for provision of electricity from nuclear energy it is grounded in case studies of contributions of radiation and nuclear techniques and technologies to everyday life rather than the grand claims of the Eisenhower era.

The cases discussed here thus suggest subtle variations in the technopolitical phenomenon of nuclearity as manifested in efforts to govern the international nuclear order over time. Uniting both, though, is an association of destructive and productive application of nuclear science technologies that – as Sonja Schmid puts it elsewhere in this special issue – '…rests on nearly incompatible interpretations of nuclear materiality'. In the promotion of Atoms for Peace, this association was made explicit from the outset – Eisenhower spoke of the 'awful arithmetic' (1953: np) that had been and could be further caused by the use of nuclear weapons in war, but sought to offset that against the scale of the benefits that could accrue from peaceful applications of nuclear power. With the How the Atoms Benefits Life campaign, the association is institutionalised within the IAEA itself rather than internal to the

campaign given that the IAEA is concerned with *all* things nuclear – weapons, energy and wider applications.

Rather than separating out, then, discussions of 'death' and 'life' in the nuclear age, an approach based on immanent critique as outlined here might instead look to analyse how the two are associated and related to one another within proposals to manage and regulate the nuclear condition (cf Schmid in this issue). That approach is intimated in classical realist scholarship, is made more explicit in critical theoretic reflections, and can be extended into a concern with identifying different manifestations of nuclearity. Such a form of immanent critique may ultimately be aporetic – that is it may do more do highlight the ways in which proposals to manage and regulate the nuclear condition emphasise the 'reconciling side of the irreconcilable' (Adorno 1972: 343) rather than performing the feat of resolving the tensions between 'atoms for peace' and 'atoms for war'. But in the process we might at least come to a better understanding of the antinomies and technopolitics of the nuclear condition, and of life in the nuclear age.

Notes

[1] Cf. the prologue to Hannah Arendt's (1998 [1958]) where her reflections are contextualised not only against the backdrop of the launch of *Sputnik* into orbit in 1957, but also the claim that 'politically, the modern world, in which we live today, was born with the first atomic explosions' (Arendt 1998: 6).

[2] For Günther Anders, designated by some as 'the philosopher of the atomic age' (van Dijk 1994: 2), a focus on the threat of atomic weapons (Anders 1962) would later evolve to also include a 'radical' (Anders 1981) understanding of nuclear power plants as a distinct but equally symptomatic manifestation of 'inverted utopianism' (Anders 1962: 496): a misguided attempt to repurpose atomic energy in the continuing belief that it could power social and economic progress. Yet Anders' evaluation of the nuclear condition also serves an interesting point of comparison and contrast to the Marcusian approach suggested here, with 'the bomb' arguably having even more prominence and centrality in Anders' considerations of the 'industrial revolution' – cf the contribution by Rens van Munster and Casper Sylvest to this special issue.

[3] Often attributed to Lewis Strauss, in remarks he made as Head of the US Atomic Energy Commission (AEC) in 1954, although there is some debate as to whether Strauss used this exact phrase – see Peoples (2016: 218, fn8).

[4] A recent example that Weart would likely object to in this regard is the 2015 documentary film *Storyville: Atomic: Living in Dread and Promise*, directed by Mark Cousins, which splices together archival footage into '…an impressionistic kaleidoscope of our nuclear times - protest marches, Cold War sabre-rattling, Chernobyl

and Fukushima - but also the sublime beauty of the atomic world, and how x-rays and MRI scans have improved human lives. The nuclear age has been a nightmare, but dreamlike too' (BBC 2015: np).

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