

Firearms analogies and settler colonialism in US nuclear deterrence strategy

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Abstract

Nuclear strategy has long been formulated through analogies. We focus on one in particular: guns. Early nuclear strategists in the United States used multiple analogical comparisons to make sense of the new, apparently unprecedented technology that confronted them. They compared nuclear deterrence to gun dueling and the nuclear revolution itself to the rise of gunpowder on European battlefields. Both analogies invoked empire, in the form of American settler frontier gunfights and the impact of firearms on European expansion. This article offers a critical reading of them. We show both analogies were historically flawed, relying on outdated accounts of how firearms shaped military-political change. Our argument proceeds in three stages. First, we document the role of gun analogies in early US nuclear strategic writing. Second, we critically evaluate the analogy, showing its historical and analytical limits. Drawing on firearms literatures in history, sociology, criminology, and economics, we show that much of what we now know about firearms diverges from nuclear theory and history. Third, we develop an alternative interpretation, contrasting these analytical fictions with the actual history of nuclear colonialism.

Keywords

Guns, intellectual history, nuclear weapons, settler colonialism, strategy, technology

Introduction

Few technologies seem as significantly transformative of international politics as nuclear weapons.¹ Their development offered unprecedented military power and drove new strategic thinking. However, because they lacked clear precedent, early nuclear strategists often relied on historical

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comparisons to grapple with them. Core Cold War models in game theory – the prisoner’s dilemma, stag hunt, chicken, and others – were based on analogies and metaphors. Analogies have long been used and abused in military thinking, and subject to much critical assessment (Cohn, 1987; Goldsmith, 2005; Hemmer, 1999; Khong, 1992, 2013; Kornprobst, 2007; Leira, 2017; May, 1975; Więclawski, 2022), especially as regards nuclear arms (Mutimer, 1997, 2000; Pelopidas, 2011).²

This paper excavates and critically assesses the intellectual history of analogies that have to date gone less examined in early US thinking on nuclear weapons: comparisons to guns and gunpowder. Firearms analogies were frequent and at times strikingly elaborate in early nuclear writing, drawing comparisons and highlighting some modes of thinking about the new weapons, while precluding others. We focus on US deterrence theorists from World War II to the late 1960s – for example, Brodie (1959), Wohlstetter (2009b), Kahn (1960, 1968) and Schelling (1960, 2008), as well as key reports (Brodie et al., 1946; Fermi et al., 1944). Drawing on history, sociology, and the emerging field of gun studies (Carlson et al., 2018), we argue these analogies helped to shape how strategists understood the new weapons’ implications. However, they were also misleading, often drawing on distorted accounts of firearms history and practice. These analogies thus disclose as much about the political imagination of US defense intellectuals as they did about nascent US nuclear weapons strategy.

We provide an interpretive account, unpacking the implied meanings in these analogies. US strategists compared nuclear weapons with firearms in two significant ways. First, they suggested a comparison between nuclear standoffs and a duel, often presented as armed men on the US frontier. This thinking appeared chiefly after 1949, when the United States lost its nuclear monopoly to the Soviet Union. Second, the strategists likened the introduction of nuclear weapons to the revolutionary and transformative effects of firearms on early modern warfare and thus on subsequent European colonialism. Both analogies had deep imperial or colonial attachments. Gun analogies centered on two broadly imperial or colonial sets of historical ideas: a vision of gun dueling during frontier settlement, and a conception of gunpowder weapons as generative of European imperial power.

Colonial and frontier references and metaphors were central to 20th-century US cultural and intellectual life – especially, though not exclusively, through western films and related narratives (Slotkin, 1998; Walker, 2001). Likewise, ideas about weapons and empire, in which technological might helped to make right the practice of European expansion, were central to how colonialism understood itself. The imagined frontier context to which the analogies referred was largely fictional. Indeed, neither analogy, we show, was well grounded in the historical record. The duel analogy, used to give voice to deterrence theory, bears little resemblance to historical dueling – frontier or otherwise. Nor were guns transformative in ways the analogies suggest. Guns did not monotonically cause European state formation or colonization (Satia, 2018; Sharman, 2019). Yet the analogies were powerful, giving voice to core ideas about nuclear deterrence strategy. They rendered the bomb both strange and familiar – an unprecedented technology about which one could still make arguments in recognizable ways. In short, these analogies helped to make potentially world-ending weapons strategically tractable for those who traded in them.

In response, we redirect attention back to the colonial context of the nuclear revolution itself: the literal involvement of nuclear arms in late imperial politics and violence. Drawing on a range of critical and historical research, we outline the not-at-all analogical links between nuclear weapons and colonialism. The analogies, we suggest, served, perhaps unintentionally, to occlude these dynamics. They sanitized what is now termed nuclear colonialism (e.g., Endres, 2009; Vincent, 2007), by locating empire in the pre-nuclear past, rather than the strategists’ nuclear present.

Throughout, our approach is interpretive – we concern ourselves not with linear causes, but with meanings (Yanow, 2006). We interpret the analogies used to understand nuclear weapons in

historical and cultural context. Indeed, metaphors and analogies are themselves interpretive moves on the part of the speaker. Guns were one analogy among many at the time, including analogically structured game theory – chicken, stag hunts, and prisoners’ dilemmas among them. Meanings being context-specific, we then point to alternate readings of the analogy, informed by the larger context of late colonialism. We thus critically juxtapose the authors’ existing interpretations with alternatives.

Focusing on social aspects of nuclear arms, our argument joins others in re-evaluating their social status. A number of studies now see nuclear arms as prestige objects (Harrington de Santana, 2009; Larson and Shevchenko, 2019: 8–9; Murray, 2018: 62). If, as Ellis (1986: 9) once wrote, ‘Guns, like everything else, have their social history’, then much the same is likely true of nuclear weapons. Indeed, we show the latter built significantly on the former. Our approach also sheds new light on the early intellectual history of nuclear arms. As Laura Considine has recently argued, the origin stories we tell about nuclear weapons constrain how we imagine our relationship with them (Considine, 2022). It also speaks to the fraught relationship between world politics and popular culture (Daniel and Musgrave, 2017; Grayson et al., 2009). The analogies at work in classic statements of deterrence strategy seem rooted more in fiction than history. By disrupting the origin story of nuclear strategy, we hope to partially recast the relationship between world politics and nuclear arms. If we rethink where nuclear strategy came from, perhaps we can also rethink how nuclear weapons can be employed – or indeed eliminated. In so doing, we also contribute to the broader project of decolonizing theoretical aspects of the discipline (Capan, 2017; Jones, 2006; Sabaratnam, 2011; Salter, 2023).

The article proceeds in three stages. First, we document the firearms analogies. Second, we critically evaluate them, historically and analytically. Third, drawing on research on nuclear colonialism, we briefly reconstruct more direct linkages between nuclear weapons and empire.

Firearms analogies in early nuclear strategic writing

Analogies shaped many aspects of early nuclear thinking, across multiple schools of thought and issues areas – from deterrence, to proliferation, disarmament, and beyond (Mutimer, 1997, 2000; Pelopidas, 2011). Deudney (2018) identifies several core branches of strategic writing on nuclear weapons, differentiated by the outcomes they sought. While analogies surface across these, we foreground one: writing focused on deterrence. For core US deterrence theorists such as Bernard Brodie, Albert Wohlstetter, and Thomas Schelling, a handful of analogies underwrote the game-theoretical models – the prisoner’s dilemma, stag hunt, chicken, and others – by which they explained and justified deterrence thinking (Amadae, 2016: 99–140; Erickson, 2015a: 163–203). Firearms were frequent props in the theorists’ explications of these models (e.g., Amadae, 2016: 89–90).

Early US nuclear strategists drew two distinct analogies to firearms. The first equated nuclear strategy with the situation of two men wielding guns.³ Their interaction takes the form of a duel: they confront one another, either attacking or deterring an attack. This analogy casts nuclear states as armed individuals – often, though not always, in a US frontier setting. It underwrites the logics of first- and second-strike use, and how to manage them. The second analogy compares the nuclear revolution to guns and gunpowder, or sometimes machine guns, as technologies that transformed war. In these analogies, the older technology – firearms – serves to make the new one – nuclear weapons – intelligible. We term these respectively the *duel analogy* and the *transformational analogy*, taking them in turn below.

The duel analogy paralleled the now-standard dynamics of nuclear brinksmanship to a duel with guns. In an early example, dated 1954, Bernard Brodie described an

American gunfighter duel, Western frontier style. The one who leads on the draw and the aim achieves a good clean win. The other is dead. But if, on the other hand, the situation is such that neither side can hope to eliminate the retaliatory power of the other, that restraint which was suicidal in one situation now becomes prudence, and it is trigger-happiness that is suicidal! (Quoted in Freedman and Michaels, 2019: 231–32)

Brodie was not alone. Albert Wohlstetter described the same analogy in a 1958 RAND report, with differences of wording only (Wohlstetter, 2009b: 204).⁴ Thomas Schelling did much the same in 1966 (Schelling, 2008: 23–24). The analogy explained the dynamics of then-emerging US nuclear strategy: one needed to be able to respond in order to deter. However, it also served a rhetorical purpose, making a strange and terrifying new technology familiar and thus tractable – to policy-makers and public audiences alike. That rhetoric rested not just on the logic of the duel but on its setting: the settler context of the imagined American West.⁵

Gun and duel analogies proliferated in the literature. Schelling deployed multiple, often elaborate gun analogies, sometimes to evoke ad hoc and unpredictable interactions. Guns explained the risk of nuclear error: ‘The gun that threatens a burglar or hold-up victim may go off accidentally before he has a chance to comply’ (Schelling, 1960: 183). Elsewhere, Schelling (1960: 207) suggested a burglar may ‘show that he has a loaded gun but not prove it by simply saying so’ and argued similarly that ‘One may say and say that a gun is loaded without being able to prove it until he actually shoots’ (Schelling, 1960: 147–148, 102, 120–121). He also discusses dueling as a substitute for warfare (Schelling, 2008: 144 n10), deployed a transformational analogy for conventional great power war (Schelling, 2008: 159), and made other passing dueling references (Schelling, 2008: 119, 205, 215).

Herman Kahn, though chiefly a nuclear warfare rather than deterrence theorist, used a different duel analogy to explain the problem of bargaining during deterrence, replacing guns with gas torches.

Assume there are two individuals who are going to fight a duel to death with blow torches. The duel is to be conducted in a warehouse filled with dynamite. One might conjecture that they could agree to leave the lights on . . . Yet they might still disagree on: How many lights? Where? How bright? Should the one with greater visual acuity handicap himself in other ways? (Kahn, 1968: 16 n6)

For Kahn, the logic of the duel, it seemed, did not in itself ensure strategic stability.⁶ Yet even here, ritualized violence, and the tools that enacted it, became multipurpose devices to help make sense of the new weapons and formulate strategic responses.

Indeed, nuclear arms were not just strategically important, they were transformative to the practice of warfare, and the firearm analogy helped make sense of this too. The analogy was used to argue the rise of gunpowder weapons radically changed European warfare. Nuclear weapons could be understood to be doing so as well, on a global scale and at much greater speed. Brodie (1959: 148) wrote that ‘when we speak of the revolution wrought by gunpowder, we are talking about something that required centuries to accomplish. It required also centuries of perspective to discern.’ Nuclear arms arose within a few years and, because they were so destructive, had to be understood strategically without the long trial and error that had attended early guns (Brodie, 1959: 148–152). Here then were both an analogy and a disanalogy, both of which served to clarify the nuclear experience. Brodie thus emphasized the more rapid transformative effect of the machine gun, referencing it repeatedly (Brodie, 1959: 48, 50, 51, 58, 59).⁷ Explaining it required resort to literature and even to the sacred. Brodie’s book opens on the battle in Heaven, in Milton’s *Paradise Lost*, in which the rebel angels deploy a new artillery piece. The point, for Brodie at least, is ‘the

ever-widening disparity in accomplishment between man's military inventions and his social adaptation to them' (Brodie, 1959: 3, 4). Kahn invoked a disanalogy when discussing the risks that the assumed failure to predict the impact of machine guns, barbed wire, and trenches had in World War I (Kahn, 1960: 351).⁸ For these theorists, failure to contend promptly with nuclear weapons would lead to disaster, just as previous failures to contend with new firearms technologies had led to past tactical and strategic failures.

The early nuclear strategists were not alone; early nuclear scientists, including European émigrés, described something similar. For example, in their 'Prospectus on Nucleonics', commonly known as the *Jeffries Report*, Fermi et al. (1944: 54) describe the following scenario:

If two people are in a room of 100 by 100 feet and have no weapons except their bare fists, the attacker has only a slight advantage over his opponent. But if each of them has a machine gun in his hands the attacker is sure to be victorious.⁹

Here, both analogies were at work: nuclear weapons were understood on a dueling model and presented as transformative of that duel's logic. Yet the frontier, colonial valences of the analogy were missing. Early realists in international relations were European exiles as well, and their uses of the analogy were similarly without Western details. On nuclear weapons, Herz (1959: 15) noted tersely that 'Faced with the machine gun, every strategy ceases'. Hans Morgenthau (1948: 296–297) emphasized the machine gun as well.¹⁰ Kissinger stressed a transformative disanalogy: 'gunpowder in its early stages was not significantly more destructive than the crossbow' (Kissinger, 1957: 119). It 'was introduced gradually over a period of centuries . . . Nuclear weapons, on the other hand, have brought with them an increase in the scale of destructiveness which leaves no margin for misinterpretation' (Kissinger, 1957: 200). Perhaps because they were by degrees Europeans in the United States, the distinctively American settler flavor of the duel was missing.

It is less clear these analogies were much used outside the United States. Based on an admittedly informal survey, we have found very few examples. British strategists, who might most closely resemble Americans, do not seem prone to them. Soviet strategists did not likely use the analogy.¹¹ The Anglo-Australian international relations theorist Hedley Bull wrote extensively on nuclear matters, but made almost no analogical reference to firearms (Bull, 1961, 1987).¹² Revising his classic work on *Strategy* after World War II, B. H. Liddell Hart was skeptical that nuclear weapons would be transformative and did not use the analogy (Liddell Hart, 1967). In late 1945, E. H. Carr wrote several editorials in the London *Times* on nuclear weapons, without analogical reference to firearms (*The Times*, 1945a, 1945b, 1945c, 1945d).¹³ More recent nuclear strategy writing often elides the analogy, perhaps because it gives voice to ideas now considered standard. For example, while Kenneth Waltz did not use gun analogies (Sagan and Waltz, 1995; Waltz, 1981, 1990, 2012), he was deeply influenced by Brodie (Waltz, 2004: 104–105), who did. Recent studies of proliferation also elide the analogy (Debs and Monteiro, 2017; e.g., Solingen, 2009). Kroenig's (2018) study of US nuclear strategy does not use it, but references Brodie, Wohlstetter, Kahn, and Schelling. In this tacit sense at least, the analogy likely persists.

Critically evaluating the analogy

This section assesses the accuracy and logic of the analogies. We do so by assessing the analogies analytically and contextualizing them in political and cultural history. We argue the analogies belong to the specific sociocultural context of the mid-century United States. We also show they offer strikingly little purchase on nuclear weapons as such. We proceed in three stages: first unpacking the analogies' (largely imagined) frontier context, second by weighing their analytical utility,

and third by evaluating the larger historical sweep to which the analogies tacitly appeal. We do so for several reasons. First, while poorly grounded analogies may do as much to shape downstream action as strong ones, their particular effects will vary with their specific analogical referents. When analogies that distort or fictionalize the historical record are deployed by experts and policymakers, they introduce those distortions or fictions into political practice. While we focus on the origins and content of the analogies, their practical implications are an important reason for attending to them. Where the practice in question is nuclear security, the stakes of distortions are high. Second, the specific content of analogies may disclose tacit assumptions on the part of analogists. Here, we show that nuclear intellectuals implied a link between nuclear weapons and colonialism. In this specific sense, the analogies were factually weak – yet they were also symptomatic of larger linkages between nuclear war and its actual historical context. Diagnosing the historiographical limits of the strategists' interpretations thus serves to orient our own interpretation of the historical record, in the next section.

The analogy's frontier context

The distinctive US element of the analogy – the frontier – ties it to the lifeworld and cultural representations of American settler colonialism. The nuclear strategists deployed images of gun duels at a specific moment in postwar US social and cultural history. The frontier in the popular imagination was anarchic and violent, marked by weak state institutions. Guns became central to the symbolic vocabulary of the imagined frontier, marking the 'rugged individualism' of American settler life.

The analogies more strongly resemble not a historical source but a pop cultural one: Westerns. Westerns were centerpieces of US popular cinema and early television at the time. Originating in dime novels and then picked up by Hollywood around the birth of US cinema, westerns were core artifacts of the US popular self-image (Mitchell, 1998; Tompkins, 1992). Gun duels were recurring plot points in them. The figure of the gunfighter, who is central for our purposes, had been present in westerns, both print and film, for decades. He became especially crucial around the time the nuclear strategists were writing, circa 1950.¹⁴ Westerns were absolutely core features of US popular culture at the time and would have been well known to the nuclear strategists. At the time they were writing, 'Eight of the top ten television shows were "horse operas", and in 1958 alone Hollywood produced fifty-four cowboy movies'. John Wayne, who dominated the genre, was the most popular actor in Hollywood and polled as 'the American man whom American men admired most' (Filene, 2013: 162). Wayne was himself a Cold Warrior, endorsing Whitaker Chambers and glorifying the HUAC hearings on film (Saunders, 2013: 240–241; Whitfield, 1996: 18, 103). While later genre permutations introduced moral ambiguity, the genre standards of the 1950s tended to depict an idealized and conservative US frontier, marked by men admired as rugged and individualistic – a morally unequivocal vision suited to the Cold War context (Henriksen, 1997: 66–68).

The duels the strategists described matched these popular representations much more closely than they did the actual historical record. Canonical representations of gunfighting are at best weakly grounded in historical fact. Dueling in the United States was held over from early modern European duels for honor (on which more below). However, 'Formal duels were not common in the Old West, and were even forbidden under most state or local ordinances' (Agnew, 2017: 88). More frequent were comparatively bloody and chaotic gunfights, which 'mostly erupted as spontaneous brawls instead of planned formal gun battles' (Agnew, 2017: 98). This perhaps reflects the role of firearms in this setting, which had little to do with individual honor or security. The chief purpose of guns in the colonial United States was not so much individual defense as collective

offense – the racialized process of settler statemaking. Consistent with this, frontier access to fire-arms was unequal: ‘Black people, slave or free, were . . . widely barred from owning weapons and forcibly disarmed’ (Jouet, 2019: 3). Later US gun rights stemmed from colonial expansion: ‘the Second Amendment was . . . about arming militias to keep a nonwhite enslaved population in its place and expropriate non-white indigenous people’ (Satia, 2019: 4; see similarly Steward, 2000: 133). The United States’ westward expansion was also marked by gender dynamics, and these too became bound up with guns, often in complex ways (Irwin and Brooks, 2004). The frontier dueling analogy admits none of this context and the unequal social and political power it implies.¹⁵

Frontier mythology has sources and significances of its own. Its symbolic roots are captured in Turner’s (1894) essay ‘The Significance of the Frontier in American History’. Turner claimed to trace US identity and exceptionalism to the self-making of westward-moving American settler colonists. The problems of Turner’s account are well documented; they described civilizational progress over putatively untamed wilderness. (Byrd, 2011: e.g., 5; Cronon, 1987). In practice, settler expansion occurred through violence against and expropriation of land from Indigenous peoples. Some historians have extensively rethought the frontier as a changeable borderland of violence and exchange – complex, destructive, and differently generative (Adelman and Aron, 1999). Others reject the frontier framework outright, calling for new formulations (Crum, 1993).¹⁶

Regardless of their inaccuracies and other problems, Turner in particular and the western genre more generally nonetheless described ideas that have persisted in the US public imagination – for example, in the ‘New Frontier’ of the Kennedy administration, foregrounding science and technology (White et al., 1994: 81). Kennedy’s rhetoric anticipated the Apollo program and was later echoed, of course, by *Star Trek* and in the early high-tech sector.¹⁷ Frontier talk also found its way to the culture of nuclear science. Among scientists, the physicists who founded Fermilab, outside Chicago, introduced a flock of bison to the surrounding countryside, to invoke the prairie (Kolb and Hoddeson, 1995). The lab was named for Enrico Fermi, one of the *Jeffries Report* authors. The frontier became an expansively loaded idea.

Analytical limits

If the frontier context clarifies what the analogies *were* doing, then we can see it in greater contrast by assessing what they do not do with any accuracy. This section and the next evaluate the analytical purchase of the analogies and then their wider historical frame of reference in dueling and the gunpowder revolution.

Analogies between dueling and war were not new, dating at least to Clausewitz (2007: 13), but were prevalent in nuclear strategy. They have sharp limits (Parent, 2009). An immediate problem concerns scale and complexity. Large, complex social organizations like states may not analogize readily to individuals, especially during crises (see canonically Bull, 1977: 44–49). Historically, a duel concerns only two individuals; their confrontation tending to produce scant collateral damage. Nuclear war destroys or grievously transforms whole societies. Dueling is characterized by unitary actors, high information, limited outcomes, and clear stakes. Decision making is straightforward. The duel elides misperception, miscalculation, accident, and other complications of states’ relationships with nuclear weapons (Jervis, 1976). In the United States, Schlosser (2013) notes multiple ‘broken arrow’ incidents of lost nuclear weapons, more than 1200 incidents (1950–1968) in which a nuclear weapon was damaged or came close to detonation, and multiple incidents in which the United States falsely believed it was under nuclear attack and prepared to retaliate.¹⁸ Sagan (1993: 264) argues tight US command and control integration made matters worse: ‘Nuclear weapons may well have made deliberate war less likely, but the complex and tightly coupled nuclear arsenal we have has simultaneously made accidental war more likely.’ The limited information

environment and complex organizational and bureaucratic politics of state nuclear strategy lack parallels in gun duels (Allison and Zelikow, 1999). In these ways, guns and nuclear arms are fundamentally dissimilar.

Contemporary social science on guns also offers little support for deterrence thinking about firearms. In criminology, the ‘deterrence thesis’ stipulates that private gun ownership should dissuade criminal violence: the more guns, the less crime. In an extensive review of empirical studies, Stroebe (2013) finds no support for it. Hoskin (2011) finds that across the 120 most populous US counties, increased gun ownership correlates with increased gun violence. Another study finds ‘US homicide rates were 7.0 times higher than in other high-income countries, driven by a gun homicide rate that was 25.2 times higher’ (Grinshteyn and Hemenway, 2016: 266). Parsons and Weigend (2016) find a correlation between weak gun laws and gun violence. Beyond the United States, Kesteren (2014) finds a strong correlation between handgun ownership and serious violence in 26 developed countries. Cross-nationally, residents of cities with more guns are more likely to be victims of gun-involved assault and robbery, but not other crimes (Alzheimer, 2008). Gun violence is also strongly raced and gendered. In the United States, Black, Hispanic, and Indigenous people are 11, 2.5, and almost 3.5 times more likely than white people to be killed by a firearm (Brady, 2023). Similarly, ‘Women are five times more likely to be murdered by an abusive partner when the abuser has access to a gun’ (Educational Fund to Stop Gun Violence, 2020).¹⁹

In sum, contra the dueling analogy, neither the comparison to nuclear warfare nor social science on guns themselves support standard deterrence models. Nuclear and firearm interactions little resemble one another, and the presence of guns generally makes people less safe, not more.

Historical limits

As we have seen, the dueling analogy the theorists deployed was idiosyncratic to the United States. It quickly loses salience when taken outside the American settler context. In medieval Europe, dueling was a form of trial by combat (Hopton, 2007: 8–9; Peltonen, 2003: 3). In contrast, modern European dueling was a private aristocratic institution, outside the law, concerned with perceived honor. It arose as ‘an integral part of the Renaissance ideology of courtesy and civility’ (Peltonen, 2003: 5). Duelers defended their honor simply by participating. The duel’s purpose was ritual, marked by the ‘irrelevance of the outcome of the fight’ (Peltonen, 2003: 2). The institution was sharply gendered. Men duelled, often in putative defense of women’s honor (Hopton, 2007: 38).²⁰ The practice lingered well into the 19th century, persisting until the 1840s in Britain, the Civil War in the United States, and the early 20th century in parts of Europe (McAleer, 1994: 3). A pistol dueling demonstration, with wax bullets, was conducted alongside the 1908 London Olympics (Royal Armouries, 2019). Hans Morgenthau joined a German sword dueling fraternity at university in the 1920s and was injured (Johnson and Morgenthau, 1984: 342–344). In the Americas, the president of Uruguay duelled in 1922 (Hopton, 2007: 37). Such historical examples of dueling do not analogize cleanly to nuclear brinksmanship. Perhaps most basically, dueling requires participants to fight, not deter – often without regard to outcome. Dueling exemplifies, if anything, a deterrence failure, in which success requires an exchange of fire.

The transformational analogy faces other difficulties. It draws on changes in early modern European warfare, putatively driven by firearms, captured by the ‘military revolution’ thesis.²¹ Though it is unclear the nuclear strategists drew directly on it, their analogy parallels it closely. The failure of one thus undermines the other. The military revolution thesis claims guns incentivized large armies that fired in formation, at a distance. Mobilizing them required new capacity for taxation, conscription, and bureaucratization – in effect creating modern European states. These states went on to build colonial empires. The thesis now faces extensive criticism, in part because the

gunpowder ‘revolution’ unfolded gradually, over centuries (Parrott, 2011: 7–8). Technical improvements – breech loading, rifling, etc. – arrived on battlefields only gradually, as gun production scaled up, and too late to explain early army and state consolidation. The result was a slow evolution, clear chiefly in retrospect. Because other changes unfolded concurrently – early colonialism, other new technologies, and multiple new scientific knowledges – guns’ impact was never monotonic (Sharman, 2019: 9–16). In contrast, as some of the nuclear strategists noted, nuclear arms took years or at most decades to develop and deploy.²²

Much early colonization thus relied on weapons other than guns. For example, Spanish expansion in the Americas involved small groups of Europeans, often fighting with swords and allied with large Indigenous armies (Sharman, 2019: 39–43). Early guns were slow to load and useless in hand-to-hand combat. In humid conditions, powder got wet and artillery was hard to move (Restall, 2004: 143). Eventually, guns and other European implements, such as horses and steel, found their way to unconquered Indigenous peoples (Restall, 2004: 142). Firearms thus had at best an ambiguous effect in the early post-contact Americas. Later, in parts of Asia, Europeans found their opponents either already had guns or could acquire them. Asian weapons often outstripped European ones.²³ Priya Satia’s work on early modern British gun production suggests the complexity of these changes. While she centers guns, Britain did not simply ride a technological wave toward state consolidation and empire. Instead, its government shepherded a firearms industry into existence to fill imperial demand (Satia, 2018: 64). Economics mattered: ‘Global commercial networks were entangled with the networks of the gun trade’, making for an ‘intimacy between war and the renowned makers of the industrial revolution’ (Satia, 2018: 91, 99). This was the mid-18th-century, more than two hundred years into early modern army- and statemaking.

In short, the dueling and transformational analogies both seem largely misplaced. Guns today are poor deterrents. In the past, they were not rapid or monotonic drivers of military-political change. The nuclear strategists’ gun analogies rested on a distorted picture of firearms history. This is important because it shows us what the analogies are *not* doing. Making clear this obfuscation clarifies the role of the frontier context and actual, colonial work the analogy does.

Nuclear weapons and settler colonialism

The analogies did not do the intellectual work claimed for them. How then should we understand their historical associations between guns, empire, and nuclear arms? To answer, we unpack literal rather than analogical linkages. The resulting unavoidably limited review points to overlaps between late colonial and nuclear history. Like guns, nuclear weapons have deep, ongoing, and quite literal colonial attachments of their own. By invoking ‘the old-fashioned Western gun duel’ (Wohlstetter 2009b: 204) and the military revolution, the strategists invoked the broader social context and symbolic vocabulary of the US frontier. But these analogies had the additional effect of occluding nuclear arms’ literal colonial linkages.²⁴

Missing from the frontier gun duel the strategists imagined is the geographical context of US and other nuclear research: early nuclear testing happened in sites of ongoing colonization. The world’s first nuclear tests took place in the Indigenous spaces of the US Southwest and continued in US Pacific territories, with enduring consequences for the long-term health and well-being of Indigenous populations (Threet, 2005). The first US nuclear test was conducted in the Nevada desert – that is, in what had been late-stage frontier territory, on the lands of the Western Shoshone Nation. ‘Between 1951 and 1992 there were almost a thousand (928) nuclear detonations at the Nevada Test Site’ (Adams, 2019: 7). The Western Shoshone continue to experience expansive health consequences and describe themselves as ‘the most bombed nation on earth’ (Zabarte, 2020).

Many Cold War-era nuclear launch sites in the United States were built on or adjacent to Indigenous land.²⁵ While we know of no systematic survey of missile sites on or near tribal lands, an exploratory look at two US states is suggestive. By the early 1960s, the US Air Force built more than 1000 silos for Minuteman missiles, one of the three chief Cold War-era nuclear missile types (Lonnquest and Winkler, 1996: 241), disproportionately in the more sparsely settled areas of the US western interior. The Dakotas are illustrative. In North Dakota, 150 silos were dispersed in the area around Minot Air Force Base (Lonnquest and Winkler, 1996: 248). Three of the surrounding counties overlap with Fort Berthold Reservation, where the Mandan, Hidatsa, and Arikara Nations currently reside, and contain 97 of these former launch sites.²⁶ In South Dakota, the Pine Ridge Indian Reservation is exemplary. Pine Ridge includes the site of the 1890 Wounded Knee massacre, in which more than 250 Lakota were killed by the US Army. Today, the Minuteman Missile National Historic Site, commemorating silos for nuclear tipped missiles from 1963 to the end of the Cold War, is located about 10 miles north of the reservation's borders.²⁷ The area is also the site of historical uranium mining, from which the reservation has suffered adverse effects, including contaminated drinking water (Erickson and Chapman, 1993: 5). These are considerable impacts on a relatively large Indigenous population and reflect the impact of nuclear weapons and extraction downstream effect colonization itself.

Nuclear colonialism is not exclusive to the United States. While the frontier firearms analogy appears distinctively American, nuclear colonialism was and is a genuinely global phenomenon. The first British nuclear tests were conducted on Indigenous land in Australia, on Pitjantjatjara Anangu country, at Maralinga and Emu Field (Mittmann, 2017). In 1960, France conducted its first nuclear tests in Algeria, during the Algerian Revolutionary War (Panchasi, 2019). Both US and French testing later moved to postcolonial spaces in the South Pacific. Soviet nuclear testing happened not in Russia but in Kazakhstan, a site of Russian Imperial and later Soviet colonization (Kassenova, 2022: 29–53). Indeed, Li (2024) argues nuclear testing is itself a colonial form of nuclear weapons use. The analogy thus represented a distinctively US way of managing or eliding a much broader phenomenon.

These colonial impacts are concrete and ongoing. As Anne Sisson Runyan (2022: 1149) notes, 'While apocalyptic visions of nuclear war suggest indiscriminate destruction, the relatively non-spectacular nuclear fuel chain is highly discriminatory'. Nuclear resource extraction and waste dumping by settler states impact Indigenous communities disproportionately, as in the United States (Edwards, 2011; Endres, 2009), Australia (Mittmann, 2017; Vincent, 2007), and Canada (Runyan, 2018). In Canada, ongoing Anishinaabe resistance opposes uranium mining at Elliot Lake that dates to 1953. That extraction occurred in a 'larger Cold War context, one that necessitated exploiting uranium discoveries to make American weapons of war' (Leddy, 2022).²⁸ Effects of testing persist as well. The 41 nuclear tests in French Polynesia, between 1966 and 1974, led to health effects still continuing today. The direct radiological impact on the territory's population has recently been shown to have been previously 'underestimated by factors of 2 to 10' (Philippe et al., 2022). The territory remains under French administration. In Algeria, health effects of French nuclear testing remain: 'To this day, the French state has yet to acknowledge and compensate for the short and long-term health and environmental impact of this experimentation program in a manner fully satisfactory to veteran and civilian victims and their advocates' (Panchasi, 2019: 84–85). In this sense, US nuclear colonialism belongs to a much larger global frame. However unintentionally, frontier-based firearms analogies invoke these colonial connections.

Conclusion

If guns were not analogous to nuclear weapons, then the comparison between them was nonetheless in a certain sense apt. Both weapons played crucial roles in colonialization – in the United

States and elsewhere. Revisiting the comparison allows us to more clearly locate the advent of nuclear arms not just in 20th-century world politics but in the longer history of settler colonialism. In making a straightforward analogy with an older technology, the US nuclear strategists invoked the origins and history of US power itself, and its implications for the world. Both weapons were involved in new expansionist forms of domination. As Satia (2019: 2) notes, guns are both symbols of US freedom and ‘instruments of conquest, enslavement, and genocide, which now terrorize a generation of American school children’.²⁹ Both weapons are potent and polyvalent symbols. Guns were and are gendered, too – heavily masculinized, both in the symbolic frontier context and in the present.³⁰ Much the same is true of nuclear weapons.³¹

US settlement was underwritten by a distinctive tradition of ‘settler contract’ (Pateman, 2007) or ‘settler sovereignty’ (Ford, 2010) – a political order that rested on concealing the violent erasure of the political worlds that preceded it. Nuclear weapons – technologies that literally erase landscapes – are a striking presence in this context. It may be then that a useful analogy remains. If guns in the early United States were symbols of settler power and tools of Indigenous dispossession, then we might understand nuclear weapons in similar terms; the colonial, racial, and gendered aspects of the analogy between guns and nuclear arms in US life appear to speak unexpected volumes. However historically mistaken in their original formulations, the analogies suggest more than the early strategists likely knew.

The analogies foregrounded some possibilities, foreclosing others. When physicists first grappled with nuclear power, they imagined non-military uses. They coined the term ‘nucleonics’ (analogous to ‘electronics’) to describe the array of potential technologies swept open by the nuclear revolution (Fermi et al., 1944: 1–2). The nuclear revolution’s potential seemed unprecedented not just in scale but in scope. Firearms analogies likely fed cognitive closure, replacing possibility with narrow strategic calculation. Ironically, nuclear weapons have more recently proven to be generative metaphors in themselves for other matters, ranging from climate change (Allan, 2017) to cyber security (Nye, 2011). These metaphors may come preloaded with implications from past analogical constructions. In this sense, firearms analogies may remain with us in new ways, in the future.

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Notes

1. On nuclear arms in international relations, see Bull (1961), Jervis (1984, 1989), Cohn (1987), Tannenwald (2005, 2007), Biswas (2014), Rublee and Cohen (2018), Narang (2022). For the proliferation debate in international relations, see Sagan and Waltz (1995). On nuclear weapons, foreign policy, and domestic politics, see reviews in Berkemeier and Fuhrmann (2017), Saunders (2019). On US popular support for

- nuclear (non-)use, see Sagan and Valentino (2017), Koch and Wells (2021). On nuclear reversal or disarmament, see Mattiacci and Jones (2016), Mehta (2020).
2. As Flanik (2017: 37) notes, analogies refer to within-domain comparisons, metaphors compare across domains of experience. However, the boundary between the two is not neatly delineated and the comparisons in this article are edge cases. While we refer to analogies throughout, aspects of metaphor unavoidably recur.
 3. The weapons-bearers are usually (if not always explicitly) presented as male. We turn to guns and gender below.
 4. Much of Albert Wohlstetter's thinking on nuclear weapons was worked out with his wife, Roberta Wohlstetter, a prominent intelligence historian (e.g., Wohlstetter, 1962). See discussion in Zarate (2009).
 5. Duel analogies had previously been used by RAND analysts, in 1948–49, to describe interactions between surveillance aircraft (Erickson, 2015b: 93–94, 108, 297 n54).
 6. On tactical nuclear arms, Kahn notes some strategists had concerns about scale: 'machine guns are not used to stop street riots' (Kahn, 1960: 104). While he attributes the view to others, the analogy is his own.
 7. Brodie endorses analogies: 'Where new circumstances require fundamental adjustments in our thinking, such aids to adjustment may be very useful' (Brodie, 1959: 19). However, he links them to intellectual humility: 'we should not deceive ourselves that we have the ability to start from scratch with completely fresh ideas and, guided merely by logic, to fashion a strategy according to the needs of the time. This is too much to expect of human beings' (Brodie, 1959: 20).
 8. Kahn fixated on technological novelty, imagining 'Californium bullets' in a 'nuclear rifle or pistol' (Kahn, 1960: 494). On the machine gun parallel with nuclear arms, and pacifying 'superweapons' generally, see Renic (2023).
 9. Wohlstetter (2009a: 224) points to the *Report* in a 1968 letter: 'The close machine gun duel analogy has been attributed to Eugene Wigner and used by other physicists as well.'
 10. Morgenthau contrasted stockpiling gunpowder and fissile materials (Morgenthau, 1964: 32). The nuclear revolution drove him to endorse a world state (Morgenthau, 1948: 391 passim). See also Deudney (2019).
 11. Americans knew that 'Soviet writings on nuclear strategy often diverged markedly in their formulations and conclusions from the American literature' (Freedman and Michaels, 2019: 404). A general history of Soviet and Russian nuclear doctrine makes no reference to firearms or duels (Mathers, 2000). Gorbachev later used it in passing, calling Pershing II missiles a 'gun pointing at our temple' (quoted in Freedman and Michaels, 2019: 542), but we have found no indication of a larger trend. On, for example, Chinese nuclear doctrine, see Talmadge (2017), Cunningham and Fravel (2019).
 12. Bull (1987: 44) refers to 'a protracted duel in which each seeks out the strategic weapons of the other, while attempting to avert inadvertent destruction to civil society', but attributes the view to others and appears to doubt it.
 13. The editorials were unsigned; on Carr's authorship, see Jones (2016: 79, 86 n61).
 14. A 1950 film, *The Gunfighter*, is a useful benchmark, though the figure itself was older (Carter, 2014; see also Davis, 1992; and, viz the Cold War, McVeigh, 2007: 76–139; Slatta, 2010; Slotkin, 1998: 383).
 15. On frontiers in international relations' disciplinary imagination, see Shilliam (2023).
 16. Frontier ideas were also gendered, dividing a tacitly or explicitly feminine homestead from the masculine wide-open spaces of rangeland, marked by cowboys, gunfighters, and presumed lawlessness. Frontier women could and did use guns, though rarely in the frontier imagination – for example, the figure of Annie Oakley (Browder, 2009: 57 passim; Homsher, 2015: 37–38).
 17. Similar language surfaced again with the advent of the Internet, as in the Electronic Frontier Foundation – see <https://www EFF.org/about>
 18. One of the nuclear theorists, Fred Iklé, warned of such risks earlier (Iklé et al., 1958). On unreliable Cold War nuclear information, perception, and judgment see Lebow and Stein (1994).
 19. US evidence suggests risks outweigh benefits of guns in the home, increasing accidents (Hemenway, 2011) and suicides (Studdert et al., 2020).
 20. Gender itself became complicated, as with a trans dueler in 18th-century France (Hopton, 2007: 179).
 21. International relations scholars will know the thesis from Tilly (1985). First stated by Roberts (1956, 1967), it was expanded by Parker ([1988] 1996). Parker foregrounded weapons over institutions (Parrott, 2011: 6).

22. Walker (2011: 30, 62) gestures at a long range, from the 1932 discovery of the neutron to the first ICBM deployment. The narrowest window, from development to first military use, runs 1942–45. Either way, the timeframe is much shorter than the gunpowder revolution, by one or two orders of magnitude, depending.
23. In India, the British found the Mughal Empire already using sophisticated rockets, which they replicated. The ‘rockets’ red glare’ over Baltimore, in the War of 1812, described in ‘The Star Spangled Banner’, referred to British Congreve rockets modeled on Mughal designs (Hickey, 2012: 213; Peers, 2011: 97).
24. By extension, they also occlude gendered aspects of nuclear colonialism – on which see for example Runyan (2018, 2022).
25. Much or most US land, like much or most Canadian and all Australian land, is unceded Indigenous territory, and many historical treaty cessions remain disputed. We refer here specifically to land recognized and designated for Indigenous use by the US federal government.
26. See Souris Basin Planning Council (2015: 1–12, 1–16, 1–17, 1–19). Thanks to James Blackwell for bringing this and some other cases here to our attention.
27. See map available here: <https://www.nps.gov/mimi/planyourvisit/directions.htm>
28. For a comparable Australian case, see uranium mining on Mirarr traditional lands – though for nuclear energy rather than weapons use (Burke, 2017: 99–107).
29. In an echo of the analogy, early League of Nations efforts to restrict the arms trade, while ineffectual, aimed largely to restrict access to guns for non-Western states and movements of national liberation (Stone, 2000). Since 1968, the Non-Proliferation Treaty (NPT) regime has aimed similarly to limit nuclear weapons to a small club of states, originally chiefly Western.
30. In defending the US household, guns and gun culture became ‘a safe, family friendly, and communal pursuit . . . associated with intimacy and family life’ (Carlson et al., 2018: 3). Blanchfield describes the firearm as a ‘prosthetic’ or ‘phallic totem’ (Blanchfield, 2018: 206).
31. Cohn’s (1987) classic study showed the sexualized language of nuclear strategists separated nuclear arms from their harms. More recently, see a special issue on nuclear arms and feminism (Choi and Eschle, 2022). Both anti-gun and anti-nuclear politics have longstanding links to women’s movements (Feigenbaum, 2015; Harford and Hopkins, 1984).

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