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Narrative and nuclear weapons politics: the entelechial force of the nuclear origin myth

Seventy years ago today on July 16, 1945, scientists saw "the end of the world" – how one of those scientists' descendants described to me the first ever-nuclear blast.[1]

The story of the Manhattan Project is one that has significance beyond the history of nuclear weapons. It has come to represent an unparalleled feat of big science, military-industrial innovation and collective effort.[2] While other countries have national stories associated with the development of their state nuclear weapons programmes, this article argues that the narrative of the Manhattan Project transcends its specific US national context to form a broader creation narrative in which the recounting of the history of 'the bomb' has unique socio-political functions, reproducing an understanding of nuclear weapons as symbolic objects of Western modernity.[3]

The Manhattan Project has also been awarded symbolic meaning through mythic trappings. Some years later, J. Robert Oppenheimer, who would become known as the 'American Prometheus' and 'father of the atomic bomb',[4] said that after the Trinity test – the first nuclear explosion at Alamogordo in the desert of New Mexico – he recalled the words of a sacred Hindu scripture, the *Bhagavad Gita*: 'Now I am become Death, the destroyer of worlds'. This recollection of Oppenheimer's has become part of a nuclear origin mythology, a particular set of themes and tropes that continue to bestow special significance on the Manhattan Project. The religious nature of the most famous quote about this event is indicative of the ways in which the broader nuclear origin narrative has been articulated in the language of myth and the sacred: in Hindu scripture, Prometheus' attempt to bring knowledge to humanity and his subsequent punishment, and the Christian story of the fall and redemption as an analogy for the sin of the nuclear condition.[5] Such mythologising is particularly apparent in relation to the

[1] Bronson 2015.
[2] On the 'Americanization' of the Manhattan Project see Laucht 2009.
[3] For more on the colonial character and implied cultural hierarchy of nuclear technology, see Biswas 2014; Williams 2011; Muppidi 2005; Gusterson 1999.
[4] Bird and Sherwin 2005, xi.
[5] Norris 1997.

Los Alamos Laboratory and the select group of mostly male, nuclear scientists who worked there.

This article claims that the Manhattan Project functions narratively in nuclear discourse as an origin myth, so that the repeated telling of atomic creation over time frames the possibilities of nuclear politics today. The article ends its study with the Trinity test as the 'birth' of the atomic age. This is not to say that at this historical point the origin of nuclear weapons ended, and their meaning and purpose was determined. There are many potential points for one which could argue this: the bombing of Hiroshima and Nagasaki, the test of the first thermonuclear weapon at Bikini Atoll. One could also argue that the origin story continues, for how can you know when a history's beginning ends, if you don't know when its ending will be? The article instead makes a narratorial argument about the structure of nuclear discourse. The Manhattan Project culminating in the Trinity test represents creation in the nuclear weapons story and, as such, has a specific narrative role. It is the same narrative role as that of the first chapter of the book of Genesis, or the story of Romulus and Remus, in representing what Kenneth Burke calls 'the creative fiat as a means of classification', an account of the explanation of what types of things nuclear weapons are – their classification – through telling how they came to be.[6]

The analysis of the Manhattan Project as origin myth is accomplished through the introduction of the concept of 'entelechy' as developed by Kenneth Burke.[7] Entelechy is a means of understanding a thing's nature through narrativising either its beginning or its end; as Burke puts it 'the statement of essence in terms of *origins* ... [or] in terms of *culminations*'.[8] Entelechy describes the unfolding of a narrative logic that moves between logical and temporal explanations through the 'temporising of essence', giving the nature of a thing by telling the story of its beginning or prophesising its end.[9] The entelechial logic functions through an interplay between origin and end in which 'beginnings anticipate endings, and both affect the middle'.[10]

Entelechy is also how Burke theorises the motivational power that he claims is within language itself, its suasive force. As symbol users, humans are driven to follow to their fruition the

[6] Burke 1958, 61.
[7] See Burke 1945, 1950, 1958, 1960, 1966, 1971, 2003.
[8] Burke 1950, 15 emphases in original.
[9] Burke 1950, 14.
[10] Carter 1997, 352.

implications of the terminologies we use, so language – understood by Burke as symbolic action – does not simply describe motives but provides them. Entelechy thus offers a means of examining the motivational powers of narrative itself.[11] The essence of a thing can be explained through narrating its beginning and/or ending and the entelechial power of language motivates users towards the implications of such narratives. Entelechy is therefore a valuable way through which to investigate the 'implicit rhetoric'[12] in the language that we use to narrate the origin of nuclear weapons.

The article claims that there is a dominant myth of nuclear creation that has become 'common sense',[13] and examines three key tropes of the Manhattan Project story: the nuclear weapon as the inevitable and perfected culmination of humankind's tendency towards violence; the Manhattan Project as a race against time; the nuclear weapon as a product of a particularly fetishized masculine, individual brilliance. These core tropes are important in giving socio-political meaning to nuclear weapons in the present. The dominance of the nuclear origin myth thereby shapes the range of contestation of nuclear politics by re-establishing their meaning in its repeated telling. The adoption of the common sense, mythologised story of the Manhattan Project tacitly accepts the ascription of meaning given by that myth and so circumscribes the potential for political contestation. This is because if one considers entelechy as an unfolding logic that classifies the nature of nuclear weapons in a narrative interplay between beginning and ending, then starting from the same beginning means that one is also bounded by the ending implicit in that beginning. Entelechy thus provides a conceptual grounding through which to interrogate the assumptions of nuclear politics that are established through nuclear narratives. The article points to the necessity for contestation of nuclear politics that does not take the nuclear origin myth as a given starting point but that, first, illuminates the myth as myth and, second, challenges its attendant meaning-making implications.

In doing so the article makes two main contributions. The first is to introduce entelechy as a conceptual grounding to explain the power of nuclear narratives, and of narratives more broadly in international politics. This is a power that is not simply reflective of the forces behind its construction but inherent to language itself. The article develops the implications of understanding the power of the entelechial logic for political contestation and advances a means

[11] Burke 1966.
[12] Lindsay 1998.
[13] Hagström and Gustafsson 2019, 391.

through which to investigate the suasive force of origin myths on political contest and understand the relationship between the narrated past, present and future. The second is to use the entelechial understanding of the nuclear narrative to advance the mythic and narrative underpinnings of 'critical nuclear studies',[14] a growing body of IR research that has challenged assumptions of traditional nuclear weapons scholarship.[15] The development of entelechy and the nuclear origin myth provides a means to understand the narrative grounding of the limits of nuclear politics that has been outlined in this body of work.

The article first explains the Burkean concept of entelechy and links it to the study of narrative in IR, explaining why entelechy provides a valuable way to interrogate nuclear discourse. The second section conducts a wide-ranging survey of academic and popular accounts of the development of the atomic weapon in the US Manhattan Project in the 1940s, showing that the myth of the creation of nuclear weapons is expressed through three core tropes that establish a symbolic meaning for nuclear weapons. The final section develops the implications of this symbolic meaning for contesting nuclear politics. The conclusion proposes a way forward for research on the nuclear past and future that attempts to break free from the dominant entelechial logic.

Entelechy and Narrative

The relationship Burke develops between language, essence and motivation through his development of entelechy provides a way in which to interrogate the power of symbols, vocabularies and myths. As such, entelechy has great potential for further development and use in the study of international politics by providing new means through which to examine the symbolic and 'narrative power' of language.[16] This section first situates the potential contribution to work on narrative in IR before explaining the relationship between narrative past, present and future that is illuminated through the concept of entelechy.

IR literature has engaged with narrative as *inter alia* a means of understanding causality, notably in the causes of war,[17] a means through which to establish national identity and

[14] Burke 2016.
[15] Works include but are not limited to Abraham 2006; Biswas 2014; Booth 2007; Burke 2009; Considine 2017; Cooper 2006; Egeland 2021; Fishel, 2015; Pelopidas 2016, 2011; Peoples 2016; Ritchie 2014, 2013.
[16] Hagström and Gustafsson 2019.
[17] Suganami 1997, 1999, 2008.

ontological security,[18] a fixer of social reality,[19] a driver of interaction and of conflict,[20] a means of limiting alternative imaginaries,[21] the form of sovereign power,[22] and that which sets the boundaries of what is legitimate and justifiable in national security.[23]

These accounts typically acknowledge the work of narrative as setting events into a chronological order, establishing a past, present and future through configuring events over time.[24] Narratives contain beginnings, middles and endings, and generally finish with an outcome that offers lessons for the future[25] so that they project a future that provides a basis for our identities and actions.[26] The purpose of the narrative ordering of events in time provides one answer to Shepherd's question of 'what does narrative do, analytically' in contrast to 'discourse' or 'ideas'.[27] This ordering of events over time naturalises certain understandings of 'how we got here' and of 'where we are going'.[28] An important aspect of this is the narrative future. As Felix Berenskoetter states, 'humans entertain visions of the future in an attempt to make the unknowable knowable, or at least meaningful'.[29]

The Burkean idea of entelechy provides a way to engage further with the explanatory dynamics of the narrativized past, present and future.[30] For Burke, narrative's function is to translate atemporal principles into stories in time through the 'temporizing of essence'.[31] The study of narrative is the examination of the formal relationship within the narrative of 'temporal and logical notions of priority'.[32] By this Burke means the differing ways of explaining the essence of a thing in terms of either its priority in time – being before and therefore prior to – or its priority in form – being the perfected embodiment of its logical principles and therefore prior to – and so explaining things according to logical principles, narrative origins or a combination of the two. The study of narrative and myth can therefore be undertaken as an exercise in

[18] Berenskoetter 2014; Bially Mattern 2005; Brand 2010; Malksoo 2009; Steele 2010),
[19] Devetak 2009.
[20] Banerjee 1998; Kauffman 2009.
[21] Wibben 2010.
[22] Edkins 2003.
[23] Krebs 2015.
[24] Polletta 1998.
[25] Hagstrom and Gustaffson 2019.
[26] Polletta 1998, 140.
[27] Shepherd 2015, 336.
[28] Finlayson 2007, 557.
[29] Berenskoetter 2014, 272.
[30] Carter 1997.
[31] Burke 1950, 14.
[32] Burke 1970, 32.

analysing how statements about archetypes and principles are articulated in narrative and personalised terms so that the relationship between logical and temporal priority exist simultaneously, and that past, present and future all imply each other.

Entelechy is concerned with fruition and rooted etymologically in the idea of 'telos' or an end state. It was coined by Aristotle to describe that which actualises potential in matter, the means by which a body has its end or 'telos' within itself; a plant is the telos of a seed for example.[33] Entelechy is the impetus within an entity to attain its potential, to move towards its finished state. Burke adapted the term Aristotle had used in a biological manner to the study of symbolism. He identifies entelechy as particularly useful to understand what he terms 'the realm of symbolic action', because there 'is a principle of perfection implicit in the nature of symbol systems; and in keeping with his nature as symbol-using animal, man is moved by this principle'.[34] By this Burke means that humans can be defined by their capacity to use symbols and that the symbols we use have an implicit motivating rhetoric that induces users towards realising their potential and thus attaining perfection. It is this that prompts him to define man as 'rotten with perfection'.[35]

In 'A Rhetoric of Motives' Burke uses entelechy as a device that gives the essence of something by referring to its outcome. If a thing's end is the perfection of its potential, then accordingly, '[b]y its fruition, we should judge it'.[36] Burke therefore develops the rhetorical conception of entelechy as using 'a history's end … [as] a formal way of proclaiming its essence or nature'.[37] A simple example Burke gives is that rather than describing the essence of a man by stating that he is 'by nature a criminal', one would state that 'he will end on the gallows'.[38] This provides a means of classifying a thing 'by conceiving of its kind according to the perfection (that is, finishedness) of which that kind is capable' , so that the process of narrativising through the means of telling a story about its end is also a process of explaining the nature of something and classifying it.

[33] Burke 1950.
[34] Burke 1966, 17. While Burke focuses on terminologies, there is an acknowledgment of non-linguistic symbols and of action as rhetoric throughout his work, see Signorile, 1989; Gusfield, 1989. Burke discusses both bodily actions as rhetorical and language as an act (1966), a contribution to critical literary theory that has been acknowledged by Fredric Jameson 1978, among others.
[35] Burke 1966, 17.
[36] Burke 1950, 14.
[37] Burke 1950, 13.
[38] Burke 1950, 13.

In other work, Burke's engagement with a narrative mode of explanation through entelechy is in terms of understanding a thing's 'essence' through an examination of its origins.[39] In this case, the 'temporizing of essence' is associated with a thing's beginning, in which its principles are explained through a temporal translation into an origin myth. He argues that the symbol-using nature of humans is also a tendency to mythopoeia (myth creation) and that both perform a move towards perfection (through classification) as a means of understanding. Myth has a socio-political function such that etiological myths (those that explain the sources or causes of something) 'resort to narrative' as a means of justifying the principles that underlie a social order.[40] The origin myth's 'narrative stating of how things were in the past thereby substantiates the principles of governance to which the faithful *should* be vowed in the present'.[41] Entelechy thus provides a means of knowing a thing according to how it embodies the principles contained in the quasi-temporal narrative of its origin. Burke provides ancient Rome as an example: the 'militaristic and fratricidal' nature of Roman society is exemplified in the myth of its foundation, when Romulus, a descendent of Mars the god of war, slays his brother.[42] Thus, the Roman origin myth provides a temporised narrative as a means of stating the essence of Rome. Taking the entelechial perspective here considers the origin story, not as a mythologised past moment from which the current from develops, but rather as an expression of the 'possibilities of perfection which reside in the form' as its telos.[43] The story of Romulus and Remus provides a quasi-temporal story of beginning but also a logical beginning and a grounding for a socio-political order.

Burke explores the concept of entelechy further as a way of explaining the ability of symbol systems to move their users towards the perfection implicit in their terms and, as such, develops entelechy as a terminological motivational force towards symbolically perfected ends. The entelechial principle is the tendency towards perfection in any set of symbols, which then acts as motivation for the symbol-user. Because any given symbolic system contains implications that move symbol users to act out the terministic implications of a particular vocabulary, vocabularies do not simply express motives but *are* motivations in themselves. There is a 'terministic compulsion'[44] in the words we use that moves us to fulfil the implications of our

[39] See Burke 1945, 1958, 1960, 1971, 2003.
[40] Carter 1997, 356.
[41] Burke 1960, 291.
[42] Burke 1971, 110.
[43] Burke 1960, 291.
[44] Burke 1966, 19.

vocabularies so that the 'entelechy of words drives human action to achieve perfectly the state of affairs they symbolise'.[45] Burke therefore asks: 'Do we simply use words, or do they not also use us?'.[46] The very terms that we use have a tendency towards perfection and the entelechial impulse within vocabularies can be used as a means through which to illuminate the compelling nature of language: how symbols shape possibilities and move us as symbol users.

The suasive power of terms as understood through the concept of entelechy is a specifically *perfectionist* one. This perfectionist tendency can be understood in two connected aspects: first in the propensity towards extension in which symbols 'linguistically demand'[47] to extend their domain of meaning and so be developed towards their complete potential, moving the symbol user towards more expansive terms that function at the same time as both explanations of and goals for action.[48] The logic of perfection that is implicit in symbols themselves moves the user towards difference and antithesis, and then to act on the implications of this difference. The second, and related, way in which symbols tend towards perfection is in the drive towards the essential. Burke argues that any symbol is in itself a perfection in that it is a simplification and distillation of what it claims to symbolise.[49] The drive towards perfection leads to a tendency to find the clearest and purest means of symbolising. We are thus driven through this 'essentializing mode of perfection'[50] to seek out the most perfect word or symbol that can describe a situation in the purest and strongest way: to find 'the right word'. Words do not therefore simply give names and expression to motives, or even function as the medium through which motives are socially determined, but also have a motivating power in themselves. That motivation pushes language users towards particular ends through a tendency to move towards the 'perfected' implications of the terms used. This leads both to a drive towards extension and increasing intensity of language, for example in heightened political rhetoric, as well as driving language users through what Burke calls 'terministic compulsion', the implicit logic of perfection within the terms they use, to act out the implications of their words.[51]

[45] Signorile 1989, 78.
[46] Burke 1966, 6.
[47] Brummett 1989, 85.
[48] Gusfield 1989, 35.
[49] Burke 1971.
[50] Brummett 1989, 86.
[51] Burke 1966, 19.

It is important to note that this approach does not necessarily imply linguistic determinism. Symbols as motives are 'terministic not deterministic'.[52] Language provides motivation in that it carries the user to an endpoint in which speech terminates, so that 'nothing further need be said' to explain action.[53] The terms themselves function as both explanation and end, but it should be noted that this end is not necessarily fixed because there are a wide range of entelechial drivers that can be functioning at once. There is no 'principle of control intrinsic to the ideal of carrying out any such set of possibilities to its "perfect" conclusion' and, as individuals and groups are also compelled through their various terminologies there is contestation as 'the schemes get in one another's way, thus being to some extent checked by rivalry with one another'.[54]

The entelechial principle provides a particularly apposite means of interrogating the implications of nuclear weapons discourse.[55] The potency of nuclear discourse is derived from its combination of two powerful sets of terminologies: that of the ultra-rational, scientistic and euphemistic, and that of the mystical, elemental and sacred.[56] This combination, as Bryan Taylor claims, means that nuclear weapons 'stimulate the entelechial quality of language'.[57] The following section conducts a reading of a range of representations of the Manhattan Project grounded in this understanding of nuclear narrative and entelechy.

The creation of 'the bomb'

There have been countless retellings of the nuclear origin story across more than seven decades and different narrative forms, from official histories to films, plays and blogposts. The purpose of this section is to provide an account of the themes that pervade the dominant narrative of the creation of the first atomic weapons in the Manhattan Project and to analyse the entelechial implications of this narrative as the origin myth of the nuclear weapon. The article does not pretend to give *the* authoritative account of the story but rather traces a set of interrelated core themes that have continued to be reproduced across a corpus of prominent accounts, from the

[52] Gusfield 1989, 35.
[53] Gusfield 1989, 35.
[54] Burke 1966, 19.
[55] By 'nuclear discourse' this article refers to the 'formation of power/knowledge linking institutions, practices, and a dense network of representations and meanings', Kinsella 2005, 49.
[56] This has included the highly rationalised and gendered use of technostrategic language, see Cohn 1987; Schiappa 1989, and discourses of nuclear mysticism, secrecy and potency, see Kinsella 2005; Taylor 2010; Brummett 1989.
[57] Taylor 2010, 2.

very first descriptions of the Trinity test to a recent drama series, *Manhattan*.[58] These themes have formed a dominant account of the creation of atomic weaponry in that 'a critical mass of social actors have accepted it as "common sense"'.[59] This results in what Norris has called the 'master narrative' of the Manhattan Project.[60] As previous work on narrative has claimed, storytelling 'is an art that produces worlds, both fictional and real, literary and political'[61] and the article makes no distinction between fictionalised accounts of the Manhattan Project and 'real' accounts in popular history, IR textbooks or academic research on the topic, because all of the texts below have engaged in the creation of Burke's mythical 'symbolic analogue' in placing the events of the Manhattan Project into wider structures of understanding. This section outlines a set of interrelated core themes of the Manhattan Project master narrative that have manifested as repeated themes across time and across different narrative forms: that of the nuclear weapon as the perfected weapon and fruition of humankind's innate destructive ability; that its development as taking the form of a race against time; and that of the nuclear weapons as a product of masculine brilliance.

One of the key themes identified throughout the texts is that of the 'perfected' nuclear weapon as the ultimate materialisation of humankind's tendency to violence. There is a particular account of the process of development of 'the bomb', and of scientific discovery more broadly, as a series of insights and moments of revelation in which individual scientists access secrets of the universe (despite the immense scale and collaborative nature of the Manhattan Project). There is often an inevitability about scientific discovery in accounts in which political and social decision-making is epiphenomenal to the atomic bomb as the telos of modernity and of scientific and technological progress. Oppenheimer himself described the development of the atomic weapon as an 'organic necessity'.[62] This inevitability is also visible in Tom Morton-Smith's recent play *Oppenheimer*. In one scene Oppenheimer states that 'the uranium bomb is entirely possible, therefore it is entirely inevitable. It's not a question of "should"; it's a question of "when"… of "where" … of by "whom"'.[63] Historians have noted the reproduction of this version of nuclear weapons in many historical accounts in which 'startling anecdotes

[58] I am also aware, as Goetze states, that regarding understanding an origin myth, the 'context of meaning is not arbitrary' in Bliesemann De Guevara ed 2016, 93, and I do not examine this topic from an external point but rather as a student and researcher of nuclear politics who has been immersed in these texts for several years, it is indeed from this position that I have accumulated the body of texts under study.
[59] Hagström and Gustafsson 2019, 391.
[60] Norris 1997, 6.
[61] Devetak 2009, 798; see also Krebs 2015, 11.
[62] in Taylor 1992, 431.
[63] Morton-Smith 2015, 40.

and "eureka" moments are foregrounded as inevitable milestones leading to the Trinity test'.[64] The repetition of this conception is also visible in descriptions that are anti-nuclear weapons in intent. For example, in his influential anti-nuclear book, The Fate of the Earth, Jonathan Schell describes a process of nuclear discovery that does not lie in social or political choices but 'in the attainment of mankind as a whole, after millennia of scientific progress' that 'has the character of destiny for the world'.[65]

The recent US television series *Manhattan* also reproduces a core theme of nuclear weapons as the perfected outcome of centuries of scientific development; a product of the progress of time and science itself. The development of atomic weaponry is not a process that began with the Manhattan Project, or with the developments in theoretical physics in the first half of the twentieth century. It is instead one that has been going on for centuries as a function of the inexorable progress of humanity's capability for destruction. In season 1 episode 12 one character asks another, 'do you know how long we've been working on this? … Seven hundred years. The Chinese invented firearms in the thirteenth century, we've been refining them ever since. Thin man [one of the bomb designs in development at the Los Alamos weapons laboratory] is just the next evolutionary stage.' The nuclear weapon is both a beginning and an end. It is the culmination of centuries of progress and at the same time the beginning of a new and totally different period in human history.

Another key theme on the Manhattan project origin myth is that the development of the nuclear weapon took the form of a 'race against time' against Hitler's Germany in which the bomb was an inevitability. Nuclear weapons were waiting to be discovered by whoever could get to it first and so the United States *had* to create the atomic bomb before its enemies did. US President Harry Truman used the 'race' description in his speech after the dropping of an atomic weapon on Hiroshima. Truman described the development of the weapon as a 'race of discovery against the Germans' in a 'battle of the laboratories',[66] and this 'race for the bomb' trope has been repeated ever since. To provide some examples: Richard Rhodes' influential account *The Making of the Atomic Bomb* uses the 'race' trope, not only against Nazi Germany but as a race 'against time'.[67] Prestige documentaries with the 'race' shorthand in their title or which use the trope include CBC's *Race for the Bomb* (1987), BBC's *Race for the World's*

[64] Hogg 2016, 21; see also Hughes 2012.
[65] Schell 1982, 100.
[66] Truman 1945.
[67] Rhodes 1986, 379.

First Atomic Bomb: A Thousand Days of Fear (2015), and the PBS documentaries *The Bomb* (2015) and *Race for the Superbomb* (1999). The motif is prevalent in fictionalised accounts also, including the films *The Beginning or the End* (1947) and *Day One* (1989) as well as in popular and official US histories.[68] Books used for teaching or as introductions to the subject of nuclear weapons politics also reproduce the language of the origin myth.[69] Accompanying the 'race for the bomb' trope throughout these works is a theme of sacrifice and of the Manhattan Project as a necessary evil because of its status as a weapon developed during wartime to combat an evil adversary. There is no doubt that contemporary scientists and policymakers did think they were in a race and that there was the real threat of a German bomb, even though this threat was known to be unfounded by 1944. What is interesting for this analysis, however, is not how actors felt at the time but how this is still the dominant framing of the story today, even though the race was ultimately a mostly imagined one and it has been known for many decades, indeed since before the first US weapon was completed, that there was no significant threat of a German bomb. Nazi atomic bombs that never existed still have outsized symbolic power and 'litter the postwar American imagination' from *Star Trek* to *The Man in the High Castle*.[70]

The narrative of the atomic weapon as both inevitable and tied to individual brilliance is reinforced by the presentation of the scientist as charismatic male figure. The history of the Manhattan Project is overwhelmingly male and masculine. It is predominantly written by men about a 'brotherhood'[71] of individual men whose genius drove a process of unprecedented technological achievement in a 'paradigmatically male spirit'.[72] The myth also valorises masculine-associated traits through its narrative of individual brilliance and charismatic men leaders. In addition, its depiction of the perfected and inevitable bomb replicates typical gendered narratives of science/nature in its portrayal of human progress as a rational scientific programme in which men uncover the secrets of and master mystical, feminised nature in an entelechial drive towards the telos of scientific progress. The atomic bomb as masculine genius is reproduced in many works about the Manhattan Project including the popular introductory

[68] See Jones 1985; Hewlett and Anderson 1962; Kelly 2009; Norris 2002.
[69] See Bernstein 2008; Futter 2015.
[70] Dennis 2000, 380.
[71] Herken 2003.
[72] Easley 1983, 7. There are accounts of women's involvement in the Manhattan Project, see Howes and Herzenberg 1998; Taylor 1993b; Kiernan 2013, and fictionalised accounts such as *Manhattan* do include wives of the scientists and one female scientist as characters. Recent historical work by the Atomic Heritage Foundation and the Los Alamos Bradbury Science Museum has also attempted to include women's stories. Nonetheless, these are notable exceptions rather than the rule.

text *The Bomb, A New History*, which describes the Manhattan Project as 'the world's greatest concentration of scientific genius'.[73] Richard Feynman, a scientist at Los Alamos, in his account of the Manhattan Project describes the 'very great men' working on the bomb as 'the boys'.[74] Oppenheimer (the eponymous 'Doctor Atomic' of the John Adams' 2005 opera) has become the Manhattan Project's 'most mythologized figure'.[75] Kelly devotes a whole section of the comprehensive edited volume of texts on the Manhattan Project to Oppenheimer and Director of the Manhattan Project Lieutenant General Leslie Groves in which Groves is eulogised as 'decisive, confident and cool'[76] and Oppenheimer as 'most compelling'[77]. The site of Los Alamos and the figure of Oppenheimer have become metonyms for the endeavour as a whole and the figure of the male scientist in nuclear history.[78] Gabrielle Hecht has argued that scholars have 'fetishized "the bomb" and its creators in endless retellings of the stories and re-examination of the characters of a few elite men'.[79] The nuclear origin myth's account of nuclear weapons as the perfected weapon thus reproduces gendered accounts of human nature and innate and valorised masculinity as a core part of nuclear exceptionalism.

The nuclear weapon, according to the master narrative of the Manhattan Project is not only the fruition/perfection of rational and masculine scientific progress. It is also a mystical 'harnessing' of the secrets of the universe and of elemental, primordial sources of energy and power. Atomic weapons are described as having mystical and elemental power and the creation of nuclear technology as a quasi-divine aspiration. These themes were visible in the journalism of William L. Laurence, a *New York Times* reporter who was selected to chronicle the Manhattan Project for the public. The numinous quality he affords to 'the Bomb' can be seen in his book *Dawn over Zero: The Story of the Atomic Bomb* in which he writes in a somewhat breathless tone, describing the Trinity Test as 'ranking with the moment when man first put fire to work for him, the vast energy locked within the heart of the atoms of matter was released for the first time in a burst of flame such as never been seen on this planet, illuminating earth and sky, for a brief span that seemed eternal, with the light of many super-suns'.[80] UK Prime Minister Winston Churchill used comparable language, describing the new weapon as the 'revelation of

[73] Younger 2009, 16. See also Bird and Sherwin 2005; Pais 2007; Schweber 2000; Herken 2003
[74] In Kelly ed. 2009, 95-96.
[75] Norris 1997, 7.
[76] Kelly 2009, 119.
[77] Kelly 2009, 130.
[78] Norris 1997.
[79] Hecht 2007, 100.
[80] Laurence 1947, 3.

the secrets of nature'.[81] The use of the myth of Prometheus as a way of characterising the work on the Manhattan Project, often particularly associated with the figure of Oppenheimer, is another way in which the idea of nuclear technology as sacred and ultimately tragic knowledge from the universe has been reproduced.[82]

Assertions of the nuclear weapon as the perfected outcome of humankinds propensity towards violence can be seen across popular and fictionalised accounts of the Manhattan Project, but also in celebrated and influential works of nuclear politics by Bernard Brodie, in which the bomb is not only the 'absolute weapon', but also the 'apotheosis of aggressive instruments'[83] and by John Herz, who describes the 'accumulated and accumulating impact of a process' that has 'perfected' the weapon.[84] Schelling and Halperin not only assert the inherent power of nuclear technology to drive towards conflict, as discussed earlier, but also understand this situation because of "Man's capability for self-destruction', which is derived from the unchangeable fact of knowing 'too much!'.[85]

The combination of the themes of inevitable technological progress, the Manhattan Project as a 'race against time' and of masculine genius presents nuclear weapons in the form of the perfected and absolute weapon. The origin of this weapon is both ancient and universal and is, as such, the outcome of a determined teleology. The story of its beginning is that of one in which a group of inspired individual and almost exclusively male scientists were engaged in a race against time to harness the primordial power of the atom. This continued dominance of the framing of the Manhattan project as a 'race', long after it is known that the 'race' was highly one-sided, reinforces an understanding of the development of nuclear weapons not only as inevitable, but as a process of finding something that was already there. In this story, nuclear weapons have the form of destiny, their development set in motion centuries, or even millennia, ago. These themes, clearly visible throughout a variety of portrayals of the origin of the atomic bomb, represent a nuclear origin myth as not only a beginning but also as the end point of predestined scientific progress. 'The bomb' is thus both completely new and very old.

Nuclear beginnings and nuclear endings

[81] In Laurence 1947, 3.
[82] Bird and Sherwin 2005.
[83] Brodie 1946, 72.
[84] Herz 1970, 12.
[85] Schelling and Halperin 1961, 5.

The Trinity test was a moment of latency, the point in time when there was an atomic bomb but no nuclear holocaust, no Hiroshima. At what point and by what means the path was set westwards across the Pacific Ocean towards Hiroshima and Nagasaki remains contested, but the narrative of the Manhattan Project as both unparalleled scientific achievement and 'destroyer of worlds' carries its own mythic value. The origin myth establishes 'nuclear exceptionalism' – the idea that the nuclear is a unique and separate realm – from the moment of creation.[86] This is accomplished through the dominant narrative's mythic trappings and the elevation of specific individuals and themes, the 'endless stream of biographies of scientists involved in the Manhattan Project and its prequels and sequels, and the persistent insistence on the uniqueness of moral dilemmas posed by atomic activities'.[87] This section uses entelechy to draw out on the implications for the nuclear present and future of how the story of the Manhattan Project as creation has been told.

The movement between logical and temporal explanation in the entelechial logic means that narrated beginnings and endings do not just signify what happened before or after, but also what was logically prior, by being either the genesis (origin) or the perfection (ending) of the nature of the thing being narrated. The story of a thing's ending is the temporised assertion of the fruition of its nature and therefore can be logically prior in that it sets the principles of how that thing should be in the present. In the same way, understanding the origin myth as logically prior as well as temporally prior means that the origin is not only a statement of past but also a statement of essence. This highlights the connection between entelechy as either origin or ending, in that both provide a narrativised account of the perfected form, told either as its beginning or as its culmination. The ending and beginning are inseparable.

What then are the implications of the relationship between the nuclear origin myth as set out here and nuclear ending? Burke recognised and was deeply concerned about the power and danger of the suasive force of technologies and terminologies, particularly regarding the technology of nuclear weapons. Entelechy is most dangerous when enacted through 'scientific nomenclatures'[88] that move towards the perfection of their terministic potential, for example in perfection of destructive technologies.[89] Burke wrote in a letter after the dropping of the first

[86] Hecht 2007.
[87] Hecht 2007, 100.
[88] Burke 1966, 19.
[89] Soukup 2007.

atomic bombs on Hiroshima and Nagasaki that there 'seems now no logical thing to do but go on tinkering with this damn thing until they have blown up the whole world'.[90] Any response to the consequences of technology moving toward 'rotten' perfection must, therefore, address the entelechial implications of nuclear terminologies and nuclear narratives. The narrative of nuclear creation set out in this analysis establishes the nuclear weapon as perfected and inevitable, as the outcome of a telos of rational, scientific progress and man's tendency to violence,[91] and at the same the beginning of an age of both '[s]alvation and apocalypse'.[92] Columba Peoples has termed this idea of nuclear technology as salvation and apocalypse as a 'nutopia' in which a 'technological optimism in which nuclear power and technologies are identified as being the key to a more progressive human future' are opposed to the destructive force of the nuclear weapon. He asserts that this contradiction underpins today's global nuclear order.[93]

There are clear links between this dominant narrative of nuclear beginning and imaginaries of nuclear ends. The resonance of the nuclear weapon as bringing 'salvation and apocalypse' can be seen in the deep contradictions inherent in visions of the nuclear future. This includes, as Joseph Masco has shown, conducting meticulous planning for mass obliteration while simultaneously being unable to grasp its actuality. Masco recognises that the 'absolute ending' of nuclear apocalypse works to 'install a new set of fantasies and short circuits that prevent reflective critique'.[94] Large-scale US Civil Defense drills 'worked in novel ways both to enable and deny the possibility of a collective death that can only be named rather than comprehended.[95] The inability to grasp the potential end of nuclear weapons as apocalypse is because it would be, as Jacques Derrida has described, 'a remainderless destruction, without mourning and without symbolicity'.[96] Nuclear apocalypse destroys everything, including the ability to comprehend it because this suggests a position from outside the event, of which there would be none. Hans Morgenthau makes a related point in his description of nuclear death as the obliteration of 'the collective memory of mankind'.[97] The unknowable but ever-present nuclear ending also fits with Frank Kermode's discussion of the modern eschatological

[90] In Hill 2009, np.
[91] I use the gendered term deliberately here as this narrative is deeply gendered.
[92] Hecht 2007, 100.
[93] Peoples 2016, 219.
[94] Masco 2012, 1115.
[95] Masco 2012, 1114.
[96] Derrida 1984, 30.
[97] Morgenthau 1961, np.

moment in which the feeling of the end is not set at a future moment in time but is 'present at every moment',[98] so that '[n]o longer imminent, the End is immanent'.[99] What results is 'perpetual crisis'[100] and thus perpetual paralysis.

The impact of the incomprehensible ending and of perpetual transition and crisis is an inability to see beyond the present in a meaningful way. Pelopidas introduces the concept of 'nuclear eternity' as the prevalent belief of 'most policymakers, experts, and citizens of the world … that nuclear weapons were part of eternal future horizons'[101] and examines how this acceptance of nuclear eternity came into being. Nuclear eternity does not mean an endless nuclear future; indeed, nuclear eternity might be prematurely ended by nuclear war. It is instead an acceptance that no future without nuclear weapons is possible. The understanding of nuclear weapons as a permanent feature is not 'co-terminus with the invention of nuclear weapons'.[102] Pelopidas instead locates a historical entrenchment of nuclear eternity during the 1960s.[103] Nuclear eternity is not incompatible with attempts to control, limit or even disarm nuclear weapons but means that these attempts occur in the context of a broader acceptance of nuclear eternity, which has the effect of 'shrinking the realm of choice'.[104]

Pelopidas posits the acceptance of nuclear eternity that is prevalent today as being embedded at a particular historical moment in the 1960s, describing 'endless [material] reproduction of a nuclear(ized) present' that is 'enough to enact a nuclear eternity'.[105] One has only to reproduce the present as is to maintain nuclear eternity. The implication of the entelechial logic of the nuclear narrative for Pelopidas' argument, and for further work on imagined nuclear futures, is that this enaction of eternity can be understood narratively as the reproduction of a nuclear present and future through the telling of a particular nuclear past. Accepting the dominant origin myth of the Manhattan Project as the end point of a pre-determined telos of inherent human traits of violence and inevitable scientific progress establishes an unfolding entelechial logic of the perfected and inevitable weapon. The inevitability of the nuclear past within this

[98] Kermode 1968, 26.
[99] Kermode 1968, 25.
[100] Kermode 1968, 101.
[101] Pelopidas 2021, 1.
[102] Pelopidas 2021, 3.
[103] It bears repeating that this issue for this article is not the historical question of *when* such ideas became entrenched but the logical question of *how* they continue to hold sway.
[104] Pelopidas 2021, 11.
[105] Pelopidas 2021, 9.

logic is connected to the inevitability of the nuclear future, so that nuclear eternity is implied by and inseparable from the narrated nuclear past.

What does this mean for the conduct of nuclear politics? Previous work outside IR has brought entelechial contestation to the issue of nuclear weapons. To challenge the entelechial force of the vocabulary of nuclear technology Brummett advocates the use of competing terminologies that place the danger and violence of nuclear weapons in strategic opposition to vocabularies of nuclear weapons as desirable.[106] Kinsella challenges an entelechial understanding of nuclear weapons as the outcome of technological or theological determinism, instead arguing that identifying the telos of the nuclear narrative is 'a fundamentally rhetorical activity' in that it cannot be known with certainty.[107] He views a potential for strategic symbolic contest to redetermine the endpoint of nuclear discourse.

Brummett's proposal of competing terminologies is limited by the fact that the vocabularies of nuclear weapons as dangerous and violent have typically been situated within the dominant broader nuclear narrative and have started from acceptance of the same nuclear origin myth as vocabularies of nuclear desirability. They are the reverse side of the salvation and apocalypse coin, landing with the apocalypse side up. While agreeing with Kinsella that the telos of nuclear narrative is a rhetorical activity, I argue that, because of the entelechial linking of narrated beginnings and ends, the imagined nuclear endpoint is implicit in the narrative of nuclear beginning. The subsequent contesting of the meaning of nuclear weapons and nuclear futures advocated by Kinsella and Brummett is always already contained within the entelechial structure that the origin story sets in place.

As such, rethinking the nuclear past in its telling as an origin myth becomes crucial because it is a core part of the entelechial structure that upholds nuclear meaning. If the end is implicit in the beginning, then it becomes necessary to search for a different way of understanding the originating moment and to find an origin that is outside the current entelechial logic. Not accepting the standard originating accounts and the myths through which the nuclear weapon is narrated is necessary to avoid repeating the same logic and becoming stuck with 'nuclear eternity'. A rethinking of the ending of nuclear weapons therefore requires a recognition of the 'power of the chosen beginning'.[108]

[106] Brummett 1989.
[107] Kinsella 2005a, 66.
[108] Carter 1997, 356.

Conclusion

During his life, Kenneth Burke became increasingly perturbed by the entelechial implications of the scientistic and ultra-rational discourse of deterrence and mutually assured destruction and the threat of nuclear annihilation. Technology, its symbolic nature, and relationship to language, was the basis of much of his later writings, which were driven partly by a fear of the consequences of 'hypertechnologism' as an entelechial drive towards perfection.[109] Burke claimed that the attempt to prevent extinction as the 'entelechially perfect'[110] ending of the nuclear weapons narrative must incorporate the rhetorical and take the form of symbolic change. This article has used Burke to argue that the nuclear past and nuclear future are narratively inseparable. The power of narrative is to set meaning in time; the entelechial perspective on narrative highlights the interplay between past, present and future and the drivers towards perfection within these narratives. These drivers are not the result of the intentions or identities of nuclear actors but reside in the entelechial force of language itself, which moves language users towards the perfection that is implicit in the terms they use.

The implication of this account of the suasive power of language in the dominant nuclear weapons origin myth is the need for a deep rethinking of the drivers of nuclear politics. It posits that it is not possible to rethink the future without rethinking the past. Changing nuclear politics cannot mean starting from the same point and contesting nuclear meaning from within the logic established by the story of nuclear creation. To escape the current narrative entrapment of nuclear weapons it is necessary to find a point outside the teleology of the nuclear weapon as 'salvation and apocalypse'.[111] Attempts at change that accept the nuclear beginning and its attendant nuclear meaning are circumscribed by its implications so that, as Pelopidas argues, the space for policy – and I would add activism – shrinks.[112] Nuclear politics therefore ends up trapped in a cyclic narrative structure and a narrative future that is constantly re-produced by the meaning of the weapons themselves.[113]

Both empirical/historical and theoretical implications follow from this argument. These point to the potential for further work that contests the dominant nuclear origin myth and its

[109] Rueckhert introduction in Burke 2003.
[110] Carter 2000, 235.
[111] Hecht 2007
[112] Pelopidas 2021, 2011.
[113] Considine 2017.

implications within the entelechial logic (historical/empirical), and/or develops ways in which to understand and challenge the logic of the nuclear narrative itself, as well as contesting its assumptions and limits (theoretical). There is potential for further development of the work of Kenneth Burke on the suasive power of language itself in the study of nuclear narrative, and of narrative in IR more broadly. This theoretical work is needed in order to unpick the logic of the nuclear past, present and future and to take on the teleological structure of origin–end that has always framed nuclear discourse and nuclear politics. There is potential to incorporate research across disciplines to find the conceptual tools with which to advance this project, including, but not limited to, the 'nuclear criticism' of 1980s literary theory.[114]

The three tropes this article identifies also highlight three connected empirical/historical directions that further work can pursue. Firstly, the dominant understanding of the creation of nuclear weapons as a 'race' against an evil and imperial foe places the United States as the unwilling nuclear state: a reluctant anti-imperial superpower shouldering a burden paced on it by history. While this story is not totally untrue, it implicitly foregrounds this motivation to the exclusion of others, while obscuring the imperial means through which the atomic bomb was developed and subsequently used and tested.[115] Also, while the idea of an 'arms race' pre-exists the Manhattan Project and the narrative of US development of nuclear weapons,[116] the nuclear origin as a 'race' trope prefigures the subsequent characterisation of the Cold War arms race and has influenced and in turn been narrated through this lens. The dynamic of a 'race against time' against a malevolent other has continued to structure nuclear politics. For example, recent Chinese nuclear development has been filtered in the US through the prism if an incipient US-China 'arms race'. The entelechial logic put forward in this article shows how this dynamic is not simply a product of exogenous geopolitical forces on nuclear weapons, but a function of the essence of the weapon itself, established through narrating its origin.[117]

Similarly, decentring the myth of the Trinity test would link to Itty Abraham's critique of nuclear history's focus on the nuclear test as the defining event of a nuclear programme.[118] This focus leads to a reduction of the multiple meanings of nuclear programmes into the fetishized outcome of the weapon and the test. The origin myth's cementing of the Trinity test

[114] Cordle 2006.
[115] Maurer and Hogue, 2020.
[116] Gray 1971.
[117] I am grateful to one of the reviewers for pointing this out and suggesting its inclusion.
[118] Abraham 2009.

as the inevitable endpoint of a telos of rational scientific progress would also be disrupted by locating the origins of nuclear weapons not as a culmination but as a continuation of dynamics of exploitation. This history could be told as beginning in multiple places and times: in the story of the colonization of the Congo, where uranium for the first bombs would be mined by forced workers for example, or in the displacement of Pueblo Indians from the land of Los Alamos.[119] Rereading the nuclear origin story through another lens, such as that of nuclear colonialism, decentres the 'race for the bomb' and the test as a teleological end.[120] Existing work on this does not just need to be expanded and incorporated into broader accounts of the Manhattan Project, but also used to reconsider its significance.

The final trope of the origin myth is the fascination with male brilliance and with the moral struggles of individual Manhattan Project scientists. This has 'fetishized'[121] specific masculine experiences and preoccupations as *the* general experiences and preoccupations of the Manhattan Project and the early atomic age. The ubiquity of this trope necessitates a reconsideration the nuclear origin myth from a feminist IR perspective. This does not just involve adding women's perspectives – though further prominence of diverse women's stories would be welcome – but also asking what a feminist narrative of nuclear origin would be. What would the histories of nuclear origin driven by feminist curiosity and interrogating the multifaceted and contextual dynamics of gendered power structures make legible?[122] What would such narratives contest, and what would be their implications for nuclear politics?

The story of the creation of nuclear weapons is implicated in our nuclear present and future. An entelechial reading reveals that this narrative has a power of its own through the suasive force of language and limits the space for political contestation within its boundaries. Challenging both the historical boundaries and implications and the closed and compulsive structure of the nuclear narrative is required if there is ever to be a truly different nuclear politics.

[119] Masco 2006.
[120] Intondi 2015; Biswas 2014; Endres 2009; Kuletz 1998; Teaiwa 1994.
[121] Hecht 2007, 100.
[122] See Enloe 2004.

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